Synergy in Science:
Partnering for Solutions

ASA • CSSA • SSSA • ESA

2015 MEETING

November 15-18 | Minneapolis, MN

PROGRAM BOOK

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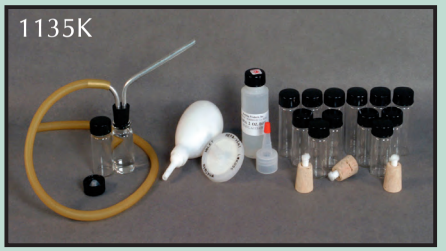
Insect Mounting Kit



Aspirator Kit

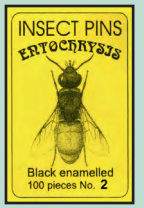
Visit us at the
ESA 63nd Annual Meeting
Minneapolis, Minnesota
November 15 - 18, 2015
Booths 420 - 426

Advanced Collecting/Mounting Kit

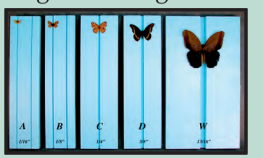
Cornell Drawer, basswood

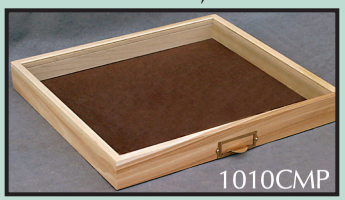
Standard Insect Box

Loupe




Caliper

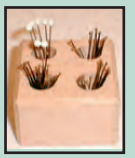

Foam Sp. Boards

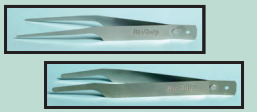


Cal. Academy Drawer, poplar

Collapsible Cages

InsectaZooka




Forceps


Mosquito Dipper

USNM Drawer, basswood


Mosquito Resting Trap

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Louise H. Fall
President/C.E.O.
11/17/2015

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Synergy in Science:
Partnering for Solutions
ASA • CSSA • SSSA • ESA
2015 MEETING
Nov. 15-18 | Minneapolis, MN

ENTOMOLOGY 2015
Synergy in Science: Partnering for Solutions
63rd Annual Meeting of the Entomological Society of America
November 15-18, 2015
Minneapolis Convention Center, Minneapolis, Minnesota
Co-located with the American Society of Agronomy,
the Crop Science Society of America, and the Soil Science Society of America

Please bring this program with you. Additional Copies will cost $25 on site.

HOTEL MAP

SYNERGY IN SCIENCE | PARTNERING FOR SOLUTIONS

ASA-CSSA-SSSA-ESA | 2015 MEETING | MINNEAPOLIS, MN

Synergy in Science: Partnering for Solutions
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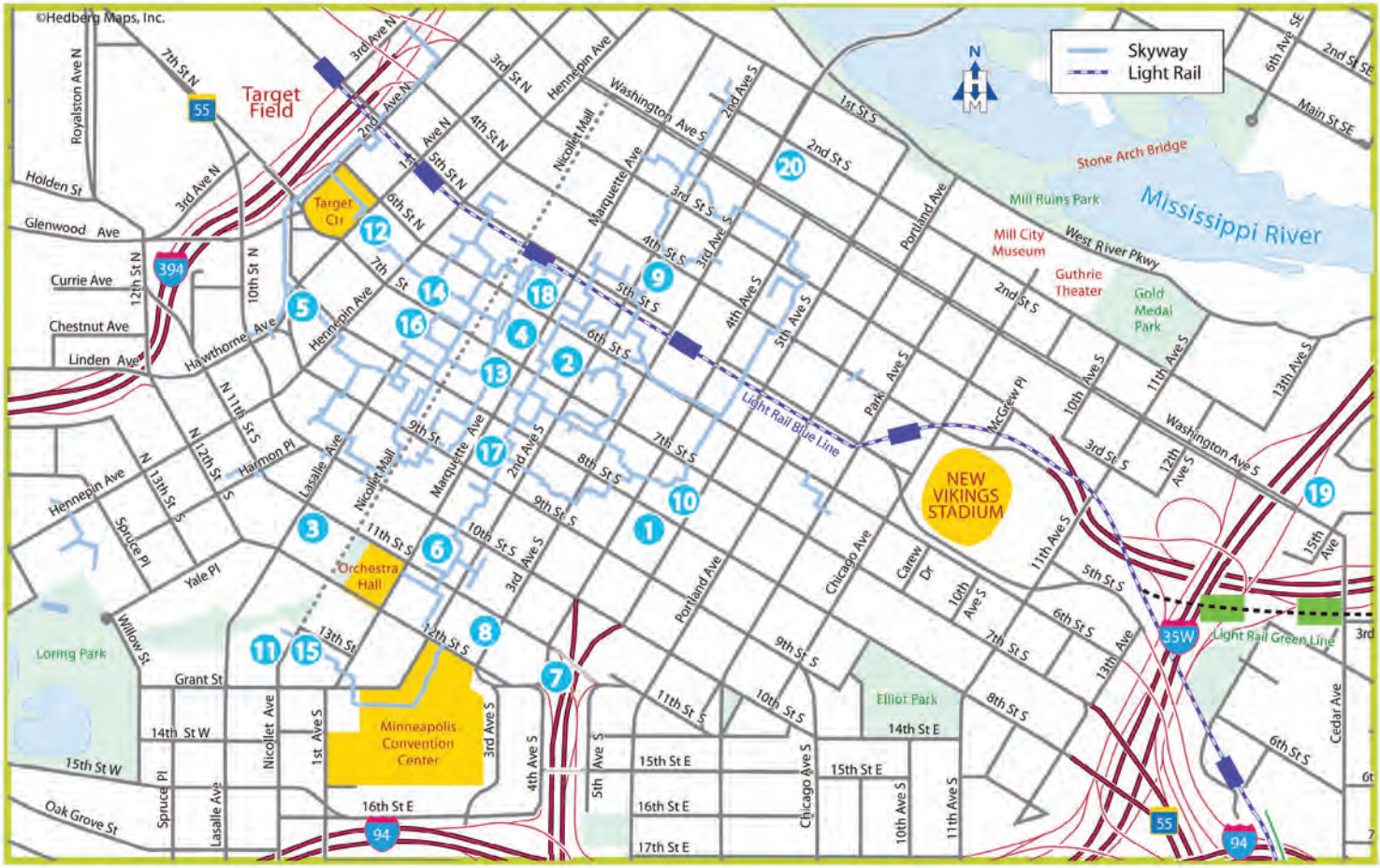

HOTELS

1	Best Western Plus Normandy Inn & Suites
2	Crowne Plaza Northstar
3	DoubleTree Suites by Hilton Minneapolis
4	Grand Hotel Minneapolis
5	Hampton Inn & Suites
6	Hilton Minneapolis
7	Hilton Garden Inn Minneapolis
8	Holiday Inn Express & Suites Downtown
9	Hotel Minneapolis
10	Hyatt Place Minneapolis Downtown
11	Hyatt Regency Minneapolis
12	Loews Minneapolis
13	Marquette (The)
14	Marriott Minneapolis City Center
15	Millennium Hotel Minneapolis
16	Radisson Blu Minneapolis
17	W-The Foshay
18	Westin (The)
19	Courtyard Minneapolis Downtown
20	Renaissance Minneapolis - The Depot

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PRESIDENTIAL WELCOME MESSAGE FOR ENTOMOLOGY 2015

My professional family and friends, it is my honor and privilege to welcome you to ENTOMOLOGY 2015, the 63rd Annual Meeting of the Entomological Society of America (ESA). Minneapolis, Minnesota is a beautiful city and environment to enjoy as we partner with a fantastic group for this co-located meeting. There are many venues to discover and enjoy with family and friends in Minneapolis, including the Mall of America with over 500 stores (no sales tax on clothing), the Sculpture Garden at Walter Art Center, Minnehaha Park and Falls, Midtown Global Market, and more than 200 miles of walking, biking, and cross-country ski trails within the city limits. Great dining is everywhere throughout the city, with three consecutive James Beard award-winning restaurants for Best Chef in the Midwest. Weather of any kind will not present concerns as our headquarters hotel (Hyatt Regency) and many others are connected to the Minneapolis Convention Center via the Skyway.

Phil Mulder

We will be meeting with the Tri-Societies (American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America). This will likely be one of the largest meetings ESA members have ever experienced at one of the world's most spectacular convention centers. Though we are co-located with the other three societies, we will conduct our business, awards, and student competitions as normal. We will also share some common opening and closing session venues, as well as some specific symposia that address our theme. The 2015 meeting theme, **"Synergy in Science: Partnering for Solutions"** was developed in concert with our Tri-Society partners, working together to embrace elements in science that we share, while still maintaining our unique perspectives and contributions specific to each discipline. The ladybird beetle was chosen because it is generally respected as a contributor to plant health and production (I am aware of the exceptions). The colors of the various cogs are blue, representing water, which is essential to the entire biome of plants, animals, and soil organisms; brown, representing soil, which maintains the ecosystems we depend on for nutrition and growth; and yellow, representing sun and air, which we depend on for all plant and animal function. These gears all work in concert to help form smoothly running teams of volunteers, students, staff, and industry partners to keep our efforts evolving into a relevant professional and scientific society for global issues. These do not represent spinning wheels for decoration, but have a purpose. Since 2012, our society has identified several grand challenges. This effort resulted in a town hall meeting two years ago where we openly discussed these challenges with our members to gain focus on solving some of the specific problems that entomology can help address. I believe that we have turned the corner in our professional society, not only for having identified these global grand challenges, but for having transformed them into opportunities on the horizon for our partnerships to confront.

Synergy in Science: Partnering for Solutions

The synergistic effect of partnering with other societies and global constituents has certainly enhanced our influence around the world to maximize the impact that entomology has on improving the human condition through our Global Health Agenda. Likewise, current and future partnerships will help us explore a Global Food Security Agenda that encompasses an international effort to provide safe, nutritious food in an environment of growing world populations, limited natural resources, climate shift, and social anxiety over agri-biotech issues. Our goal is to serve as a global platform for convening important discussions on these worldwide issues.

Several strategy sessions with ESA leaders, committees, and various members have helped us identify the opportunities that we should embrace to be a national and global leader and to elevate the profile of both the society and our science on federal and international levels. This past year, we increased focus on our social responsibility to develop ALL members through formation of a Member Diversity Governing Board Committee. We increased our partnerships within and outside our science on a global scale through formal gatherings with other professional societies and international partners, such as our current meeting, and a formal Memorandum of Understanding with the Society of Brazilian Entomologists to engage in an effort to combat mosquito-borne diseases in the Western Hemisphere. We continue to grow the society and expand our influence in the United States and abroad through our membership campaigns and special initiatives like the Science Policy Fellows program, participation in special hearings and briefings in Washington, DC, and continued focus on advocating for those issues connected to entomology that can profoundly help in improving the human condition and our knowledge of the world around us. Finally, we have established a leadership development Presidential Committee to work with Section leaders to regain impetus on our 2006 ESA renewal objectives and to address key capabilities that will increase their influence and impact outside the Annual Meeting. This has definitely been an extremely busy and productive year with ESA, and the times ahead appear equally exciting for gaining additional traction to address global issues through increased partnerships and synergy with those groups.

The 2015 Annual Meeting promises to be an exciting, diverse, and engaging opportunity for many disciplines, including entomology, to share their science with a large, diverse audience. During the Joint Plenary portion of our program, we will hear from Dr. Sonny Ramaswamy, Director of the National Institute for Food and Agriculture (NIFA), and Dr. Rod Snyder, President of Field To Market: The Alliance for Sustainable Agriculture. Both speakers will provide their unique perspectives on intentions and strategies for helping provide food, fiber, and fuel for more than 9 billion people across the globe by 2050. Prior to the Joint Plenary Session, the ESA Plenary Session will be held Sunday afternoon. Our Founders' Memorial Lecturer, Dr. Thomas Baker, University Distinguished Professor of Entomology in the Department of Entomology, Center for Chemical Ecology, Pennsylvania State University, will be honoring the late, great Dr. Harry H. Shorey in his presentation entitled "Love at First Sniff: Harry Shorey and the Dawn of the Age of Pheromones." Dr. Shorey was instrumental in his seminal research in the discovery and utility of pheromone chemistry for so many species of insects.

Following the two plenary sessions, we will have our usual Welcome Reception, with an unusual twist. Individual tables with signs will be set up as gathering points for specific institutions to welcome alumni and friends. Many of these sites will serve as potential watering (or whatever) sites for their constituents. This will not replace, but supplement, our usual Monday evening social activities, including university and industry receptions, other functions, and get-togethers with families and colleagues. The Sunday evening gatherings will help make our exhibitors, poster presenters, and sponsors happy to serve as a destination point for everyone. Throughout the rest of the week, ESA will provide more than 90 symposia opportunities for attendees; over 450 10-minute papers; nearly 500 student competition 10-minute papers; over 210 student competition posters; and nearly 350 member posters. New initiatives that began in 2015 include an exciting three-minute presentation student competition, where students will be allowed one slide, three minutes, and no questions asked afterwards to present their best elevator talk to a team of judges and the audience. President Prize awards will be provided for this event.

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OF THE LOS ANGELES BASIN

BY CHARLES L. HOGUE

REVISED AND EDITED
BY JAMES N. HOGUE

Updated for the first time in over 20 years by the Natural History Museum of Los Angeles County, *Insects of the Los Angeles Basin* is the definitive guide to more than 450 insects, arachnids, and other terrestrial invertebrates found in Southern California.

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NATURAL HISTORY MUSEUM
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This inaugural contest will take place Monday afternoon, just prior to the Section business meetings, allowing as much audience participation as possible. An additional new initiative is "Premier Presentations," highlighted symposium presentations that address our theme and connect our science with our partners and today's hot-topic issues. These latter presentations will actually be highlighted in your program, and each of the authors will be given the opportunity to present some of their information in a special interview recorded during the meeting. These recordings will become highlight reels for E-News and the Entomologytoday blog.

Five program symposia are planned for the week. These reflect the theme of the meeting and include:

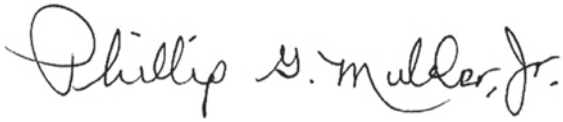
1) **Applying a Systems Approach—Emergent Outcomes of Multidimensional Interactions in Agroecosystems**
2) **Arthropods and Wildlife Conservation: Synergy in Complex Biological Systems**
3) **How Can Ecosystem Services Support Resilient and Multifunctional Agriculture Systems to Meet the Challenges of the 21st Century?**
4) **Molecular Evolution in Social Insects: Insights from the Synergy of Natural History, Diversity, and Genomics**
5) **Symposium in Honor of Nan Yao Su: How Synergy in Science Led to Innovation**

Several Lunch and Learn topics that involve our partner organizations will also highlight our program throughout the week. One such opportunity for students will take place Sunday afternoon and will explore possible careers for students and advice for young professionals. Another title on that same day will explore the impacts of insecticides and other influences on honey bee health. On Monday, we will team up with Tri-Society members to explore the topic of "Data Stewardship" and "Managing Job Transitions as an Early Professional." On Tuesday, we will continue the theme of finding careers with "Preparing for the Future: What Every Student Should Know about Getting a Job or Finding a Career," and our first five Science Policy Fellows will be present to discuss "Fellows, Funding, and the Federal Future of Entomology." On Wednesday, attendees can choose from a rousing town hall meeting on "Perspectives on Sustainably Supporting the Human Populace in the Future" or a special session of "Meet the ESA Editors."

As you enjoy the successful 2015 ESA meeting, network with colleagues, and reconnect with old friends, *please* offer your thanks to our Program Co-Chairs Von Kaster and Tom Sappington as well as all of the members of the Program Committee. Throughout the year, they have been a tremendous and very fun group with which to work. This outstanding and dedicated committee, in addition to Tom and Von, includes Melody Keena and Sue Blodgett (Poster Co-Chairs); Jesus Esquivel, Catherine (Kate) Loudon, and Alvin Simmons (Student Competition Co-Chairs); Faith Oi and Dini Miller (MUVE Section Reps); Qisheng Song and Nannan Liu (PBT Section Reps); Sujaya Rao and Fred Musser (P-IE Section Reps); Hojun Song and Maria (Alma) Solis (SysEB Section Reps) and Rebecca Schmidt-Jeffris (Student Liaison). These individuals have endured a great deal of time, effort, editing, thought, and a few knocks on the head (with a pillow) from the President and have created a very strong program during a very challenging year. They certainly deserve your recognition and thanks, so please take the time to recognize these tireless volunteers. I also wish to personally thank Rick Foster and Ken Ostlie for helping us seek additional sponsors and exhibitors for this tremendous venue.

Please also take time to acknowledge and thank the tireless and focused effort provided by our ESA staff, who have the thankless job of keeping us all on task and centered on member value for our Annual Meeting and assisting with so much of what goes on behind the scenes all year long. This is a tremendous team of professionals who work together seamlessly to serve our members effectively at all times, but most visibly during our Annual Meeting, so please take the time to thank them for their efforts. Our Executive Director, David Gammel, brings an intelligent, focused, professional, and always delightful perspective to our society. He is likely one of the easiest, most helpful, and most dedicated leaders within our professional society. Similarly, and not-so-seriously, I have referred to Rosina Romano (Director of Meetings) as the Queen Bee of our program. She is the consummate professional, with a clear understanding of the entire works within our system. She is absolutely the go-to person for anything programmatic and generally has the knowledge available immediately. What a great resource she has been throughout the year. Thank you, Rosina! Another ESA staffer to whom we owe a great deal of gratitude this year in particular is Cindy Myers (Manager of Meetings, Exhibits, and Sponsorship), who manages our awards program as well as our exhibitors and sponsorships for the meeting. Debi Sutton (Director of Membership and Marketing) has also done a stellar job of keeping the Membership Committee on task and very effectively marketing our membership drive for this year. Chris Stelzig (Director of Strategic Initiatives) has been a veritable workhorse this year, with our certification program, new Foundation structuring, and other new initiatives that have moved forward. Lisa Junker (Director of Publications and Communications) has assumed the Herculean task of working with our diverse group of editors and our new publishing partners, Oxford University Press. What a great job she has done in handling all of these publications, editors, and relationships, along with Josh Lancette (Manager of Publications) who came to us with the *Journal of Insect Science,* bringing his expertise to our staff! Neil Willoughby and Alexis Lyons are not often encountered by many of our members, but their tireless and incredibly efficient efforts as Director of Finance and Staff Accountant, respectively, have kept ESA thriving through both the good times and the bad. Richard Levine (Communications Program Manager) has also done a tremendous job with eNews, job ads, datebook, media relations, and our Entomology Today blog. Many folks outside of ESA look to Richard for these great articles and the information storehouse that he has at his fingertips. Finally, I cannot use enough superlatives to describe the focus and tireless efforts of Becky Anthony (Program and Meetings Manager) and Katherine Matthews (Database Manager). These young women represent some of the finest young people I have ever met, and on top of that, can provide nearly any piece of information needed about ESA instantly. What a great resource they have been throughout the year; my wife and I always look forward to seeing them at meetings. Three new team members you will meet this week include Matthew Chism (Certification and Office Administrator), Steven Adams (Marketing Specialist) and Nikki Olin (Executive Assistant), adding to the outstanding staff in Annapolis. The members of this team complement one another extremely well and certainly deserve our thanks, so please give our staff members the recognition they so richly deserve.

For nearly 40 years I have valued my ESA membership and have grown some of my closest relationships, outside my immediate family. That is one reason I wanted to bring some of my immediate family to reconnect with and/or meet my professional family and let them get a sense of why I enjoy attending the ESA meetings each year. This society and our Annual Meeting represent a fantastic opportunity for exploring our science, networking with colleagues, learning new approaches, and reconnecting with friends. Please take the time to engage in all these activities and make ESA your professional family for years to come.



Phillip G. Mulder, Jr., PhD
2015 President, Entomological Society of America

PROGRAM COMMITTEE CO-CHAIRS' WELCOME

Welcome to ENTOMOLOGY 2015, the 63rd Annual Meeting of the Entomological Society of America! We are looking forward to having you join us in Minneapolis, Minnesota, for an exciting meeting held in conjunction with that of the Tri-Societies: Agronomy Society of America (ASA), Crop Science Society of America (CSSA), and Soil Science Society of America (SSSA). The Program Committee and ESA Headquarters staff have worked hard to provide many opportunities for cross-pollinating, both within our society as well as with the many scientists of the Tri-Societies. We encourage you to take advantage of the co-location of the meetings to forge new relationships and collaborations.

Von Kaster and Tom Sappington

President Mulder's theme for the meeting is "Synergy in Science: Partnering for Solutions." During his presidency, Phil has continued to build upon the grand challenges first embodied during Past-President Frank Zalom's tenure. Solving the great problems of our time will require foresight, energy, innovation, and deep understanding of the complex web of interacting factors that are driving them, and that are needed to develop and drive lasting, sustainable solutions. Entomologists have a significant role to play in this endeavor and a duty to be brave, engaged humans whose gifts in the realm of science are directed toward finding ways to keep our beautiful world a place worth living in and a place worthy of our children and grandchildren. But as scientists, we know enough about the complexities we face to admit that no scientific discipline by itself, including entomology, can make serious enough or fast enough headway against all of the problems facing humankind to solve the grand challenges. We surely must engage the great problems from different angles, from different disciplines, to generate the necessary synergies to make meaningful progress. You can look at your own work in entomology—be it research, teaching, or extension; private-sector or public-sector; basic or applied; or anything else in any combination—and you know inside why you are doing it and the good it contributes to society. So don't be timid or apologetic to others when you describe what you do and what you are trying to accomplish with your career. And don't be afraid to engage with those whose gifts to society are offered up in different disciplines, either outside or within entomology. Phil hopes you will take full advantage of ESA co-locating with the Tri-Societies in this unique time and place to be exposed to different ways of approaching the same problems, to forge new relationships with our gifted sisters and brothers in other disciplines, and to let them know what you have to offer from an entomologist's perspective. In the spirit of synergy in science, you are also encouraged to taste some of the offerings of symposia and sessions within entomology, but outside your own Section, outside your own zone of comfortable familiarity. You will be surprised by the synergistic thoughts and ideas that will well up in your mind and imagination. And seeing familiar problems approached from different angles might just inspire an idea or partnership that will change the world.

The 2015 Program Committee Co-Chairs worked with President Mulder and the Tri-Society leadership to develop an Opening Keynote to all four Societies called, "Partnering for Solutions to Supply Chain Sustainability." This keynote is designed to stimulate much thoughtful discussion during the remainder of the meeting. As a follow-up opportunity for conversation on the theme broached in the Opening Keynote, a special town-hall style meeting co-organized by ESA and Tri-Society leadership, "Perspectives on Sustainably Supporting the Human Populace in the Future," will be presented over lunchtime on Wednesday. This must-attend session will feature well-respected expert speakers as they address global food challenges from widely differing perspectives. The Opening Keynote will be preceded by ESA's own Opening Plenary and Founder's Memorial Lecture titled, "Love at First Sniff: Harry Shorey and the Dawn of the Age of Pheromones," to be delivered by Tom Baker of Penn State University. There are many other additional opportunities in the form of jointly developed symposia in both programs. You can view the full list of events for the ASA, CSSA, and SSSA meetings starting on page 98.

The 2015 Program Committee Co-Chairs solicited the general membership for program symposia proposals that best exemplified the Annual Meeting's theme. The Program Committee received 35 proposals for program symposia. We ensured the selected symposia reflected our society's diversity of topics, organizers, and speakers and are excited by this year's selection of 5 outstanding program symposia.

Twenty-nine section symposia were recommended by section leadership, and 42 member symposia were selected to complement this year's theme. It was a challenge to evaluate, accept, and schedule this many outstanding symposia, and we thank the members who took such care and effort in organizing interesting sessions. Building on the organized meeting concept initiated by last year's Co-Chairs, Sue Blodgett and Melody Keena, we accepted 16 organized meetings, which include the Section business meetings.

Similar to last year, ESA members are limited to one invited talk to promote increased speaker diversity and to encourage more participation by young professionals. Following favorable feedback from last year's meeting, several symposia feature the addition of submitted talks and posters to diversify the types of presentations and experiences of audience members. Seven of the symposia will be using WebEx to allow speakers to present their talks remotely, and 16 symposia will include posters. All rooms will have wireless Internet capability this year.

In addition to the 746 symposia presentations, we are pleased to have accommodated 10-minute paper presentations (939), posters (560), and virtual posters (36). As an added benefit to this year's meeting, you will be able to attend any of the presentations and posters offered by the Tri-Societies. The choices are truly astounding! We invite you to attend the Social Hour with Poster Presentations in the poster area Monday and Tuesday from 5:30 to 6:30 PM and Wednesday from 12:15 to 1:15 PM. Poster presenters are encouraged to be at their posters during assigned times. For further details, please refer to the Social Hour with Poster Presenters section later on in this program book.

The tradition continues this year where students are the focus of the meeting on Monday:

- Student Competition for the President's Prize: Students will present 487 10-minute papers, 216 posters, and 21 virtual posters. **NEW THIS YEAR** is an exciting three-minute presentation (3MP) competition! The 3MP format stretches the imagination and skill of the student with the challenge of having a short amount of time (strictly three minutes) and one slide to convey a research topic to the audience. In addition to the President's Prize, the first and second-place finishers in each of two sessions, and those selected in each session for the Audience-Choice Award will do an encore presentation during the Closing Plenary on Wednesday.
- Student Debates: The Student Debate competition on Tuesday afternoon will include the following topics:
  1. What is the single best genetically engineered technology for arthropod pest control?
  2. With the development of tools like RNAi, in the future we may be capable of eradicating species. If we can eradicate a species, should we?
  3. What is the single best tool for managing pesticide resistance?

  Be sure to live-tweet the Student Debates for your chance to win a $50 Amex gift card!
- Linnaean Games: Ten university teams will compete at the 32nd Linnaean Games. The preliminary round of games will be held Sunday. Come watch the excitement of a great competition and learn something while you're there.
- Student Reception: To reward and recognize the students for their hard work and importance to our Society, the ESA Student Affairs Committee is planning a reception on Tuesday evening at the Pourhouse in downtown Minneapolis. Shuttle service will be provided to the off-site event starting immediately after the Student Awards ceremony.
- Symposia: Students have been extensively involved in organizing and participating in Program, Section, and Member Symposia.

Other meeting features:

NEW THIS YEAR: Twenty Program and Section Symposium presentations have been chosen by the Section leadership to be featured as Premier Presentations. In addition to special highlighting in the program book, presenters will be interviewed about their research. The interviews will be posted on the ESA website and available for viewing on the global scale that only the Internet can provide.

Seven Lunch and Learn sessions will feature a variety of topics that you won't want to miss, presented in a lively, informal atmosphere.

The child care program will supplement child care services for parents attending the meeting, in addition to the Mothers' Room at the Convention Center.

Attendees and their guests may take part in one of several off-site tours and activities being offered this year.

Serving this past year as Program Co-Chairs has been a tremendously rewarding experience. Minneapolis is a crown jewel of the Midwest and offers many opportunities for shopping, dining, and entertainment. Take advantage of the excellent Skyway system and explore this great cosmopolitan city.

Come see us at the meeting if you want our advice on other things to do or see. And make sure to share your experiences with us and other members via Twitter using the hashtag #entsoc15.

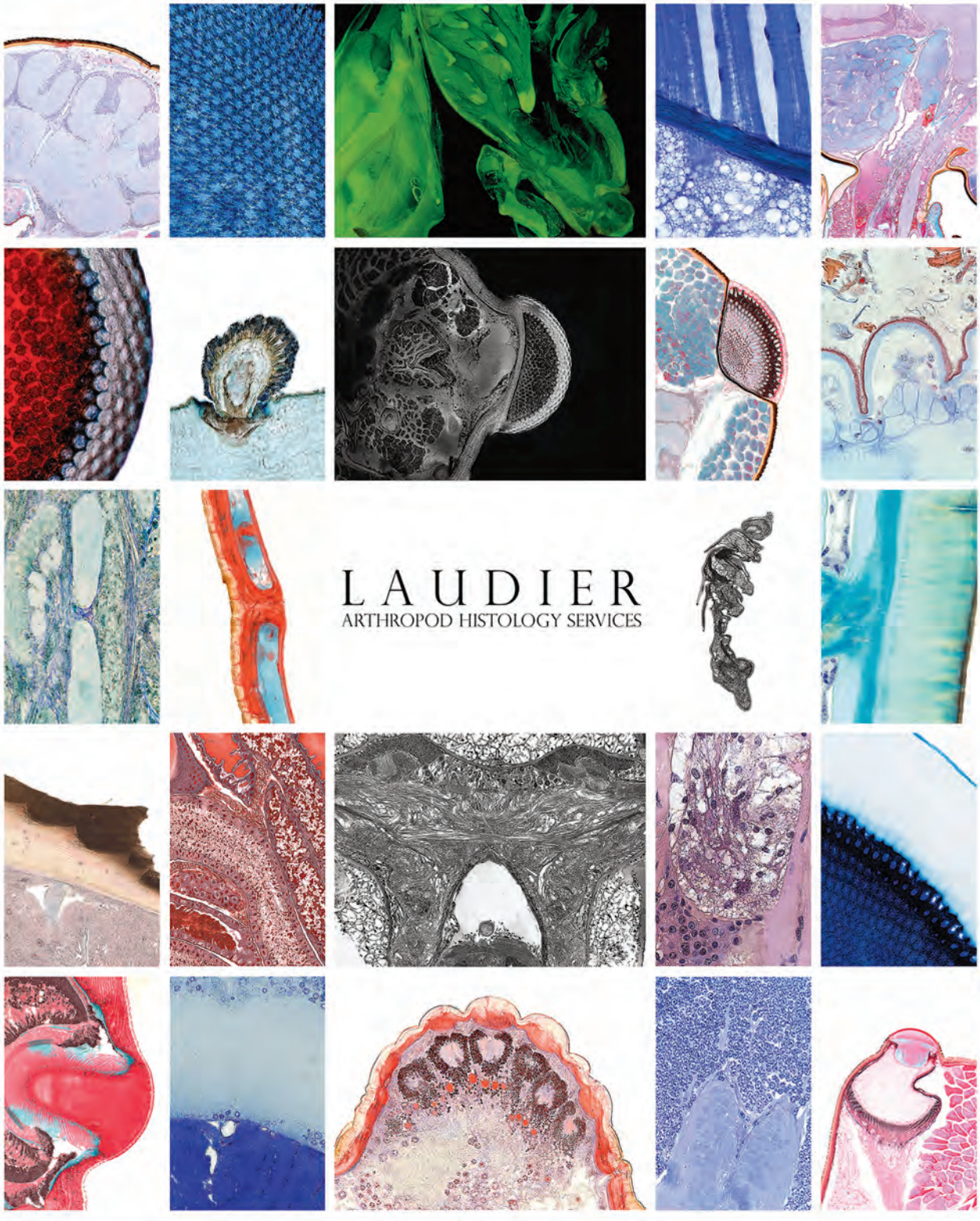
We are eternally grateful to the wonderful ESA staff and the rest of the Annual Meeting Program Committee. Watching and experiencing their commitment to delivering a quality program has been truly humbling. Please take time during the meeting to thank them in person. Without their help, as well as the commitment of so many other volunteers who selflessly serve on the various committees, the Annual Meeting would not be what it is: a dynamic, diverse, enjoyable, and connected gathering of entomologists from around the globe. Enjoy Minneapolis and enjoy the Annual Meeting!

See you all next year at ICE2016 in Orlando, Florida!

Von Kaster and Tom Sappington
2015 ESA Program Committee Co-Chairs

Pictured from left to right: Dini Miller, Faith Oi, Melody Keena, Fred Musser, Sue Blodgett, Qisheng Song, Sujaya Rao, Nannan Liu, Von Kaster, Tom Sappington, Phil Mulder, Kate Loudon, Alvin Simmons, Jesus Esquivel, Rebecca Schmidt-Jeffris
Not pictured: Hojun Song, Alma Solis

YOUR PARTNER FOR PRECISION ARTHROPOD HISTOLOGY



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ABOUT MINNEAPOLIS

Minneapolis, MN

Minneapolis, Minnesota, host for ENTOMOLOGY 2015, is a city that offers something for everyone. Minneapolis is the perfect blend of natural beauty and urban sophistication. No other American city has a chain of lakes, a river like the mighty Mississippi, and 200 miles of walking, biking and cross country ski trails within the city limits. You will find yourself literally steps from the most vibrant arts and music scene outside New York City, with the best shopping in the region and museums that are among the finest in the nation. From ski hills to shopping malls, muskies to Monet, biking to beef bourguignon, Minneapolis is the American city where natural and urban drama share a single stage.

Ground Transportation

METRO Light Rail Transit (LRT)

The METRO Light Rail Transit (LRT) system is a network of transit ways with frequent, all-day service between stations. Customers can expect trips at least every 15 minutes throughout most of the day. A single trip on the LRT to any destination is $2.25 (one way). Use the METRO Trip Planner at metrotransit.org. Some helpful tips when using METRO Light Rail Transit include the following:

- The Blue Line connects downtown Minneapolis (Nicollet Mall) to the Mall of America and the airport.
- Tickets are required for all riders on LRT, and transit officers may request to see proof of payment during any trip. ESA recommends that you always have a valid ticket for riding METRO.
- Ticket machines are located at each station. There are no fare boxes onboard METRO trains. Keep your ticket until you have completed your trip.
- Several free mobile apps are available to download to your smartphone; for more information, visit metrotransit.org/mobile-site-and-transit-apps.

SuperShuttle

SuperShuttle provides daily airport shuttle service to/from the Minneapolis downtown area. Shuttle prices begin as low as $15 one way and $24 round trip, with a $1.60 fuel surcharge each way. Book online at groups.supershuttle.com/agronomy.html to receive discounted rates. Discounts are automatically deducted at checkout. Discounts are also available upon arrival at the Minneapolis St. Paul International Airport (MSP). Travel discounts are valid November 11-18.

Upon arrival to MSP, claim your luggage at Baggage Claim. Follow the signs for Hotel Shuttles and Vans to the ground transportation atrium. You will go up another set of escalators and proceed to the SuperShuttle service desk. If traveling via Air Tran, Iceland Air, Southwest, or Sun Country, you will be arriving in Terminal 2. The SuperShuttle service desk is at the ground transportation center, which is across the street on the ground floor of the parking ramp. The service desk is on the right as you enter. If an agent is not present, use the RED courtesy phone to speak with the service desk, or use the kiosk that is to the right side of the counter.

Taxi

Upon arrival at the Minneapolis St. Paul International Airport, follow signs for ground transportation. Downtown Minneapolis is approximately 12 miles from the airport, with fares averaging $39-$49.

For additional taxi service while in Minneapolis, contact the following:

Airport Taxi
612-888-8000

Blue & White Taxi
612-333-3333

Green & White Taxi
612-222-2222

Rainbow Taxi
612-332-1615

Red & White Taxi
612-871-1600

Yellow Cab
612-888-8800

Parking

Parking rates vary at each hotel. Please check your reservation or hotel website for parking information.

Attendee parking for the Minneapolis Convention Center is available on Third Avenue directly east of the Center. The maximum daily rate is $15. Additionally, there are a dozen parking ramps within easy walking distance of the convention center, connected by the Skyway.

Guaranteed Parking

Meet Minneapolis has partnered with Parking Panda, the nationwide leader in online parking reservations, to allow visitors to purchase guaranteed parking near their destination. Once purchased, parking is 100% guaranteed even if the location otherwise fills up. Simply present your purchase confirmation at the selected location, and this serves as your payment, with no additional payments or fees. Parking availability is limited, so it is strongly recommended that you purchase parking in advance.

Use this Exclusive Partner Code for 15 percent off your first reservation: MEETMINNY2015. To purchase parking or select a location from the interactive map, visit: www.entsoc.org/parking-panda

Skyway and Free Bus Transportation

The Minneapolis Skyway System is an interlinked collection of over 11 miles (18 km) of enclosed pedestrian footbridges that connect various buildings across 69 full city blocks of Downtown Minneapolis, enabling people to walk in climate-controlled comfort year-round. Many of the conference hotels are connected to the Minneapolis Convention Center via the Skyway, as are numerous businesses, restaurants, and shops along the route. A map showing the location of the hotels, convention center, and Skyway can be found in the front of the program book.

Don't Miss This Year's Premier Presentations

Synergy in Science: Partnering for Solutions

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2015 MEETING

November 15-18 | Minneapolis, MN

New for 2015! ESA leaders have selected 20 *Premier Presentations* to be highlighted during ENTOMOLOGY 2015, five from each ESA Section. Each of the speakers will also be interviewed onsite for a two- to three-minute video that will be posted on ESA's website, further highlighting their work.

Premier Presentations are designated in their symposia with the words "Premier Presentation" bolded in front of the presentation title, as well as being highlighted in gray. For your convenience, below is a complete listing of this year's Premier Presentations, in chronological order.

PROGRAM SYMPOSIUM IN HONOR OF NAN YAO SU: ***How Synergy in Science Led to Innovation***
SUNDAY, NOVEMBER 15, 2015: 8:00 AM – 12:00 PM
204 AB, CONVENTION CENTER

8:10 0002 Mosquitoes and malaria: role of vector control in the eradication agenda. **Anthony A. James** (aajames@uci.edu), *University of California, Irvine, CA*

8:40 0003 Exploiting plant behavior and chemical ecology for developing new crop protection strategies for Africa. **Zeyaur Khan** (zkhan@icipe.org)[1], Charles Midega[1], Toby Bruce[2], Tony Hooper[2], Michael Birkett[2], and John Pickett[2]. *[1]International Centre of Insect Physiology and Ecology, Nairobi, Kenya, [2]Rothamsted Research, Harpenden, Hertfordshire, United Kingdom*

PBT SECTION SYMPOSIUM: ***Developmental Synergy between Genome Regulation and Environmental Stimuli: From Phenotypic Plasticity to Disease Response***
SUNDAY, NOVEMBER 15, 2015: 8:00 AM – 12:00 PM
208 C, CONVENTION CENTER

9:32 0018 The developmental basis of phenotypic evolution in ants: Hormones, genes, and epigenetics. **Rajendhran Rajakumar** (rajakumar@ufl.edu) and Ehab Abouheif, *McGill University, Montreal, QC, Canada*

10:12 0020 Aggression and metabolism in hybrid honey bees is linked to allele specific expression. **Joshua Gibson** (gibson85@purdue.edu), *Purdue University, West Lafayette, IN*

P-IE SECTION SYMPOSIUM: ***Worldwide Resistance to Bt-toxins: Causes, Consequences, Cures?***
SUNDAY, NOVEMBER 15, 2015: 8:00 AM – 12:00 PM
200 C, CONVENTION CENTER

8:30 0035 Resistance to *Bacillus thuringiensis* Cry2Ab toxin in *Helicoverpa* spp. is conferred by mutations in a novel ABC transporter. Wee Tek Tay[1], Rod Mahon[1], Tom Walsh[1], Sharon Downes[2], William James[1], Siu Fai Lee[3], Annette Reineke[4], Adam Williams[3], Karl Gordon[1], and **David G. Heckel** (heckel@ice.mpg.de)[5]. *[1]CSIRO, Canberra, Australia, [2]CSIRO, Narrabri, Australia, [3]University of Melbourne, Parkville, Australia, [4]Geisenheim University, Geisenheim, Germany, [5]Max Planck Institute for Chemical Ecology, Jena, Germany*

SYSEB SECTION SYMPOSIUM: ***Conserving Rare Butterflies: Challenges and Successes***
SUNDAY, NOVEMBER 15, 2015: 8:00 AM – 12:00 PM
209 AB, CONVENTION CENTER

8:25 0051 The status of North America's butterflies: Are once-common species in trouble? **Scott Black** (sblack@xerces.org), *Xerces Society, Portland, OR*

MUVE SECTION SYMPOSIUM: ***Best Bed Bug Management Practices and Novel Research***
SUNDAY, NOVEMBER 15, 2015: 1:15 – 3:15 PM
207 AB, CONVENTION CENTER

2:05 0235 Best bed bug monitoring practices. **Changlu Wang** (cwang@aesop.Rutgers.edu) and Narinderpal Singh, *Rutgers, The State University of New Jersey, New Brunswick, NJ*

PROGRAM SYMPOSIUM: ***Applying a Systems Approach: Emergent Outcomes of Multi-dimensional Interactions in Agroecosystems***
TUESDAY, NOVEMBER 17, 2015: 8:00 AM – 12:00 PM
AUDITORIUM 1, CONVENTION CENTER

9:20 0883 Development of a system approach to multi-pest management: Application of a Bayesian decision theory approach to the joint management of the *Cephus cinctus* Norton (Hymenoptera: Cephidae) and *Bromus tectorum* L. **Fabian Menalled** (menalled@montana.edu)[1], Ilai Keren[2], David K. Weaver[1], and James Robison-Cox[1]. *[1]Montana State University, Bozeman, MT, [2]Washington Department of Fish and Wildlife, Olympia, WA*

MUVE SECTION SYMPOSIUM: ***30 Years of Hunting the Tiger.*** **Aedes albopictus** ***in America: Current Perspectives and Future Challenges***
TUESDAY, NOVEMBER 17, 2015: 8:00 AM – 12:00 PM
206 AB, CONVENTION CENTER

11:00 0903 Field trials of autocidal approaches to suppress *Aedes albopictus*. **Stephen Dobson** (sdobson@uky.edu), *University of Kentucky, Lexington, KY*

PBT SECTION SYMPOSIUM: ***Partnering for Health: Genetic, Behavioral, and Environmental Synergies in Insect Immunity***
TUESDAY, NOVEMBER 17, 2015: 8:00 AM – 12:00 PM
204 AB, CONVENTION CENTER

9:55 0919 Immune system responses to a drop in food supply: Not a global decline, but a shift in immune system strategy. **Shelley A. Adamo** (sadamo@dal.ca), *Dalhousie University, Halifax, NS, Canada*

P-IE SECTION SYMPOSIUM: ***Ecology and Management of Migratory Moth Pests: Uniting Disciplines to Provide Solutions***
TUESDAY, NOVEMBER 17, 2015: 1:30 – 5:30 PM
211 B, CONVENTION CENTER

4:33 1225 A genomics approach to studying migration in high-flying moth pests. **Christopher Jones** (christopher.jones@rothamsted.ac.uk)[1], Jason Lim[1], Chris Bass[1], and Jason Chapman[2]. *[1]Rothamsted Research, Harpenden, United Kingdom, [2]University of Exeter, Penryn, United Kingdom*

4:53 1226 A bat's perspective on the autumn movements of migratory noctuid moths. **Jennifer Krauel** (jkrauel@vols.utk.edu)[1], John Westbrook[2], and Gary McCracken[1]. *[1]University of Tennessee, Knoxville, TN, [2]USDA–ARS, College Station, TX*

SYSEB SECTION SYMPOSIUM: ***Evolution of Castes in Social Organisms: Behavior, Development, and Regulating Mechanisms***
TUESDAY, NOVEMBER 17, 2015: 1:30 – 5:30 PM
213 AB, CONVENTION CENTER

1:55 1259 The pre-adult social environment has lasting impacts on adult behavior and health in the honey bee *Apis mellifera*. **Clare Rittschof** (clare.rittschof@gmail.com)[1,2], Chelsey Coombs[1], Maryann Frazier[2], Christina M. Grozinger[2] and Gene E. Robinson[1]. *[1]University of Illinois, Urbana, IL; [2]Pennsylvania State University, University Park, PA*

3:29 1264 Division of labor from 50,000 evolutionary feet. **Patrick Abbot** (patrick.abbot@vanderbilt.edu), *Vanderbilt University, Nashville, TN*

PROGRAM SYMPOSIUM: ***Arthropods and Wildlife Conservation: Synergy in Complex Biological Systems***
WEDNESDAY, NOVEMBER 18, 2015: 8:00 AM – 12:00 PM
AUDITORIUM 1, CONVENTION CENTER

8:30 1493 Dynamics and impacts of sarcoptic mange in Yellowstone's wolves. **Emily Almberg** (esa5046@psu.edu)[1], Paul Cross[2], Andrew Dobson[3], Douglas Smith[4], and Peter Hudson[5]. *[1]Penn State University, Bozeman, MT, [2]U.S. Geological Survey, Bozeman, MT, [3]Princeton University, Princeton, NJ, [4]National Park Service, Yellowstone National Park, WY, [5]Penn State University, University Park, PA*

9:55 1496 Introduced parasite causes significant mortality in Darwin's finches: Is there an immediate solution? **Sarah Knutie** (saknutie@gmail.com)[1] and Dale H. Clayton[2], *[1]University of South Florida, Tampa, FL, [2]University of Utah, Salt Lake City, UT*

10:45 1498 From island to subarctic populations: What role do vectors play in the transmission of avian malaria in a naive avifauna? **Jenny S. Carlson** (jencarlson@ucdavis.edu), *University of California, Davis, CA*

P-IE SECTION SYMPOSIUM: ***Forest Entomology: Synergy from Symbiosis***
WEDNESDAY, NOVEMBER 18, 2015: 8:00 AM – 12:00 PM
200 C, CONVENTION CENTER

11:19 1521 Diversity of interactions in mutualism-centered plant-insect symbioses: The case of figs and fig wasps. **Renee Borges** (renee@ces.iisc.ernet.in), Ananya Jana, Satyajeet Gupta, Vignesh Venkateswaran and Pratibha Yadav, *Indian Institute of Science, Bangalore, India*

SYSEB SECTION SYMPOSIUM: ***New Approaches in Big-Data Phylogenetics: Data Harvest and Phylogenomic Analyses That Transform Current Systematic Practice***
WEDNESDAY, NOVEMBER 18, 2015: 1:30 – 5:30 PM
213 AB, CONVENTION CENTER

1:30 1845 The 1KITE initiative. Past, present and future. **Karl M. Kjer** (kjer@aesop.rutgers.edu)[1], Bernhard Misof[2], and Xin Zhou[3]. *[1]Rutgers, The State University of New Jersey, New Brunswick, NJ, [2]Museum Alexander Koenig, Bonn, Germany, [3]Beijing Genomics Institute, Shenzhen, China*

2:50 1849 Genes and genomes yield new insights into the phylogeny and evolution of beetles (order Coleoptera). **Duane D. McKenna** (dmckenna@memphis.edu)[1], Stephanie Haddad[1], and Seunggwan Shin[2]. *[1]University of Memphis, Memphis, TN, [2]North Carolina State University, Raleigh, NC*

The Skyway My Way website (http://www.skywaymyway.com/) and mobile app can help you plan your trip to and from the convention center as well as provide real-time GPS navigation of the Skyway. Simply search "Minneapolis Skyway" in the app store or android marketplace to download the Skyway app to your smartphone.

While in the Skyway, you'll find signage that points to the Minneapolis Convention Center to help you find your way.

General operating hours of the Skyway are as follows:

Sunday, November 15: 7:00 AM – 10:00 PM
Monday, November 16: 6:30 AM – 10:30 PM
Tuesday, November 17: 6:30 AM – 10:30 PM
Wednesday, November 18: 6:30 AM – 10:30 PM

Free bus rides are available on Nicollet Mall in downtown Minneapolis including to and from the Minneapolis Convention Center. The free-ride buses run every 7-10 minutes on weekdays (5am-7pm), every 10-15 minutes on week nights and Saturday (until 1am), and every 20 minutes on Sunday. More information is available at metrotransit.org/freeride.

Convention Center

The Minneapolis Convention Center (MCC), the largest convention center in the Upper Midwest, has achieved Level One certification to the ASTM Standard pertaining to the Evaluation and Selection of Venues for Environmentally Sustainable Meetings, Events, Trade Shows, and Conferences.

Minneapolis Convention Center
301 2nd Avenue South
Minneapolis, MN 55403
Phone: 612-335-6000

Hotels

Hyatt Regency Minneapolis (ESA Headquarters Hotel)
1300 Nicollet Mall
Minneapolis, MN 55403
Phone: 612-370-1234

Hilton Minneapolis (ASA, CSSA, SSSA Headquarters Hotel)
1001 Marquette Avenue South
Minneapolis, MN 55403
Phone: 612-376-1000

Best Western Normandy Inn & Suites
405 South 8th Street
Minneapolis, MN 55404
Phone: 612-370-1400

Courtyard Minneapolis Downtown
1500 S Washington Ave
Minneapolis, MN 55454
Phone: 612-333-4646

Crowne Plaza Northstar Hotel
618 2nd Avenue South
Minneapolis, MN 55402
Phone: 612-338-2288

DoubleTree Guest Suites Minneapolis
1101 LaSalle Avenue
Minneapolis, MN 55403
Phone: 612-332-6800

Grand Hotel
615 Second Avenue South
Minneapolis, MN 55402
Phone: 612-373-0407

Hampton Inn & Suites Minneapolis Downtown
19 North 8th Street
Minneapolis, MN 55403
Phone: 612-341-3333

Hilton Garden Inn
1101 4th Avenue South
Minneapolis, MN 55404
Phone: 612-339-6633

Holiday Inn Express Hotel & Suites Downtown Minneapolis
225 South 11th Street
Minneapolis, MN 55403
Phone: 612-341-3300

Hotel Minneapolis
215 4th Street South
Minneapolis, MN 55401
Phone: 612-340-2000

Hyatt Place Minneapolis Downtown
425 South 7th Street
Minneapolis, MN 55415
Phone: 612-333-3111

Loews Minneapolis Hotel
601 1st Avenue North
Minneapolis, MN 55403
Phone: 612-667-1100

Marquette Hotel
710 South Marquette Avenue
Minneapolis, MN 55402
Phone: 612-333-4545

Millennium Hotel Minneapolis
1313 Nicollet Mall
Minneapolis, MN 55403
Phone: 612-332-6000

Minneapolis Marriott City Center Hotel
30 South 7th Street
Minneapolis, MN 55402
Phone: 612-349-4000

Radisson Blu Minneapolis
35 South 7th Street
Minneapolis, MN 55402
Phone: 612-339-4900

Renaissance Depot Minneapolis Hotel
225 3rd Ave South
Minneapolis, MN 55401
Phone: 612-375-1700

W Minneapolis – The Foshay
821 Marquette Avenue South
Minneapolis, MN 55402
Phone: 612-215-3700

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2015 MEETING

Nov. 15-18 | Minneapolis, MN

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GENERAL INFORMATION

ESA Registration and Information Center

Registration will be held at the Minneapolis Convention Center, in the foyer of Exhibit Hall B, during the following times:

Saturday, November 14, 2:00 – 6:00 PM*
Sunday, November 15, 7:00 AM – 9:00 PM
Monday, November 16, 7:00 AM – 5:00 PM
Tuesday, November 17, 7:00 AM – 5:00 PM
Wednesday, November 18, 7:00 AM – 12:00 PM

Registration and Information Center phone number: 612-335-6651

Attendees can pick up their registration materials at the Registration Center. ESA staff are always available to answer your questions.

*Note: Pre-registrants may pick up their Annual Meeting badge and credentials from 10:00 AM – 2:00 PM on Saturday in the foyer of Exhibit Hall B of the Minneapolis Convention Center.

Cancellation and Refund Policy

ESA will honor cancellation refunds in full for its Annual Meeting until 5:00 PM EST, October 2, 2015. Partial refunds will be granted for requests submitted October 3–19, 2015 (20 percent service charge will apply). No refunds will be granted for cancellations received after October 19, 2015. Please submit cancellation requests via e-mail to nwilloughby@entsoc.org. Requests can also be faxed to 301-731-4538. All refunds will be processed after the Annual Meeting, and no refunds will be made for on-site registrations.

Any tour reservation must be cancelled no later than October 2, 2015, to receive a refund. If insufficient tour enrollment causes a professional or destination tour to be cancelled, ESA will issue a full refund after the meeting closes.

Certificates of Presentation and Attendance

Presenters can download and print on-site certificates of presentation and attendance in the Presentation Preview Room (PPR) in 201 B in the Minneapolis Convention Center after their presentation has taken place. For hours of operation of the Presentation Preview Room, please see page 27. Attendees who did not present during ENTOMOLOGY 2015 may request certificates of attendance at the ESA Registration and Information Center.

Certificates will also be available for download via Speaker's Corner after the conference ends; a personalized link will be provided after the Annual Meeting.

Business Center

The on-site UPS Business Center offers a variety of services right from the main floor of the Convention Center, offering all of the amenities of a UPS store. Your shipping, copy, binding, printing, and signage needs can be handled on-site prior to or during ENTOMOLOGY 2015. From last-minute supplies to overnight shipping, the Business Center is available to serve your business demands.

The UPS Business Center is set up to print your posters in advance and have them available for on-site pickup within the convention center. PDFs of your poster presentation may be submitted online in advance of the meeting. Payment may be made online or on-site during pickup. For more information or to submit your poster, please visit: theupsstorelocal.com/6479.

Phone: 612-335-6295; E-mail: store6479@theupsstore.com; Web: theupsstorelocal.com/6479

Career Center

The Career Center will be set up in Exhibit Hall BC in the Minneapolis Convention Center. Review current position openings and/or drop off your résumé. Operating hours are:

Sunday, November 16, 7:10 – 9:00 PM
Monday, November 17, 9 AM – 6 PM
Tuesday, November 18, 9 AM – 6 PM
Wednesday, November 19, 9 AM – 4:30 PM

Code of Conduct

By attending ENTOMOLOGY 2015, you agree voluntarily to abide by our ethics policy.

Authorship: All authors connected to a presentation and/or abstract must agree on all information contained in the presentation. Failure of an author to agree to the presentation format will lead to the presentation being withdrawn from the conference.

An author who submits a presentation to the Annual Meeting must have intentions of attending, registering, and presenting at the meeting once the submission is accepted into the program. Repeated or consecutive last-minute cancellations by presenters may result in future submissions being denied.

Harassment and Safety: ESA is dedicated to providing a safe, hospitable, and productive environment for everyone attending our events, regardless of ethnicity, religion, disability, physical appearance, gender, or sexual orientation. It is important to remember that a community where people feel uncomfortable or threatened is neither healthy nor productive. Accordingly, ESA prohibits intimidating, threatening, or harassing conduct during our conferences. This policy applies to speakers, staff, volunteers, and attendees. Conference participants violating these rules may be sanctioned or expelled from the conference, at the discretion of ESA leadership.

Harassment of ESA participants will not be tolerated in any form. Harassment includes offensive gestures or verbal comments related to ethnicity, religion, disability, physical appearance, gender, or sexual orientation in public spaces, deliberate intimidation, stalking, following, harassing photography or recording, sustained disruption of talks or other events, inappropriate physical contact, and unwelcome attention. Participants asked to stop any harassing behavior are expected to comply immediately.

If a participant or exhibitor engages in harassing behavior, ESA leadership may take any action they deem appropriate, ranging from a simple warning to the offender to expulsion from this and future conferences. If you are being harassed, notice that someone else is being harassed, or have any other concerns, please do not hesitate to contact ESA staff who can work with appropriate ESA leadership to resolve the situation.

ESA staff will be happy to help participants contact convention center/hotel/venue security or local law enforcement, and otherwise assist those experiencing harassment, to enable them to feel safe for the duration of the conference. We value your attendance, and want to make your experience as productive and professionally stimulating as possible.

Need to file a complaint? Please contact Rosina Romano, rromano@entsoc.org, 703-593-0222.

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Photography: ESA requests that attendees not take photographs or videos during sessions because they are disruptive to the presenters. If you wish to take photographs of a presentation or poster, please contact the presenter for permission. ESA reserves the right to use photographs and videos taken and testimonials given during the ENTOMOLOGY 2015 meeting for informational and promotional purposes.

Coat/Bag Check

Attendees will be able to check their coats and bags at the Coat/Bag Check located in the main foyer, near the main entrance on 2nd Avenue. ESA provides this complimentary service to you.

Cyber Café and Charging Station sponsored by syngenta®

If you left your laptop at home, we still have you covered! Just head to the Exhibit Hall (Hall BC) during regular exhibit hours, where you can use the computer stations located in the Cyber Café to check your e-mail.

Need a quick charge for your phone, tablet, or other mobile device? Charging stations will be set up in the Cyber Café with power supply and a selection of popular chargers for you to stay connected while in Minneapolis.

Daily Announcements and Messages

In addition to using the ENTO2015 mobile app, you may check last-minute announcements and messages on the bulletin board located near the ESA Registration and Information Center, located in the Exhibit Hall B foyer.

ESA Central Exhibit Booth (Booth 620)

Look for the ESA Tower in the center of the Exhibit Hall and take time to stop in to learn about ESA programs and activities. Let ESA Headquarters staff answer your questions, meet a colleague, rest your feet, and learn about the many benefits of ESA membership (which now include no page charges for ESA's print journals). Be one of the first 100 to renew your membership and receive a nice gift, purchase a publication, have your business card laminated into a luggage tag, grab a snack, or purchase an extra copy of the 2016 World of Insects calendar. Learn more about ESA's certification program and see the new ACE Study Guide. It's all here.

Curious about how 3D printing works? Stop by and enter to win a cool 3D insect made during the meeting!

Check out ESA's blog (www.EntomologyToday.org) for the latest entomological news, jobs, research, discoveries, and events.

Learn more about the ESA Science Policy Fellows program, now entering its second year. The second class of Fellows was recently selected. Stop by to learn more about the Fellows program and how ESA is working to reshape the federal funding landscape to be more appreciative and understanding of the work of entomologists. You can also learn more about how *you* could be in the next class of ESA Science Policy Fellows!

The Entomological Foundation booth is now part of ESA Central. Stop by and learn more about what the Foundation is doing to develop the next generation of scientific thought leaders, participate in the Silent Auction and Raffle, learn more about the Teacher Workshop, and find out more about how YOU can get involved with the Foundation in 2016. For more information, see the Entomological Foundation section on page 32. Be sure to stop by during the Welcome Reception on Sunday evening to participate in the Blitz Auction and bid on one-of-a-kind items available ONLY during the reception.

Special Contests and Giveaways:

1. We have a special gift for the first 100 persons who stop by the ESA booth or Registration Desk to renew their membership or join for 2016! If you renew your membership at the ESA Registration Desk, please bring your receipt to the ESA booth for your gift.
2. Audience members who live tweet the entire Student Debates using both the meeting hashtag (#entsoc15) and #ESAdebates will be entered to win a $50 Amex gift card. Come and support our students during the debates!
3. Be near the ESA booth on Wednesday at 1:00 PM for the Passport Drawing, where you'll have the opportunity to win valuable prizes donated by key exhibitors. Drop your completed ticket in the prize hopper. You must be present on Wednesday to win. Good luck!

First Aid/Medical Emergencies

If first aid services are needed while in the convention center, please call 612-335-6040 (or from any house phone, dial 2013). Please have the following information ready: (1) your exact location, (2) the nature of the emergency, (3) whether the patient is conscious, and (4) whether there are life-threatening injuries, bleeding, etc. In a life-threatening emergency, dial 911. There is one permanent First Aid Station located west of Room 101 in Lobby C.

Fitness Activities at ENTOMOLOGY 2015

5K Fun Run/Walk
Tuesday, November 17
Start Time: 6:30 AM
Fee: $35 USD after October 1 (advance registration is required)

Join your friends and colleagues for this year's 5K Fun Run/Walk, offered jointly with the Agronomy, Crops, and Soil societies. The starting line will be located a few blocks from the convention center in Loring Park, an easy walk from all the downtown hotels.

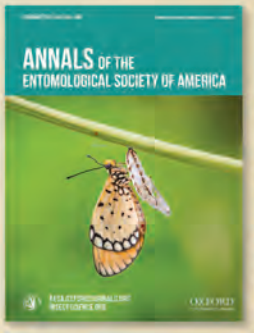
Included in the registration fee is a T-shirt, water, and snacks at the finish line. Prizes will be awarded to the top finishers during the closing plenary session. Registration for the 5K Fun Run/Walk will close at 5:00 PM on Monday, November 16; you can sign up at the ESA Registration and Information Center. Registration will not be available at the start line. You will be able to pick up your course map, T-shirt, and bib number at the Registration Center.

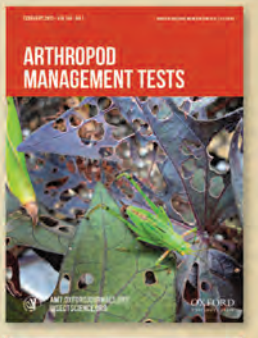
Sunrise Yoga
Wednesday, November 18
Time: 6:30 – 7:30 AM
Location: Group fitness room in the Fitness Center of the Hyatt Regency (6th floor)

Want to end your time in Minneapolis by boosting your physical, emotional, and mental well-being? Come join us for sunrise yoga on Wednesday, November 18! Local yoga teacher, Angela Schwartz, will lead you in a beginner friendly yoga practice that will refresh and relax you. We will provide mats, so just wear comfortable clothing and show up! All levels welcome!

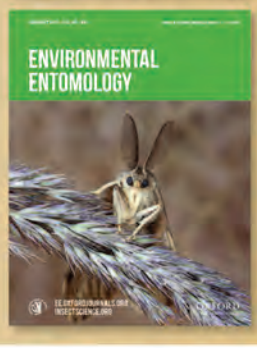
OUP Booth **505**

THE NEW FACE OF Entomology publishing





The Entomological Society of America and Oxford University Press are unveiling a new look for the ESA Publications Portfolio at Entomology 2015, and WE'RE INVITING YOU TO JOIN US!



Meet the ESA Editors Lunch: November 18

Learn about the future of publishing in entomology from the field's foremost researchers at the Meet the ESA Editors Lunch and Learn on **November 18** at **12:15 PM-1:15 PM, room 209 AB.** Prospective authors will have the opportunity to interface directly with editors from ESA publications portfolio through an informal Q&A session. The event promises to be an invaluable experience for students, early researchers and veteran researchers alike.

Join us at the Oxford University Press Booth (#505)

Visit OUP in the exhibit hall at **booth 505!** We're giving away free sample copies of ESA publications and top-line ESA publications promo items. Enter our **raffle** to win $200 worth of OUP books, take part in our booth **photo experience**, or talk to OUP representatives about our wide selection of book, journals, and online products.

Follow **@OxfordJournals** and **Hashtag #EntSoc15** on Twitter for the latest updates.

ENTOMOLOGICAL SOCIETY OF AMERICA

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Guest Hospitality

Registered guests are allowed access to the Exhibit Hall, Welcome Reception, Opening and Closing Plenary Sessions, the Linnaean Games, the Student Awards Program, and the presentation given by the primary registrant. For more information, please visit the ESA Registration and Information Center.

Internet Access

ESA is offering complimentary Wi-Fi throughout the public spaces of the convention center. Plenty of tables for networking will be positioned at various locations in the convention center, including the Cyber Café. Take advantage of free Wi-Fi to take a break with friends, network, check your e-mail, or Skype with the family back home.

Password login is not required at the Minneapolis Convention Center. Choose "synergy" to connect to the network.

Lost and Found

Check in with the staff at the ESA Registration Center if you have lost something or have found a treasure and need to turn it in. We'll do our best to help you!

Movie Night with Jorge Cham

Screening of "The PHD Movie 2: Still in Grad School," with Creator, Jorge Cham
Tuesday, November 17, 7:00 – 9:00 PM
102 A-F, Convention Center

Join your colleagues from all four societies to view a screening of the newly-released "PHD Movie 2," the independently produced sequel to the popular "PHD Movie," based on *PHD Comics* by Jorge Cham. It is a hilarious dramatization about life (or the lack thereof) in academia, readily recognized as spectacularly close to reality by any grad student or anyone who used to be a grad student – your details are different, but the experience is the same! As a follow-up, you won't want to miss Jorge Cham's entertaining talk at the Closing Plenary Session on Wednesday evening.

Complimentary popcorn and refreshments will be provided at the movie.

Mobile App sponsored by BASF, Monsanto and Cotton Incorporated

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Enhance your experience at ENTOMOLOGY 2015 by downloading the ENTO2015 mobile app. Access the latest program information and schedules, stay organized with the show dashboard, create a personal schedule, link to exhibitors, connect with other attendees, join in the show chatter with the built-in social media feeds—all from your smartphone. The app is fully integrated with the abstract management system so you will always have the latest information at your fingertips.

Downloading the app for ENTOMOLOGY 2015 is easy. For iPhone and Android, visit the App Store or Android Market on your phone and search for ENTOMOLOGY 2015.

All phone types, including those listed above, may simply point their mobile browser to m.core-apps.com/ento2015. The system will direct you to the proper app version for download to your device. Bookmark this page for easy access throughout ENTOMOLOGY 2015.

To download the ASA, CSSA and SSSA mobile app search for "MySci Mtgs" in the Apple or Android store. You do not need to enter your e-mail address to access the schedule information.

Mothers' Room

The Convention Center offers two comfortable, private spaces for nursing mothers within the Convention Center. Please stop by the ESA Registration Desk and Information Center for room locations and access information.

Press

The ESA Information Desk, located in the ESA Registration area, serves as the press desk for the meeting. Members of the media who have preregistered can pick up their press passes there. Those who have not yet registered can request passes. However, proper media credentials must be presented upon arrival at ENTOMOLOGY 2015, and the credentials must show a direct affiliation with an accredited news organization (print, TV, or radio) or membership with the National Association of Science Writers. Public information officers from universities with proper credentials and identification may also receive press passes.

Freelance journalists who do not have media credentials and a professional affiliation will not receive press passes, but exceptions will be considered on a case-by-case basis. Requests can be made by calling 301-602-8953.

Companies or organizations producing publications, videos, and/or other electronic media intended for marketing, advertising, financial analysis, or public relations purposes may not register as members of the media. ESA reserves the right to bar from this and future meetings any registered media personnel who, at the determination of the Executive Director of the ESA, misuse media privileges to engage in activities other than journalistic pursuits.

No member of the media will be permitted to record symposia, lectures, meetings, or other events without prior written permission from the ESA; and no film or videotape may be broadcast or rebroadcast without prior review and written permission from the ESA. The press contact for the ESA Annual Meeting is Richard Levine, rlevine@entsoc.org or 301-602-8953.

Refreshment Break sponsored by ESA, Bayer CropScience and Oxford University Press

BAYER · OXFORD UNIVERSITY PRESS

ESA, in partnership with Bayer CropScience and Oxford University Press is delighted to provide a complimentary coffee and hot tea in the Exhibit Hall each morning at 9:30 AM. Be sure to join us for your morning cup of coffee and networking opportunity.

Social Media at ENTOMOLOGY 2015

Get connected to ENTOMOLOGY 2015 before you arrive in Minneapolis. ESA is connected to you via social media in a variety of ways. Use the conference hashtag **#entsoc15** to share your ENTOMOLOGY 2015 and Minneapolis experiences with your fellow attendees. The top 10 users of the hashtag will receive Amex gift cards again this year!

Twitter:
ESA staff and volunteers will be using Twitter for live updates, highlights from sessions, and more. Follow us by visiting twitter.com/EntsocAmerica. Twitter users can simply login and click "follow." View and participate in conversations about ENTOMOLOGY 2015 on Twitter by using the hashtag #entsoc15. Don't have a Twitter account? You can still view our updates and even bookmark the ESA Twitter webpage.

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Join us on Instagram via the ENTOMOLOGY 2015 mobile app and post the best photos of your experiences in Minneapolis using the hashtag #entsoc15.

LinkedIn and Facebook:
ESA and the ESA Certification Corporation are on LinkedIn (entsoc.org/LinkedIn) and Facebook (entsoc.org/facebook). Join our groups to connect to colleagues, friends, and new contacts in advance of the conference and start making plans for Minneapolis!

YouTube:
View videos from previous conferences on our YouTube Channel (www.entsoc.org/youtube). View the ENTOMOLOGY 2015 videos as they are posted or hear the highlights planned for this year's conference!

Student volunteers will be shooting video throughout the meeting to upload to the ESA Channel on YouTube. Videographers also will be interviewing presenters and others during the meeting. You could be on ESA's YouTube channel!

Tours

Twin Cities Highlights Tour / Mall of America
Dates: Saturday, November 14, and Sunday, November 15
Time: 10:00 AM – 4:00 PM (2:30 & 3:30 departures from the Mall of America)
Fee: $36
Location: Meet at the ESA Registration and Information Center

Start off on a three-hour tour of the Twin Cities, Minneapolis and St. Paul, before spending time shopping at the Mall of America! Explore the famous Nicollet Mall, Skyway network, theater district, Minneapolis Sculpture Garden, Guthrie Theatre, Milwaukee Train Depot, Orchestra Hall, the television home of Mary Tyler Moore, and St. Anthony Falls, the birthplace of Minneapolis.

A short stop will be made at Minnehaha Falls to see Minnesota's oldest tourist attraction. This is where the 22-mile Minnehaha Creek, which flows from Lake Minnetonka through the western suburbs of Minneapolis and into the city, dives over the falls and into the Mississippi River. The 53-foot falls have been immortalized in Henry Wadsworth Longfellow's "Song of Hiawatha" and are visited by thousands of tourists and locals every year.

In St. Paul, explore Rice Park, Ordway Center for the Performing Arts, Landmark Center, Children's Museum, Mickey's Diner, the Fitzgerald Theater (where Garrison Keillor performs his live radio show, *A Prairie Home Companion*), Minnesota History Center, and the Minnesota State Capitol, considered the second most beautiful capitol building in the United States. See the magnificent Cathedral of Saint Paul, the fourth largest cathedral in the United States, with seating for 3,000 people. Built in the classical Renaissance style of architecture, the cathedral dome is modeled after St. Peter's Basilica in Rome.

Following the city tour, you will have the option to be dropped off at the renowned Mall of America for three hours of shopping time. Attendees who do not wish to visit the Mall of America may choose to depart the tour prior to going to the mall.

Upper Midwest Organic Agriculture Tour
Date: Saturday, November 14, 2015
Time: 7:30 AM – 4:30 PM
Fee: $70 after October 1
Location: 12th street entrance, bus departure area

The upper Midwest is a leader in the organic and local food movements, supporting diversified organic production, as well as novel distribution and training models. This tour will highlight both urban and rural organic farms in the Twin Cities area, producing vegetables and dairy. Tour stops also include beginning and minority training programs for organic farmers, as well as a distribution center for organic produce.

Bell Museum of Natural History
Curator Tours of the Diorama Hall and Peregrine Falcon Exhibit
Date: Monday, November 16, 2015
Time: 1:00 – 3:30 PM
Fee: $40 USD per person
Location: Meet at the ESA Registration and Information Center

Delve into the Bell Museum's iconic dioramas from the perspective of a museum curator. One of our resident experts will help you engage with the art, history, and science that make the diorama displays an inimitable resource for environmental learning against the backdrop of sweeping global and local changes to climate, habitats, ecosystems, and wildlife populations. From a busy lodge of taxidermy beavers to a prairie molded in delicate hand-painted wax—your Bell Museum curator will lead the discussion into how and why dioramas were made, how they are maintained and preserved, and what they can tell us about the history and future of Minnesota's natural world. In addition to touring the acclaimed dioramas, you'll also tour a brand-new exhibit for the fall of 2015 featuring the peregrine falcon. The Raptor Center at the University of Minnesota has been working to reintroduce the peregrine falcon into Minnesota.

The Bell Museum is part of the University of Minnesota campus and located just across the river from downtown Minneapolis.

Ecolab's Global Research, Development, and Engineering Center
Date: Tuesday, Nov. 17th
Time: 1:15 – 5:00 PM (bus leaves at 1:30 PM)
Fee: $10
Location: Meet at the ESA Registration and Information Center

This tour is only being offered to students, student transition, and early professionals.

Ecolab Pest Elimination invites you to visit the Ecolab's Global Research, Development, and Engineering Center in Eagan, MN. Meet the Pest Elimination Research and Development Team, tour the facility, and learn more about how the team supports the Pest Elimination Division. Get an up close view of the Pest Elimination Lab and an overview of how the Pest R&D team evaluates products, develops new technologies, and delivers premium pest elimination services to our commercial customers world-wide. The tour includes transportation and refreshments.

As a trusted partner at more than one million customer locations, Ecolab (ECL) is the global leader in water, hygiene and energy technologies and services that protect people and vital resources. With 2014 sales of $14 billion and 47,000 associates, Ecolab delivers comprehensive solutions and on-site services to promote safe food, maintain clean environments, optimize water and energy use and improve operational efficiencies for customers in the food, healthcare, energy, hospitality and industrial markets in more than 170 countries around the world. For more Ecolab news and information, visit www.ecolab.com.

Behind the Scenes: AVEDA—Connecting Beauty, Environment, and Well-Being
Date: Wednesday, November 18
Time: 9:30 AM – 1:30 PM
Fee: $55 USD (lunch included)
Location: Meet at the ESA Registration and Information Center

The art and science of pure flowers and plant essences is the core of AVEDA. The AVEDA mission is to care for the world we live in, from the products they make to the ways AVEDA gives back to society. At AVEDA, they strive to set an example for environmental leadership and responsibility, not just in the world of beauty, but around the world.

This tour will take you to the AVEDA Institute for an enlightening visit to see firsthand the famous facility. You will be guided through and learn about the chemistry behind the world-renowned products.

The visit will include a special spa service, a gift of AVEDA products, and an opportunity to shop the Aveda store with purchases at a discount. After the tour, guests will enjoy lunch at the Common Roots Café, featuring hand-crafted food made with local ingredients from local farmers raising animals for meat and dairy in a sustainable way, and growing grain organically.

Trainings and Workshops

Workshop: ASReml-R: Analysis of Breeding Trials
Saturday, November 14, 8:00 AM – 5:30 PM
L100 A, Convention Center
Fee: $140 USD after October 1

This workshop will focus on the fundamentals of using the ASReml-R version (with optional support on ASReml standalone) for the analysis of genetic data arising mainly from agricultural, animal, and forestry breeding programs. However, the course places emphasis on agriculture, forestry, and fisheries. ASReml-R is a statistical software (and library in R) that fits linear mixed models using REML methodology, and predicts BLUP (or EBV) values. Genetic concepts required for the construction of appropriate linear models will be addressed, together with understanding the ASReml interface, inputting and manipulating data, and proper construction/specification of linear models (and their variance structure). In addition, some extensions on the use of complex statistical designs and on genetic/biological interpretation of the results will be discussed. This workshop is strongly oriented to the practical aspect of analysis of real, complex, and messy datasets. It is recommended to have some prior understanding of linear mixed model methodology and genetic theory, and that you are familiar with R (www.r-project.org). The main topics discussed will be univariate analyses of animal (individual) models, half-sib families, and full-sib families, together with a presentation of multivariate and multienvironment trials studies and spatial analyses. The course will also include presentations of genomic selection and the use of ASReml-R to perform GBLUP analyses.

Facilitator: Salvador Gezan, School of Forest Resources & Conservation, University of Florida

Analyses of Microbial Community and Metagenomics Using QIIME
Sunday, November 15, 8:30 AM – 4:30 PM
L100 A, Convention Center
Fee: $135 USD after October 1

This workshop will focus on the analysis of soil microbial communities with different formats of metagenomics data using QIIME. At the end of the workshop, participants will learn the different next-generation sequencing platforms, resources, and data analysis and how they may be applicable to their research. They will also learn how the different databases and bioinformatics analyses tools may be accurately and efficiently used.

Facilitator: Mark Ibekwe, U.S. Salinity Laboratory

Meta-Analysis for the Synthesis of Evidence in Agriculture
Sunday, November 15, 9:00 AM - 4:30 PM
L100 C, Convention Center
Fee: $140 USD after October 1

Meta-analysis is the analysis of the results of multiple independent studies, and is typically performed to synthesize evidence from many possible sources in a formal quantitative manner. In the simplest and most common case, the outcome of each study becomes a single observation in the meta-analysis of all available studies. The discipline developed originally in the social sciences in the 1970s, based on earlier pioneering contributions by Fisher, Pearson, Yates, and Cochran, and has now been embraced within many scientific disciplines, especially in medical research. Since 1980, over 80,000 journal articles have been published that either use the method or expand on the procedure. After a very slow start, agricultural scientists are now applying meta-analytic methods to a range of problems. This workshop will cover basic concepts and approaches in meta-analysis, and show how to estimate parameters and interpret results. Common methods for expanding the meta-analytical model to account for study-level characteristics (so-called moderator variables) and for multiple treatments per study will be reviewed. The advantages of meta-analysis will be presented in terms of prediction and high statistical power; the major (potential) disadvantage, bias, will also be discussed. Methods will be explained using SAS software, including the use of specialized macros. R code will also be shown for some applications. Attendees should bring a laptop with SAS 9.3 or later, or the free SAS University Edition, installed.

Facilitator: Kathleen Yeater, Statistician, U.S. Department of Agriculture

Big Data Meets Insect Ecology: Examining Insects Continentally using NEON Data and R
Sunday, November 15, 1:00 – 3:00 PM
208 AB, Convention Center
No advance registration required

The National Ecological Observatory Network (NEON) is a long-term observatory created to inform our understanding of ecosystem change in response to climate and land-use change and species invasions at the scale of an entire continent. NEON is collecting abundance and diversity data on ground beetles (Carabidae), mosquitoes (Culicidae), and ticks (Ixodidae) at 60 sites over 30 years beginning in 2017. NEON will also provide data on key insect-transmitted pathogens for a subset of collected mosquitoes and ticks, allowing researchers to investigate the relationship between disease spread and global change variables. Currently, NEON is ramping up its monitoring network and is producing high-quality preliminary data that is freely available to the public via an online data portal. These data provide the opportunity to delve into the world of Big Data and to use the tools that are increasingly important in ecological research. At this workshop, we will use R to conduct exploratory analyses on ground beetle data that are currently available via the NEON data portal. This workshop will highlight the multiscale nature of the sampling protocols by connecting beetle data to other variables measured by NEON (i.e., weather, plant communities, etc.).

Facilitator: Katherine LeVan, Insect Ecologist, National Ecological Observatory Network, Boulder, CO

5 GREAT WAYS TO BUILD THE FUTURE OF ENTOMOLOGY...

The Entomological Foundation is building the future of our profession by supporting the needs of educators in grades K-12. We promote science literacy through insect-based education. Please help support our work through these exciting events. Stop by the ESA Booth in the Exhibit Hall to learn more.

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1 The ***Blitz Auction*** features some incredible one-of-a-kind items that will be available ONLY during the Welcome Reception on Sunday night (Nov 15). You won't want to miss these. Items include:

- a song written for you by John Acron, TV's "The Nature Nut", past winner of the Entomological Foundation's Medal of Honor
- a *Buzzwords* column about a subject of your choosing by National Medal of Science winner and 2016 ESA President May Berenbaum
- a $100 dinner Monday evening (Nov. 16, 7pm) for 2, here in Minneapolis, with ESA Fellow Sonny Ramaswamy
- a private Washington DC tour of the Smithsonian' NMNH's incredible insect collection with the Acting Collections Manager, Floyd Shockley

2 The ***Entomological Fondation Raffle*** will be your chance to win one of a couple of great prizes, featuring an iPad mini or even an ICE VIP package to include:

- Free VIP registration to the 2016 International Congress of Entomology
- Free roundtrip airfare for ICE
- Free suite accommodations for 6 nights in Orlando during ICE
- Free roundtrip airport ground transportation to ICE
- Free 2 gala tickets at ICE
- Free VIP seating at the farewell ICE dinner
- Free invitation to the Governing Board reception at ICE

Raffle tickets are $5 for 1, $10 for 3, $15 for 5, or $20 for 10 tickets and a free Insect Diversity poster. Buy your raffle tickets online prior to the meeting, or in the ESA Booth on the Exhibit floor. Drawing will be Wednesday evening. See www.entfdn.org/pr_raffle.html for details.

3 The ***Silent Auction*** is always one of the most popular events at the ESA Annual Meeting. Featuring donations from our supporters and vendors, this is a great chance to do some early holiday shopping for many insect-themed items and support the future of your profession at the same time. Bid early, bid often from Sunday through Wednesday at 1pm.

4 Let's face it. Nothing says "I support entomology" quite like cash. We are working hard to fulfill the needs of educators and need your support to make that happen. ***Please join us and financially support*** the Entomological Foundation as part of your annual ESA renewal, year-end philanthropy, or just because. Donate year-round at www.entfdn.org.

5 This is a new era for the Entomological Foundation. We need your input, support, and ***volunteerism*** to help direct our efforts in the failure. There are committe openings now and you can sign on to help build our future. Stop by the ESA Booth to learn how you can become more involved. Volunteers are needed to help at the ICE 2016 Insect Expo, next year's Educators Workshop, and with other projects. Volunteer Today!

Data Handling and Analysis Tricks They Don't Teach You in Grad School
Sunday, November 15, 1:30 - 5:00 PM
L100 B, Convention Center
Fee: $75 USD after October 1

This hands-on workshop is intended for graduate students and upper-level undergraduate students only. This is a hands-on workshop for which you are expected to bring a laptop. Are you overwhelmed by your data? Are you unclear about the concept of data organization? Are you wondering about efficient data handling procedures? If you are, this workshop is for you. We will teach you basic data handling techniques using common tools such as EXCEL, JMP, and SAS. What you do at the front end of your data analysis project will affect how efficiently you can complete this work. To paraphrase Ralph Waldo Emerson, "Data analysis is a journey, not a destination."

Facilitator: Edzard van Santen, College of Agriculture, Auburn University

Mechanical Measurements of Crops and Soils: Principles and Techniques
Monday, November 16, 11:00 AM – 1:30 PM
Rochester Room, Hilton Minneapolis
Fee: $135 USD after October 1

Characterizing the mechanical response of plant tissues and addressing agricultural problems such as root lodging, stalk lodging, and fruit drop requires accurate measurement of mechanical forces. This workshop will describe engineering best practices for acquiring such measurements and discuss common pitfalls and measurement errors. Topics to be covered include (1) standard test types (tension, bending, compression, and shear); (2) standard instrumentation for measuring forces; (3) methods for measuring deformation and strain; and (4) common problems encountered in performing mechanical tests and strategies for avoiding these problems. Participants will leave the workshop with a much better understanding of how to design, perform, and evaluate mechanical testing techniques and methodologies.

Facilitator: Douglas Cook, New York University Polytechnic School of Engineering

Making a Compelling Science Message
Monday, November 16, 1:30 – 3:30 PM
Tuesday, November 17, 10:00 AM – 12:00 PM
Board Room 1, Hilton Minneapolis
Fee: $25 USD after October 1

Have you ever thought, "I wish people understood what I did?" or, "Why doesn't everyone value my science?" We designed this workshop to help you…and our Societies…develop clear science messages for the public.

In this workshop, you will learn how to define your audiences; create compelling messages for each audience; frame your messages to be audience-relatable; and generate story ideas that interest journalists. This is a hands-on workshop, so bring at least two rough drafts of different messages or communications objectives you want to refine. Roll up your sleeves and work with other scientists and our science communications team to hone your message and work successfully with the public. Bring your computer and be ready to write and edit messages!

Facilitator: Susan Fisk, Director of Public and Science Communications, Alliance of Crop, Soil, and Environmental Science Societies

Women in Science "Breaking the Bias Habit" Workshop/ Reception: A Special Joint Program of the ACS Women in Agronomy, Crops, Soils, and Environmental Sciences Committee and the Women in Entomology Committee
Tuesday, November 17, 2:00 – 5:00 PM
102 A-F, Convention Center
Fee: $10 USD for students/$25 USD for nonstudent members

This special workshop is an important venue to address critical issues facing women scientists while providing opportunities to promote women in science and in the Societies. This program provides a unique opportunity for students to network with established scientists and the Societies' leadership. It is our objective to improve the attendance of students in these programs that may lead to greater involvement with the Societies in the future. This year the ACS program, held in conjunction with the Women in Entomology Committee, includes a keynote speaker with an interactive presentation on "Breaking the Bias Habit to Promote Gender Equity." This workshop will include interactive exercises to illustrate the existence of unconscious or implicit gender biases, will show how these biases may play out in work settings, and will provide evidence-based strategies that can be used to minimize their impact. Participants will be asked to complete an "Implicit Association Test" prior to the workshop.

Keynote: Jennifer Sheridan, Women in Science & Engineering Leadership Institute, University of Wisconsin, Madison

Marketing for Scientists
Wednesday, November 18**,** 8:15 – 9:45 AM
208 AB, Convention Center
Fee: $10 USD

Dr. Kuchner is an astrophysicist who never planned on learning about marketing. In his career, as he applied for grants and tried to help his students get jobs, he noticed that many great scientists are not so good at delivering a clear message about what they do. The usual education of a scientist does little to teach the powerful tools business professionals use to win support for their ideas.

This workshop will teach you how to use business and marketing tools to promote yourself and your work. The workshop aims to introduce scientists to the fundamental techniques drawn from the business world that matter most to them, like sales, branding, and relationship building.

This workshop will teach scientists how to get their ideas across vividly while maintaining their integrity and building the outstanding reputations they need.

Learn more at http://marketingforscientists.com/

Facilitator: Dr. Marc Kuchner, NASA Goddard Space Flight Center Exoplanets and Stellar Astrophysics Laboratory

A **Grand Challenge** Agenda for Entomology

Convening the global community of entomologists to improve the human condition

As the largest insect-science society in the world, the Entomological Society of America is convening a global initiative to engage and empower other entities worldwide to take on grand challenges we face in the coming decades.

The effort will bring together top scientists, policymakers, industry groups, NGOs, funders, and other organizations to create alliance-based coalitions to implement sustainable solutions to some of the world's insect-based problems.

The initial project will focus on improving management of *Aedes aegypti* in the Americas.

Learn more about upcoming meetings, the esteemed Board of Advisors, how you can support this important initiative, and subscribe to updates — **www.entomologychallenges.org**

UPCOMING EVENTS:

- Brazilian Congress of Entomology Latin American Congress of Ent. (Mar. 2016)
- Grand Challenge Summit at ICE 2016 (Orlando, Sept. 2016)

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esa@entsoc.org

University Entomology Clubs

Club representatives will be available to sell T-shirts and more in ESA's Exhibit Hall (Hall BC) during normal exhibit hall hours. As of August 2015, the list of clubs participating includes the following:

Clemson University Entomology Club
Iowa State University Entomology Graduate Student Organization
Louisiana State University
Mississippi State University Entomology & Plant Pathology Club
North Carolina State University Entomology Graduate Student Association
Penn State Entomology Graduate Student Association
Rutgers University Graduate Entomology Student Association
Texas A&M University Entomology Graduate Student Organization
The Ohio State University Entomology Graduate Student Association
University of Arizona Entomology Graduate Student Association
University of California, Davis, Entomology Graduate Student Association
University of California, Riverside, Entomology Graduate Student Association
University of Illinois Entomology Graduate Student Association
University of Kentucky H.G. Garman Entomology Club
University of Maryland Entomology Student Organization
Utah State University Entomology Club

The Entomological Foundation

Many volunteers and donors support the Entomological Foundation throughout the year and we could not fulfill our mission without their support. Branch volunteers and donors were reported to ESA HQ by the Branch Presidents. Any omissions are regretted. The Entomological Foundation appreciates all donations, including those that were made anonymously and all who made bids at the National and Branch meeting silent auctions. Financial donors* (August 24, 2014-July 31, 2015):

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Beverly Sparks
Nan-Yao Su
Karen M. Vail
Michelle Walters
Steve and Janet Yaninek
Megan Ayers
Victoria Bayless
Leslie Bethke
Seth Bybee
Juli Carrillo
Yian Chen
Clarence Levi Coleman
Will T. Crites, BCE-Em.
Joel Dinglasan
G. I. Erdosh
Stanton A. Gill
Roger W. Graham, ACE
David B. Hogg, BCE
Judy A. Johnson
Diana Kearns
Terry A. Klein
Robert J. Lavigne
J. Isabel Lopez-Arroyo
Albert S. Marulli
Chase Metzger
Moufied A. Moussa
Larry D. Novy, BCE
Reno Parker
Parthasara Ramaseshadri
Silvia Rondon
Chanpreet Sheena Sidhu
Sherry Spriggs
Qian Sun
Stacey L. Vigil
Donald Weber
Donald Yee

* ESA began recording donations on behalf of the Entomological Foundation as of 1/1/2015. While most donations received prior to that time are noted in this list, it is possible that some were omitted. We regret any omissions.

PROGRAM INFORMATION

Uploading Presentations

Upload your presentation at least 24 hours before your session.

Please be aware that if you want to upload your file on the day of your presentation, you can only do so in the presentation room itself, before the start of the session or during the short break (if one is scheduled). It is not the responsibility of the ESA Program Committee nor the moderator if there is not enough time available to upload the talk. If you are unable to upload your talk (even just a draft) the day prior to your assigned time, it would be considerate to contact the moderator to explain the delay and when you plan upload the file. **If using video files or unusual file-types embedded in your presentation, you must stop by the Presentation Preview Room (PPR), 201 B, to test the presentation within our system**. Student volunteers and Confex employees will be available if you run into problems and need advice. It is always a good idea to bring a backup copy of your presentation on a flash drive.

The PPR room is located in 201 B of the Convention Center. Operating hours are as follows:

Saturday, November 14, 2:00 – 6:00 PM
Sunday, November 15, 7:00 AM – 6:00 PM
Monday, November 16, 7:00 AM – 6:00 PM
Tuesday, November 17, 7:00 AM – 6:00 PM
Wednesday, November 18, 7:00 AM – 12:00 PM

Moderator Training

Moderators for symposia, student competition sessions, and 10-minute paper sessions must attend one of the moderator training sessions. Here you will receive details on equipment operation, light controls, and other responsibilities. The audiovisual and Confex representatives will be available to answer your questions. Moderators must keep the program on schedule and **not advance talks in the schedule if one is withdrawn**. In case of tardy file uploads by presenters, the moderators have the right to refuse a presentation, especially if the delay threatens disrupting the rest of the schedule. All moderator training sessions will be held in 205 A in the Convention Center. Following are the dates and times for the training sessions:

Sunday, November 15, 7 – 7:30 AM or 12 – 12:30 PM
Monday, November 16, 7 – 7:30 AM or 12:30 – 1PM
Tuesday, November 17, 7 – 7:30 AM or 12 – 12:30 PM
Wednesday, November 18, 7 – 7:30 AM

Judges' Training

Judges for the student competitions must attend one of the judges' training sessions. Here you will receive details regarding the judging process, criteria, and reporting. All judges must submit their scores (to Confex) by 6:30 PM on Monday, November 16.

All judges' trainings will be held in 200 E in the Convention Center. The dates and times for the training sessions are as follows:

Sunday, November 15, 12:30 – 1:00 PM or 2:30 – 3:00 PM
Monday, November 16, 7:00 – 7:30 AM

Lunch and Learn Sessions

You have a great opportunity to get together with friends and colleagues after the morning sessions, have lunch together, and learn something new all at the same time. Concession options will be available near the Lunch and Learn meeting rooms, so you can quickly purchase your lunch and enjoy it during the presentation.

There will be seven Lunch and Learn sessions this year:

Exploring Careers in Extension—Advice for Students and Early Professionals
Sunday, November 15, 12:15 – 1:15 PM
209 AB, Convention Center

The goal of this panel is to provide students and early professionals insight into what careers are available in extension. The panel will discuss the experience, skills, and training necessary to secure a position in extension and to be successful in that position. A large portion of the Lunch and Learn will be reserved for questions from the audience—so come prepared with questions!

Organizer: Rebecca Schmidt-Jeffris, New York State Agricultural Experiment Station, Cornell University

Panelists: Elizabeth Beers, Washington State University; Rachel Elkins, UC Cooperative Extension, University of California; Casey Hoy, Ohio Agricultural Research and Development Center, The Ohio State University; and Jonathan Larson, UNL Extension, University of Nebraska, Lincoln

Fitting the "Narrative": How Media Hype Can Hijack Your Research Findings
Sunday, November 15, 12:15 – 1:15 PM
208 D, Convention Center

Once published in the public domain, research scientists may find themselves dealing with media misconceptions. This session will use case studies of neonicotinoid research to demonstrate how research is refracted through the media and the pitfalls for scientific investigators that this dynamic entails.

Moderator: G. Philip Hughes, White House Writers Group

Panelists: Christopher Cutler, Dalhousie University; Scott Stewart, University of Tennessee; David Zaruk, Vesalius College, Brussels Institute for European Studies

Managing Job Transitions as an Early Professional (STEP sponsored)
Monday, November 16, 12:45 – 1:45 PM
209 AB, Convention Center

Learn about the unique opportunities and challenges early professionals encounter when transitioning jobs, from a panel of early professionals of varied career paths who have successfully managed the job transition process. How can you best achieve personal and career development during this time? How can you maintain life balance? How do you highlight your transferable skills? What are opportunities to seize and pitfalls to avoid? What are the most important practices to successfully navigate the transition? This session will help you prepare for and navigate this unique time in your career. Boxed lunch is provided for the first 50 participants who are preregistered. Advance registration is encouraged.

Moderators: Therese Cira, STEP Committee Chair, University of Minnesota; Ana Maria Velez, University of Nebraska, Lincoln

Panelists: Mitchell Stamm, BASF; Bob Koch, University of Minnesota; Zach Rystrom, Diamond Ag and Research; Tamra Reall Lincoln, USDA; Andrine Shufran, Oklahoma State University

Preparing for the Future: What Every Student Should Know About Getting a Job or Finding a Career
Tuesday, November 17, 12: 00 – 1:15 PM
209 AB, Convention Center

This Lunch and Learn will immediately follow the symposium on the same topic, allowing students to interact with the session speakers in an informal session. The goal of the symposium is to inform students about what to expect during the interview process, introduce students to career options that don't fully focus on entomology, and give students the opportunity to talk to recruiters and ESA members about career options. This session will focus on the theme "Partnering for Solutions" to engage traditional entomologists with public health officials, teachers, and others who have entomology degrees but have nontraditional careers. Participants will learn tips on how to write a cover letter, what to expect during an interview, what careers in entomology are considered alternative, and what elective courses should be taken prior to graduation to help with their future career choices.

Boxed lunches provided to the first 50 participants.

Moderators: Janet Hurley, Texas A&M AgriLife Extension Service; Robert Davis, BASF Corporation

Science Policy: Fellows, Funding, and the Federal Future of Entomology
Tuesday, November 17, 12:15 – 1:15 PM
207 AB, Convention Center

Scientists have the knowledge and experience to uniquely communicate the importance of federal investment in entomology, as well as the need to consider entomological issues when developing federal programs and policies to address societal challenges. Understanding how your voice can be raised and heard is an important part of engaging federal policymakers. Learn from the experts! ESA's first class of Science Policy Fellows will join ESA staff and representatives from our advocacy firm in Washington, DC, to discuss how federal funding decisions can affect your science and your career. The program will review the federal science landscape, forecast the outlook for next year leading up to the 2016 election, and provide an update on ESA's involvement in science advocacy.

Boxed lunches provided to the first 50 participants.

Moderator: Alison Thompson, Lewis-Burke Associates

Meet the ESA Editors
Wednesday, November 18, 12:15 – 1:15 PM
209 AB, Convention Center

This ESA-sponsored Lunch and Learn offers prospective authors the opportunity to interface directly with editors-in-chief and editorial staff from the ESA publications portfolio. Learn best practices for researching, writing, editing, submitting, and reviewing manuscripts, and get the editors' take on the state of the field and its future. Informal Q&A breakout sessions will give attendees the opportunity to address questions regarding specific ESA journals and publications. This event will be an invaluable experience for students, early researchers, and veteran researchers alike.

Boxed lunches provided to the first 50 participants.

Panel: E. Alan Cameron, Pennsylvania State University (Emeritus); Eric T. Natwick, BCE, University of California; William K. Reisen, University of California; Marlin E. Rice, DuPont Pioneer; Kevin L. Steffey, Dow AgroSciences; Kelley Tilmon, South Dakota State University; John T. Trumble, University of California; Phyllis G. Weintraub, Agricultural Research Organization; James B. Woolley, Texas A&M University

Perspectives on Sustainably Supporting the Human Populace in the Future
Wednesday, November 18, 12:00 – 1:30 PM
102 A-F, Convention Center

This town-hall style session aims to attract a diverse set of conference attendees. It will present different perspectives on how global societies can meet the food, fiber, and energy needs of the future and sustainably support a population of 9 billion by 2050 under conditions of global change. Agricultural industries and public research communities must develop technologies that enhance agricultural productivity on a diminishing base of land and water resources, impacted by a projected change in climate. The push for new technologies also needs to be balanced by adequate consideration for long-term sustainability of Earth's resources and equitable social conditions.

Each speaker will provide a high-level perspective on the above issue. Although it is not intended to be overly provocative, this session aims to present different perspectives. Some of the specific talking points to be considered include the following:

- What technologies are needed to meet the agricultural production goals, and will the technological trends be sustainable?
- Which resources will become most threatened or limited?
- What factors are likely to be significant in terms of determining future agricultural and environmental sustainability?
- What role will the scientific and professional communities play?
- How should early-career professionals prepare for this future?

Organizer: Ronald F. Turco, Purdue University
Moderator: Manjit Misra, Iowa State University

Presenters: Allan Felsot, Washington State University; David Fischhoff, The Climate Corporation; Sieglinde S. Snapp, Michigan State University; Ricardo J. Salvador, Union of Concerned Scientists

Premier Presentations

For the first time, ESA leaders have selected 20 Premier Presentations for ENTOMOLOGY 2015. Five presentations from each of the ESA Sections are being highlighted during the meeting. Each of the speakers will also be interviewed onsite for a two- to three-minute video that will be posted online, further highlighting their work.

Premier Presentations are designated in their symposia with the words "Premier Presentation" bolded in front of the presentation title, as well as being highlighted in gray. For your convenience, a complete listing of this year's Premier Presentations can be found on page 10 of the Program Book.

ESA Plenary Session & Founders' Memorial Lecture

Sunday, November 16, 3:30 – 5:30 PM
Auditorium, Convention Center

Call to Order, Welcome, Introductions, Remembrance
Phillip G. Mulder, Jr., *President*

State of the Society/Presidential Address
Phillip G. Mulder, Jr., *President*

ESA Executive Director's Report
C. David Gammel, *Executive Director*

Entomological Foundation Report
Frank Zalom, *Entomological Foundation President*

Update on International Congress for 2016 in Orlando, Florida
Walter Leal and Alvin Simmons, *Co-Chairs of ICE 2016*

ESA Professional Awards Program
Phillip G. Mulder, Jr., *President*

Annual Founders' Memorial Lecture

Dr. Thomas C. Baker, Distinguished Professor of Entomology and Chemical Ecology at Penn State University, will deliver the Founders' Memorial Award lecture and honor Dr. Harry Shorey.

Upon graduation from high school, Baker was accepted at Harvard University but turned them down in order to attend Cornell because of his strong desire to attain a B.S. degree in Entomology, which was awarded in 1972. He worked as a research technician for two years in Wendell Roelofs' lab at Geneva, N.Y. and received his M.S. in Entomology from Cornell in 1975. He received his PhD in Entomology from Michigan State University in 1979 under the guidance of Ring Cardé. He joined the faculty at UC Riverside in late 1979, where he served as Head of the Division of Toxicology and Physiology from 1986-1988, and Chair of the department from 1988-1992. He moved to Iowa State University in 1992 where he served as Chair of the Department of Entomology until 1999. In 2003 he started his professorship at Penn State University, where he has continued to perform his research in neuroethology of olfaction and its applications for agents-of-harm detection and integrated pest management. Over the years as a faculty member overseeing his own research groups, Baker's always-small but energetic and inquisitive research teams have helped advance the basic understanding of insect behavioral responses to pheromones and other odors, as well as the olfactory pathways underlying these responses. He feels fortunate to have had such talented, inspired graduate students and postdocs explore with him the exciting new territories of insect chemical communication. Over his career, Baker and his teams have made pioneering advances in the field of insect behavioral responses to pheromones that have earned him an international reputation as a leader in this field. His research helped uncover the mechanisms used by flying insects to locate odor sources from a distance, as well as the olfactory pathways insects use to discriminate among odors. This pioneering work was cited in his being elected Fellow of the Entomological Society of America, Fellow of the American Association for the Advancement of Science, receiving both the Silverstein-Simeone Award and the Silver Medal Award for career achievement by the International Society of Chemical Ecology, and in being named University Distinguished Professor at Penn State University. Over the years this work has attained a wide scientific readership, with 8 of his 175 original scientific research papers being published in the journals *Science*, *Nature*, and *Proceedings of the National Academy of Sciences*. His papers have been cited 4,395 times by other authors, with a personal H-index of 40. In addition, he has published 30 review articles and book chapters providing his overviews and summaries of his field. Over the last 10 years he has averaged 8 invited talks and seminars per year to national and international audiences.

Dr. Harry Shorey was an Adjunct Professor of Chemical Ecology in the Department of Entomology, University of California at Riverside, and a pioneer of sex pheromone research and applications. Dr. Shorey's discovery of mating disruption was an important contribution to integrated pest management and environmental protection.

Closing Remarks
Phillip G. Mulder, Jr., *President*

Adjourn to the Joint Plenary Session with the American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America

Joint Opening Plenary Session: Partnering for Solutions to Supply Chain Sustainability

Sunday, November 15, 6:00 – 7:30 PM
Auditorium, Convention Center

Presiders: Paul E. Fixen, American Society of Agronomy; Michael A. Grusak, Crop Science Society of America; Harold van Es, Soil Science Society of America; and Phillip G. Mulder Jr., Entomological Society of America

The grand challenge of contemporary science could be stated: "To sustainably improve the human condition for a growing global population in a changing environment." Our general vision for the session is to address supply chain sustainability from the field to the marketplace—but with a look to the future, considering both North American and global challenges. Those challenges include meeting the aggregate needs eventually of 9 billion people in the face of changes in resource supply and climate. They also include addressing immediate consumer concerns about the environmental and social impacts of meeting those needs. How can the scientific community play an increased role in "Partnering for Solutions" to this grand challenge?

From field to market: How the supply chain is partnering to improve agricultural sustainability
Rod Snyder, President, Field to Market

Synergy of science and communications to sustainably solve the nine billion problem
Sonny Ramaswamy, Director of the National Institute of Food and Agriculture, U.S. Department of Agriculture

Joint Closing Plenary Session and Old Masters Linnaean Games

Wednesday, November 18, 5:30 – 7:30 PM
Auditorium, Convention Center

Join us for the Joint Closing Plenary Session with our colleagues from the American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America as we say goodbye to our time together in Minneapolis. This year's closing plenary will feature Jorge Cham, a cartoonist and roboticist best known for his popular newspaper and web comic strip "Piled Higher and Deeper" (PHD Comics). Cham started drawing PHD Comics as a graduate student at Stanford University. The comic strip has appeared or been featured in the journal *Nature*, *Science Magazine*, the *Chronicle of Higher Education*, *IEEE Potentials* magazine, *Math Horizons* magazine, *Stanford Magazine,* and Canada's *The Peer Review* magazine, among others, and has been linked to the websites of *USA Today*, the *New York Times,* and the *Washington Post*.

Join ESA President Phillip G. Mulder, Jr. as he acknowledges his 2015 team and passes the gavel to Vice President May Berenbaum, who will discuss her thoughts on 2016, including ICE 2016! Stay and enjoy a final round of the Linnaean Games, where the student winners of the National Linnaean Games and the Old Masters team will battle it out for being the sharpest in the science.

POSTER PRESENTATIONS

Printed Posters

The Program Committee has scheduled three sessions of poster presentations for the Annual Meeting. Posters are numbered sequentially in the program book and, where possible, grouped according to ESA Section and subject matter. Authors must display their posters on the board bearing the same number as that indicated in the program book for each poster.

Poster Size: Each poster must be contained within the 46 × 46 inch (117 × 117 cm) space provided. Two posters will be displayed on each side of a single board (four posters per board). The poster must NOT exceed the size limit. Please be considerate of the person with whom you are sharing a display space.

Set Up: Your poster must be placed in the assigned space in the Exhibit Hall the night before your poster is scheduled, i.e., Sunday (7:30 – 9:30 PM), Monday (8:00 – 9:30 PM), and Tuesday (8:00 – 9:30 PM). Bring your own Velcro strips (push pins are not allowed in the Exhibit Hall) to secure your display to the poster board. The poster board is covered with felt cloth, and the frame is aluminum. Please do not attach anything to the metal frame.

Poster Presentation Times: Because the Exhibit Hall becomes quite congested during presentation hours, presenters of posters with odd and even numbers are assigned specific times to be present at their posters. Presenters are expected to be available at their displays during the "Authors Present" time slot for questions and discussion. A cash bar reception area will be set up within the poster display area during presentation times. The schedules below include the times of expected author availability:

Monday, November 16, Student Competition Posters:
Setup: Sunday, 7:30 – 9:30 PM
Viewing: Monday, 8:00 AM – 6:30 PM
Authors Present: Posters with odd numbers: 5:30 – 6:00 PM;
Posters with even numbers: 6:00 – 6:30 PM
Takedown: Monday, 6:30 – 7:30 PM

Tuesday, November 17, Scientific Posters:
Setup: Monday, 8:00 – 9:30 PM
Viewing: Tuesday, 8:00 AM – 6:30 PM
Authors Present: Posters with odd numbers: 5:30 – 6:00 PM;
Posters with even numbers: 6:00 – 6:30 PM
Takedown: Tuesday, 6:30 – 7:30 PM

Wednesday, November 18, Scientific Posters:
Setup: Tuesday, 8:00 – 9:30 PM
Viewing: Wednesday, 8:00 AM – 2:30 PM
Authors Present: Posters with odd numbers: 12:00 – 12:30 PM;
Posters with even numbers: 12:30 – 1:00 PM
Takedown: Wednesday, 2:30 – 3:30 PM

Poster Removal: Posters should be removed promptly between 6:30 and 7:30 PM on Monday and Tuesday, and between 2:30 and 3:30 PM on Wednesday. Please do not remove your poster before the close of the scheduled viewing time. Do not remove poster numbers when removing posters from boards.

Virtual Posters

Virtual posters are back again this year! These electronic posters provide a unique opportunity to view the research of entomologists from outside of the United States who cannot attend the ESA Annual Meeting in person. Virtual posters will be positioned in the Exhibit Hall this year near the printed posters on large, flat-screen monitors. Attendees will be able to scroll through the virtual posters throughout the day to view the variety of research taking place around the world.

SOCIAL ACTIVITIES & MIXERS

New Member Meet & Greet Reception

Sunday, November 15, 2:00 – 3:00 PM
Seasons, Second Floor, Convention Center

If you are a new ESA member this year, you are invited to our New Member Meet & Greet Reception. Mingle with other new members, ESA leaders, and staff. Learn about the benefits of ESA membership, and important details of the ENTOMOLOGY 2015 Annual Meeting. Light refreshments will be served. New members should have received a special invitation to the reception in the mail—bring it and exchange it for a special ESA welcome gift!

Welcome Reception

Sunday, November 15, 7:10 – 9:00 PM
Exhibit Hall BC, Convention Center

You are cordially invited to attend the Welcome Reception on Sunday evening in ESA's Exhibit Hall (Exhibit Hall BC) immediately following the Joint Opening Plenary Session (Auditorium). This is a great opportunity to have time with the exhibitors and colleagues and learn about the latest resources and tools available to agronomists and entomologists. Grab some light refreshments and a drink, network with colleagues and friends, and check out the displays.

New this year: Universities have the option to host networking tables within the exhibit hall during the Welcome Reception. The following universities signed up to host tables as of August 31:

Michigan State University, Department of Entomology
Oklahoma State University
Penn State Entomology
University of California, Davis (Entomology)
University of Minnesota, Department of Entomology

National Insect Photo Salon

Tuesday, November, 12:15 – 1:15 PM
205 B, Convention Center

Some of the most beautiful insect photos in the world will be presented this year in the Insect Photo Salon. Plan to join the Photographic Society of America and fellow ESA members and guests for this terrific show of insects, spiders, and other arthropods in their natural environments.

Social Events

See the complete schedule of social functions on page 95. Everyone has the opportunity to network at numerous receptions throughout the week. Monday night is the traditional time for receptions, with no scientific sessions scheduled for the evening.

Social Hour with Poster Presenters

Join us for our Social Hour with Poster Presenters on Monday, Tuesday, and Wednesday during poster presentation hours in the ESA Exhibit Hall (Exhibit Hall BC, Convention Center).

Monday, November 16: 5:30 – 6:30 PM, Student Competition Poster Presentations
Tuesday, November 17: 5:30 – 6:30 PM, Poster Presentations
Wednesday, November 18: 12:15 – 1:15 PM, Poster Presentations

Women in Science Breakfast sponsored by Dow AgroSciences

Dow AgroSciences

Monday, November 16, 6:15 – 8:00 AM
Seasons, 2nd Floor, Convention Center

This year, the Women in Science Breakfast is being organized by the Women in Entomology Network and the Women in Agronomy, Crops, Soils, & Environmental Sciences Committee. It continues the tradition of holding the breakfast at the ESA Annual Meeting. It is a great opportunity for attendees to meet and talk with other women at all points in their careers, as well as with leadership of the societies. The emphasis is on networking and encouraging more women to enter and stay in the sciences, and both women and men are encouraged to attend. Birds-of-a-feather tables will have topics relating to prospective careers, employers (academia, industry, government, etc.), becoming involved in a professional society, and family/career issues. The breakfast will be a la carte this year, with a limited menu of breakfast sandwiches, beverages, fruit, and/or muffins for purchase. Dow AgroSciences has once again generously offered to sponsor the first 175 students at this event. No RSVP is necessary.

STUDENT ACTIVITIES

Linnaean Games

Preliminary Round: Sunday, November 15, 12:30 – 3:15 PM
Auditorium Main, Convention Center

Final Round: Tuesday, November 17, 5:30 – 6:30 PM
Auditorium Main, Convention Center, followed immediately by the Student Awards Session and Student Reception.

Be sure to check out the Linnaean Games (entsoc.org/linnaeangames), a "College Bowl"-type competition that is one of the more spirited sessions of our annual meetings. Stop in and cheer on your favorite team! Winners and runners-up will be recognized at the Student Awards Session immediately following the Linnaean Games Finals on Tuesday evening.

Student Competition for the President's Prize

Monday, November 16, 7:55 AM – 2:00 PM and 5:30 – 6:30 PM
Convention Center, various locations

To support ESA's student members and encourage them to become more involved in the world of entomology, Monday morning is dedicated to student paper competition. There are 51 sessions containing graduate and undergraduate student oral presentations, three-minute presentations, student posters, and virtual posters. A full list of presentations for all formats of the student competition can be found starting on page 138. Stop by and show your support for ESA's students! This year's first-place winners will receive a $175 cash award, a certificate, and a free 2016 ESA membership. Second place will receive a $50 cash award and a certificate.

Student Debates

Tuesday, November 17, 1:30 – 4:30 PM
Auditorium Main, Convention Center

The main 2015 Student Debate theme is "Molecular Biology and Entomology: Partnering for Solutions."

Two student teams chose to debate what they believe to be the best GE technology for managing arthropod pests.

Another debate will focus on the ethics of complete species eradication—if this is possible, should we do it?

The final debate will concern the best tool for managing pesticide resistance.

All three debates will be interesting, informative, and entertaining. Audience members are welcome to ask questions at the end of each debate. Come cheer on your favorite team!

Audience members who live tweet the entire debate session will be entered in a raffle to win a $50 Amex gift card. Tweets must include the #entsoc15 meeting hashtag as well as #ESAdebate.

Student Awards

Tuesday, November 17, 6:45 – 8:30 PM
Auditorium, Convention Center

The winners of the President's Prize, ESA Student Awards, Student Debates, and Linnaean Games will be recognized. After the conclusion of the program, shuttle service will be provided to the off-site Student Reception.

Student Reception sponsored by BASF

BASF
We create chemistry

Tuesday, November 17, 8:30 – 11:30 PM
The Pourhouse Minneapolis
10 South 5th Street
Minneapolis, MN

Located in the heart of downtown Minneapolis, the Pourhouse is the perfect venue to host ESA's annual Student Reception. Don't miss out on this great event—a must-attend for all students! This is a fantastic opportunity to see old friends and to meet new ones while enjoying dinner, dancing and games. All registered students are invited to attend and dance the night away—please be sure to have your ID and name badge as proof of registration. Shuttle service will be provided from the convention center to the Pourhouse following the Student Awards ceremony.

Student Volunteers

Volunteers can pick up their volunteer T-shirt from the volunteer coordinator at the ESA Registration and Information Center located outside of Exhibit Hall B in the Convention Center, prior to the start of their first shift. All volunteers should report to their designated assignments 15 minutes before the start of their shift. Needed materials will be provided by ESA. If you cannot make it to your assignment or you need additional information, please see the volunteer coordinator at the ESA Registration and Information Center.

ENTOMOLOGICAL FOUNDATION

Starting in 2015, daily management of the Entomological Foundation moved to the Headquarters of the Entomological Society of America. A new leadership structure was unveiled at this same time with revised bylaws and a refocus on the basics of meeting the Foundation's mission: *Exciting young people about science through insects and building a future for entomology!* The Foundation has been supported by many hundreds of individuals in the past, and we're looking forward to continuing that spirit of community contributions. If you've been a member of the Board of Counselors in the past and would like to re-engage with us, please stop by our booth on the Exhibit Hall floor and talk to us. We're all in this together.

Entomological Foundation Teacher Workshop – STEMbugs

Saturday, November 14, 10:00 AM – 2:00 PM
208 AB, Convention Center

The Entomological Foundation is once again offering a teacher workshop developed for educators in grades K-12. There are six sessions, with two each geared toward educators of students in elementary, middle, and high school, and then a wrap-up "lessons learned" and tips on applying the session's content to the classroom.

Dr. Karen Oberhauser from the University of Minnesota will lead a "Learning Lunch" session. The entrance fee is $10 which includes snacks, a boxed lunch, access to all six lesson plans, and validated parking at the Convention Center. More information is online, including a registration form, visit www.entfdn.org/pr_workshop. The Entomological Foundation is very grateful to all who helped to prepare this great event especially our speakers Rebecca Baldwin (BCE), Doug Golick, John Guyton, Erin Ingram, Tanja McKay, Karen Oberhauser, TJ Prochaska, Marianne Shockley, Andrine Shufran, and Tom Turpin.

Entomological Foundation Blitz Auction, Silent Auction & Raffle

A long tradition of the Entomological Foundation, the Silent Auction has become a go-to destination for many ESA Annual Meeting attendees as a fun place to get some insect-themed holiday gifts and still make a meaningful contribution to the future of the profession. This year we're doing things a little differently and will have the Auction as part of the ESA Central booth. Come by and check us out.

We'll have a ***Blitz Auction*** during the Welcome Reception, where some one-of-a-kind items will be available for bid. Items include:

- **Monday Minneapolis Dinner:** Join ESA Fellow Dr. Sonny Ramaswamy for a night on the town at CRAVE in downtown Minneapolis. Reservations are for 7 PM, and a $100 dinner is on us.
- **Your Research in a Song:** Dr. John "The Nature Nut" Acorn will write a song about your favorite insect or research topic, or favorite (or least favorite) professor! No, you don't get copyright, but you do get a new song to put on your ringtone!
- **NMNH Entomology Private Tour**: If you come to Washington, DC often Dr. Floyd Shockley will work with you to arrange a private tour of the largest insect collection in the USA—the Smithsonian National Museum of Natural History. The diversity is stunning!
- **Immortalize Your Research:** ESA's 2016 President, Dr. May Berenbaum, will write a *Buzzwords* column about a topic of your choosing. Honor a colleague, raise awareness of an issue you care about, or simply have fun!
- Other fun prizes are being assembled now and will be on display during the Welcome Reception.

And don't forget the traditional Entomological Foundation Silent Auction. This fun annual event is a place to bid on insect-themed jewelry, clothing, books, crafts, and other great items donated by your peers. All proceeds go directly to the Foundation in support of our mission of developing a love of science in children through insects. The Silent Auction will be open during the regular ESA Central booth hours. Donated items are being accepted through the Welcome Reception and will be auctioned off during the week. All bids become final on Wednesday at 1:00 PM. Winning bids must be picked up before the Exhibit Hall closes at 4:30 PM. Items cannot be shipped by the Foundation.

The ***Entomological Foundation Raffle*** will feature two main prizes this year. You could win a **VIP registration package to the International Congress of Entomology** in September 2016, which includes air travel, plush hotel accommodations for six nights, an invitation to the ESA Governing Board Reception, and other special treatment, for an estimated retail value of nearly $5,000! A second-runner-up prize will also be included in the raffle. If you don't win the ICE VIP package, you could still possibly win one of our great runner-up prizes. Stop by the Foundation booth in ESA Central to learn more.

Raffle tickets will be sold during regular hours of the ESA Central booth, with the winning ticket selected at the closing Plenary on Wednesday evening. Prices for raffle tickets are listed below:

- One for $5
- Three for $10
- Five for $15
- Ten for $20 (get a free "Insect Diversity" poster with every 10 tickets you purchase, while supplies last)

Entomological Foundation Meetings

The Board of Directors is the governing body that leads the Entomological Foundation, setting all policies and priorities in accordance with the founding documents. Lunch will be generously provided by Clarke Mosquito Control. Only Directors need to attend this meeting, held Monday, November 17, 4:30 – 6:00 PM in Minnehaha of the Hyatt Regency.

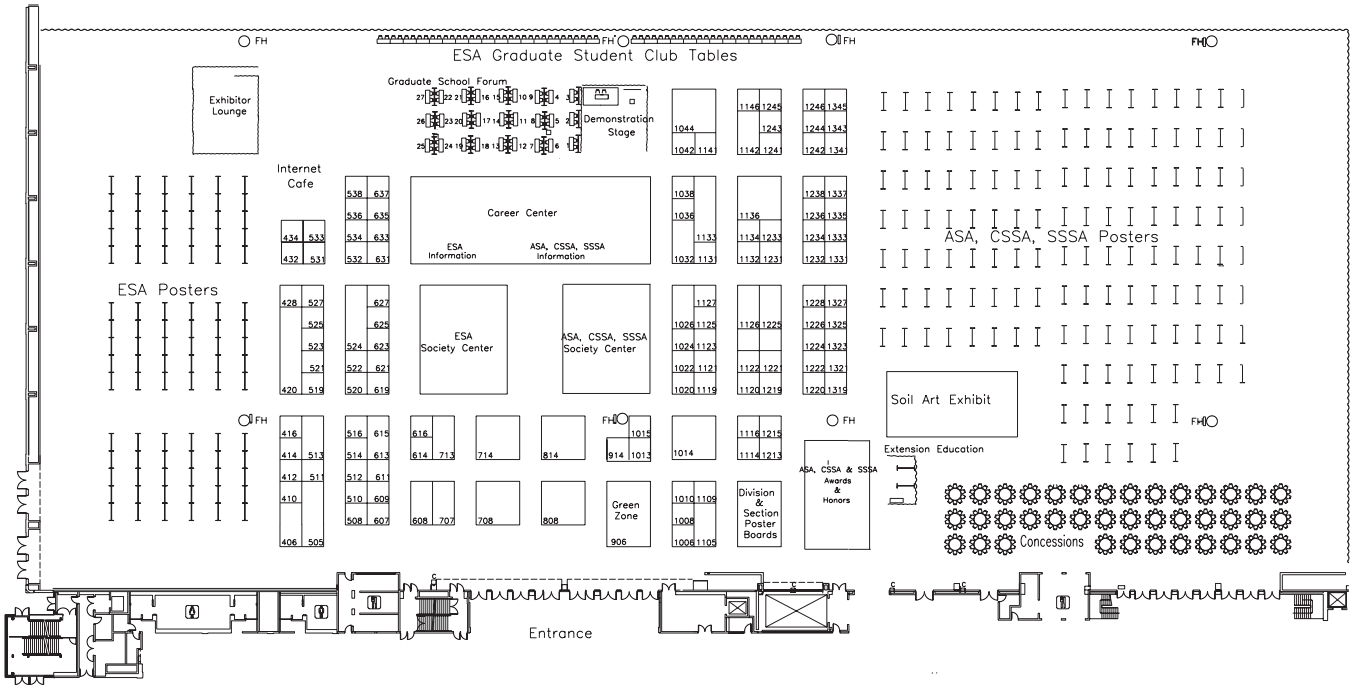
The Board of Counselors serves as an advisory board for the Directors. The Board of Counselors meeting will be held on Tuesday, November 17, from 12:00 to 1:30 PM in Minnehaha of the Hyatt Regency. If you would like to learn more about becoming a Counselor, please attend this meeting to have your name submitted to the Board of Directors for consideration.

Branch-Related Entomological Foundation Activities

Pacific Branch: **Lisa Neven** and **Eric Winninger** developed and organized a "Bee Line" Fun Walk/Run that supported the Entomological Foundation at this year's Pacific Branch meeting. **Lisa Neven** also donated the prizes for runners, and the Branch supported the event with refreshments. **Chris Hedstrom** and **Sanford Eigenbrode** were responsible for the T-shirts provided at the run.

Eastern Branch: **Juli Gould** organized a great Silent Auction at this year's Branch meeting that netted over $1,700. Many thanks to our bidders and the donors who supplied the items, including **Juli Gould, Theresa Murphy, Miriam Cooperband, Mike Raupp, Jamie Wahls, Damon Crook, Paul Chaloux, Faith Kuehn, Marianne Cunningham, Harold Harlan**, and **Dogfish Head** brewers.

Southwestern Branch: **Bonnie Pendleton** and **Jackie Lee** organized a Silent Auction for the Branch meeting that netted about $1,000. Many thanks to our bidders and the donors who supplied the items, including **Christina Vint, Bob Davis, Andrine Shufran, Xandra Morris, BASF, Cade Morris, Greg Cronholm, Jerry Michels, Bonnie Pendleton,** and the **Hard Rock Hotel and Casino**.



ESA EXHIBITORS & SUSTAINING ASSOCIATES

Exhibit Hall

Please plan to visit the exhibits, poster presentations, and more in Exhibit Hall BC in the Convention Center, near the ESA Registration and Information Center. See the latest in entomological equipment, supplies, gifts, and reference materials.

Exhibit hours:
Sunday, November 15, 7:10 – 9:00 PM (Welcome Reception)
Monday, November 16, 9:00 AM – 6:00 PM
Tuesday, November 17, 9:00 AM – 6:00 PM
Wednesday, November 18, 9:00 AM – 4:30 PM

Exhibitors

The following exhibitors are participating in ENTOMOLOGY 2015 as of August 1, 2015.

AAAS Science & Technology Policy Fellowships **Booth: 1233**
Washington, DC
Website: www.aaas.org/stpf
For more than 40 years, the AAAS Science & Technology Policy Fellowships have provided scientists and engineers with a unique opportunity to apply their knowledge and skills to national and international issues in the federal policy realm, while learning first-hand about establishing and implementing policy. Fellows serve yearlong assignments in the executive, legislative, and judicial branches of the federal government in the Washington, D.C. region.

AgEagle **Booth: 1142**
Neodesha, KS
Website: www.ageagle.com

Agriculex Inc. **Booth: 1120**
Guelph, ON
Website: www.agriculex.guelph.org

AgroClimate **Booth: 1134**
Gainesville, FL
Website: www.agroclimate.org
AgroClimate provides decision support tools and climate information to improve crop management decisions and reduce production risks associated with climate variability, climate change, and extreme weather events. AgroClimate features decision support tools, climate outlooks, monitoring and forecast of the El Niño Southern Oscillation phenomenon, and basic climate information. It also includes educational resources about management practices and technologies that help decrease the vulnerability of agricultural systems to climate variability and change. AgroClimate is regularly used during training events for County Extension faculty and during workshops with agricultural producers. Its modular platform allows for an easy replication in other geographies and for content expansion.

Agronomix Software Inc. **Booth: 1038**
Winnipeg, MB
Website: www.agronomix.com

Air Force Recruiting Services **Booth: 532**
Randolph Air Force Base, TX
Website: www.airforce.com
The world's greatest Air Force—powered by Airmen, fueled by innovation. Looking for unique challenges, professional growth, and the desire to make a difference in your life as well as the lives of others? Consider a career as an Air Force Biomedical Sciences Corps Officer (BSC). Few firms can match the perks we offer: competitive salary; funded advanced and continuing education; comprehensive medical and dental; 30 days' paid vacation each year; and tax-free food and housing allowances.

ALMACO **Booth: 1126**
Nevada, IA
Website: www.almaco.com
ALMACO is the leader in providing innovative solutions to our clients in the seed research industry.
ALMACO was founded in 1884 as a family owned and run business in Central Iowa, and since 1978 we have been custom designing

and building precision Ag equipment specifically for the leading Research Programs worldwide. We've worked closely with leading Agronomists to develop cutting edge technology for specialized Ag practices that provide a great return on investment for our clients. Our products include combines, planters, drills, electronic data capture systems, threshers, shellers, and automated seed processing lines. Additionally, we provide premier customer service with factory and onsite service available 24 hours a day!

Alpha Resources Inc. **Booth: 1224**
Stephensville, MI
Website: www.alpharesources.com
Provider of low cost high quality OEM alternative products to the combustion analysis industry for over 30 years. Our line of ELTRA combustion analyzers for CHNOS in organics & metals is a leader in cost per sample value. We manufacture supplies for LECO®, Horiba®, ELEMENTAR®, Eltra®, Velp®, Dumatherm® and other OEM's. Our products include certified SRM's, reagents, sample containment, graphite/ceramic crucibles, precision quartz, glassware and other analytical supplies. We serve industries including environmental, petroleum, food protein, water, soil, metal, mining, lab testing, aerospace, & power industries. ISO17025 & Guide 34 certified.

Alpha Scents, Inc. **Booth: 611**
West Linn, OR
Website: www.alphascents.com
A global supplier of quality insect monitoring systems—traps, lures, attract-and-kill, MalEx™—designed to reduce toxic pesticide use. Products for most native and exotic species in agriculture, horticulture, ornamentals, forestry, and the home and garden PestWizard® brand. Custom pheromone synthesis for research, manufacturing, and government. Made with high-purity pheromones per recommendations from the research community.

American Geosciences Institute **Booth: 1236**
Alexandria, VA
Website: www.americangeosciences.org
AGI connects Earth, science, and people by serving as a unifying force for the geoscience community. With a network of 50 member societies, AGI represents more than a quarter-million geoscientists. No matter your individual discipline, AGI's essential programs and services will strengthen your connection to the geosciences.

American Peat Technology (APT) **Booth: 635**
Aitkin, MN
Website: www.americanpeattech.com
American Peat Technology has manufactured quality microbial carrier media since 2003. We produce granular and powdered carriers from Minnesota-harvested reed-sedge peat. Our bioAPT media is the industry standard for granular rhizobia formulations. Stop by our booth to see how APT can support your solutions for sustainable agriculture.

AMS, Inc. **Booth: 1013**
American Falls, ID
Website: www.ams-samplers.com
AMS, Inc., is a leading manufacturer & provider of high quality sampling equipment. AMS sampling equipment is primarily used for environmental, geotechnical, and remediation uses as well as soil, soil gas, and groundwater monitoring, but also provides simple solutions for a variety of fields, including the agricultural industry.

Apogee Instruments **Booth: 1036**
Logan, UT
Website: www.apogeeinstruments.com
Apogee develops and builds cost-effective, research-grade environmental sensors for use in agriculture, meteorology, and renewable energy. Founded in 1996 by Dr. Bruce Bugbee in Logan, Utah, Apogee's product lines include pyranometers, pyrgeometers, net radiometers, quantum sensors, spectroradiometers, infrared radiometers, oxygen sensors, temperature sensors, chlorophyll meters, aspirated radiation shields, and more.

Army Medical Recruiting **Booth: 513**
Fort Knox, KY
Website: www.goarmy.com
Your knowledge of insects and their behavior can impact the health, morale, and overall environment of our Soldiers. When you serve your country as an entomologist and officer on the U.S. Army health-care team, you'll conduct research, perform pest management, and provide important information to our leaders regarding biological hazards around the globe. Visit our booth to talk to an Army entomologist and find out more about exciting careers in the United States Army.

Arthro-Pod: Come Share Your Entomology Stories **Booth: 538**
Website: arthro-pod.blogspot.com
Stories help us connect with each other and the world around us. Stop by the Arthro-Pod booth to record a short audio story with Laura Higgins and Jonathan Larson. Tell them why you became an entomologist, share your greatest insect adventure, or regale them with the tale of an epic fail in the field. These stories will be shared by ESA and its partners for outreach. Be a part of telling the world who we are!

ASA, CSSA, and SSSA Society Center **Booth: 820**
Madison, WI
Websites: www.agronomy.org
www.crops.org
www.soils.org

Join us at ASA, CSSA, and SSSA Society Center, located in the Exhibit Hall. The Society Center is anchoring the exhibits and may be found in the center of the exhibition space. Need help? ASA, CSSA, and SSSA staff will be on hand to answer questions and help you take advantage of our full range of programs and services. The Society Center is more than just a place to go when you need help or information—it's a place to relax, work and catch up with colleagues. Come visit with us—we'd like to spend time with you. Look for events happening in and around the Society Center each day!

Atlas Screen Printing **Booth: 616**
Gainesville, FL
Website: www.wildcotton.com
We have the fun stuff! T-shirts, jewelry, kids' stuff, puzzles, mugs, magnets, tote bags, caps, and much more. Come early, come often. Most products endemic to this show, Christmas presents you will find nowhere else!

Bio Chambers **Booth: 1114**
Winnipeg, MB
Website: www.biochambers.com
Our focus at BioChambers is on building positive client experiences. We achieve this by delivering top of class reach-in plant growth chambers and walk-in rooms, providing excellent after sales service, and introducing innovative designs to the marketplace. We invite you to drop by our booth to pick up our latest literature and to discuss your specific research needs.

Biopesticide Industry Alliance **Booth: 512**
McFarland, WI
Website: www.biopesticideindustryalliance.org
Advancing Knowledge About Biopesticides: BPIA is dedicated to fostering adoption of biopesticide technology through increased awareness about biopesticides' effectiveness and a full range of benefits to a progressive pest management program.

BioQuip Bugs **Booth: 428**
Rancho Dominguez, CA
Website: www.bioquip.com
Stop by BioQuipBugs and check out our selection of LIVE and dried specimens. With thousands of species and over 3 million specimens in our inventory, we are the trusted source for arthropods from around the world. We look forward to helping you with your specimen needs.

BioQuip Products **Booth: 420**
Rancho Dominguez, CA
Website: www.bioquip.com
BioQuip has been providing equipment and books for use in the field, lab, museum, and classroom since 1947. Our 28 employees hold a valuable diversity of knowledge, with more than 395 years of combined experience. Please stop by our Booths at ENTOMOLOGY 2015 for a visit and to see what's new.

BRILL Publishers **Booth: 508**
Leiden, the Netherlands, and Boston, MA
Website: www.brill.com/search/subject/science/subject/biology

Bruker **Booth: 1223**
Kennewick, WA
Website: www.bruker.com
Bruker is known worldwide as a leader in X-ray analysis equipment ranging from handheld XRF analyzers to large XRF and XRD spectrometers. As a leader in field-portable XRF spectrometry, Bruker's Tracer series can be used for a wide variety of AgriScience applications including soil pollutants, nutrient measurement and crop treatment.

CABI/CSIRO/FAO **Booth: 524**
Sterling, VA
Website: www.styluspub.com
CABI is a not-for-profit international organization that improves people's lives by providing information and applying scientific expertise to solve problems in agriculture and the environment. CSIRO PUBLISHING operates as an independent science and technology publisher, covering a wide range of scientific disciplines, including agriculture, the plant and animal sciences, and environmental management. Distributed in North America by Stylus Publishing.

Cambridge University Press **Booth: 531**
Cambridge, England
Website: www.cambridge.org/knowledge
Cambridge University Press is a not-for-profit organization that advances learning, knowledge and research worldwide. It is an integral part of the University of Cambridge and for centuries has extended its research and teaching activities through an extensive range of academic books, journals and digital products.

Campbell Scientific Inc. **Booth: 1032**
Logan, UT
Website: www.campbellsci.com
Campbell Scientific manufactures data-acquisition and control instruments used worldwide in agricultural, environmental, industrial, and renewable-energy applications. Since 1974, our products have continued to build on a well-earned reputation for versatility, precision, and dependability, even in harsh, remote environments. Typical systems include weather stations, evapotranspiration stations, CO2 and water-vapor flux measurement systems, and systems for monitoring soil conditions. Our dataloggers can measure nearly any sensor with an electrical output. A wide range of telecommunication and software options are available for data retrieval, display, and analysis. Stop by booth #1032 to discuss your instrumentation needs. Campbell Scientific–when measurements matter

CHS **Booth: 814**
Inver Grove Heights, MN
Website: www.chsinc.com
CHS Inc. is a leading global agribusiness owned by farmers, ranchers and cooperatives across the United States. Diversified in energy, grains and foods, CHS is committed to helping its customers, farmer-owners and other stakeholders grow their businesses through its domestic and global operations. CHS, a Fortune 100 company, supplies energy, crop nutrients, grain marketing services, livestock feed, food and food ingredients, along with business solutions including insurance, financial and risk management services. The company operates petroleum refineries/pipelines and manufactures, markets and distributes Cenex® brand refined fuels, lubricants, propane and renewable energy products.

CID Bio-science **Booth: 1022**
Camas, WA
Website: www.cid-inc.com
CID Bio-Science is an industry leader in the design and manufacturing of scientific instruments for plant physiology research. Our mission is to identify and satisfy the needs of plant researchers by delivering high-quality instruments that are portable, durable and easy to use. To learn more, or set up an appointment with an application scientist, visit us at Booth #1022, or phone Judith Edwards at (360) 833-8835.

Conviron **Booth: 914**
Winnipeg, MB
Website: www.conviron.com
Conviron is the world leader in the design, manufacture and installation of controlled environments. Conviron's reach-in plant growth chambers, walk-in rooms and Argus Control Systems provide precise, uniform, and repeatable control of temperature, light, humidity, dehumidification, CO2, and other environmental conditions. Applications include plant growth, entomology, germination and other research where tight environmental controls are required.

Cornell University Press **Booth: 525**
Ithaca, NY
Website: www.cornellpress.cornell.edu
Cornell University Press publishes well-designed works of lasting merit and scientific rigor in natural history, conservation science, and ecology. Visit the Cornell booth to see our most recent titles and discuss potential book projects with Science Editor Kitty Liu.

CRC Press/Taylor & Francis Group **Booth: 619**
Boca Raton, FL
Website: www.crcpress.com
CRC Press/Taylor & Francis Group is a leading publisher of technical references and textbooks in Entomology. Review new and bestselling books and receive up to 25% off on conference orders. Check out our show specials for even greater discounts. Talk to us about being a CRC Press Author!

Cricket Science **Booth: 627**
Pocatello, ID
Website: www.cricketscience.com
Cricket Science offers a variety of *one-of-a-kind* eclectic items of interest to insect enthusiasts and entomologists, including antiquarian books, prints, jewelry, Baltic amber, cards, cricket cages, notepads, stamps, etc. Prepaid shipping available; all credit cards accepted. See the "anderobe" store on eBay or send an e-mail for books and other items not at the convention.

Daiki Rika Kogyo Co, Ltd. **Booth: 1133**
Kounosu, Japan
Website: www.daiki.co.jp

DairyOne/Agron-One **Booth: 1242**
Ithaca, NY
Website: www.dairyone.com

Decagon Devices **Booth: 808**
Pullman, WA
Website: www.decagon.com
Decagon Devices designs, manufactures, sells and supports an extensive line of products to measure soil-water interactions, thermal properties, and canopy characteristics. Stop by our booth #808 to see our newest products, including ruggedized soil moisture sensors, sonic anemometer, water depth sensor, and the dual-head infiltrometer.

Delta-T Devices **Booth: 707**
Cambridge, United Kingdom
Website: www.delta-t.co.ul
Delta-T Devices manufactures instruments for agronomy, soil science, canopy analysis, solar energy studies, meteorology and environmental monitoring. Our 12 channel GP2 Data Logger and Controller is SDI-12 compatible, and is an ideal partner for the new free online DeltaLINK-Cloud data sharing service (www.deltalink-cloud.com). The GP2 provides an ideal solution for demanding research applications and is at the heart of the WS-GP2 Weather Station. Recently upgraded products include the ML3 ThetaProbe soil moisture sensor and EQ3 Tensiometer, which both now include temperature measurement. Our plant science products include the canopy analysis SunScan system, for accurate LAI measurement, and the AP4 Porometer for readout of stomatal conductance and resistance of leafs. Other areas of expertise include solar radiation measurement (SPN1 Pyranometer) and soil moisture profiling (PR2 Profile Probe - SDI-12 compatibility in early 2016).

Department of Entomology, Virginia Tech **Booth: 527**
Blacksburg, VA
Website: www.ento.vt.edu
The Department of Entomology at Virginia Tech offers M.S. and Ph.D. degrees, with strengths in vector biology, vector-borne diseases, insect toxicology, biological control, and pest management in forest, agronomic, horticultural, and urban systems. The department's display provides information on graduate study, available fellowships, and other opportunities.

Dino-Lite Scopes (BigC) **Booth: 516**
Torrance, CA
Website: www.dinolite.us
Dino-Lite portable digital microscopes and eyepiece cameras provide high-quality microscopy video interfacing to PC and Mac with clear and steady imaging. Most models provide 10x–200x, along with a multitude of software features. The included DinoCapture software makes it easy to take snapshots, record videos, manipulate images, and save and e-mail discoveries.

Doctor of Plant Medicine and Doctor of Plant Health **Booth: 510**
Gainesville, FL
Website: www.ufplantdoctors.org
The University of Florida DPM Program is a degree for training professional plant health practitioners, or Plant Doctors. Our students complete hands-on courses, two elective substantial internships, and several credits of required internships. The following discipline departments collaboratively support DPM students through mentoring, teaching, and committee service: Agronomy, Entomology and Nematology, Environmental Horticulture, Food Science and Human Nutrition, Horticultural Sciences, Plant Pathology, School of Forest Resources and Conservation, and Soil and Water Sciences.

Dow AgroSciences **Booth: 708**
Indianapolis, IN
Website: www.dowagro.com
Dow AgroSciences discovers, develops, and brings to market crop protection and plant biotechnology solutions for the growing world. Based in Indianapolis, Indiana, USA, Dow AgroSciences is a wholly owned subsidiary of The Dow Chemical Company and had annual global sales of $7.3 billion in 2014.

DuPont Pioneer **Booth: 1333**
Johnston, IA
Website: www.pioneer.com
DuPont Pioneer (www.pioneer.com/careers) headquartered in Des Moines, Iowa, is the world's leading developer and supplier of advanced plant genetics, providing high-quality seeds to farmers in more than 90 countries. DuPont Pioneer provides agronomic support and services to help increase farmer productivity and profitability and strives to develop sustainable agricultural systems for people everywhere.

Dynamax, Inc. **Booth: 608**
Houston, TX
Website: www.dynamax.com
Dynamax, Inc. is a primary source of equipment for plant water relations, weather, and productivity measurement, and is the world's leading producer of sap flow systems and sensors for measuring plant water use directly. As the US distributor for Delta-T Devices, Gill Instruments and Force-A, we offer a wide range of products for soil, crop and environmental sciences. We are introducing the SapIP wireless system and the SapIP-IRT IR leaf temperature and irrigation management system. Delta-T will present the new GP2 "intelligent" data logger and Gill will be demonstrating the new MetStream WiFi logger.

EA Consumables **Booth: 1232**
Collingwood, NJ
Website: www.eaconsumables.com
Elemental analyzer consumables for: Leco®, Elementar, Thermo/Carlo Erba, Perkin Elmer, Dumatherm®, Europa/Sercon, Exeter Analytical, Eltra, Horiba, EuroVector, Shimadzu, Antek, Velp and others. EA Consumables Inc. stocks and distributes the full range of Elemental Micoanalysis products for users throughout the US. Our product range and quality are acknowledged worldwide, and with our 'total satisfaction guarantee' you can try our products risk-free. Please ask about our extensive range of compositional as well as isotopic standard materials. We offer equal or superior quality with significant savings versus the original equipment manufacturer.

Earthen Gypsy Designs **Booth: 534**
Derry, NH
Website: www.freewebstore.org/earthengypsydesigns
Stop by to see unique handmade jewelry and gifts! Featured at ENTOMOLOGY 2015 is the line "Scientific Refuse," which uses real bugs and butterflies artistically preserved in resin to make wearable creations. All specimens used for this line were obtained from scientific by-catch or roadkill, are identified, and come with a biography.

elementar Americas **Booth: 1127**
Mt. Laurel, NJ
Website: www.chnos.com

Elsevier **Booth: 613**
San Diego, CA
Website: www.elsevier.com
As your access point into the recent advancements in agronomy, crop & soil science and entomology, Elsevier provides cutting-edge research from worldwide experts. Explore the latest in research via our exciting books and journals on display such as *Industrial Oilseed Crops*, and *Current Opinion in Insect Science*. Discover our electronic research and solution tools on ScienceDirect!

Environmental Growth Chambers **Booth: 1008**
Chagrin Falls, OH
Website: www.egc.com
EGC is celebrating 62 years of design and manufacturing experience with the largest selection of plant growth chambers of any company worldwide. Producing entomological research chambers, controlled environmental rooms, tissue culture chambers, lighted and refrigerated incubators, gas-exchange chambers, day-lit chambers, and Root Zone cabinets.

Entomological Society of America (center of Exhibit Hall)
Annapolis, MD
Website: www.entsoc.org
Stop by ESA's Central Tower in the center of the hall, where you'll find information on ESA programs and activities. Chat with ESA Headquarters staff, meet a colleague, rest your feet, and learn about ESA membership and the certification program. Support the Entomological Foundation, by exploring the silent auction and buying raffle tickets for your chance to win an ICE VIP package valued at nearly $5,000 and other great items. Renew your membership, get a free luggage tag, or grab a variety of snacks. Check out ESA's blog (www.EntomologyToday.org) and enter to win a prize during the Passport Drawing. It's all here.

FarmLink **Booth: 1042**
Kansas City, KS
Website: www.FarmLink.com
FarmLink is transforming agriculture through equipment solutions, actionable information, analytics and new innovations to improve the productivity, profitability and sustainability of your entire operation. Visit www.farmlink.com to learn more about FarmLink and our portfolio of services.

FIAlab Instruments Inc. **Booth: 1325**
Bellevue, WA
Website: www.flowinjection.com
FIAlab Instruments Inc. is a manufacturer of fully automated flow injection analyzers for nutrient assays, such as nitrate/nitrite, phosphate, ammonia, and many others.

Forestry Suppliers, Inc. **Booth: 1122**
Jackson, MS
Website: www.forestry-suppliers.com
Full range of field supplies for forestry, agriculture, environmental, surveying and engineering professionals. GPS, flagging, tags, measuring tapes and rangefinders, soil and water sampling and monitoring instruments, entomological and botanical supplies, weather monitoring and environmental data loggers. Everything the outdoor professional needs. FREE 700+ page catalog or visit www.forestry-suppliers.com.

Frontier Scientific **Booth: 637**
Newark, DE
Website: www.frontierssi.com
Frontier Scientific is pleased to announce the expansion of its Agriculture Services Division, a leading provider of high-quality insect products supporting agricultural insecticide research. This expansion complements Frontier's pre-eminent contract services and onsite FTE staffing business models supporting R&D organizations in pharma, biotech, and agricultural research organizations.

Gasmet Technologies Inc. **Booth: 1132**
Toronto, ON
Website: www.gasmet.com
Gasmet's rugged FTIR multi-gas analyzers provide exceptional analytical precision for researchers measuring soil gas fluxes in the field, measuring CO2, Methane, Nitrous Oxide, Water Vapor & Ammonia gases simultaneously with sub-ppm detection levels. The portable FTIR Gas Analyzers are light-weight and compact for easy field transport and the CalcmetTM Software provides an easy-to-use interface for researchers to view multiple gases in near real-time. Stop by our exhibit and see for yourself what other soil scientists are talking about where their research is benefitting from the Gasmet FTIR's low cost of ownership, high accuracy and significant advantage in field productivity of data collection.

Gylling Data Management **Booth: 1020**
Brookings, SD
Website: www.gmdata.com
Providing research management software since 1982. See the new ARM 2016 used to establish, manage, analyze, and report information for crop experiments including field and greenhouse protocols and trials. Tablet Data Collector: enter and analyze assessments, take plot pictures, and record trial GPS locations. ST: summarize and report a trial series across locations and/or years; links with Trial Database to select trials based on information in any trial data entry field.

Gypsoil **Booth: 1220**
Chicago, IL
Website: www.gypsoil.com
GYPSOIL, a division of Beneficial Reuse Management LLC, is the leading supplier of gypsum to agriculture. GYPSOIL brand gypsum helps farmers improve productivity by providing valuable nutrients, and by improving soil structure, water infiltration and moisture retention. GYPSOIL also helps prevent the loss of nutrients and topsoil from agricultural fields. For more about GYPSOIL and how gypsum benefits crop production and the environment, visit www.gypsoil.com

HALDRUP USA **Booth: 1044**
Bluffton, IN
Website: www.haldrup.net
For nearly 50 years, HALDRUP has provided superior and customized solutions to breeders, field research institutes, and agri-science businesses from all around the world through the development and production of the most durable and precise machines in the industry. HALDRUP's commitment to the American market can be seen in our decision to establish a new sales, service, and assembly plant in Northeastern Indiana. Our highly qualified team is here to support you with world-class service: assisting you in your endeavors to achieve the best possible results for your field research.

Harvest Master **Booth: 1026**
Logan, UT
Website: www.harvestmaster.com
Designed and manufactured by Juniper Systems, HarvestMaster products significantly improve efficiency and data accuracy for agricultural research applications. HarvestMaster GrainGages® precisely collect on-combine grain measurement data on a wide variety of crops. And HarvestMaster's Mirus™ software makes data collection easy, providing users with the best data collection experience possible.

Holland Scientific **Booth: 1234**
Lincoln, NE
Website: www.hollandscientific.com
Holland Scientific, Inc. designs, manufactures and markets a broad line of high performance ground-based and aerial remote sensing instrumentation. We specialize in developing emerging technologies for the agricultural and environmental sciences. Please visit Holland Scientific's booth to see our new line of real-time crop sensor products which include the Crop Circle™ ACS-211, ACS-225 and ACS-430 plant canopy sensors, RapidSCAN CS-45, Crop Circle™ ACS-470 spectrally configurable plant canopy sensor and GeoSCOUT X data logger.

International Marketing & Design **Booth: 1639**
San Antonio, TX
Website: www.seedcounters.com
International Marketing will be displaying their line of seed counters which at this show will include a new group that both counts and weighs the seed to obtain the Weight/gram, or ounce and can automatically log that data into an external PC or printer. Also being shown is an Automatic Packeting Machine for plot packets of all types of seed by count or weight.

International Plant Nutrition Institute **Booth: 1119**
Norcross, GA
Website: www.ipni.net
The International Plant Nutrition Institute (IPNI) is a not-for-profit, science-based organization with programs throughout the Americas, Africa, Asia, Eastern Europe/Central Asia, the Mid-East, and Oceania. IPNI has initiatives addressing the world's growing need for food, fuel, fiber, and feed. Through cooperation and partnering with institutions around the world, IPNI adds its unique strengths to improve global agronomic research and education.

IRROMETER Company, Inc. **Booth: 1123**
Riverside, CA
Website: www.irrometer.com
IRROMETER Company, Inc. of Riverside, California has been manufacturing soil moisture measurement and control equipment to optimize irrigation since 1951. IRROMETER tensiometers and WATERMARK Soil Moisture Sensors are in use for research, production agriculture, landscape water management and environmental applications worldwide. Soil moisture scheduling is a widely recognized method of efficiently applying irrigation water, increasing yield and quality as well as preventing the leaching of applied nutrients.

IRROMETER also offers an extensive line of Soil Solution Access Tubes, or suction lysimeters, used in suction extract analysis of soil water for nutrient management and environmental sampling.

ISCA Technologies **Booth: 607**
Riverside, CA
Website: www.iscatech.com
ISCA Technologies is located in Riverside, California, and has been in business for over 20 years. The company prides itself in research and development, pheromone synthesis, product manufacturing, and green technologies. Each product line provides a safe, effective, natural, and environmentally friendly solution for agriculture, forest, and urban insect pest management. ISCA's mission is to protect the world from damaging insects and disease-causing pathogens by developing tools and solutions that are economical, effective, and ecologically friendly. ISCA Technologies Inc., 1230 W. Spring Street, Riverside, CA 92507; 951-686-5008. For more information, please e-mail ISCA Technologies at info@iscatech.com.

Kincaid Equipment **Booth: 1136**
Haven, KS
Website: www.kincaidequipment.com

L4iS **Booth: 410**
State College, PA
Website: www.L4iS.com
L4iS is a technology company based in State College, Pennsylvania offering its patent-pending Laser Ablation Tomography ("LATScan") services. L4iS's LATScan provides highly-contrasted 3D imagery and structure analysis. LATScan offers greater resolution, greater contrast, and quicker sample processing speeds than competing imaging and microscopy techniques.

LECO Corporation **Booth: 1015**
St. Joseph, MI
Website: www.leco.com
For more than 75 years, LECO Corporation has provided technologically advanced products and solutions. Today, that commitment continues with innovative instrumentation ideal for the environmental and agronomy markets, including our CHN628 Series—available in N, CN, and CHN configurations, and the TruMac® CNS Macro Analyzer—for macro sample sizes.

LI-COR Biosciences **Booth: 714**
Lincoln, NE
Website: www.licor.com/env
Visit LI-COR's booth (714) to see the latest instrumentation for environmental research, including the LI-6400XT Portable Photosynthesis System, the LI-8100A Soil Gas Flux System, radiation sensors, leaf area measurement equipment, complete eddy covariance systems, and gas analyzers, including the LI-840A, LI-7200, and LI-7500A CO2/H2O analyzers, and the LI-7700 Open Path CH4 Analyzer. LI-COR will demonstrate new SoilFluxPro™ Software, which computes fluxes of trace gases, and FluxSuite™ Software, a secure web-based service that provides real-time results and status information from eddy covariance sites. The newly improved and redesigned LI-190R, LI-200R, and LI-210R quantum, pyranometer, and photometric sensors will also be featured.

Macroscopic Solutions **Booth: 520**
Coventry, CT
Website: www.macroscopicsolutions.com
Macroscopic Solutions sells high-resolution imaging technologies and provides professional imaging services. Its signature device, the Macropod, yields three-dimensional images of small to medium sized specimens that are completely in focus, in context, and in color. The Macropod is a research device and an educational tool, and provides an efficient workflow for digitizing and cataloging natural history specimens.

Mega International **Booth: 1244**
Newport, MN
Website: www.mega-international.com
The **CYG Germination Pouch™** and the **High-Contrast Blue Blotter Pouch ™** (designed for imaging) are inexpensive space-saving tools designed to replace pots and glassware in root development observations. Universities and research centers worldwide use them in studies of plant physiology and pathology, tissue transfer as well as comparative studies.

METOS USA **Booth: 1124**
Ogden, UT
Website: www.morph20ag.com
Metos USA provides soil moisture measurement for irrigation scheduling and crop protection instrumentation including weather stations, remote insect monitoring traps and visual crop monitoring equipment. Web application software includes crop disease models, evapotranspiration generation, data analysis and reporting.

MicaSense, Inc. **Booth: 1141**
Seattle, WA
Website: www.micasense.com
MicaSense is a developer of precision sensors and data solutions designed specifically for agricultural remote sensing applications on unmanned aircraft (drones). Our scientific-grade hardware and advanced analytics provide new tools for crop managers and agronomists to make critical decisions to maximize the health and yield of their crops.

MicaSense offers RedEdge™, a rugged yet lightweight multispectral camera that offers agricultural professionals the highest quality data on their crops. MicaSense has launched ATLAS™, an imagery processing, analytics, and management platform to work with

RedEdge, providing a complete solution from image capture to data outputs and online tools for deeper insights and analysis of multispectral imagery.

Midco Global, Inc **Booth: 1221**
Kirkwood, MO
Website: www.midcoglobal.com
Midco Global, Inc. has been specializing in the agricultural supply industry for over 80 years and strives to be "Your Partner in Research and Production Supplies". Every product listed within their site is there because it offers the best quality to help with research. Midco Global, Inc. works with an international network of authorized manufacturers in order to offer their customers a wide array of supplies and equipment for the harvest, planting and pollinating seasons.

As agriculture industry professionals, Midco Global, Inc. prides themselves on providing high quality products as well as timely and accurate customer service, and understands that their product and customer service have a direct impact in their customers' profitability and efficiencies.

MIDI, Inc. **Booth: 1231**
Newark, DE
Website: www.midi-inc.com
MIDI, Inc. has been providing microbial identification and fatty acid analysis solutions since 1991. Our novel phospholipid fatty acid analysis (PLFA) extraction procedure and analysis tools enable you to take a "snapshot" of your microbial community profile and biomass size. The system is available for purchase or for contract service.

Midland Scientific **Booth: 1243**
Omaha, NE
Website: www.midlandsci.com
Midland Scientific Inc. is a nationwide supplier of laboratory equipment and supplies including the new MSI trifold filter paper designed for soil testing labs. Midland Scientific serves agriculture, food, environmental, manufacturing and research industries. For people you trust and values you count on call Midland Scientific at 800.642.5263 or visit MidlandSci.com.

Minnesota Department of Agriculture **Booth: 1331**
St. Paul, MN
Website: www.mda.state.mn.us
The Minnesota Department of Agriculture (MDA) is a state agency based in St. Paul, Minnesota. Our three general areas of responsibility include; protecting the food supply, protecting the environment, and cultivating an agricultural economy in Minnesota. The MDA's exhibitor booth will feature information about environmental programs on water quality, pesticides and nutrient management.

Minnesota Valley Testing Labs **Booth: 1337**
New Ulm, MN
Website: www.mvtl.com
MVTL is an independent laboratory specializing in agriculture analysis. We provide analytical services on soil, manure and plant tissue. MVTL has been in business for *64 years!* Throughout those 64 years, we have gained a vast amount of experience. Let us put our knowledge and experience to work for you!

Monsanto **Booth: 906**
St. Louis, MO
Website: www.monsanto.com
Monsanto is a leading global provider of technology-based solutions and agricultural products that improve farm productivity and food quality. We work alongside farmers to make agriculture more sustainable. To produce more food, to conserve more resources and to improve lives. We do this by selling seeds, traits developed through biotechnology, and crop protection chemicals. Learn more about our business and our commitments at www.monsanto.com.

MP Biomedicals **Booth: 1220**
Solon, OH
Website: www.mpbio.com
MP Biomedicals sells 55,000 products featuring molecular biology products and FastPrep sample prep instruments, accessories and nucleic acid purification kits. We supply immunology and cell biology products, with antibodies, antigens, purified proteins, culture media and immunoassay reagents. We serve researchers worldwide with innovative tools and unparalleled service.

NAS Board on Agriculture and Natural Resources **Booth: 1335**
Washington, DC
Website: www.dels.nas.edu/BANR

National Pest Management Association **Booth: 514**
Fairfax, VA
Website: npmapestworld.org
The National Pest Management Association (NPMA), a nonprofit organization with more than 7,000 members, was established in 1933 to support the pest management industry's commitment to the protection of public health, food, and property. Visit us at www.npmapestworld.org.

NIGHTSEA **Booth: 432**
Lexington, MA
Website: www.nightsea.com
NIGHTSEA features a modular, economical system that adapts existing stereo microscopes for fluorescence in under a minute, with five available excitation/emission combinations. Works great in the lab or the field with transgenic or naturally fluorescent subjects. We also offer excitation flashlights and barrier filter glasses for observing fluorescence by eye.

Opti-Sciences Inc. **Booth: 1341**
Hudson, NH
Website: www.optisci.com
Plant stress measurement (chlorophyll fluorescence, gas exchange & chlorophyll content), soil CO_2 flux measurement, & soil respiration measurement. New - iFL integrated fluorometer-photosynthesis system with leaf absorptance measurement, easy to use automation, & F_M' correction. New – inexpensive Y(II) meter for light adapted measurement, & leaf absorptance measurement. New - "Plant Stress Kit". OS5p+, our best chlorophyll fluorometer, provides technology leadership, F_M' correction, chloroplast migration meas., lake model quenching, & OJIP. New – Multichannel growth chamber and soil chamber CO_2 & H_2O measuring systems.

Oxford University Press **Booth: 505**
Cary, NC
Website: www.global.oup.com
Oxford University Press publishes some of the world's leading scientific books, journals, and online rescources. Stop by our booth in the Entomology exhibit hall for discounts on new and classic titles, free journal samples, and information about online products. Please also visit us online at www.oup.com/us.

Percival Scientific Inc. **Booth: 631**
Perry, IA
Website: www.percival-scientific.com
Percival Scientific represents a rich tradition of product ingenuity and reliability throughout the world. Our facility encompasses all engineering, design, fabrication, and construction of the product line. We take American pride in engineering and manufacturing the best environmental incubators and growth chambers used throughout the world.

Picarro, Inc. **Booth: 1219**
Santa Clara, CA
Website: www.picarro.com
Picarro is a leading provider of solutions to measure greenhouse gas concentrations, trace gases and stable isotopes across many scientific applications, including soil science, agriculture and ecology. Our ultra-precise and easy-to-use Cavity Ring-Down Spectroscopy instruments are deployed across the globe offering unmatched performance in a variety of field conditions.

Polytec, Inc. **Booth: 1125**
Hopkinton, MA
Website: www.analytics-online.com
Polytec's on-line Near Infrared spectrometers are the instruments of choice for harvesters and other online applications for agriculture and food. For almost 50 years, we have been a world leader providing instruments for rapid, non-contact tests for a wide variety of applications. Visit us in booth 1125 and let us show you how our systems can help you easily and quickly get results online.

PP Systems **Booth: 1116**
Amesbury, MA
Website: www.ppsystems.com
Stop by and learn more about our popular, truly portable CIRAS-3 Portable Photosynthesis & Chlorophyll Fluorescence system. Our range of gas analyzers for CO2, CO2/H2O and soil/canopy flux systems will be on display. Come and see the new "MaxiMet" range of compact weather stations from Gill Instruments.

Purdue Department of Entomology **Booth: 522**
West Lafayette, IN
Website: www.purdueinsects.org
Please stop by to check out opportunities for undergraduate and graduate studies, and information on programs in teaching, research, extension, and outreach education.

Qubit Systems Inc. **Booth: 609**
Kingston, Ontario
Website: www.qubitsystems.com
Cost-effective equipment and software for measuring respirometry and photosynthesis. Single- and multichannel gas exchange systems. Environmental control systems for regulating pO2, pCO2, temperature, RH, and pH. Sophisticated imaging systems for conveyor-based, robotic, and field-based plant phenotyping. Hand-held spectrometers for chlorophyll fluorescence and plant reflectance indices (NDVI, PRI, N-content etc.).

Rad Source Technologies **Booth: 633**
Suwanee, GA
Website: www.radsource.com
Rad Source Technologies is the only company in the world supplying a comprehensive line of commercial X-ray radiation products designed to replace self-shielded gamma sources. Current products are used for the irradiation of blood (*new*), small animals, cells, sterile insect technique (SIT) applications, viral inactivation, phytosanitation, and other scientific applications.

Sable Systems International **Booth: 614**
North Las Vegas, NV
Website: www.sablesys.com
Founded in 1987 by comparative physiologists studying insects, Sable Systems' instruments, systems, analytical software, and expertise are borne from real research needs in metabolic science. Our staff is still active today in research. Sable designs bench-top or field-capable systems and individual instruments that are precise, reliable, and rugged for measurement and control of O2, CO2, humidity, temperature, and flow for biological, biomedical, agricultural, and environmental sciences.

Scientist and Environmentalists for Population Stabilization **Booth: 533**
Del Mar, CA
Website: www.populationstabilization.org
SEPS is an educational and environmental organization focused on overpopulation and its environmental consequences. It advocates reduced immigration and small family sizes so as to achieve U.S. population stabilization soon. Our booth distributes, gratis, books, charts, and articles on these issues from a wide spectrum of authors and organizations.

SC Johnson Entomology Research Center **Booth: 412**
Racine, WI
Website: Raidkillsbugs.com
We are SC Johnson's global research facility that is dedicated to understanding insect life and promoting positive human-insect interactions. Located in Racine, Wisconsin, we are involved in all aspects of entomology that lead to technical innovations for improving the lives of consumers. Stop by and learn more about our Research Center.

Seed Research Equipment Solutions (SRES) **Booth: 1215**
South Hutchinson, KS
Website: www.sresweb.org

Sentek Technologies **Booth: 1238**
Stepney, Australia
Website: www.sentek.com.au
Sentek Technologies is an award-winning company that designs, develops, manufactures and globally distributes solutions for precision measurement and management of soil moisture and salinity dynamics. Sentek's technology is used to visualise the dynamics of the plant-water-salt-soil-atmosphere interactions, and provides insights in many research areas.

Sigma-Aldrich **Booth: 1228**
St. Louis, MO
Website: www.sigmaaldrich.com
Sigma-Aldrich is a leading Life Science and High Technology company that manufactures and distributes more than 270,000 chemicals, biochemicals and other essential products globally. With a focus on Agriculture, Sigma-Aldrich delivers customized solutions, from plant breeding to crop protection, that enable commercial growers to focus on feeding a growing population.

Soil Measurement Systems LLC **Booth: 1131**
Huntington Beach, CA
Website: www.soilmeasurement.com
Soil Measurement Systems will display equipment for hydraulic characterization of soils in the field and in the laboratory. Included in the display are tension infiltrometers, an automated ring infilitrometer, soil tensiometers with pressure transducers, cone pentrometers, different sized soil columns, a battery powered vacuum pump, and suction lysimeters for monitoring the vadose zone. Examples are presented for determining water retention curves, saturated and unsaturated hydraulic conductivities, and movement of contaminants through soil.

SoilMoisture Equipment Corp. **Booth: 1213**
Goleta, CA
Website: www.soilmoisture.com

Spectral Evolution **Booth: 1319**
Lawrence, MA
Website: www.spectralevolution.com
SPECTRAL EVOLUTION is a leading manufacturer of field portable and laboratory spectroradiometers and spectrometers for applications including geological remote sensing, ground truthing, spectral remote sensing, environmental and climate research, crop and soil research, vegetative studies, water body research

including water quality and pollution studies, forestry and canopy studies, upwelling and downwelling measurement, and more. With the PSR+ the company offers the standard in field portable spectroradiometers with a 350-2500nm spectral range, the highest resolution and the best sensitivity (signal-to-noise ratio). With no internal moving optics, our instruments deliver long life and high reliability for *in situ* spectroscopy measurements and analyses.

Spectrum Technologies **Booth: 1010**
Aurora, IL
Website: www.specmeters.com
Spectrum offers a full line of affordable measurement technology for soil compaction, soil moisture, nutrient levels, light, weather, and other factors directly affecting plant development. Our external sensors can record rainfall, leaf wetness hours, temperature and humidity fluctuations, and other weather events with our WatchDog data loggers, which range from stand-alone units to full weather stations. Comprehensive software allows users to graph data, run reports, create custom reports, export data to excel and import other weather data. Disease monitoring software is available for 17 disease models and 60 insect models. Over 15,000 customers count on Spectrum's easy to use, dependable technology.

Springer **Booth: 713**
New York, NY
Website: www.springer.com

Stevens Water Monitoring Systems, Inc. **Booth: 1006**
Portland, OR
Website: www.stevenswater.com
Stevens designs and manufactures advanced technology products for groundwater, surface water, agriculture, sports turf and water resources. Our sensor technology includes solutions for soil and groundwater monitoring, water flow and water quality, and hydrometeorological parameters. Stevens also offers advanced and reliable telemetry, online monitoring, and flexible data acquisition to meet most any requirement. Stevens can be the one stop solution for monitoring, telemetry, data acquisition. Featured Products Include: The Stevens Hydra Probe Soil Sensor, Stevens pF Matric Potential Sensor and Stevens Connect Wed data hosting.

STI Biosafe **Booth: 1323**
Indianapolis, IN
Website: www.stibiosafe.com

Surface Optics Corporation **Booth: 1321**
San Diego, CA
Website: www.surfaceoptics.com
Surface Optics Corporation (SOC) is a leader in hyperspectral imaging technology, and offers various imaging systems for research and industrial applications. SOC has extensive experience providing HSI sensors and support to agricultural scientists and researchers. Stop by our booth to check out our sensors and collect data.

Taylor & Francis Group **Booth: 621**
Boca Raton, FL
Website: www.crcpress.com
Taylor & Francis boasts a growing and high-caliber journals portfolio in agronomy and entomology. Our journals are edited by some of the most prominent academics in their fields. We are partnered with an array of the world's leading societies to publish cutting-edge, high-quality research. Visit www.tandfonline.com for information.

Tessenderlo Kerley, Inc. **Booth: 1121**
Phoenix, AZ
Website: www.cropvitality.com
Crop Vitality – A Division of Tessenderlo Kerley, Inc. Continuing a commitment that began over 60 years ago, today's Crop Vitality division of Tessenderlo Kerley, Inc. (TKI) manufactures and distributes a portfolio of liquid fertilizers that enhances nutrient performance, optimizes fertilizer efficiency and improves crop quality – while saving water and providing outstanding value for growers of both specialty and broadacre crops. The Crop Vitality liquid fertilizer Thio-Sul® is the world's most widely used ammonium thiosulfate, and the entire product line is supported by a team of highly qualified Crop Vitality Specialists and a national distribution network. To learn more about the Growing Legacy of Crop Vitality products, please visit cropvitality.com.

The Coleopterists Society **Booth: 414**
Santa Barbara, CA
Website: www.coleopsoc.org
The Coleopterists Society is an international organization devoted to the study of all aspects of systematics and biology of beetles of the world. Membership is open to all people who share our passion in any pursuit of knowledge and appreciation of all things beetle. The Coleopterists Society is a national 501(c)3 not-for-profit organization, organized and operated exclusively for scientific and educational purposes. These include fostering collaboration and communication among professional and avocational coleopterists, recognition of accomplishments of coleopterists, and the publication of Coleoptera-related research in our refereed quarterly journal, *The Coleopterists Society Bulletin*, published continuously since 1947. Visit The Coleopterists Society's booth and examine our latest publications—and if you are not already a member, join now!

Trécé Inc. **Booth: 406**
Adair, OK
Website: www.trece.com
The industry leader in insect monitoring and control. Over 30 years of consistent reliability; a worldwide distribution network; state-of-the-art organic chemistry and controlled-release formulations; research and development and on-site manufacturing, and chemists following strict quality assurance programs producing premier pheromone- and kairomone-based products for monitoring and controlling insects, including PHEROCON®, STORGARD®, and CIDETRAK®.

Trimble **Booth: 1241**
Westminster, CO
Website: www.trimble.com/agriculture
Trimble Agriculture provides technology solutions across the entire crop production cycle, for most brands and types of equipment. With precision agriculture products and related solutions, Trimble assists growers throughout every step of their operation. Growers leverage Trimble's proven technologies to operate efficiently, save on input costs, and improve crop performance and productivity in order to make the best decisions for their farming operations—season after season, year to year.

Truax Company Inc **Booth: 1246**
New Hope, MN
Website: www.turaxcomp.com
Truax Company, Inc. manufactures precision, no-till grain and grass drills and broadcast seeders for agriculture, conservation and reclamation seeding needs. Our innovative "On the Go" seed drill is engineered to go from no-till to conventional seed beds hydraulically, saving time and money. Look us up at www.truaxcomp.com or call 763-537-6639!

Union of Concerned Scientists **Booth: 1222**
Washington, DC
Website: www.ucsusa.org

University of Arkansas—Entomology **Booth: 521**
Fayetteville, AR
Website: www.entomology.uark.edu
The Department of Entomology at the University of Arkansas offers M.S. and Ph.D. degrees, with strengths in systematics, host–plant

interactions, applied insect ecology, and other research areas. The department's display provides information on graduate study, available fellowships, and other opportunities.

University of Maryland Insect Transformation Facility **Booth: 523**
Rockville, MD
Website: www.ibbr.umd.edu/facilities/itf
The University of Maryland's Insect Transformation Facility specializes in transforming nonmodel insects. Services include "fee-for-service" transformation (with established protocols), collaboration (to develop new protocols), training (microinjection, insect rearing), and consultation. The facility has a staff with broad and deep experience in insect biology and transformation technologies.

University of Minnesota **Booth: 536**
St. Paul, MN
Website: www.entomology.umn.edu
The Department of Entomology, UMN, has a 127-year history of research, teaching/outreach, and extension to the citizens of Minnesota and to our profession. We support 20 tenure-track faculty and 40 graduate students, engaged in cross-cutting research from cellular/molecular inquiry to applied ecology and IPM; we address critical issues in arthropod vector biology, biodiversity, invasive species, climate change and more. See http://www.entomology.umn.edu/.

USDA APHIS PPQ S&T and the Arizona Museum of Natural History **Booth: 511**
Phoenix, AZ
Website: www.azmnh.org
One hundred years of pink bollworm in western cotton: an exhibition created by the USDA and the Arizona Museum of Natural History. The exhibit uses sculpture, photography, text, and video to describe cotton in the southwest, pink bollworm—an invasive, exotic pest—and the successful, multifaceted PBW Eradication Program.

USDA-NRCS **Booth: 1146**
Washington, DC
Website: www.soils.usda.gov
The USDA-NRCS Soil Science Division is part of the National Cooperative Soil Survey, an effort of Federal and State agencies, universities, and professional societies to deliver science-based soil information. Web Soil Survey enables soil maps and data to be viewed online in a nationally consistent method. The 12th edition of the Keys to Soil Taxonomy (2014) is now available. It provides the taxonomic keys necessary for the classification of soils in a form that can be used easily in the field.

Vestaron Corporation **Booth: 434**
Kalamazoo, WI
Website: www.vestaron.com
Vestaron Corporation exploits the natural insecticidal properties of a class of peptides, which have potent insect killing potential but are safe to humans, birds, fish, and the environment. These peptides utilize new modes of action that do not suffer from insect resistance. For more information, visit www.vestaron.com.

Viking Metal Cabinet Company **Booth: 416**
Montgomery, IL
Website: www.vikingmetal.com
Viking manufactures a full product line of quality museum cabinets that meets the storage needs for a wide variety of museum collections. Whether you need to preserve natural history specimens, historical objects, fine art or rare documents…Viking has a cabinet specifically designed to respect the integrity of your collection.

Visit Orlando **Booth: 519**
Orlando, FL
Website: www.visitorlando.com
Join us in Orlando for the 2016 International Congress of Entomology! Stop by the Visit Orlando booth to learn about new and exciting things to do, and collaborate on fun ideas to create your memorable trip. Snap & share your #ESA2016 Orlando pic on social media to spread the word!

Western Ag Innovations Inc **Booth: 1327**
Saskatoon, SK
Website: www.westernag.ca
Western Ag Innovations provides Plant Root Simulator (PRSTM) probes for the simultaneous measurement of soil supply rates of 14 different elements. The PRS probes are ion exchange membranes inserted in an easy-to-use plastic support. Used from the poles to the tropics in agricultural, forestry, and environmental studies. Visit us at booth 1327 to review published data and discuss applications for your research area.

Wiley **Booth: 623**
Malden, MA
Website: www.wiley.com
Wiley is the leading society publisher. Our scientific, technical, medical, and scholarly business publishes on behalf of more societies and membership associations than anybody else, and offers libraries and individuals 1,250 online journals, thousands of books and e-books, reviews, reference works, databases, and more. For more information, visit www.wiley.com, or our online resource: onlinelibrary.wiley.com.

Wintersteiger **Booth: 1014**
Salt Lake City, UT
Website: www.wintersteiger.com
Wintersteiger is the worldwide market leader for agricultural field research equipment. We have our new Quantum plot combine on display for the first time. The Quantum has been field testing for the last three years and represents a new benchmark when it comes to field research equipment. Our product range also includes split plot combines, forage plot harvesters, biomass harvesters, plot seeders, precision spaced planters, stationary threshers, seed treaters and seed counters. Please visit our booth and learn the latest about our equipment.

ZURN Harvesting **Booth: 1105**
Waldenburg, Germany
Website: www.zeurn.de

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Gold Level

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Representative: Mr. J. Thomas Wofford
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At BASF, we create chemistry for a sustainable future. We combine economic success, social responsibility, and environmental protection. Through science and innovation, we enable our customers in almost all industries to meet the current and future needs of society.

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PO Box 12014, 2 TW Alexander Drive, Durham, NC 27709
Representative: Dr. Amanda Beaudoin
E-mail: amanda.beaudoin@bayer.com
Web: www.bayercropscience.com
Bayer CropScience strives to be the global innovation leader, providing sustainable crop solutions from seed to harvest. We help farmers worldwide meet the ever-increasing demand for affordable and high-quality food, feed, fiber, and energy crops. We help shape the future of agriculture and create value for our customers and society. This is how we live Science for a Better Life.

Dow AgroSciences
9330 Zionsville Road, Indianapolis, IN 46268
Representative: Dr. Amanda Jacobson
E-mail: ajjacobson@dow.com
Web: www.dowagro.com
Dow AgroSciences LLC is a global leader in providing pest management and biotechnology products that improve the quality and quantity of the earth's food supply; and contribute to the safety, health, and quality of the life of the world's growing population. Dow AgroSciences is supported by more than 6,000 employees in 50 countries.

DuPont Crop Protection
1090 Elkton Road, Newark, DE 19711
Representative: Dr. Hector E Portillo
E-mail: hector.e.portillo@dupont.com
Web: www2.dupont.com/Prod_Agriculture/en-us/content/crop-protection.html
DuPont (NYSE: DD) has been bringing world-class science and engineering to the global marketplace in the form of innovative products, materials, and services since 1802. The company believes that by collaborating with customers, governments, NGOs, and thought leaders, we can help find solutions to such global challenges as providing enough healthy food for people everywhere, decreasing dependence on fossil fuels, and protecting life and the environment. For additional information about DuPont and its commitment to inclusive innovation, please visit www.dupont.com. For information on agriculture crop solutions from DuPont, please visit www.cropprotection.dupont.com.

Syngenta Crop Protection, Inc.
PO Box 18300, Greensboro, NC 27419-8300
Representative: Dr. John Koenig
E-mail: john_patrick.koenig@syngenta.com
Web: www.syngenta.com
Syngenta is one of the world's leading companies, with more than 26,000 employees in more than 90 countries dedicated to our purpose: bringing plant potential to life. Through world-class science, global reach, and commitment to our customers, we help increase crop productivity, protect the environment, and improve health and quality of life. For more information about us, please go to www.syngenta.com.

Silver Level

FMC Agricultural Solutions
1735 Market Street, Philadelphia, PA 19103
Representative: Dr. Lamar Buckelew
E-mail: lamar.buckelew@fmc.com
Web: www.fmc.com
FMC has been serving agriculture for more than a century—long enough to know that new crop production challenges are always on the horizon. Crop by crop, region by region, we're dedicated to meeting these challenges head-on with innovative herbicides, insecticides, and fungicides that add value to growers. By providing these crop protection products, FMC Agricultural Products delivers broad-spectrum control and long-lasting activity to take challenges out of the way. For more information on FMC crop protection products, please visit www.FMCcrop.com.

Bronze Level

AMVAC Chemical Corp.
4695 Macarthur Court, Ste. 1200, Newport Beach, CA 92660
Representative: Dr. John A. Immaraju
E-mail: johni@amvac-chemical.com
Web: www.amvac-chemical.com
AMVAC Chemical Corporation, a subsidiary of American Vanguard Corporation (NYSE:AVD), is a diversified specialty and agricultural products company. With annual revenues of more than $300 million, AMVAC's successful business model has emphasized manufacturing of key active ingredients in the United States, acquiring or licensing both new and well-established product lines that serve high-valued niches in crop protection, turf and ornamental, and the public and animal health segments. AMVAC has positioned itself to capitalize on developing trends in the global markets.

Gylling Data Management
405 Martin Blvd., Brookings, SD 57006-4605
Representative: Dr. Steven Gylling
E-mail: support@gdmdata.com
Web: www.gdmdata.com
Providing research management software since 1982. See the new ARM 10.2015 used to establish, manage, analyze, and report information for crop experiments including field and greenhouse protocols and trials. Tablet Data Collector: Enter and analyze assessments, take plot pictures, and record trial GPS locations. ST: Summarize and report a trial series across locations and/or years; links with Trial Database to select trials based on information in any trial data entry field.

Contributor

Bellspray Inc. R&D Sprayers
419 Highway 104, Opelousas, LA 70570
Representative: Mrs. Bernadine Nezat
E-mail: rdspray@co2sprayers.com
Web: www.co2sprayers.com
For more than 25 years, R&D Sprayers has been an authority in the research, design, and manufacturing of pesticide spray units. Today, the company prides itself on providing a wide range of sprayers and designing products for special needs. R&D's product base is expanding to meet our customers' high expectations. Superior service is our priority; providing great sprayers is our business.

LNouvel Inc.
4657 Courtyard Trail, Plano, TX 75024
Representative: Mr. Larry Nouvel
E-mail: lnouvel@lnouvel.com
LNouvel Incorporated provides business and product development services to the nonagricultural pest control market.

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Bianca C. Soares, *Co-Chair*, University of São Paulo, São Paulo, Brazil
Paul Abram, *Member*, Université de Montréal, Montréal, QC, Canada
Richard Halfpenny, *Member*, Staffordshire University, Newcastle under Lyme, United Kingdom
Lewis Hun, *Member*, University of Arizona, Tucson, AZ
Deane Kathleen Jorgenson, *Member*, Syngenta Crop Protection, Stanton, MN
Tamra Reall Lincoln, *Member*, USDA ARS, Columbia, MO
Mervat Ahmed Badawy Mahmoud, *Member*, University of Missouri, Columbia, MO
Carey Minteer, *Member*, USDA ARS, Davie, FL
Boyd A. Mori, *Member*, Swedish University of Agricultural Sciences, Malmö, Sweden
Jean Willy Nduwimana, *Member*, University of Burundi, Bujumbura, Burundi
Haydee Peralta-Vazquez, *Member*, University of Calgary, Calgary, AB, Canada
Julie Ann Peterson, *STEP Committee Liaison*, University of Nebraska, North Platte, NE

Rosina Romano, *Headquarters Staff Liaison*, Entomological Society of America, Annapolis, MD
Debi Sutton, *Headquarters Staff Liaison*, Entomological Society of America, Annapolis, MD

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2015 ESA, ESA CERTIFICIATION CORPORATION, AND ENTOMOLOGICAL FOUNDATION AWARDS

Each year the Entomological Society of America, Entomological Society of America Certification Corporation and the Entomological Foundation provide annual honors and awards to recognize scientists, educators, and students, who have distinguished themselves through their contributions to entomology. Consider nominating a friend or colleague today!

For more information on the ESA, Certification Corporation, and Entomological Foundation awards visit www.entsoc.org/awards

The awards below will be presented at the Opening Plenary Session, Sunday, November 15, 3:30 PM - 5:30 PM, Main Auditorium, Minneapolis Convention Center.

HONORARY MEMBERS

Dr. Wayne Gardner
Dr. Michael Gray
Dr. Jacqueline Miller
Dr. Marlin Rice
Dr. John T. Trumble

ESA FELLOWS

Dr. Serap Aksoy
Dr. M. Deane Bowers
Dr. Sarjeet S. Gill
Dr. Le Kang
Dr. Michael Kanost
Dr. Jeremy McNeil
Dr. James R. Miller
Dr. Steven Naranjo
Dr. Michael J. Raupp
Dr. David Soderlund

ESA PROFESSIONAL AWARDS

Dr. James Hagler, Award for Excellence in Integrated Pest Management (sponsored by Syngenta Crop Protection, Inc.)
Dr. Alec Gerry, Distinguished Achievement Award in Extension
Dr. Kenneth A. Sorensen, Distinguished Achievement Award in Horticultural Entomology
Dr. James R. Carey, Distinguished Achievement Award in Teaching
Dr. Andrew Michel, Early Career Innovation Award (sponsored by BASF)
Dr. Ebony Murrell, Henry and Sylvia Richardson Research Grant
Dr. Bruce Tabashnik, Nan-Yao Su Award for Innovation and Creativity in Entomology
Dr. Angela Douglas, Recognition Award in Insect Physiology, Biochemistry, and Toxicology (sponsored by Apex Bait Technologies, Inc.)
Dr. Coby Schal, Recognition Award in Urban Entomology (sponsored by S.C. Johnson & Son, Inc.)
Dr. Andrew Deans, Thomas Say Award

ESA CERTIFICATION AWARDS

Mr. Michael Goldman, ACE, ACE Professional Award
Dr. James G. Fredericks, BCE, Distinguished Service Award to the Certification Program

ENTOMOLOGICAL FOUNDATION AWARDS

Sven Strnad, President's Prizes for Outstanding Achievement in Primary Education
Christine Brothers, President's Prizes for Outstanding Achievement in Secondary Education
Dr. Thomas Green, Entomological Foundation Medal of Honor

ESA STUDENT AWARDS

The winners of the President's Prize, ESA Student Awards, and the Linnaean Games will be recognized Tuesday, November 16, 6:45 PM - 8:30 PM, Main Auditorium, Minneapolis Convention Center.

The following student award winners will be honored:

John Henry Comstock Graduate Student Awards
Ms. Mia Park, Eastern Branch
Ms. Amy C. Morey, North Central Branch
Dr. Mohammad-Amir Aghaee, Pacific Branch
Ms. Jessica Hartshorn, Southeastern Branch
Ms. Meaghan Pimsler, Southwestern Branch

ESA Student Awards
Ms. Alix Whitener, The Larry Larson Graduate Student Award for Leadership in Applied Entomology
Ms. Emily K. Meineke, Lillian & Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry, or Molecular Biology
Dr. Tamra Reall Lincoln, Student Activity Award (sponsored by Monsanto Company)

ESA Student Certification Award
Mr. Sanjay Basnet, ESA Student Certification Award (sponsored by PestWest Environmental Science)

Monsanto Research Grant Award:
Mr. Geoffrey Broadhead
Mr. Donghun Kim
Ms. Mitzy Porras
Ms. Loren Rivera Vega
Ms. Qian Sun

Monsanto Student Travel Award:
Ms. Flor E. Acevedo
Mr. Adam Dale
Ms. Anjel Helms
Ms. Brittany Peterson
Ms. Loren Rivera Vega

USDA AFRI Travel Grant Award:
Mr. Flor E. Acevedo
Ms. Lina Bernaola
Mr. Mehmet Ali Doke
Mr. Todd Johnson
Ms. Alice Ruckert
Mr. Emmanuel Santa-Martinez
Ms. Katharine Swoboda Bhattarai
Mr. Patrick Selig
Mr. Suresh Varsani
Ms. Wenqing Zhou

ESA HONORARY MEMBERS

Honorary Membership acknowledges those who have served ESA for at least 20 years through significant involvement in the affairs of the Society that has reached an extraordinary level. Candidates for this honor are selected by the ESA Governing Board and then voted on by the ESA membership.

Dr. Wayne A. Gardner has been a member of the University of Georgia's (UGA's) entomology faculty since 1979. He attained the rank of professor in 1991, and has served as unit administrative coordinator on the UGA Griffin Campus for 24 years. Dr. Gardner has actively served ESA in various committee and leadership capacities during his 41 years of continuous service as a member of the Society. He served as secretary, chair-elect, and chair of Subsection Ce (Microbial Control) and as co-chair of the Local Arrangements Committee for the Society's 1999 meeting in Atlanta. Dr. Gardner continued to serve on the Local Arrangements Committee for the next 10 years as coordinator of student volunteers for the Society's annual meetings. He personally invested hundreds of hours in ensuring that student members have a positive networking experience. Dr. Gardner was elected to and served on the ESA Governing Board from 2001 to 2004, including an additional year of service beyond the usual three-year term following the passing of the board representative he replaced. During his time on the board, the Society solidified

its financial standing and realigned its organization to effectively address the changing needs of its membership and those the Society serves. Dr. Gardner also contributed extensively to ESA Southeastern Branch governance on committees, as Program Committee chair on two occasions, and as president (2004-2005). He also has served the Georgia Entomological Society in various leadership roles including president (2004-2005) and as business manager (1988-1993) and editor (1993 to present) of the *Journal of Entomological Science*.

Dr. Michael E. Gray is a professor and assistant dean at the University of Illinois at Urbana—Champaign (UIUC). Dr. Gray graduated from the University of Northern Iowa with a BA (1977) degree in biology, and received MS (1982) and PhD (1986) degrees in entomology from Iowa State University. He is internationally recognized for his research and extension programs on management of the western corn rootworm (*Diabrotica virgifera virgifera* LeConte). Dr. Gray has published numerous journal articles on western corn rootworm, including a 2009 *Annual Review of Entomology* paper, and also served as co-editor for the *ESA Handbook of Corn Insects*, published in 1999. He has been a member of ESA since 1979 and has served the Society in many leadership roles, including program chair, North Central Branch (NCB) Meeting, 1994; Editorial Board, *American Entomologist*, 1990-1995; Executive Committee, NCB, 1994-1997; editor, *Journal of Economic Entomology*, 1995-1997; program co-chair, ESA National Meeting, 2001; president, NCB, 2002-2003; Governing Board, Section E, 2004-2005; chair, ESA Nominations Committee, 2004-2006; and Governing Board Executive Committee, 2004-2009. Dr. Gray served as president of ESA during the first full year (2008) of ESA's renewal and transition to the four new Sections. In 2002, he received the ESA-NCB Award for Excellence in Integrated Pest Management. In 2011, he received the ESA Distinguished Achievement Award in Extension. In 2013, the ESA-NCB honored Dr. Gray with the C.V. Riley Achievement Award. He received the UIUC Paul A. Funk Recognition Award (2007) for outstanding achievement and major contributions to the betterment of agriculture, natural resources, and human systems. In 2013, Dr. Gray was elected an ESA Fellow.

Dr. Jacqueline Y. Miller has been a member of ESA since 1992. She received a PhD in zoology from the University of Florida (UF) in 1986 and has been associated with the Florida Museum of Natural History since 1981, where she now serves as a curator of Lepidoptera at the McGuire Center for Lepidoptera and Biodiversity. Dr. Miller served as a research scholar and taught entomology at New College of Florida (1995-2004) and currently serves as an adjunct professor in the Department of Entomology and Nematology and the Department of Biology at UF. She has served on numerous graduate committees at UF as well as nationally and internationally. Her research interests include systematics, biogeography, and biodiversity of Lepidoptera worldwide, especially in the Caribbean basin. She represented Section A on the ESA Systematics Resources Committee from 1994 to 1997, and then served the committee as secretary (1997-1998), vice chair (1998-1999), and chair (1999-2000). She has served on the ESA Annual Meeting Program Committee and co-chaired the Local Arrangements Committee, and has also served on the ESA Ethics Committee and as a representative to the ESA Governing Board (2003-2005). Dr. Miller has served as both a moderator and a judge for the ESA Annual Meeting student competition. She was elected an ESA Fellow in 2008. She is presently serving on the Local Arrangements Committee for the 2016 International Congress of Entomology and on the Presidential Committee on Section Leadership.

Dr. Marlin E. Rice is a senior research manager with DuPont Pioneer in Johnston, Iowa, and a collaborating professor at Iowa State University. He has served ESA for 26 consecutive years, which includes service on numerous committees, boards, and publications. For nine years, Dr. Rice served on the ESA Governing Board and was elected by the membership as representative (Section E), secretary-treasurer, and president. During his tenure as president, he appointed the first student representative to the Governing Board, which the membership later voted to make a permanent elected position. The same year (2009), the membership overwhelmingly supported creation of the International Branch and a new Society logo. He served on two Executive Director Search Committees and has worked in various capacities on ESA publications, including *Journal of Economic Entomology* (Editorial Board and chair) and *Handbook of Corn Insects* (co-editor). Along with Kevin Steffey, he was a co-founder and is currently co-editor-in-chief for ESA's *Journal of Integrated Pest Management*. He labored on the Annual Meeting Program as poster chair, Student Competition chair, and, during 2000, program chair for the Montreal meeting. Currently, he participates on committees for the World of Insects Calendar and YouTube Your Entomology, and he writes the column "Legends" for *American Entomologist*. In the ESA North Central Branch, Rice was elected to the Executive Committee, was Linnaean Games master for five years, and was program chair during the Great Sioux Falls Blizzard of 1998. In 2011, Rice was elected an ESA Fellow, primarily for his contributions to extension entomology.

Dr. John Trumble, Distinguished Professor of Entomology, University of California at Riverside, joined ESA in 1975. Since then, he has served on the ESA Governing Board, and has been involved in buying computers and a building for the Society, selecting executive directors, promoting electronic publishing, and serving as president of the Pacific Branch. He has helped advance ESA by serving on more than 40 committees that handled finances, award selections, nominations, long-term planning, and managing the nuts and bolts of Society operations. Since 2001 his primary role has been to serve as the editor-in-chief of the *Journal of Economic Entomology*. When he accepted this position in 2001, he was immediately challenged to set up an entirely new publication system mandated by the Governing Board. The old approach, with three or four co-editors, was replaced with a new system consisting of an editor-in-chief and 20-30 subject editors. Dr. Trumble found qualified scientists willing to take on the editorial jobs and converted the journal from a paper-based review system to an email-based system and then to a web-based submission system, greatly reducing the response time on manuscripts. Since 2001, Dr. Trumble has continually added new editors as others retired or moved on. He also maintains an active mentorship program. In just the last four years, he has published six papers with undergraduate students as co-authors. This type of mentorship also serves ESA by creating an enthusiasm for our science that motivates the next generation of scientists to become entomologists.

ESA FELLOWS

The designation of ESA Fellow recognizes individuals who have made outstanding contributions to entomology.

Dr. Serap Aksoy is a professor in the Department of Epidemiology of Microbial Diseases at Yale School of Public Health. She is internationally known for her work with vector genomics, genetics, and immune and symbiotic physiologies with a focus on tsetse flies and trypanosome parasites.

Aksoy was born in Turkey in 1955 and grew up in Istanbul. After coming to the United States, she received a B.S. from Vassar College and a Ph.D. in biology from Columbia University. She joined Yale's Department of Internal Medicine as a postdoctoral fellow and studied the molecular aspects of the African trypanosome parasite. In 1988, Aksoy joined the faculty at Yale School of Public Health, where she has built a large program for investigations on tsetse flies and African trypanosomes, with direct implications for disease control in Africa. She also served as the department chair from 2002-2010.

The overarching paradigm for Aksoy's program is an interdisciplinary approach to investigation of disease transmission—spanning from basic research on vector, parasite, and symbiont biology in the laboratory to the population genetics/genomics of the vector and parasite in natural populations and disease epidemiology in the field. Her investigations have helped pioneer development of an innovative control method involving use of beneficial symbionts to render the insect's environment inhospitable for disease-causing pathogens. She has collaborated extensively with colleagues in East Africa to build research capacity in tsetse-transmitted diseases in sub-Saharan Africa. She led an international consortium, International *Glossina* Genome Initiative (IGGI), to develop genetics and genomics knowledge for tsetse flies. The consortium has recently completed the genome sequence of *Glossina morsitans* and the sequencing of five additional species.

Aksoy has published more than 120 peer-reviewed research articles and numerous reviews and editorials, as well as a book, *Insect Transgenesis*. Her work has been funded by diverse research agencies, including the National Science Foundation, National Institutes of Health, and World Health Organization, along with the Li Foundation and Ambrose Monell Foundation. She has been a leader within many professional societies, as well as many international, national, and university committees and boards. Aksoy has been the co-Editor-in-Chief of *PloS Neglected Tropical Diseases* since 2009.

She has been a Fellow of the American Society of Tropical Medicine and Hygiene (ASTMH) since 2013 and is an ASTMH Council Member (2014-2018). She is a Fulbright Scholar (2015) and winner of the 2015 Research Innovation and Leadership award given by the Connecticut Technology Council.

Aksoy and her husband Sait Aksoy live in Woodbridge, Connecticut, and enjoy kayaking in the lakes, rivers, and shoreline communities.

Dr. M. Deane Bowers is the Curator of Entomology at the University of Colorado Museum of Natural History and Professor and Chair of the Department of Ecology and Evolutionary Biology at the University of Colorado. She is internationally known for her research on the chemical ecology of insect-plant interactions and multi-trophic interactions, as well as the biology of the Lepidoptera.

Bowers was born in New York in 1952, but soon after that her family moved to Winter Park, Florida, where she grew up. It was here that she became fascinated with insects, especially butterflies and moths. She received a B.A. in zoology from Smith College in 1974 and a Ph.D. from the University of Massachusetts in 1979. She then spent two years at Stanford as a postdoctoral fellow. In 1981, she began her first faculty position at Harvard University, as an Assistant Professor and Curator of Lepidoptera. She was promoted to Associate Professor in 1986. In 1989, she moved to the University of Colorado, where she was jointly appointed between the Museum of Natural History and the Department of Ecology and Evolutionary Biology. She was promoted to Full Professor in 1996. She began her service as Chair in 2014.

Bowers's interdisciplinary research is focused on the chemical ecology of insect-plant-natural enemy interactions, with a particular interest in insects that have the ability to sequester plant chemicals to render themselves unpalatable. She has also investigated factors that can contribute to variation in plant chemistry and how that variation affects other trophic levels, including not only herbivores, but also predators and parasitoids. More recently, she has collaborated on a project investigating how biofuel crops affect native bee communities and become involved in a citizen science project focused on bees. She has published more than 130 papers and book chapters and generated more than $4.5 million in grant funding. As curator, she has overseen extensive growth of the Museum's entomology collection and received funding for improvement of the collection. She served as interim Director of the Museum in 2007-2008. Bowers enjoys mentoring students and has graduated 14 Ph.D. and 13 Master's students, as well as supervising eight postdoctoral fellows and dozens of undergraduate researchers.

Bowers has given more than 300 invited and contributed presentations, been active on several editorial boards, and served as editor of the *Journal of the Lepidopterists' Society*. She received the University of Colorado at Boulder Faculty Assembly Excellence Award in Research in 1996. She was chair of the Gordon Conference on Plant-Herbivore Interaction in 1998.

In addition to her overall fascination with insects, Bowers enjoys cooking, gardening, spinning, weaving, and natural dyeing, especially, of course, with insects.

Dr. Sarjeet Gill is Distinguished Professor of Cell Biology and Neuroscience and an Entomologist in the Agricultural Experiment Station at the University of California at Riverside.

Gill received his doctorate in insecticide toxicology from the University of California at Berkeley and joined the Department of Entomology faculty at the University of California at Riverside in 1983. He helped establish the Department of Cell Biology and Neuroscience and the Environmental Toxicology Graduate Program, serving as Chair of the Department and Director of the Program. Gill is currently the editor of *Insect Biochemistry and Molecular Biology*, a premier journal in entomology, and he co-edited the series *Comprehensive Molecular Insect Science*.

Gill's laboratory has two principal research foci. The first area is to elucidate the mode of action of insecticidal toxins derived from the bacteria *Bacillus thuringiensis.* These toxins are active against agricultural pests as well as vectors of human diseases. More recently, his work has also included another gram-positive bacteria, *Clostridium bifermentans*, which is mosquitocidal. The research in Gill's lab aims to gain a molecular understanding of the toxins involved and how these toxins interact with cellular targets, thereby disrupting ion regulation and lethality. A second area of research

focuses on understanding mosquito midgut and Malpighian tubules function (in particular ion and nutrient transport), changes that occur following a bloodmeal, and how toxins affect these functions.

Gill is a Fellow of the American Association for the Advancement of Science and a recipient of the ESA Recognition Award in Insect Physiology, Biochemistry, and Toxicology. He has served on numerous grant review panels at the National Institutes of Health and U.S. Department of Agriculture.

Dr. Le Kang is Professor of Entomology in the Institute of Zoology, Chinese Academy of Sciences (CAS). He is internationally recognized for his research on the ecological genomics of insects.

Kang was born on April 5, 1959, in Huhehot City, Inner Mongolia, China. He received a B.A. in plant protection from Inner Mongolia Agricultural University in 1982. He then enrolled in China Agricultural University (formerly Beijing Agricultural University), where he obtained an M.S. in entomology in 1987. In 1990, he received his Ph.D. in ecology from the Institute of Zoology (CAS). In 1991, he accepted a position as an Associate Professor of Ecology at the Institute of Zoology. He was a visiting scientist at Kansas State University in 1992 and postdoctoral fellow at the University of Nebraska-Lincoln in 1993. In October 1993, he returned to the Institute of Zoology and has continued there for 23 years. He was promoted to Full Professor in 1995 and has served as Director-General of the Institute since 2012.

Kang began his explorations of the ecology of grassland grasshoppers in 1987. In 1995, he expanded this to include the study of the cold tolerance of locusts, grasshoppers, and dipteran leafminers. At same time, he also studied plant-leafminer-parasitoid interactions. Since 1999, he has been working on the ecological genomics of locusts. His research has revealed much of the coding and noncoding RNA involved in locust phase change, in which olfactory-related genes play an important role. He has also identified genes in the dopamine pathway and in microRNA-133 that act as a maintenance mechanism of gregarious locusts. He has contributed substantially to our understanding of the general principles of metabolomic and immunity-specific differences between solitary and gregarious locusts, specifically demonstrating that gregarious locusts have a more active lipid metabolism and stronger resistance to fungal pathogens. He decoded the entire genome sequence of the locust, the largest genome sequenced in animals to date. He has published more than 157 peer-reviewed scientific papers with 2,387 citations.

Kang has mentored more than 50 graduate students and 10 postdoctoral researchers. Since 1995, he has been teaching evolutionary ecology to hundreds of graduate students every year. He serves as president of the Entomological Society of China, and as Editor-in-Chief of *Insect Science*, Deputy Editor-in-Chief of *Protein & Cell*, and editor for several international journals, including *Journal of Insect Physiology*, *Current Opinion in Insect Science*, and *Frontiers in Ecology and Evolution*, among others.

Kang has been elected to the Chinese Academy of Sciences and the Third World Academy of Sciences (TWAS). He received an Honorary Doctor of Science degree from the University of Nebraska in 2009. He has received several important awards including the prestigious Life Science & Biotechnology Prize, Ho Leung Ho Lee Foundation (Hong Kong) in 2011, the ESA International Branch Distinguished Scientist Award in 2013, and Tan's Life Science Achievement Prize in 2015.

Dr. Michael R. Kanost is University Distinguished Professor in the Department of Biochemistry and Molecular Biophysics at Kansas State University. He is internationally known for his research in biochemistry and immunology of insects.

Kanost was born in Cheyenne, Wyoming, in 1956 and moved with his family to Broomfield, Colorado, at age 12. He received a B.S. with majors in zoology and entomology from Colorado State University in 1979. He earned a Ph.D. in entomology at Purdue University in 1983, mentored by Dr. Peter Dunn and investigating synthesis of hemolymph antibacterial proteins stimulated by bacterial infection in *Manduca sexta.* From 1983-1986, he was a postdoctoral fellow in the Department of Biology at Queen's University in Kingston, Ontario, Canada, working with Dr. G.R. Wyatt on regulation of hemolymph protein synthesis by juvenile hormone. He moved to the Department of Biochemistry at the University of Arizona, working with the late Dr. Michael Wells at an exciting time, the beginning of the Center for Insect Science. He was a Research Associate (1986-1989) and then Research Assistant Professor (1989-1991) at Arizona, investigating biochemistry of lipophorin and then beginning a study of serpins in insect hemolymph that has continued for 25 years. In 1991, Kanost became Assistant Professor of Biochemistry at Kansas State University, with promotion to University Distinguished Professor in 2005. He served as head of the Department from 2002-2012.

Kanost has served as major professor for 23 Ph.D. and M.S. students and as research mentor for 19 postdoctoral scientists and 42 undergraduate students. He has taught numerous biochemistry courses, including many offerings of Advanced Topics in Insect Biochemistry. He has authored more than 180 journal articles and book chapters, and his publications have been cited more than 10,000 times. Kanost's research has focused on functions of hemolymph plasma proteins and hemocytes in immune responses, biochemistry of insect exoskeletons, and functions of insect multicopper oxidases. He helped lead the sequencing and annotation of the genome of *Manduca sexta*, an important model species for insect research. His research on caterpillars, mosquitoes, and beetles has been supported with more than $17 million in grants from agencies such as the National Institutes of Health, National Science Foundation, U.S. Department of Agriculture, and others. He received a MERIT Award from the National Institute of General Medical Sciences in 2011 in recognition of the track record of productivity, creativity, and impact of his research.

Kanost is a Fellow of the American Association for the Advancement of Science, and he has received awards including the ESA Recognition Award in Insect Physiology, Biochemistry, and Toxicology (2007), Purdue University College of Agriculture Distinguished Agriculture Alumni Award (2008), University of Kansas Olin K. Petefish Award in the Basic Sciences (2011), and the Purdue University John V. Osmun Alumni Professional Achievement Award in Entomology (2015).

Kanost and his wife Jill have been married since 1977 and have four children. Kanost plays the cello in the Salina (Kansas) Symphony, and he enjoys growing tomatoes.

Dr. Jeremy N. McNeil has developed a strong interdisciplinary research program in chemical ecology, with particular emphasis on the reproductive biology of parasitoids and the behavioral and ecological aspects of the reproductive biology of both migrant and non-migrant species where mate location and mate choice are modulated by sex pheromones.

McNeil was born in Tonbridge, England, in 1944; his family then moved to Newfoundland in 1945. He went to high school in England and worked for two years as a hospital orderly then as a wine merchant in London. He returned to Canada, where he completed a B.Sc. in Honours Zoology at the University of Western Ontario (1969), followed by a Ph.D. under the direction of Dr. R. L. Rabb at North Carolina State University (1972). He won the ESA Southeastern Branch Robert T. Gast Award and the Entomological Society of America-Entomological Research Institute Outstanding Graduate Award (now the John Henry Comstock Award).

McNeil returned to Canada in 1972, taking a position in the Biology Department at Université Laval, where he remained for 30 years, being promoted to Associate Professor in 1977 and Full Professor in 1982. In 2003, he was awarded a Humboldt Research Fellowship and spent a year with Drs. Wittko Francke (University of Hamburg) and Stefan Schulz (Braunschweig University of Technology). In 2004, McNeil was named the Helen Battle Professor of Chemical Ecology in the Biology Department at the University of Western Ontario.

During his career at Université Laval and the University of Western Ontario, McNeil has taught undergraduate and graduate courses in general entomology, integrated pest management, ecology, chemical ecology, and communication of science. He has also taught similar courses as a visiting professor at universities in Brazil (Parana, Vicosa), Chile (Santiago), China (Beijing, Jinan), France (Rennes), Portugal (Azores), Switzerland (Geneva, Neuchatel), and the United States (Cornell).

McNeil has authored or co-authored more than 200 scientific papers in behavioral and chemical ecology. He has also trained more than 60 graduate students and postdocs, many now working in universities or government laboratories worldwide. He has received a number of national and international research awards, including the C. Gordon Hewitt Award (1979) and Gold Medal for Outstanding Achievement in Canadian Entomology (1987) from the Entomological Society of Canada, the F.E.J. Fry Medal of the Canadian Society of Zoologists (2008), the Delwart Prize in Chemical Ecology (1986), the Silver Medal of the International Society of Chemical Ecology (2004), and the Order of Canada (2014). He is a Fellow of the Entomological Society of Canada (1981) and the Royal Society of Canada (1999).

For more than four decades, McNeil has combined his passions for insects and photography to actively engage, both at home and abroad, in activities relating to the public awareness of science. He has received several national awards for his outreach activities, including the J. Gordin Kaplan Award from the Canadian Federation of Biological Societies (1996), the McNeil Medal for the Public Awareness of Science from the Royal Society of Canada (1998), and the Partners In Research National Science Ambassador Award (2014).

Dr. James R. Miller, Distinguished Professor of Entomology at Michigan State University, is internationally recognized for pioneering research in insect physiology, chemical ecology, and behavior that has significantly enhanced insect detection and management.

Miller was born in 1948 in the farming community of Lancaster, Pennsylvania. Exposure to animals, plants, and nature fed his childhood appetite for biology. Public high school teachers rejected Miller's plans to farm and entered him into Millersville University in 1966. Entomologist William J. Yurkiewicz guided Miller's undergraduate research on lipid metabolism of insects, resulting in two peer-reviewed publications and acceptance into a National Science Foundation-sponsored Ph.D. program in the Department of Entomology at Penn State University in 1970 under the mentorship of Dr. Ralph O. Mumma. Pioneering Ph.D. research on the chemistry and physiology of the defensive agents of Dytiscidae and Gyrinidae led to a John Henry Comstock Award and an offer for postdoctoral research on moth sex pheromones with Dr. Wendell Roelofs of Cornell University in 1974. Miller joined the faculty of the Department of Entomology at Michigan State University (MSU) in 1977, where he has remained. He has taught insect physiology as well as insect behavior. He assists teaching insect ecology, medical entomology, aquatic entomology, and international integrated pest management. Miller's Nature and Practice of Science Graduate Seminar course has long been in demand by graduate students across MSU. Miller served from 1996-1999 as Associate Dean of MSU's largest science college and Director of the Division of Science and Mathematics Education.

Among his research accomplishments, Miller (with collaborators) introduced the field of chemical ecology to the internal standard method for accurately quantifying tiny amounts of natural products; made the wind-tunnel accessible to all as the recommended method for quantifying insect orientational behaviors; produced a classic series of papers on onion fly-onion interactions establishing that resource acceptance is strongly influenced by visual and physical cues in addition to chemicals; originated the rolling-fulcrum model of animal decision making and the push-pull tactic of pest management, now of great practical importance to maize production in Africa; expanded our knowledge of what constitutes suitable habitats for African malaria mosquitoes; discovered that avermectins administered to African cattle just before the rainy season can suppress malaria epidemics; maintained and expanded mechanistically meaningful vocabulary for insect behavior; and elucidated the dominant mechanisms whereby mating disruption using pheromones operates, thereby increasing the effectiveness and economics of this important pest management tactic. Miller's recent Springer Brief book, *Trapping of Small Organisms Moving Randomly*, promises to elevate insect pest management to a new level by enabling accurate measurement of absolute rather than relative pest density. Miller is senior author on 120 peer-reviewed publications and a principal investigator on grants totaling more than $20 million. He has been major professor for 30 graduate students and served on 125 graduate guidance committees. He is editor of the Behavior Section of *Environmental Entomology* and serves on the Sea Lamprey Control Board.

Miller received the MSU Council for Advancement and Support of Education (CASE) Professor of the Year Award and was named Distinguished Professor in 2007. He received the ESA North Central Branch Distinguished Achievement Award in Teaching as well as the Award of Excellence in Integrated Pest Management. Penn State University College of Agriculture awarded Miller a Distinguished Alumnus Award.

Miller and his lifelong sweetheart, Naomi, enjoy country living and have two children and four grandchildren.

Dr. Steven Naranjo is Director of the USDA-ARS Arid Land Agricultural Research Center in Maricopa, Arizona. He is internationally recognized for his research in integrated pest management (IPM), insect sampling and decision aids, conservation biological control, insect population ecology, and environmental risk assessment of transgenic crops.

Naranjo is a native of Colorado and completed his B.S. in zoology at Colorado State University (CSU) in 1978. He worked for several years as a biological technician in the Capinera laboratory at CSU before going on to do graduate work at the University of Florida (M.S. Entomology, 1983) and Cornell University (Ph.D. Entomology, 1987). He joined USDA-ARS in 1988 as a postdoctoral research associate in Brookings, South Dakota, and then as a Research Entomologist at the Western Cotton

Research Laboratory in Phoenix, Arizona, from 1990-2005. In 2006, two Phoenix-based laboratories were relocated to a new Center in Maricopa, where he served as Research Leader of the Entomology Unit from 2006-2012 before becoming Director. Naranjo holds an adjunct appointment in the Department of Entomology at the University of Arizona.

Naranjo has contributed to knowledge and development of IPM programs in several field crops. He was a key architect in the implementation of a cotton IPM program in Arizona that has been widely adopted in other parts of the world. In Arizona, the program has reduced insecticide use by nearly 90% and saved growers hundreds of millions of dollars in the last 18 years. He has conducted important long-term field studies to document the non-target effects of transgenic *Bt* cotton with specific emphasis on natural enemy abundance and function. He also led and collaborated on several large meta-analyses to quantify non-target effects of *Bt* crops worldwide. This work has collectively demonstrated the low risk of *Bt* technology to the environment and aided regulatory agencies.

He has authored more than 200 scientific papers, books, book chapters, and technical reports and has presented numerous invitational papers and seminars at professional conferences, symposia, and academic institutions. Naranjo served as Co-Editor-in-Chief of the international journal *Crop Protection* from 1995-2006 and currently serves as Subject Editor for *Environmental Entomology*, covering the topic area of Transgenic Plants and Insects, a section that he founded in 2005, and as Review Editor for *Frontiers in Plant Biotechnology*. He has mentored and advised a number of high school, undergraduate, and graduate students. He has served or currently serves on a number of state and national agricultural boards, advisory committees, professional committees, and grant panels and is highly sought for peer review on grant proposals and manuscripts. Naranjo was president of the ESA Pacific Branch in 2013-2014.

Naranjo has been the recipient of several awards and honors, including the UDSA-ARS Early Career Scientist of the Year, the ESA Recognition Award in Entomology, the ESA Pacific Branch C.W. Woodworth Award, and the Entomological Foundation IPM Team Award.

Naranjo is married to Roberta and they have a son, Nathan. In his spare time, he enjoys woodworking and restoring vintage automobiles.

Dr. Michael J. Raupp is Professor and Extension Specialist in the Department of Entomology at the University of Maryland. Dr. Raupp earned B.S. and M.S. degrees from Rutgers University and his Ph.D. at the University of Maryland. He served as Department Chair and Associate Dean and Extension Director at Maryland, and as President of the ESA Eastern Branch.

Dr. Raupp's extension programs provide training on the theory and practice of integrated pest management to green industry professionals and the general public. His research programs focus on global change issues, including invasive species and urbanization. His professional and extension achievements include more than 250 publications and 1,100 presentations. A regular guest on NPR, Dr. Raupp has appeared on all major television networks in this country and several abroad and has been featured on National Geographic, Science Channel, and PBS NewsHour. His "Bug of the Week" website (www.bugoftheweek.com) and YouTube channel (www.youtube.com/user/BugOfTheWeek) demystify insect behavior and natural history to thousands of viewers weekly in 87 countries around the world.

Dr. Raupp has received a dozen regional or national awards for excellence in extension programming and media communications, including the Secretary of Agriculture's Award for Environmental Protection, the ESA Distinguished Achievement Award in Extension, the Maryland Board of Regents' Award for Excellence in Public Service, and the R.W. Harris Author's Citation from the International Society of Arboriculture. His most recent book, *26 Things that Bug Me*, introduces youngsters to the wonders of insects and natural history, while *Managing Insect and Mites on Woody Landscape Plants* is a standard for the arboricultural industry.

Dr. David M. Soderlund, professor of entomology at Cornell University, was elected as Fellow in 2015. He is recognized internationally as a leading authority on the toxicology and mode of action of insecticides affecting ion channels.

Soderlund was born in Oakland, California, in 1950. He received a B.S. in biology with high honors from Pacific Lutheran University (1971) and a Ph.D. in entomology from the University of California at Berkeley (1976) under the direction of John Casida. Following postdoctoral research with Michael Elliott at Rothamsted Experimental Station in the United Kingdom, he joined the Entomology Department at Cornell University's New York State Agricultural Experiment Station in 1978, where he is Professor of Insecticide Toxicology. He served from 2007-2010 as the last Chair of the Entomology Department at Geneva, guiding that department's merger in 2010 with Cornell's Entomology Department in Ithaca, and then was Associate Chair of the merged Entomology Department at Cornell from 2010-2012. From 1999-2015, Soderlund also served as the Director of the Northeast Region IR-4 Program at Cornell, part of a national cooperative program between the U.S. Department of Agriculture and land-grant universities to register crop protection tools for use on specialty crops.

Soderlund's research, spanning more than 35 years, has produced numerous contributions to the science of insecticide toxicology, but he is best known for his research on the toxicology and mode of action of insecticides affecting voltage-gated sodium channels. This work, which includes studies of sodium channels from rats and humans as well as insects, has identified molecular mechanisms of target site resistance to pyrethroids in insects and characterized the action of insecticides on individual mammalian sodium channel isoforms. These studies not only identified differences in sensitivity between isoforms that underlie pyrethroid neurotoxicity but also provided an experimental platform for the study of insecticide action on human sodium channels, an area of research with important regulatory implications. Soderlund has authored more than 110 research publications and 21 reviews and book chapters, and he holds four patents. He has mentored 24 postdoctoral scientists and 14 graduate and undergraduate students.

Awards that have recognized Soderlund's accomplishments and contributions include: Centennial Alumnus of Pacific Lutheran University (1990); ESA Eastern Branch Distinguished Achievement Award in Insect Physiology, Biochemistry, and Toxicology (2001); American Chemical Society International Award for Research in Agrochemicals (2008); and the Paul A. Dahm Memorial Lectureship at Iowa State University (2009). Soderlund served as Associate Editor of *Invertebrate Neurobiology* (2001-2007). He currently serves on the editorial boards of *Pesticide Biochemistry and Physiology* (since 1987) and *Archives of Insect Biochemistry and Physiology* (since 1991).

Soderlund and his wife, Carol, have two children and one grandchild. Soderlund's other interests and activities include nature and landscape photography, sailboat racing, and playing the trombone in local wind ensembles.

ESA PROFESSIONAL AWARDS

Award For Excellence in Integrated Pest Management

This award, which is sponsored by Syngenta Crop Protection, is based on outstanding contributions that have a direct relation to Integrated Pest Management (IPM).

Dr. James R. Hagler is a research entomologist with the USDA-ARS Arid-Land Agricultural Research Center in Maricopa, Arizona. He earned a BS in pest management and an interdisciplinary MS in entomology, biology, and range science from New Mexico State University, as well as a PhD in entomology from the University of Arizona.

Dr. Hagler is the pioneer of the insect "immunomarking" procedure. The immunomarking method has revolutionized both mark-release-recapture (central point release) and mark-capture (area-wide dispersal) research. He has established collaborations with scientists from a variety of research institutions who are using this procedure to study pest, natural enemy, and pollinator dispersal patterns.

Dr. Hagler's biological control research has concentrated primarily on applying molecular techniques to examine predator feeding behavior. His molecular probes (prey-specific ELISAs and PCR assays, and most recently, a generic prey immunomarking procedure) for detecting prey remains in predator guts are considered state-of-the-art research tools. These assays have been used to identify key predators of cotton pests and to identify trophic level interactions of the entire cotton arthropod community on targeted prey species.

Dr. Hagler is widely known for his efforts in mentoring high school students through postdoctoral researchers, as well as young research scientists. He has mentored students and postdoctoral researchers from over 40 academic institutions.

Dr. Hagler is an editor for the *Journal of Insect Science*. He has served as the predator subject editor for *BioControl* and the associate biological control subject editor for *Environmental Entomology*.

Distinguished Achievement Award in Extension

This annual award recognizes outstanding contributions to extension entomology.

Dr. Alec C. Gerry is a professor of veterinary entomology and extension specialist in the Department of Entomology at the University of California (UC) at Riverside. Dr. Gerry received his BA in biology at UC Berkeley and his PhD in medical and veterinary entomology at UC Riverside.

Dr. Gerry's research and extension program focuses on the biology, ecology, and management of pest arthropods and disease vectors associated with animal agriculture. Dr. Gerry has published over 100 scientific and extension articles, and given over 170 scientific and extension presentations in the area of veterinary entomology. He is a member and current chair of the USDA S-1060 multistate research and extension project, and in support of this multistate project maintains a website on Arthropod Pests of Animals (www.veterinaryentomology.ucr.edu) and a database of state-registered pesticides for use against animal pests that can be accessed at this website. Dr. Gerry has provided considerable service to ESA, including current vice chair (elect) of the MUVE section, former member and chair of the Publications Council, member of the Editorial Board for *Journal of Economic Entomology*, and subject editor for *Arthropod Management Tests*. Invited extension service includes a California Senate Government Committee, UC-IPM Review Committee, UC Partnership for Advancement of Cooperative Extension (PACE), and UC Riverside Science Lecture Series and Community Engagement Committees. Additionally, he has served on a number of extension workgroups and industry advisory boards in California and nationally.

Prior to appointment at UC Riverside in 2003, Dr. Gerry was a senior public health biologist for the California Department of Public Health, Vector-Borne Disease Section. Dr. Gerry is also a recent retiree from the U.S. Army Medical Department following 26 years of combined active and reserve military service, most recently as a senior entomologist (Rank: LTC) with the U.S. Army Public Health Command.

Distinguished Achievement Award in Horticultural Entomology

This award honors any ESA member who has contributed to the American horticulture industry.

Dr. Kenneth Alan Sorensen is an emeritus professor in entomology at North Carolina State University (NCSU), where he was extension specialist on horticultural crops for 36 years. He received his BS in agricultural education at the University Rhode Island in 1966, and was an NDEA Fellow for MS in 1968 and a PhD in entomology in 1970, with minors in horticulture and plant pathology. His research on the buffalograss webworm made him an authority on this turfgrass insect. At NCSU, Dr. Sorensen's statewide extension responsibilities were on fruit and vegetable Integrated Pest Management (IPM) programs with emphasis on sweetpotato (SP). He developed a sweetpotato weevil trapping system that is used throughout the world and has saved millions of dollars by preventing and overcoming unnecessary quarantines. He cooperated with Plant Pathology and Foundation Seed in aphid monitoring and virus management in the certification and SP micropropagation programs. This resulted in quality plants, increased yields, and produced greater economic returns for plant producers, growers, processors, and related industries. Ornamental SP for landscapes also increased, and SP weevil introductions have been minimized and quarantines limited. His colored identification leaflets and posters heightened grower awareness throughout the Southeast, and he cooperated with colleagues on SP weevil collections and DNA fingerprinting. He also helped procure IPM/RAMP grants amounting to over $2 million for research on soil insect management. He worked two summers after retirement with the North Carolina Department of Agriculture on SP weevil monitoring and trapping, and placed some 1,600 pheromone traps on over 12,000 acres in Johnston County.

Dr. Sorensen has international experience in more than 30 countries; is a member of several professional and honorary societies; and has received over 50 awards and recognitions from professional and civic organizations. He was creator (1977) and editor (1977-1982) of *ESA Arthropod Management Tests,* and he has contributed over 90 reports and more than 300 publications. He has organized more than 10 ESA symposia, given hundreds of talks, and created over 80 poster displays.

In retirement, Dr. Sorensen provides leadership to the ESA Senior Entomologist group, networks with annual symposia, and has completed three stints as a visiting professor with UF for four months each on vegetable insect monitoring and resistance to insecticides, use of predatory mites, Asian cockroach

management, and spotted wing Drosophila varietal preference on strawberries. He prioritized needs at annual IR4 food use workshops, obtained industry and government grant support, and worked on minor use registrations for 33 years; he has obtained over 100 insecticide registrations. Dr. Sorensen has conducted more than 600 insecticide tests; helped establish several centers at NCSU (IPM, IR4, Small Fruit, and Specialty Crops); and taught the first distance learning class in entomology at NCSU, titled "Insects and Plants."

Distinguished Achievement Award in Teaching

This award is presented annually to the member of the Society deemed to be the most outstanding teacher of the year.

Dr. James R. Carey is a distinguished professor in the Department of Entomology at the University of California (UC), Davis, with research interests in insect demography, mortality dynamics, and insect invasion biology. He received two degrees from Iowa State University, including a BS in fisheries and wildlife biology (1973) and an MS in entomology (1975). Immediately after receiving his PhD in entomology from UC Berkeley (1980), Dr. Carey was appointed assistant professor at UC Davis, an institution at which he has spent his entire career. Dr. Carey is a Fellow of ESA as well as of the American Association for the Advancement of Science, the Gerontological Society of America, and the California Academy of Science. He is the author of 250 scientific publications and three books, including the highly cited *Demography for Biologists with Special Emphasis on Insects* (Oxford, 1993). From 2003 through 2013, he directed an 11-university, National Institute on Aging-funded program titled "Evolutionary Ecology of Lifespan." Considered the preeminent world authority on arthropod demography, Carey has been credited by professional demographers as having discovered a previously unknown life table identity now designated with the epithet "Carey's Equality," i.e., age composition and the distribution of remaining lifespans are identical in stationary populations. Dr. Carey is a recipient of two UC Davis academic senate awards, including the Distinguished Teaching (2014) and the Distinguished Service (2015) Awards. Professor Carey teaches two main courses at UC Davis, including an upper-division course titled "Longevity" (300+ students) and a lower-division GE online course titled "Terrorism and War" (100+ students). Dr. Carey was chosen to be one of the plenary speakers at the 2016 International Congress of Entomology in Orlando, where he will present "Insect Demography: A 21st century Tour," the contents to be framed around his forthcoming lead-authored book, *Biodemography: Concepts and Methods* (Princeton).

Early Career Innovation Award

This award, sponsored by BASF, honors young professionals working within the field of entomology who have demonstrated innovation through contributions within any area of specialization (research, teaching, extension, product development, public service, etc.).

Dr. Andy Michel received his BS in entomology from Purdue University and his PhD in biological sciences from the University of Notre Dame. After a postdoctorate at Notre Dame, Dr. Michel joined the Entomology Department in 2007 at the Ohio Agricultural Research and Development Center, The Ohio State University, with research and extension responsibilities. Dr. Michel manages the Insect Molecular Ecology and Adaptation Laboratory (iMEAL), whose overall goal is to understand how insect pests adapt to rapidly changing selection pressures in agroecosystems, such as host-shifting to important crops or resistance to management tactics. Specifically, his research uses molecular ecology and population genomic techniques to characterize the genetic basis for insect pest adaptation and how these adaptive traits spread across the landscape. Understanding and demonstrating how insects adapt, as well as communicating research-based insect management recommendations, delays the evolution of resistance or emergence of pests, and ensures safer and more productive food supply. His main focus has been understanding the interaction between the soybean aphid and aphid-resistant soybean in order to extend the durability of host-plant resistance. He has also been part of a collaborative effort to understand western corn rootworm resistance adaptation to *Bt* corn. His research has produced over 50 publications and leveraged over $5 million as a principal investigator and a co-principal investigator.

Henry & Sylvia Richardson Research Grant

This grant provides research funds to postdoctoral ESA members who have at least one year of promising work experience, are undertaking research in selected areas, and have demonstrated a high level of scholarship.

Dr. Ebony Murrell earned her PhD at Illinois State University in 2012, where she was advised by Dr. Steven Juliano. She has worked as a postdoctoral research associate in agroecology at University of Wisconsin—Madison with Dr. Eileen Cullen, and at the Pennsylvania State University with Dr. Jason Kaye, Dr. Mary Barbercheck, and Dr. David Mortensen. She has a broad interest in pest insect ecology, including plant-insect interactions, oviposition behavior, predator-prey relationships, interspecific competition, and changes in community composition over time.

Dr. Murrell greatly enjoys conducting research in agroecosystems because she considers them to be an ideal system in which to study both basic and applied insect ecology. In addition to research, she also enjoys teaching and explaining research to a broad audience. She received the Ecological Society of America Murray F. Buell Award for Best Student Presentation in 2012, and received an Illinois State University Teaching Award for her curriculum development in biostatistics.

In her current position, Dr. Murrell is investigating bottom-up effects of different cover crop species on arbuscular mycorrhiza associations with corn plants, and whether these differences in mycorrhizal associations alter corn plant defense to insect herbivory. She hopes that her research can one day be used to develop bottom-up mechanisms of herbivore control that can be implemented as part of Integrated Pest Management programs in organic and conventional agricultural systems.

Nan-Yao Su Award For Innovation And Creativity in Entomology

Each year this award is given to an ESA member who is able to demonstrate through his or her projects or accomplishments an ability to identify problems and develop creative, alternative solutions that significantly impact entomology.

Dr. Bruce Tabashnik is a Regents' Professor and head of the Department of Entomology at the University of Arizona. He earned his BS in zoology at the University of Michigan and his PhD in biological sciences at Stanford University. Dr. Tabashnik has advanced understanding and management of insect resistance, thereby promoting sustainable, environmentally friendly pest control. His research has shaped the refuge strategy adopted in conjunction with most of the cumulative total of more than one billion acres of transgenic insecticidal crops grown worldwide since 1996.

Dr. Tabashnik pioneered the field of resistance management, starting with a landmark computer modeling paper in 1982 based on his postdoctoral research at Michigan State University. This work clarified how evolution of resistance could be delayed most effectively by refuges of untreated areas that allow survival of susceptible insects. When he was a faculty member at the University of Hawaii (1983-1996), his team discovered the first case of field-evolved resistance to insecticidal proteins from the bacterium *Bacillus thuringiensis* (*Bt*).

A year after moving to the University of Arizona in 1996, his group reported the first experimental evidence that refuges can delay resistance to *Bt* toxins. His team's 2003 paper identified the mutations conferring resistance to *Bt* cotton in pink bollworm. This breakthrough and related modeling laid the foundation for integrating *Bt* cotton with mass releases of sterile moths to virtually eradicate this invasive pest from the Southwestern United States. Applying fundamental knowledge of the mechanism of resistance to *Bt* toxins, Dr. Tabashnik collaborated with colleagues to develop and test genetically engineered *Bt* toxins effective against pests that are resistant to native *Bt* toxins. Google Scholar lists over 16,000 citations of his more than 300 publications. His many awards include election as a Fellow of ESA and American Association for the Advancement of Science.

Recognition Award in Insect Physiology, Biochemistry, & Toxicology

This award, which is sponsored by Apex Bait Technologies Inc., recognizes and encourages outstanding extension, research, and teaching contributions in urban entomology.

Dr. Angela E. Douglas is the Daljit S. and Elaine Sarkaria Professor of Insect Physiology and Toxicology at Cornell University. She received a BA in zoology from Oxford University in 1978, and a PhD from Aberdeen University, United Kingdom (UK), in 1981. Dr. Douglas was awarded a 10-year research fellowship from the Royal Society of London, during which she developed a research program on insect nutritional physiology of phloem-feeding insects. Her fellowship research included the first direct physiological evidence that symbiotic bacteria provide aphids with essential amino acids, nutrients in short supply in the aphid diet of plant phloem sap. Following the fellowship, Dr. Douglas was a faculty member at the University of York (UK), where she was promoted to a personal professorial chair, and she took up her current position at Cornell University in 2008. Dr. Douglas' research concerns insect interactions with beneficial microorganisms, including the application of genomic data to model metabolic and signaling networks in insect-microbial interactions. The three foci of her current research are metabolic coevolution between plant sap-feeding insects and their intracellular bacterial symbionts; sugar utilization by phloem-feeding insects, and its role in carbon nutrition and osmoregulation; and impact of the taxonomic and functional diversity of gut microorganisms on the nutritional function of drosophilid flies. Her research is built on the commitment to explain how insects function in terms of underlying molecular mechanisms, and to use this information to predict how insects interact with other organisms and the wider environment. This commitment has informed Dr. Douglas' writing of many scientific reviews and three books, including *The Symbiotic Habit* (2010) and the fifth edition of *Insects: Structure and Function* (2012), co-edited with Steve J. Simpson, and it guides her teaching of students and outreach activities for school teachers and the wider community.

Recognition Award in Urban Entomology

This award recognizes and encourages outstanding extension, research, and teaching contributions in urban entomology.

Dr. Coby Schal is the Blanton J. Whitmire Distinguished Professor of Entomology at North Carolina State University (NCSU). He has a BS from SUNY-Albany, a PhD in entomology from the University of Kansas (with Bell), and postdoctoral training in chemical ecology at the University of Massachusetts (with Cardé). Between 1984 and 1993, Dr. Schal was assistant and then associate professor of urban entomology at Rutgers University.

Dr. Schal's research group takes an integrative approach to challenging questions in insect biology and urban entomology. Chemical ecology projects include studies of cockroach sex and aggregation pheromones, roles of microbes in mosquito and sand fly oviposition, and cuticular lipids in ant and termite nestmate recognition. Research on gustation includes collaborative projects on the neuronal basis of sugar-aversions in cockroaches. Recent research has also addressed the biology of cockroach-produced allergens, intervention strategies to mitigate their pervasiveness in the indoor environment, and studies on the impacts of environmental interventions on health outcomes in asthmatic children. The Schal Lab has also been investigating the recent resurgence of bed bugs, through collaborative research in population genetics and chemical ecology.

Dr. Schal's research has been funded by EPA, HUD, NIH, NSF, USDA, private foundations, and industry, and he has published over 260 refereed papers. He has served as subject editor for the *Journal of Economic Entomology*, on the editorial boards of five other journals, and on the ESA Governing Board. Schal has mentored 33 graduate students and 35 postdoctoral researchers. He teaches insect behavior, urban entomology, and chemical ecology. Recent honors include Lifetime Honorary Membership in the North Carolina Pest Management Association, Distinguished Achievement Award in Urban Entomology from the National Conference on Urban Entomology, Fellow of ESA, Fellow of AAAS, Silverstein-Simeone Award from the International Society for Chemical Ecology, Distinguished Member of Sigma Xi, and the Holladay Medal, NCSU's highest honor.

Thomas Say Award

This ESA award acknowledges significant and outstanding work in the fields of insect systematics, morphology, or evolution.

Dr. Andrew R. Deans grew up in the suburbs of Boston, Massachusetts, where he spent afternoons and weekends flipping rocks in the woods and treading in the tide pools of Buzzards Bay. He took this burgeoning passion for natural history to the University of New Mexico, where he had opportunities to work on projects aimed at understanding the ecology and parasites of southwestern bats. These research experiences, based at the Museum of Southwestern Biology, exposed him to entomology, systematics, and the power and relevance of natural history collections. After earning his BA from the University of New Mexico (1996), Dr. Deans went to the University of Arkansas for his MS in entomology (2000) and the University of Illinois for his PhD (2005). His graduate degrees, both under the direction of Dr. James B. Whitfield (2011 Say Award recipient), focused on the systematics of parasitoid Hymenoptera.

Since 2007, Dr. Deans has served as professor and curator of two major research collections, first at North Carolina State University (2007–2012) and now as director of the Frost Entomological Museum at Penn State. His research program continues to focus on the systematics of parasitoid Hymenoptera, while he also works with colleagues to develop accessible approaches to generating and sharing phenotype data. His research program has generated more than $4.2 million in grants since 2009, and he has coauthored more than 50 papers.

Dr. Deans also teaches an advanced course on insect systematics (insect biodiversity and evolution), part of the core curriculum at Penn State, and co-developed an active learning seminar on insect morphology. His latest project aims to change the ways that systematic entomology and comparative morphology are taught and includes open access teaching materials.

ENTOMOLOGICAL SOCIETY OF AMERICA CERTIFICATION CORPORATION AWARDS

ACE PROFESSIONAL AWARD

This award recognizes the superior contributions of an Associate Certified Entomologist (ACE) in the field of structural pest management.

Michael Goldman has been in the structural pest management industry for over 35 years. After attending Seneca College, focusing on business administration, in 1981 he started Purity Pest Control Limited. Among other degrees he holds, in 2010, he was the first non-US resident to earn the ACE designation after ESA amended the program rules to require a US pesticide applicators license to apply for the ACE.

Mr. Goldman is a past president (two terms) of the Structural Pest Management Association of Ontario and served as conference chairman for over 12 years. He is a founding member and past president of the IPM Council of Canada, where he helped establish guidelines and protocols for the turf industry that were eventually accepted and put into law by the Ministry of the Environment of Ontario. Mr. Goldman was also a founding member of the Pesticide Industry Council of Ontario and sat on the City of Toronto Bed Bug Steering Committee.

Mr. Goldman frequently speaks to a variety of groups on bed bugs and termites and has written articles for such publications as *Restaurateur Magazine* and *PCT Magazine*.

Mr. Goldman has been a dog trainer for many years, and after realizing the value of using K-9s to detect termites, he became the first person in the world to train and deploy dogs to detect live bed bugs. He created an entirely new subsector in the pest management industry. Mr. Goldman was asked to join the NPMA's Canine Insect Detection Division Committee, where he was an active and founding member for four years and helped create best management practices for companies using dogs for insect detection.

Mr. Goldman was a contributor to a study by Western University for "Genetic Evidence of Multiple Invasions of Eastern Subterranean Termites into Canada."

Mr. Goldman believes he owes a lot of his successes in part to three friends and mentors in his long career in pest management: Dr. Bob Cameron, Dr. Michael Potter, and Mr. Norm Cooper. But the biggest influence in Mr. Goldman's life, both professional and personal, is his family—his wife of 33 years, Arlene, and his two children, Tracy and Kyle.

Distinguished Service Award to The Certification Program

This award encourages, recognizes, and rewards outstanding contributions to the ESA Certification Program and the professionalism of entomology.

Dr. Jim Fredericks is the vice president of technical and regulatory affairs for the National Pest Management Association (NPMA), Fairfax, Virginia, the only national organization representing the structural pest management industry in the United States and internationally. In his position with NPMA, Dr. Fredericks is responsible for all aspects of technical and entomological publications, services, education, and training, as well as providing strategic direction to NPMA's state and federal public policy efforts.

Dr. Fredericks is the executive director for the Pest Management Foundation, a nonprofit foundation affiliated with NPMA, whose mission and purpose is to advance the pest management industry through education, research, and training.

Dr. Fredericks is a Board Certified Entomologist specializing in industrial and urban entomology and currently serves on the ESA Certification Board. He holds a PhD in entomology from the University of Delaware, where his research focused on the factors influencing how subterranean termites interact with below-ground bait stations. Dr. Fredericks also holds an MS degree in entomology from the University of Delaware and a BS degree in biology education from Millersville University of Pennsylvania.

Prior to joining NPMA, Dr. Fredericks was technical director for a large pest management firm serving the mid-Atlantic region, where he served for 11 years. While there, he was responsible for product selection, treatment protocol development, service quality assurance, and technical training.

Dr. Fredericks lives in Northern Virginia with his wife, Alison, and two lovely daughters, Lydia and Annabel.

ENTOMOLOGICAL FOUNDATION PROFESSIONAL AWARDS

President's Prize For Outstanding Achievement in Primary Education

This award recognizes educators who have gone beyond the traditional teaching methods by using insects as educational tools in grades K-6.

Dr. Sven. P. Strnad is a national board-certified fifth-grade teacher at Millstone River School in the West Windsor—Plainsboro School District in New Jersey.

Dr. Strnad was born in Koping, Sweden, to Czechoslovakian parents. His family moved to Toronto, Canada, before settling in South Portland, Maine. Dr. Strnad received a BA degree in biology with emphasis in ecology, evolution, and systematics from Cornell University in 1974, an MS degree in entomology from the University of Maine in 1982, working with Dr. Cassie Gibbs on fish predation of larval black flies in the Penobscot River, and a PhD degree in entomology from Purdue working under Dr. Marlin Bergman on host finding and feeding behavior of neonate western corn rootworm larvae. In 1990, Dr. Strnad became the insectary supervisor at American Cyanamid in Princeton, New Jersey, later becoming a terrestrial ecotoxicologist. Dr. Strnad obtained his elementary teaching certificate at Rider University and transitioned into teaching in 2002 when the agricultural research facility was closed.

Dr. Strnad's classroom, which he shares with co-teacher Dr. Vickie Gurzau, resembles a nature center more than a traditional classroom. He believes that many students, especially fifth graders, are intrinsically drawn to nature and are more willing and enthusiastic learners when surrounded by it. Grants and donations are used to provide each young learner with his or her own insect-collecting kit. During the spring, his students can be seen outside happily chasing insects on the school grounds. His students participate in an annual field project based on some aspect of the feeding behavior of the American carrion beetle. Insects are also incorporated into other content areas. This summer, Dr. Strnad received an EPA Presidential Innovation Award for Environmental Educators in Washington, D.C.

Dr. Strnad and his wife, Joann, have one son, Kyle, a PharmD who is currently in a residency program at the University of Pittsburgh Medical Center.

President's Prize for Outstanding Achievement in Secondary Education

This award recognizes educators who have gone beyond the traditional teaching methods by using insects as educational tools in grades 7-12.

Christine Brothers is the Grade 7-12 science department head for the Falmouth Public Schools in Falmouth, Massachusetts, where she has taught for 19 years. Ms. Brothers has taught biology, advanced placement biology, and marine ecology at Falmouth High School, and this past year started a new course at the school, advanced placement environmental science. She holds a BS in environmental science from Cornell University and an MS in environmental education from The Ohio State University. Prior to teaching high school, she worked as an environmental educator at several nature centers. Ms. Brothers has received numerous awards for her teaching, including the Presidential Award for Excellence in Science Teaching, the Outstanding Biology Teacher Award from the National Association of Biology Teachers, and the Amgen Foundation Science Teaching Excellence Award. When not teaching, Ms. Brothers enjoys traveling and photography, but her true passion is birding, and she has seen over 650 species of birds in the United States.

Ms. Brothers' students have researched the prevalence of *Wolbachia* in insects for the past nine years through the Discover the Microbes Within: The *Wolbachia* Project, and she was one of three teachers to pilot this now-nationwide project. *Wolbachia* is a bacterial endosymbiont found in approximately 20 percent of insects that affects their reproduction and evolution. The students collect and identify insects, extract their DNA, and perform PCR and electrophoresis to test for the presence of the bacteria. Dr. Brothers' students have also been involved in an ecological study of vernal pools at a local wildlife sanctuary for the past four years. They have been sampling the aquatic invertebrates found in several artificially constructed vernal pools to document the colonization by and diversity of species in the pools.

Entomological Foundation Medal of Honor

This award is the highest award presented by the Foundation and is given only to those who have attained preeminence in the field throughout outstanding contributions.

Dr. Thomas Green has been a national leader in market-based sustainability and Integrated Pest Management (IPM) initiatives for more than 30 years. He is president and co-founder of the IPM Institute of North America, a nonprofit working to leverage marketplace power to improve health, environment, and economics in agriculture and communities through IPM and other sustainable practices. The Institute co-leads the National School IPM Working Group, which works to reduce pest and pesticide risks in schools, including promoting IPM curricula for students and educators, operates IPM STAR certification for schools, and offers Green Shield certification to facilities, structural pest management professionals, and IPM programs. The Institute partners with food companies including Sysco, McDonald's, ConAgra Lamb Weston, McCain Foods, Simplot, and Whole Foods Market on sustainability initiatives, and with American Farmland Trust in the BMP CHALLENGE project, guaranteeing farmer income when they adopt conservation practices. The Institute was awarded Supplier of the Year for Quality Assurance from Whole Foods Market in 2015, earned the International IPM Excellence Award from the Sixth International IPM Symposium in 2009, was recognized as a U.S. EPA Pesticide Environmental Stewardship Program Champion in 2004, 2005, and 2008, and received the U.S. EPA Sustained Excellence in IPM Award in 2009 and 2012. Dr. Green has served as a director of the Entomological Foundation since 2009, and as vice president and president from 2011 to 2014. He has been a member of the Entomological Society of America since 1983, and served on the Presidential Committee on Science Policy and the Presidential Committee on Awards. Dr. Green is a Certified Crop Advisor and a USDA NRCS-certified Technical Service Provider. He holds a PhD in entomology from the University of Massachusetts and has authored or co-authored more than 100 publications and presented at more than 250 professional and industry events.

ESA STUDENT AWARDS

John Henry Comstock Graduate Student Awards

These five awards are given to one graduate student from each ESA Branch to promote interest in entomology and to stimulate interest in attending the ESA Annual Meeting.

Mia Park (Eastern Branch) is currently assistant professor in the Department of Humanities and Integrated Studies and research faculty in the Department of Biology at the University of North Dakota. She received her PhD in 2014 from the Department of Entomology at Cornell University. Mia's research focuses on pollination services provided by wild bees. Her recent work has shown that wild bees are important pollinators in eastern apple orchards, and that their visitation to apples is driven by the combined effects of pesticide use and landscape complexity. To forward appreciation for wild pollinators and their conservation, Mia has given talks throughout New York State, produced a well-received handbook entitled, "Wild Pollinators of Eastern Apple Orchards and How to Conserve Them," and recently released an educational video, available on YouTube, called "Pollination: Trading Food for Fertilization."

Mia has received several research awards and fellowships, including being named a College of Agriculture and Life Sciences Land Grant Extension Fellow. Mia has served as a national meeting volunteer, moderator, program symposium co-organizer, and journal reviewer for ESA. Service in her community includes supporting events that encourage women in science and that engender appreciation of insects.

At the bottom of all this study and activity, Mia simply loves insects and the boundless sense of discovery that comes from studying them. She appreciates being part of ESA, where she readily finds others who feel the same.

Amy Morey (North Central Branch) is a PhD candidate in entomology at the University of Minnesota working with Dr. Rob Venette and Dr. Bill Hutchison. Amy's research uses cold hardiness phenotypes of *Epiphyas postvittana* to explore the underlying cold hardiness mechanisms of this invasive insect, which, if understood better, would improve spatially explicit strategies to predict and prevent its spread. Her research integrates fundamental entomological research with societal factors to improve the scientific basis for pest risk analysis and policy related to invasive insects. Additionally, Amy was awarded an NSF-IGERT and will receive a minor in the risk analysis of invasive species and genotypes. Amy received a BA in biology from Luther College, and an MS in entomology from the University of Minnesota, where she researched the cold hardiness and integrated pest management of *Helicoverpa zea*.

Dr. Mohammad-Amir Aghaee (Pacific Branch) received his doctorate at the University of California, Davis, working on integrated pest management tactics for the rice water weevil (*Lissorhoptrus oryzophilus* Kuschel) in California rice. He was able to replicate, but not fully explain, the mechanisms behind winter flooding as a pest management tool for the weevil and successfully tested a biopesticide based on *Bacillus thuringiensis* ssp. *galleriae* as a means of controlling the insect. He is currently a postdoctoral researcher at North Carolina State University working on *Helicoverpa zea* resistance to Bt cotton and on brown marmorated stink bug (*Halyomorpha halys*) effects on cotton and movement between crops. In his spare time, he enjoys painting, sketching, and improving his culinary skills.

Jessica Hartshorn (Southeastern Branch), a native of Dayton, Ohio, received her BS in zoology with a minor in chemistry from Southern Illinois University (SIU)—Carbondale in 2010. During her time at SIU, she worked on projects examining the ecology of Lyme disease at the Cary Institute of Ecosystem Studies in Millbrook, New York, macroinvertebrate community dynamics in streams of the Konza LTER in the Flint Hills of Kansas, and conservation of native bamboo in the Southeast. In 2012 she completed her MS in entomology at the University of Arkansas looking at oviposition behavior of the native woodwasp, *Sirex nigricornis*. She will complete her PhD in entomology at the University of Arkansas in May of 2016 evaluating triggers of adult *S. nigricornis* emergence and parasitism of adult female woodwasps by nematodes.

Meaghan Pimsler (Southwestern Branch) is a PhD candidate in the Department of Entomology at Texas A&M University (TAMU). Her work uses de novo transcriptomics to investigate sexual dimorphism and behavioral ecology in an invasive blow fly with a unique and poorly understood sex determination mechanism. She received her BS in entomology from Cornell University in 2007, and subsequently spent three years in Okinawa, Japan, working at two high schools as an English as a Second Language teacher. After recuperating sufficiently from the rigors of her undergraduate education, she began her postgraduate journey with Dr. Jeffery K. Tomberlin and Dr. Aaron M. Tarone in 2010.

Meaghan has had a deep and abiding love of arthropods her entire life, and determined at the age of four that she would be an entomologist. She helped found entomology clubs in both high school and college and has helped organize many entomology-themed outreach and enrichment events, including working with the Smithsonian Museum of Natural History on its BugFest on the Mall and with Cornell University's Entomology Department on its Open House. Meaghan is primarily interested in forensic entomology, and this has led to a certification in crime scene investigation with Texas Engineering and Extension Services, teaching workshops to federal, state, and local law enforcement groups, and the opportunity to coordinate symposia for 2013 and 2014 ESA conferences on "Youthful Perspectives in Forensic Entomology" with Ms. Charity Owings. But it's not all hard work and science for Meaghan; she was also a member of TAMU's graduate student Linnaean Games Team for two years and the captain of the Debate Team for the 2013 ESA Student Debates. She enjoys baking, science fiction movies, and training in mixed martial arts.

Larry Larson Graduate Student Award for Leadership in Applied Entomology

This award, which is sponsored by Dow AgroSciences, recognizes Dr. Larry Larson's role as a leader and pioneer in insect management and carries that legacy to the next generation of leaders in applied entomology.

Alix Whitener received her bachelor of science in biology-anthropology and a minor in women's studies at Western Washington University (WWU), where she was a coxswain for WWU's NCAA women's rowing team. She is beginning her third year as a PhD student at Washington State University under advisor Elizabeth H. Beers. Alix's research project focuses on the behavior and control of spotted wing drosophila in sweet cherry systems. This research is an extension of work she began as an undergraduate laboratory and field technician in Dr. Beers' laboratory. She hopes to contribute to tree fruit IPM in her current research project and as a professional in the future. At Washington State University (WSU), Alix is serving her second term as president of WSU's Entomology Graduate Student Association. She is a member of the WSU Linnaean Games team and is excited to compete at the National Meeting a second year in a row. Alix co-chaired the branch Career Fair for the last two years and is looking forward to improving the event for next year's ESA Pacific Branch meeting. She also serves as the Pacific Branch representative to the Student Affairs Committee. This year at ESA 2015, Alix will present a paper in the Student Competition, compete in the Linnaean Games, and help run the Student Debates.

Lillian & Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry, or Molecular Biology

This award aims to encourage graduate students working with insects or other arthropods in the broad areas of physiology, biochemistry, and molecular biology to affiliate with ESA's Physiology, Biochemistry, and Toxicology Section and to attend the ESA Annual Meeting or an International Congress of Entomology.

Emily Meineke graduated from University of North Carolina—Chapel Hill in 2008 with a BS in environmental science. After graduation, she traveled across Southeast Asia and the United States. She has served as a seasonal technician on several ecology projects and as an Americorps trail worker.

Emily is now a PhD candidate at North Carolina State University studying how urban warming leads to higher chronic pest densities on street trees. Her focus is scale insects, one of the most ubiquitous and cryptic insect groups on urban plants. Generally, she is interested in how global changes like urbanization and climate change affect ecosystems. Emily is or has been supported by an EPA STAR Fellowship, a Garden Club of America Urban Forestry Fellowship, and a Preparing the Professoriate Fellowship, among others.

Emily grew up in Pitt County, North Carolina, with her parents and three brothers. She now lives in downtown Raleigh under a big willow oak tree.

Student Activity Award

Sponsored by Monsanto Company, this award is presented annually to recognize a student for outstanding contributions to the Society, his or her academic department, and the community, while still achieving academic excellence.

Tamra Reall Lincoln recently graduated with her PhD from the University of Missouri. Her graduate research, under the direction of Dr. Richard M. Houseman, explored ecological influences of entomopathogenic fungi on founding pairs of the subterranean termite, *Reticulitermes flavipes*. She also received a minor in college teaching and a graduate certificate in science outreach. Tamra received her BS in horticulture from Brigham Young University. She is currently a postdoctoral research associate with the USDA-ARS at the Biological Control of Insects Research Laboratory in Columbia, Missouri.

Tamra is very active within her community, her school, and ESA. In her community and at MU, she participates in many outreach activities, including organizing award-winning hands-on science events and speaking at schools about the importance of science, research, and insects. Tamra served as president of Mizzou's graduate student organization, the CV Riley Entomological Society, and co-authored "Ask a Scientist" articles for the local newspaper. At ESA branch and annual meetings, she enjoyed participating in Linnaean Games competitions and presenting papers and posters. Tamra served on the Student Affairs Committee (SAC) as vice chair and chair, as well as on the Program Committee. In these positions, she represented students' needs and assisted in organizing the Student Symposium, the Student Debates, and the Student Reception for ESA in 2013 and 2014. Currently, Tamra continues to represent student and early professionals' needs. She serves as student representative to the Governing Board (GB), as GB liaison to the Student Transition and Early Professional Committee and the SAC, and also as ESA's early career leader representative to the Council of Science Society Presidents. Additionally, Tamra serves on the 2016 ICE SAC.

Outside of school and work, Tamra enjoys beekeeping and exploring the outdoors with her husband and junior entomologist children.

Student Certification Award

Sponsored by PestWest Environmental Science, this award recognizes and encourages outstanding entomology graduate students with an interest in the mission of the ESA certification program, and to promote the understanding and importance of the program.

Sanjay Basnet is a PhD student at the University of Nebraska—Lincoln working under the supervision of Dr. Shripat T. Kamble. His PhD research is in molecular toxicology focusing on the exploration of RNAi in bed bug control. He also works on bed bug specimen preservation techniques: experiments on DNA extraction, PCR amplification, and sequencing. Along with his PhD research project, he is also involved in industry research projects on urban pests, such as ants and subterranean termites. Mr. Basnet received his MS in entomology in 2011 from Virginia Tech, under the mentorship of Dr. Douglas G. Pfeiffer, on the invasive brown marmorated stink bug (BMSB) in grapes and raspberries. His MS research has yielded interesting data and resulted in two referred publications. Mr. Basnet obtained his BS in agriculture in 2008 from Tribhuwan University, Nepal, and did an

internship in advanced agricultural studies at AICAT, Sapir, Israel, in 2009. Mr. Basnet is active within ESA. He has volunteered and presented his research at several ESA branch and national meetings, and participated in the YouTube Video contest. He is interested in the certification program and is planning to obtain his board certification within a year.

Monsanto Research Grant Awards

Monsanto Research Grant Awards fund outstanding ESA student members who are undertaking research projects. The funds may be used for salaries, equipment, supplies, or travel to initiate, accelerate, augment, or expand a research project.

Geoffrey Broadhead graduated from North Carolina State University in 2010. Since then he has spent time as a field assistant in North Carolina and a research technician in Texas working on projects involving *Drosophila* developmental physiology and neurobiology, before starting in the graduate field of neurobiology and behavior at Cornell University in the fall of 2012. His research interests are primarily focused on the chemical ecology of insect-plant interactions—particularly what information an insect can learn about a plant using its chemical senses, and how those senses might be fooled by an enterprising plant or a curious researcher. He hopes to address these questions using a combination of chemical analyses, behavioral experiments, and electrophysiology.

Donghun "Andy" Kim was born in Busan, Korea. He finished his BS (2006) and MS (2008) at Kyungpook National University, Daegu, Korea. During his master's studies, he conducted research with leafhoppers, investigating their physiological responses to temperature stress, and subsequently developed a novel control method using natural resources. In 2008, Andy started his doctoral studies at Texas A&M University, later transferring to Kansas State University to work with Dr. Yoonseong Park in 2011. Andy is currently a PhD candidate and plans to complete his degree in December 2015.

Andy's dissertation research focuses on tick neurophysiology, in particular the mechanisms of tick salivary secretion by classical physiology using pharmacological tools and modern technology using genomic tools (analysis of transcriptome). He has published on the topic of the two distinct physiological roles of two dopamine receptors in tick salivary secretion in the *Journal of Experimental Biology* in 2014 (highlighted at *Inside JEB*). Additionally, he is studying the genomic levels of gene regulation underlying the processes of pathogen acquisition and development of immunity toward the pathogen via tick transcriptome analysis. Andy's research interests are not limited only to tick salivary physiology, but are more open to arthropod neural and endocrine physiology. His ultimate goal is to develop a novel mode of action insecticide through a deeper understanding of arthropod physiology.

Andy is organizing the Korean Young Entomologist Symposium at the ESA 2015 meeting and will play an integral role in connecting scientists for future collaborations between the United States and Korea. He is deeply appreciative of his advisor, Dr. Yoonseong Park, Monsanto, ESA, and the award committees.

Mitzy Porras is a biologist, currently enrolled in the entomology and the international agriculture development doctoral programs at Penn State University. Her research goal is to integrate different techniques to study ecophysiological aspects of insect-plant interactions, and the application of this knowledge to natural and agro-ecosystems. Mitzy, a Colombian native, earned her BSc in biology from the National University of Colombia in 2010 with a concentration in ecology. During her undergraduate program, she worked in insect biodiversity at the institute of Natural Sciences and attended an international course on insect-plant interactions in Uruguay. She then joined the laboratories of Dr. Aldo Malavasi in Moscamed-Brazil and Dr. A. Lopez-Avila at the Colombian Agricultural Research Center, where she was interested in ecology of medflies and whiteflies. She developed a new tool for the control of whiteflies using plants' secondary metabolites. Mitzy was trained in ecophysiology of ectotherms in the Ecophysiology and Evolutionary Physiology Laboratory at University of Sao Paulo.

In her research at Penn State, Mitzy studies the ecophysiological and behavioral mechanisms for insect coexistence, using tools from molecular and chemical ecology to elucidate resource allocation and partitioning by aphids. She is happy to be working on ecology using insects as a model system, and enjoys time in the lab and field exploring the wonderful world of these small organisms. Mitzy has been invited as a speaker at the International Aphid Symposium and Zoological Conference.

Outside of the lab, Mitzy loves to go scuba-diving, kayaking, and kite-surfing, and she also enjoys dancing and traveling.

Loren Rivera Vega is a PhD candidate in Entomology with a dual degree in International Agriculture and Development at Penn State University. She obtained her bachelor's degree in Agriculture at the Escuela Agrícola Panamericana (Zamorano) in Honduras in 2007. In 2011, she completed her master's program at The Ohio State University, working on the comparative transcriptomics of North American and Asian ash (*Fraxinus* spp.) trees for identification of potential resistance to emerald ash borer (*Agrilus planipennis*). She is currently advised by Dr. Gary W. Felton and studies the effect of host plants on the composition of saliva in the cabbage looper (*Trichoplusia ni*) and its impact on plant defenses. She recently spent six months at the German Centre for Integrative Biodiversity Research (iDiv) studying the response of black mustard roots (*Brassica nigra*) to cabbage rootfly (*Delia radicum*) under the supervision of Dr. Nicole van Dam. Loren has published four first-author journal articles and collaborated on five others. She is also involved in teaching and particularly enjoyed her experience with co-creating and co-teaching the tropical entomology graduate seminar. Her research interests focus on understanding the factors that affect plant defenses against insect herbivores both above- and belowground as well as the social impact of scientific advancement in developing countries.

Qian "Karen" Sun graduated with a BS in 2008 from the Honors Program of Life Science at China Agricultural University, where she continued to obtain an MS in ecology. Being fascinated by the biology of social insects, in 2010 Qian began a PhD program in entomology at the University of Kentucky, working on termites with Dr. Xuguo "Joe" Zhou. Her dissertation research aims to understand the adaptive value and underlying mechanisms of undertaking

behavior in termites, by integrating behavioral study with chemical ecology and molecular biology. Undertaking behavior, the disposal of dead colony members, is a convergent trait in social insects to mitigate disease hazard. Qian's research demonstrated differential undertaking responses toward corpses with various origins and postmortem times, and identified chemical cues from the dead that mediate corpse cannibalism and burial. The Monsanto Research Grant will support her to investigate the influence of entomopathogenic fungi on corpse management in termite colonies, which is an important component to understanding the environmental factors regulating social behavior.

Qian has received four fellowships to support her graduate studies at the University of Kentucky. She has published her research results in peer-reviewed journals, including *International Journal of Biological Sciences* and *Scientific Reports*. In addition, Qian has presented actively at national and regional meetings of ESA, and received several awards for her presentations. While working with termites, Qian found the study of eusociality is enormously exciting, and she took the initiative to study worker-reproductive differentiation in termites as her side project. Upon graduation, she will be seeking a postdoctoral position and continue exploring the evolution of eusociality in the animal kingdom.

Monsanto Student Travel Awards

The Monsanto Student Travel Awards were created to promote interest in entomology at the graduate level and to stimulate interest in attending ESA's Annual Meeting.

Flor E. Acevedo is a PhD candidate at The Pennsylvania State University. Her dissertation research focuses on the study of the adaptive mechanisms used by polyphagous insects to exploit different host plants. She has been working in entomology for the last 10 years. For her undergrad thesis research, she developed DNA molecular markers in the coffee berry borer to study the dispersion of this insect in field conditions. After receiving her bachelor's degree in 2006 from Universidad de Caldas (Colombia), she joined the entomology team of the Colombian Center for Coffee Research, Cenicafe, where she studied the genetic variability of the coffee berry borer in Colombia. In 2010, she started her PhD studies at Penn State partially sponsored by a Fulbright scholarship. Flor has been captivated by research in the field of insect-plant interactions. She is interested in understanding how insects evolve the ability to feed on plants and its influence on insect diversification. Further avenues that she would like to explore are related to the evolution of neuroethological adaptations mediating host finding in plant feeding insects.

Adam Dale is a PhD candidate at North Carolina State University, advised by Dr. Steve Frank. He grew up in North Carolina and received his bachelor's degree in biological sciences from North Carolina State. Prior to graduate school, he worked as a lab technician, where he developed an interest in entomology and landscape pest management. Now as a student, Adam researches urban ecology and the effects of urban habitats on arthropod pests and their host plants. His primary goals are to uncover mechanisms behind pest outbreaks and develop Integrated Pest Management strategies to reduce their environmental impacts and economic costs.

Anjel Helms graduated with a BS in Biology and a BA in Biochemistry from Pepperdine University. After graduation, she was awarded a Fulbright Fellowship to conduct research in Jonathan Gershenzon's lab at the Max Planck Institute for Chemical Ecology in Jena, Germany. While at the Max Planck Institute, she conducted molecular and chemical analyses for dirigent protein over-expressing lines of Norway spruce (Picea abies) and investigated their role in defense against the bark beetle *Ips typographus*. After this experience, Anjel knew she wanted to continue studying chemical ecology and decided to attend Penn State University for her graduate work. She recently completed her PhD in the Entomology Department at Penn State, where she was advised by Dr. John F. Tooker and Dr. Mark C. Mescher. Her dissertation research was supported by a National Science Foundation Graduate Research Fellowship and examined whether plants can perceive and respond to insect pheromones. For this work, she has focused on how tall goldenrod (*Solidago altissima*) plants perceive the pheromone of the specialist, gall-inducing fly (*Eurosta solidaginis*) and respond by enhancing their anti-herbivore defenses. After graduation, she plans to continue at Penn State University as a postdoctoral scholar studying below-ground interactions among plants, insects, and nematodes.

Brittany Peterson is a PhD candidate in the Department of Entomology and the Interdisciplinary Life Science Program at Purdue University working with Professor Michael Scharf. She holds both a BS (2008) in Microbiology and an MS (2011) in Biology from Western Illinois University. Her master's work focused on symbiont-mediated virus vectoring potential in whiteflies. As a doctoral student, she is working to understand the physiological collaborations of *Reticulitermes flavipes* and its symbionts, specifically focusing on digestion and immunity. This includes an effort to characterize the gut metatranscriptome (termite host, protists, and bacteria) and identify important symbiont-derived enzymes in both healthy and pathogen-challenged termites.

Aside from her dissertation research, Brittany has also collaborated on several projects both at Purdue and in the broader entomology community. This includes a project characterizing the Japanese beetle microbiome and contributions to two insect genome projects.

In addition to being a researcher, Brittany is an advocate for the advancement of women in STEM fields and for science literacy. She is a member of the Association for Women in Science and a founding member of Purdue's organization for graduate women in the College of Agriculture. She is also involved in community outreach activities in the greater Lafayette, Indiana, area. Mentoring is a passion of Brittany's. She has served as a peer mentor for other graduate students in her program, along with mentoring undergraduate students in the laboratory setting. Upon completion of her degree, she plans to continue studying the intricacies of symbiotic evolution and how invertebrate-microbe interactions can be exploited in innovative, applied ways.

Loren Rivera Vega is a PhD candidate in Entomology with a dual degree in International Agriculture and Development at Penn State University. She obtained her bachelor's degree in Agriculture at the Escuela Agrícola Panamericana (Zamorano) in Honduras in 2007. In 2011, she completed her master's program at The Ohio State University, working on the comparative transcriptomics of North American and Asian ash (*Fraxinus* spp.) trees for identification of potential resistance to emerald ash borer (*Agrilus planipennis*). She is currently advised by Dr. Gary W. Felton and studies the effect of host plants on the composition of saliva in the cabbage looper (*Trichoplusia ni*) and its impact on plant defenses. She recently spent six months at the German Centre for Integrative Biodiversity Research (iDiv) studying the response of black mustard roots (*Brassica nigra*) to cabbage rootfly (*Delia radicum*) under the supervision of Dr. Nicole van Dam. She has published four first-author journal articles and collaborated on five others. She is also involved in teaching, and particularly enjoyed her experience with co-creating and co-teaching a tropical entomology graduate seminar. Her research interests focus on understanding the factors that affect plant defenses against insect herbivores, both above- and belowground, as well as the social impact of scientific advancement in developing countries.

USDA-AFRI Student Travel Grants

This travel grant award is funded by USDA-NIFA's Agriculture and Food Research Initiative Program on Plant-Associated Insects and Nematodes. It was created to provide financial support to graduate students for new networking, presentation, and research opportunities at Entomology 2015.

Flor E. Acevedo is a PhD candidate at The Pennsylvania State University. Her dissertation research focuses on the study of the adaptive mechanisms used by polyphagous insects to exploit different host plants. She has been working in entomology for the past 10 years. For her undergraduate thesis research, she developed DNA molecular markers in the coffee berry borer to study the dispersion of this insect in field conditions. After receiving her bachelor's degree in 2006 from Universidad de Caldas (Colombia), she joined the entomology team of the Colombian Center for Coffee Research, Cenicafe, where she studied the genetic variability of the coffee berry borer in Colombia. In 2010, she started her PhD studies at Penn State partially sponsored by a Fulbright scholarship. Flor has been captivated by research in the field of insect-plant interactions. She is interested in understanding how insects evolve the ability to feed on plants and its influence on insect diversification. Further avenues that she would like to explore are related to the evolution of neuroethological adaptations mediating host finding in plant-feeding insects.

Lina Bernaola was born in Lima, Peru. She attended the San Marcos National University, where she received her BS in Biological Sciences and a minor in Molecular Biology. Her professional experience, as well as her passion in the world of plants, began when she joined the International Potato Center (CIP) in Lima to perform her undergraduate thesis. She conducted research on the characterization of the resistance to the late blight in potato. Based on this experience, Lina joined Louisiana State University (LSU) to pursue her MS in agronomy and crop sciences. During this time, she has had the opportunity to learn new molecular techniques and to learn how to survive graduate school. Her thesis research focused on utilization of molecular markers in assessing genetic diversity in smooth cordgrass and sugarcane. Currently, she is working on her PhD in the Department of Entomology at LSU with Dr. Michael Stout. Her research interests include plant-insect and plant-pathogen interactions. Her project involves investigations of the mechanistic basis of plant resistance against above-ground and below-ground organisms in rice. Primarily, she studies the effects of mycorrhizal fungi, a symbiotic soilborne organism, on rice resistance to insect herbivores. The ultimate goal of Lina's research is to provide a better understanding of plant-insect-mycorrhizae interactions in rice pests of Louisiana, which will help to develop more effective pest management programs in rice. Her leadership roles within ESA include serving as student representative of the P-IE Governing Council and Student Affairs Committee of the Southeastern Branch-ESA (SEB-ESA). She is a member of the LSU Entomology Club, having served as president the past year, and she enjoys conducting educational outreach about insects to kids with the Entomology Club. In her free time, Lina enjoys travelling, watching movies, dancing merengue, photography, and good company.

Mehmet Ali Doke obtained his BS in Molecular Biology and Genetics (2009) and his MS in Biology from Middle East Technical University (2012) in Ankara, Turkey. As an undergraduate, he started working with honey bees as a model organism in Dr. Aykut Kence's laboratory, where research was focused on population genetics, diversity, ecology, and behavior of honey bees. He was fascinated with this amazing super-organism, and to this day continues to conduct research on their biology.

As a part of COLOSS in its effort to unveil a common thread in the unprecedented colony losses in the early 2000s, Mehmet was part of a team that conducted the first honey bee colony losses survey in Turkey and published the results in *Apidologie*.

Mehmet's MS thesis, "Analysis of Environmental Cues Causing the Seasonal Change in PGM *(Phosphoglucomutase)* Allozyme Frequencies in Honeybees *(Apis mellifera)*," focused on a metabolic enzyme in honey bees that was earlier shown, in Dr. Kence's lab, to exhibit alternative forms with the change of seasons. He worked on determining the environmental cues that could explain the observed seasonal variation and its potential correlation with overwintering physiology.

In January 2013, he started the Entomology PhD program at the Pennsylvania State University under the supervision of Dr. Christina Grozinger. His research in Dr. Grozinger's lab focuses on overwintering behavior in honey bees and related genetic, physiological, behavioral, and ecological factors. Mehmet and his colleagues prepared a comprehensive review manuscript on honey bee overwintering, including scientifically sound suggestions for beekeepers to improve overwintering success of their managed colonies. This article was recently published in *Current Opinion in Insect Science*.

Todd Johnson completed his BS in Biology in 2009 at Moravian College in Bethlehem, Pennsylvania. During his undergraduate years, he became interested in chemical ecology. Particularly, he was fascinated by the immense amount of chemical diversity generated by herbivores and the plants they feed upon. In 2010, he moved to the lab of Kenneth Raffa at the University of Wisconsin–Madison to lead the releases of biological control agents against the emerald ash borer in Wisconsin. Concurrently, he began his MS in 2011, studying how the introduced parasitoid *Spathius agrili*, as well as *Spathius floridanus,* a native congeneric, locate the emerald ash borer. In the summer of 2013, Todd completed his MS in Entomology, showing that both wasps used cues associated with ash trees to find the beetle. Further, biocontrol agents released in 2011 were recovered, suggesting that biological control of the emerald ash borer may be possible in Wisconsin. In the fall of 2013, Todd began a PhD in entomology with Dr. Lawrence Hanks at the University of Illinois Urbana–Champaign. His research has focused on identifying parasitoids and predators of cerambycids, specifically those that eavesdrop on cerambycid pheromones. Todd is broadly interested in how insects use and integrate information from their environments to make decisions. Additionally, he is interested in how physiology can modify the strength of responses by insects to external cues. After completing his doctorate, he wishes to continue in academia, using his research to inform management of non-native insects or pests.

Alice Ruckert is originally from Italy and grew up in the beautiful countryside of Tuscany, where her parents had a small farm. There she developed love and curiosity for insects. She graduated from both the University of Pisa and the Sant'Anna School of Advanced Studies, where she earned a BS and MS in Agricultural Sciences with a minor in Entomology. Alice's interest in insects grew as she learned about sustainable Integrated Pest Management (IPM) strategies. During her graduate education, she actively worked with an Italian research team studying how the use of external sounds can interfere with the "vibrational" communication of Auchenorrhyncha hemipterans, which use this form of sexual behavior to complete mating. The goal of her research team's work was to eventually develop a successful vibrational mating disruption strategy. After graduation, Alice spent almost one year at the New Zealand Institute for Pant and Food Research Center as an intern, conducting electroantennographic analysis on several tortricid lepidopterans affecting fresh vegetable and fruit production in New Zealand, with the goal to find repulsive chemicals for these insect pests. She found an interesting position as a research assistant, suggested by ESA. Alice is currently finishing her doctoral degree in Entomology at Utah State University, where she studies the combined effect of drought stress and the use of neonicotinoids on secondary outbreaks of spider mites in corn systems. Upon graduation, Alice hopes to continue to work in the IPM field, by developing, testing, and marketing new environmentally friendly control products, and to engage in more outreach, promoting insect appreciation and understanding of conservation needs.

Emmanuel Santa-Martinez grew up in San Lorenzo, Puerto Rico, and received his bachelor's degree in general biology from the University of Puerto Rico in Humacao. As an undergraduate student, Emmanuel participated in several summer internships. He conducted research at the University of Colorado–Boulder, the University of Minnesota–Twin Cities, and Case Western Reserve University. In 2012, he began graduate studies at the Department of Entomology in the University of Wisconsin–Madison, where he is pursuing a PhD in Entomology under the supervision of Dr. Johanne Brunet. His research project involves examining the foraging behavior of honey bees, bumble bees, and leaf-cutting bees on alfalfa plants and quantifying their impact on selfing rate and potential for gene flow. He is studying how distinct bee species forage within and among plants and deposit pollen over successive flowers. Emmanuel's research will help others understand how distinct pollinators mediate mating systems and impact the genetic structure of plant populations. Emmanuel is actively involved in outreach events where he teaches the community about pollinators, their importance and benefits, and ways to promote their conservation. Aside from research, Emmanuel likes going to the beach, gardening, movies, and hiking.

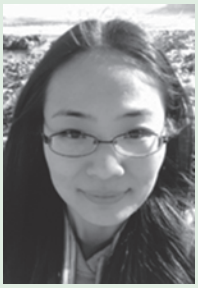
Katharine (Katie) A. Swoboda Bhattarai is a PhD candidate in the Department of Entomology at North Carolina State University. She received her undergraduate degree in Biology from the University of Nebraska–Lincoln, with an undergraduate thesis on the systematics of the scarab beetle tribe Valgini with Dr. Mary Liz Jameson and Dr. Brett Ratcliffe. Katie completed her MS degree at Utah State University, working with Dr. James Cane at the USDA-ARS Pollinating Insects Research Unit. She studied the pollination ecology of Utah sweetvetch, a native legume selected for rangeland restoration in the U.S. Intermountain West, and evaluated two native, cavity-nesting bee species for their potential use as managed pollinators of commercial Utah sweetvetch seed crops. Katie then assessed learning and memory in bumblebees and monarch butterflies as a research associate in Dr. Robert Gegear's laboratory at Worcester Polytechnic Institute. Katie currently works in the Small Fruit and Secialty Crop Integrated Pest Management (IPM) Laboratory led by Dr. Hannah Burrack at North Carolina State University. She studies the ecology of *Drosophila suzukii* in blackberry agroecosystems in western North Carolina, focusing on the effects of non-crop habitat on *D. suzukii* infestation in crop fields, the seasonal and diurnal activity patterns of *D. suzukii*, and the susceptibility of ripe and ripening caneberries to infestation. Her dissertation research was designed with two goals in mind: 1) to help growers better manage risk associated with *D. suzukii* in the short term, and 2) to help develop an integrated management program for *D. suzukii* in the long term. Ultimately, Katie would like to combine her experience working with managed pollinators and IPM to help growers both produce and protect their crops.

Patrick Selig grew up in rural Indiana in a small town called Huntington. Ever since he can remember, he was interested in the sciences—particularly biology. He was often found outside collecting bugs or in the kitchen conducting "experiments." He attended Indiana University–Purdue University in Fort Wayne, where he received his bachelor's degree in Biology. After graduation he worked as the greenhouse manager in the Department of Biology, which captured his interest in plants and their cultivation. During this time he also conducted independent research on soybean plant defense

responses against soybean aphid and aphid-transmitted virus in the laboratory of Dr. Punya Nachappa. These experiences led him to pursue his master's in biology, focusing on plant-insect interactions under the supervision of Dr. Vamsi Nalam and Dr. Punya Nachappa. Patrick was awarded a graduate research fellowship to support his MS education. His MS thesis is focused on engineering a plant host defense regulatory gene, *Phytoalexin Deficient 4* (*PAD4*). Overexpression of this gene has been shown to provide protection against a wide range of pathogens and insect pests. The goal of his project is to develop stable soybean transgenic plants that over-express *PAD4* with enhanced resistance against the soybean aphid and potentially other soybean pests such as nematodes. Upon graduation, Patrick plans to pursue his PhD with a focus on plant-insect interaction.

Suresh Varsani is currently a PhD student in the Department of Entomology at the University of Nebraska–Lincoln, working under the guidance of Dr. Joe Louis. He completed his MTech in Biotechnology from Padmashree Dr. D. Y. Patil University, Navi Mumbai, India in 2012. His master's thesis research was, "Study of Metacaspases Expressions and Cloning of hpRNAi for Silencing of Ubiquitously Expressed Metacaspase in *Solanum tuberosum*." After graduation he worked as a junior research fellow at the Indian Institute of Advanced Research, Gandhinagar, in a project funded by the Department of Biotechnology, Government of India.

Suresh's current research in Dr. Louis' lab focuses on maize-corn leaf aphid interactions. Specifically, his research examines the underlying basis of molecular, biochemical, and physiological mechanisms that mediate maize defenses against the corn leaf aphid. He hopes that the outcomes from his research will contribute significantly to advance our knowledge of plant resistance to insects and plant-insect interactions.



Wenqing Zhou is a fifth-year PhD candidate in the Department of Entomology at Texas A&M University, working under the guidance of Dr. Gregory Sword. Wenqing's research interests include plant-herbivore-microbe ecological interactions and their mechanistic explanations. She received her BS in crop protection from Northwest A&F University in China in 2007, and earned her MS in zoology at the Chinese Academy of Sciences in 2010, studying the molecular phylogenetic reclassification of the parasitoid family Eulophidae (Hymenoptera: Chalcidoidea). Her current dissertation project focuses on exploring interactions between endophytic fungi and plant parasitic nematodes/insect herbivores in cotton, along with their potential use as tools in Integrated Pest Management (IPM). While working with nematologists Dr. James Starr and Dr. Terry Wheeler, she has gained broader experience in interdisciplinary study conduct, in both lab and field experiments. Beginning with a project on endophyte-associated plant-nematode interactions belowground, she expanded her study to aboveground insect-plant-endophyte interactions. The main goals of her research are to 1) discover potential fungal endophytes as novel pest control agents against insects and nematodes, 2) explore plant-endophyte-nematode interactions in agroecosystems, and 3) explain the mechanisms underlying endophyte-mediated plant-fungus defensive mutualisms. She is currently writing her dissertation and developing a mechanistic model to interpret how fungal endophytes influence phytohormone profiling and mediate plant resistance against root-knot nematodes.

The Stinger Awards (2015 Finalist)

These awards are given to the winners of the You Tube Your Entomology video contest. This contest gives ESA members the opportunity to showcase their talents and creativity through video.

The winner and runner up will be announced during the opening session and will be determined from the following finalist.

"A Pictorial Ode to Insect Flight"
By Karl Foord
University of Minnesota

"Anatomy of a Mosquito Part 1: The structures of the head"
By Kristen Healy and Matt Faust
Louisiana State University

"(A)synchrony - An Untimely Problem"
By Michael Falk and Jeremy Hemberger
University of Wisconsin

"Escape from the Jaws of Death!"
By Adrian Smith, Fredrick Larabee, and Andrew Suarez
University of Illinois at Urbana-Champaign

"Identification of Parasitized Caterpillars"
By Petr Kosina, UC IPM; Rachael Long, UCCE Yolo County; and Ray Lucas, UC ANR Communication Services

ESA DAILY SCHEDULE BY DATE AND TIME

FRIDAY, NOVEMBER 13		
Time	**Session/Function**	**Location**
8:30 AM - 5:00 PM	*Annual Review of Entomology* Editorial Committee Meeting	St. Croix, Hyatt Regency

SATURDAY, NOVEMBER 14		
Time	**Session/Function**	**Location**
7:00 AM - 5:00 PM	Entomological Collections Network	Greenway C-H, Hyatt Regency
7:30 AM - 2:30 PM	ESA Governing Board Meeting I	Regency, Hyatt Regency
8:00 AM - 5:30 PM	Workshop: ASReml-R: Analysis of Breeding Trials	L100 A, Convention Center
8:30 AM - 5:30 PM	Microbial Control Working Group	Greenway A, Hyatt Regency
10:00 AM - 2:00 PM	Entomological Foundation Teacher Workshop - STEMbugs	208 AB, Convention Center
10:00 AM - 4:00 PM	Offsite Tour: Twin Cities Highlights Tour / Mall of America	Exhibit Hall B Foyer, Convention Center
2:00 PM - 5:00 PM	Section Leadership Council Meeting	Greenway I, Hyatt Regency
2:00 PM - 6:00 PM	ESA Registration and Information Center	Exhibit Hall B Foyer, Convention Center
2:00 PM - 6:00 PM	Presentation Preview Room (PPR)	201 B, Convention Center
2:30 PM - 3:00 PM	ESA Certification Corporation Governing Board Meeting	Regency, Hyatt Regency
3:00 PM - 6:00 PM	Council of Entomological Department Administrators Meeting	Greenway J, Hyatt Regency
5:00 PM - 6:00 PM	P-IE Governing Council Working Session	Regency, Hyatt Regency
6:00 PM - 9:00 PM	Entomological Collections Network	Northstar A, Hyatt Regency

SUNDAY, NOVEMBER 15		
Time	**Session/Function**	**Location**
7:00 AM - 7:30 AM	Moderator Training	205 A, Convention Center
7:00 AM - 12:00 PM	Entomological Collections Network	Greenway C-H, Hyatt Regency
7:00 AM - 6:00 PM	Presentation Preview Room (PPR)	201 B, Convention Center
7:00 AM - 9:00 PM	ESA Registration and Information Center	Exhibit Hall B Foyer, Convention Center
8:00 AM - 10:00 AM	*Environmental Entomology* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
8:00 AM - 12:00 PM	Program Symposium in Honor of Nan Yao Su: How Synergy in Science Led to Innovation	204 AB, Convention Center
8:00 AM - 12:00 PM	PBT Section Symposium: Developmental Synergy between Genome Regulation and Environmental Stimuli: From Phenotypic Plasticity to Disease Response	208 C, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Beyond Bt: Trait Discovery and Breeding for Modified Plant-Insect Interactions	200 B, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Worldwide Resistance to Bt-toxins: Causes, Consequences, Cures?	200 C, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Synergy and Partnerships in Biological Control: Honoring the Career of Roy Van Driesche	205 B, Convention Center
8:00 AM - 12:00 PM	SysEB Section Symposium: Conserving Rare Butterflies: Challenges and Successes	209 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: The Nascent Mason Bee Industry: Researchers, Entrepreneurs, and Agriculturists Partnering for Pollination Solutions	200 A, Convention Center
8:00 AM - 12:00 PM	Member Symposium: What Are The Costs and Benefits for Neonicotinoid Seed Treatments in Field Crops?	200 D, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Brown Marmorated Stink Bug Working Group: Synergizing IPM Research to Deliver Solutions	200 F, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Beyond Corn and Soybeans...Challenges to Integrated Pest Management in Specialty Crops	205 A, Convention Center

8:00 AM - 12:00 PM	Member Symposium: Bed Bugs, *Cimex lectularius*, in Sensitive Areas: Research and Mitigation Techniques	207 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Colony Collapse Disorder Eight Years Later: What We Know Now That We Didn't Know Then	208 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Greenhouse Insect Management: Critical Questions Answered with Collaborative Research	208 D, Convention Center
8:00 AM - 12:00 PM	Organized Meeting: Current Advances in Acarology	212 AB, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: Biology and Behavior	200 I, Convention Center
8:30 AM - 10:30 AM	Member Symposium: Ecological Pest Management: Key for Sustainable Agricultural Production	205 CD, Convention Center
8:30 AM - 12:00 PM	Ten-Minute Papers, PBT Section: Physiology and Immunity	211 B, Convention Center
8:30 AM - 12:00 PM	Ten-Minute Papers, PBT Section: RNAi, RNA-Seq and Molecular Biology	211 A, Convention Center
8:30 AM - 4:30 PM	Workshop: Analyses of Microbial Community and Metagenomics Using QIIME	L100 A, Convention Center
9:00 AM - 4:30 PM	Workshop: Meta-Analysis for the Synthesis of Evidence in Agriculture	L100 C, Convention Center
9:30 AM - 11:30 AM	MUVE Section Symposium: Insects and Their Diseases that Cause Harm to Humans and Animals	206 AB, Convention Center
9:30 AM - 10:30 AM	2015 Annual Meeting Program Committee Meeting	Greenway I, Hyatt Regency
10:00 AM - 12:00 PM	*Annals of the ESA* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
10:00 AM - 4:00 PM	Offsite Tour: Twin Cities Highlights Tour / Mall of America	Exhibit Hall B Foyer, Convention Center
10:30 AM - 12:00 PM	Presidential Committee on Section Leadership	Greenway B, Hyatt Regency
11:00 AM - 2:00 PM	Certification Board Meeting	Greenway I, Hyatt Regency
11:30 AM - 3:30 PM	Member Symposium: Synergy in Arthropod Genomics: Integrative Solutions to Functional and Evolutionary Biology	205 CD, Convention Center
12:00 PM - 12:30 PM	Moderator Training	205 A, Convention Center
12:15 PM - 1:15 PM	Lunch and Learn: Exploring Careers in Extension: Advice for Students and Early Professionals	200 A, Convention Center
12:15 PM - 1:15 PM	Lunch and Learn: Fitting the 'Narrative': How Media Hype can Hijack Your Research Findings	208 D, Convention Center
12:30 PM - 1:00 PM	Judges' Training	200 E, Convention Center
12:30 PM - 3:15 PM	Linnaean Games - Preliminary Rounds	Auditorium Main, Convention Center
12:30 PM - 3:30 PM	Member Symposium: Acarological Society of America Honors James Amrine	212 AB, Convention Center
12:30 PM - 3:30 PM	Organized Meeting: SOLA Scarab Workers	211 D, Convention Center
12:45 PM - 3:30 PM	Ten-Minute Papers, SysEB Section: Behavior and Ecology	210 AB, Convention Center
1:00 PM - 3:00 PM	Workshop: Big Data Meets Insect Ecology: Examining Insects Continentally using NEON Data and R	208 AB, Convention Center
1:00 PM - 3:00 PM	*Journal of Economic Entomology* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
1:00 PM - 3:30 PM	GDM ARM Software Workshop	Greenway A, Hyatt Regency
1:00 PM - 3:30 PM	Ten-Minute Papers, SysEB Section: Biodiversity, Bioinformatics & Education	211 B, Convention Center
1:15 PM - 3:15 PM	MUVE Section Symposium: Best Bed Bug Management Practices and Novel Research	207 AB, Convention Center
1:15 PM - 3:15 PM	Member Symposium: Integrated Pest Management Programs for Tropical Crops	200 B, Convention Center
1:15 PM - 3:15 PM	Member Symposium: Thysanoptera of Arid Areas	200 C, Convention Center
1:15 PM - 3:15 PM	Member Symposium: Research Advances in Root Feeding Insect Pests and Their Management	200 D, Convention Center
1:15 PM - 3:15 PM	Member Symposium: Synergy and Partnering with Retired and Emeriti Seniors in Professional Societies (ESA, ASA, CSSA AND SSSA) on their Involvement in Research, Teaching, Special Interests, Travel, and Consulting in Retirement	204 AB, Convention Center
1:15 PM - 3:15 PM	Member Symposium: Using Animation and Music as Tools for Communicating Science	205 A, Convention Center

1:15 PM - 3:15 PM	Member Symposium: The Art of Writing a Successful Research Paper	206 AB, Convention Center
1:15 PM - 3:15 PM	Organized Meeting: Americas Neuropterists Meeting	205 B, Convention Center
1:30 PM - 2:30 PM	Science Policy Capability Committee	Minnehaha, Hyatt Regency
1:30 PM - 3:30 PM	Organized Meeting: International Society of Hymenopterists Symposium and Business Meeting	200 F, Convention Center
1:30 PM - 5:30 PM	Workshop: Data Handling and Analysis Tricks They Don't Teach You in Grad School	L100 B, Convention Center
2:00 PM - 3:00 PM	New Member Reception	Seasons, Convention Center
2:00 PM - 3:30 PM	International Organization for Biological Control (IOBC-NRS) Governing Board Meeting	Greenway B, Hyatt Regency
2:30 PM - 3:00 PM	Judges' Training	200 E, Convention Center
3:30 PM - 5:30 PM	ESA Opening Plenary Session and Founders' Memorial Lecture	Auditorium Main, Convention Center
6:00 PM - 7:10 PM	ASA, CSSA, SSSA, and ESA Opening Keynote: Partnering for Solutions to Supply Chain Sustainability	Auditorium Main, Convention Center
7:10 PM - 9:00 PM	Exhibit Hall	Exhibit Hall BC, Convention Center
7:10 PM - 9:00 PM	Welcome Reception	Exhibit Hall BC, Convention Center

MONDAY, NOVEMBER 16

Time	Session/Function	Location
6:30 AM - 8:00 AM	Women in Science Breakfast	Seasons, Convention Center
7:00 AM - 7:30 AM	Judges' Training	200 E, Convention Center
7:00 AM - 7:30 AM	Moderator Training	205 A, Convention Center
7:00 AM - 1:00 PM	The Coleopterists Society Executive Council Meeting	Greenway I, Hyatt Regency
7:00 AM - 5:00 PM	ESA Registration and Information Center	Exhibit Hall B Foyer, Convention Center
7:00 AM - 6:00 PM	Presentation Preview Room (PPR)	201 B, Convention Center
8:00 AM - 10:00 AM	*Arthropod Management Tests* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
8:00 AM - 1:00 PM	IRAC-US Meeting	Greenway J, Hyatt Regency
8:00 AM - 11:00 AM	Joint Symposium: Connecting Phytobiomes with Soil and Plant Health	101 DE, Convention Center
8:00 AM - 6:30 PM	01 - Undergraduate Poster Competition: MUVE - Medical and Veterinary	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	02 - Undergraduate Poster Competition: P-IE - Bees and Arthropod Communities	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	03 - Undergraduate Poster Competition: P-IE - Herbivores, Invasive Species, and Trapping	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	04 - Undergraduate Poster Competition: PBT - Ants, Bees, Beetles, and Moquitoes	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	05 - Undergraduate Poster Competition: SysEB - Honey Bees and other Hymenoptera	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	06 - Undergraduate Poster Competition: SysEB - Aquatic Insects and Trapping	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	07 - Graduate Poster Competition: MUVE - Ticks and Mosquitoes	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	08 - Graduate Poster Competition: MUVE - Bed Bugs, Urban Pests, and Field Populations	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	09 - Graduate Poster Competition: P-IE - Honey Bees and Related Pollinators	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	10 - Graduate Poster Competition: P-IE - Attractants and Pheromone-mediated Behavior	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	11 - Graduate Poster Competition: P-IE - Insect Control, Ecology, and Ecosystems	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	12 - Graduate Poster Competition: P-IE - Nursery and Specialty Crops	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	13 - Graduate Poster Competition: P-IE - Biological Control	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	14 - Graduate Poster Competition: P-IE - Invasive Species	Exhibit Hall BC, Convention Center

8:00 AM - 6:30 PM	15 - Graduate Poster Competition: P-IE - Monarchs, Hemiptera/ Heteroptera, and Stored Products	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	16 - Graduate Poster Competition: PBT - Insect Control	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	17 - Graduate Poster Competition: PBT - Biology and Physiology	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	18 - Graduate Poster Competition: SysEB - Phylogeny	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	19 - Graduate Poster Competition: SysEB - Hymenoptera	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	20 - Graduate Poster Competition: SysEB - Evolutionary History	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	21 - Graduate Poster Competition: SysEB - Symbionts and Behavior	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	Student Virtual Poster Competition: Graduate	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	Student Virtual Poster Competition: Undergraduate	Exhibit Hall BC, Convention Center
7:55 AM - 12:30 PM	01 - Graduate Ten-Minute Paper Competition: P-IE - IPM A	200 A, Convention Center
7:55 AM - 12:30 PM	02 - Graduate Ten-Minute Paper Competition: P-IE - IPM B	200 B, Convention Center
8:10 AM - 12:20 PM	03 - Graduate Ten-Minute Paper Competition: P-IE - IPM C	200 C, Convention Center
8:10 AM - 12:30 PM	04 - Graduate Ten-Minute Paper Competition: P-IE - Insecticide A	200 D, Convention Center
8:10 AM - 12:20 PM	05 - Graduate Ten-Minute Paper Competition: P-IE - Insecticide B	200 E, Convention Center
7:55 AM - 12:30 PM	06 - Graduate Ten-Minute Paper Competition: P-IE - Chemical Ecology	200 F, Convention Center
7:55 AM - 12:30 PM	07 - Graduate Ten-Minute Paper Competition: P-IE - Biology/Behavior A	200 G, Convention Center
8:10 AM - 12:30 PM	08 - Graduate Ten-Minute Paper Competition: P-IE - Biology/Behavior B	200 H, Convention Center
7:55 AM - 12:30 PM	09 - Graduate Ten-Minute Paper Competition: P-IE - Ecology A	200 I, Convention Center
7:55 AM - 12:30 PM	10 - Graduate Ten-Minute Paper Competition: P-IE - Ecology B	200 J, Convention Center
7:55 AM - 12:30 PM	11 - Graduate Ten-Minute Paper Competition: P-IE - Bees	204 AB, Convention Center
7:55 AM - 12:30 PM	12 - Graduate Ten-Minute Paper Competition: P-IE - Host Plant Resistance	205 A, Convention Center
7:55 AM - 12:30 PM	13 - Graduate Ten-Minute Paper Competition: P-IE - Biocontrol	205 B, Convention Center
7:55 AM - 12:30 PM	14 - Undergraduate Ten-Minute Paper Competition: SysEB	205 CD, Convention Center
8:10 AM - 12:10 PM	15 - Graduate Ten-Minute Paper Competition: MUVE - Mosquitoes, Midges, and Bed Bugs	206 AB, Convention Center
8:25 AM - 10:45 AM	16 - Undergraduate Ten-Minute Paper Competition: MUVE, PBT, and P-IE	207 AB, Convention Center
8:25 AM - 12:00 PM	17 - Graduate Ten-Minute Paper Competition: MUVE - Diptera	208 AB, Convention Center
7:55 AM - 12:00 PM	18 - Graduate Ten-Minute Paper Competition: MUVE - Control Methods and Traps	208 C, Convention Center
8:25 AM - 12:10 PM	19 - Graduate Ten-Minute Paper Competition: MUVE - Ticks, Termites, Ants, Behavior, and Field Studies	208 D, Convention Center
8:25 AM - 11:10 AM	20 - Graduate Ten-Minute Paper Competition: PBT - Physiology	209 AB, Convention Center
7:55 AM - 12:30 PM	21 - Graduate Ten-Minute Paper Competition: SysEB - Systematics and Taxonomy	210 AB, Convention Center
8:10 AM - 12:10 PM	22 - Graduate Ten-Minute Paper Competition: PBT - Bees and Pesticides	211 A, Convention Center
8:25 AM - 12:00 PM	23 - Graduate Ten-Minute Paper Competition: PBT - Gut, Bt, Microbes, and Immune Response	211 B, Convention Center
7:55 AM - 12:30 PM	24 - Graduate Ten-Minute Paper Competition: SysEB - Behavior, Coevolution, and Symbiotic Associations	211 C, Convention Center
8:25 AM - 12:10 PM	25 - Graduate Ten-Minute Paper Competition: SysEB - Citizen Science, New Methods, and Physiology	211 D, Convention Center
8:10 AM - 12:30 PM	26 - Graduate Ten-Minute Paper Competition: SysEB - Dispersal, Colonization, and Biogeography	212 AB, Convention Center
8:10 AM - 12:10 PM	27 - Graduate Ten-Minute Paper Competition: SysEB - Speciation and Evolutionary Morphology	213 AB, Convention Center
8:30 AM - 12:30 PM	Science Policy Fellows Workshop	Minnehaha, Hyatt Regency
9:00 AM - 6:00 PM	Exhibit Hall	Exhibit Hall BC, Convention Center
9:30 AM - 10:00 AM	Refreshment Break	Exhibit Hall BC, Convention Center

9:30 AM - 12:00 PM	Joint Symposium: Getting More from Data: Science for Sustainable Solutions	Auditorium Main, Convention Center
10:00 AM - 12:00 PM	*Journal of Insect Science* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
10:15 AM - 11:30 AM	Joint Symposium: Managing Research Centers for Wildlife and Beneficial Insects	M100 E, Convention Center
11:00 AM - 12:00 PM	Committee on Ethics and Rules	Greenway A, Hyatt Regency
11:00 AM - 1:30 PM	Workshop: Mechanical Measurements of Crops and Soils: Principles and Techniques	Rochester Room, Hilton
12:00 PM - 1:30 PM	*Journal of Medical Entomology* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
12:00 PM - 2:00 PM	ACE Support Committee Meeting	Greenway A, Hyatt Regency
12:15 PM - 1:15 PM	Lunch and Learn: Managing Job Transitions as an Early Professional	209 AB, Convention Center
12:30 PM - 1:00 PM	Moderator Training	205 A, Convention Center
12:30 PM - 2:00 PM	Student Three-Minute Presentation Competition A	208 C, Convention Center
12:30 PM - 2:00 PM	Student Three-Minute Presentation Competition B	208 D, Convention Center
12:30 PM - 2:00 PM	Joint Session: Tips from the Experts on the Job Application and Interviewing Process	Marquette Ballroom IV-V, Hilton
1:00 PM - 2:00 PM	ICE 2016 Organizing Committee Meeting	200 G, Convention Center
1:00 PM - 4:15 PM	Joint Symposium: Insect Ecology in Organic Crop Management Systems	L100 A, Convention Center
1:30 PM - 3:30 PM	Workshop: Making a Compelling Science Message	Board Room 1, Hilton
2:00 PM - 3:00 PM	Grand Challenges Leaders Meeting	Greenway J, Hyatt Regency
2:00 PM - 4:00 PM	ACE Turf and Ornamental Exploratory Committee Meeting	Greenway A, Hyatt Regency
2:00 PM - 4:00 PM	Joint Session: Teaching and Extension	Marquette Ballroom IV-V, Hilton
2:00 PM - 6:00 PM	Organized Meeting: Highlights of Medical, Urban, and Veterinary Entomology (MUVE) in 2015	208 AB, Convention Center
2:00 PM - 6:00 PM	Organized Meeting: Physiology, Biochemistry, and Toxicology (PBT) Networking Section	211 AB, Convention Center
2:00 PM - 6:00 PM	Organized Meeting: Plant-Insect Ecosystem (P-IE) Section Networking, Business, and Learning Session on Effective Communication: How to Avoid Pie in Your Face!	200 A-D, Convention Center
2:00 PM - 6:00 PM	Organized Meeting: Systematics, Evolution, and Biodiversity (SysEB) Section Meeting	205 CD, Convention Center
3:00 PM - 4:00 PM	ICE Council Meeting	Minnehaha, Hyatt Regency
3:00 PM - 5:00 PM	*American Entomologist* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
4:30 PM - 6:00 PM	Entomological Foundation Board of Directors Annual Meeting	Minnehaha, Hyatt Regency
5:30 PM - 6:30 PM	Student Competition Social Hour with Poster Presenters	Exhibit Hall BC, Convention Center
5:30 PM - 7:00 PM	International Association of Black Entomologists Annual Business Meeting	204 AB, Convention Center
6:30 PM - 8:30 PM	Purdue Mixer	St. Croix, Hyatt Regency
6:30 PM - 8:30 PM	University of Florida Alumni Mixer	Northstar A, Hyatt Regency
6:30 PM - 8:30 PM	Michigan State University and The Ohio State University Joint Mixer	Greenway A, Hyatt Regency
6:30 PM - 9:00 PM	University of California Mixer for Alumni and Friends	Studio ABCD, 14th Floor, Millennium Hotel
6:30 PM - 8:00 PM	University of Illinois Mixer	Greenway H-I, Hyatt Regency
6:30 PM - 8:30 PM	Colorado State University, Kansas State University and University of Nebraska-Lincoln Mixer	Greenway E-G, Hyatt Regency
6:30 PM - 8:30 PM	Iowa State University Alumni Mixer	LaSalle, Hyatt Regency
7:00 PM - 9:00 PM	Mizzou Mixer	Skyway Suite AB, Hyatt Regency
7:00 PM - 9:00 PM	North Carolina State University Mixer	Greenway J, Hyatt Regency
7:00 PM - 9:00 PM	Northwest Mixer (UI, MSU, OSU,WSU)	Marquis Ballroom, 14th Floor, Millennium Hotel
7:00 PM - 9:00 PM	The LSU, Mississippi State, and UGA Combined Mixer	Regency, Hyatt Regency

7:00 PM - 9:00 PM	Texas A&M University, Oklahoma State University & Southwestern Branch Mixer	Northstar B, Hyatt Regency
7:00 PM - 9:00 PM	Arkansas, Auburn, Clemson, Kentucky and Tennessee Mixer	Greenway C, Hyatt Regency
7:00 PM - 9:00 PM	Mid Atlantic Mixer	Mirage, Hyatt Regency
8:00 PM - 10:00 PM	Cornell University Entomology Mixer-Reception	Dome, 14th Floor, Millennium Hotel
8:00 PM - 10:00 PM	Minnesota Mixer - Department of Entomology University of Minnesota	Greenway B, Hyatt Regency

TUESDAY, NOVEMBER 17

Time	Session/Function	Location
6:30 AM - 7:30 AM	5K Fun Run/Walk	Loring Park
6:30 AM - 8:00 AM	Southwestern Branch Executive Committee & Program Planning Meeting	Greenway C, Hyatt Regency
6:45 AM - 7:45 AM	USDA ARS All Hands Meeting	200 E, Convention Center
7:00 AM - 7:30 AM	Moderator Training	205 A, Convention Center
7:00 AM - 8:00 AM	Past Presidents' Breakfast	St. Croix, Hyatt Regency
7:00 AM - 8:00 AM	Fire Ant eXtension Network Meeting	Greenway A, Hyatt Regency
7:00 AM - 5:00 PM	ESA Registration and Information Center	Exhibit Hall B Foyer, Convention Center
7:00 AM - 6:00 PM	Presentation Preview Room (PPR)	201 B, Convention Center
8:00 AM - 6:30 PM	MUVE Section Poster Session A	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	P-IE Section Poster Session A	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	PBT Section Poster Session A	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	SysEB Section Poster Session A	Exhibit Hall BC, Convention Center
8:00 AM - 6:30 PM	Virtual Posters	Exhibit Hall BC, Convention Center
8:00 AM - 12:00 PM	Program Symposium: Applying a Systems Approach: Emergent Outcomes of Multidimensional Interactions in Agroecosystems	Auditorium 1, Convention Center
7:55 AM - 12:00 PM	Joint Symposium: Bugs and Dirt: Four Letter Words That Go Together	M100 D, Convention Center
8:00 AM - 9:00 AM	School and Urban IPM eXtension Network Meeting	Greenway B, Hyatt Regency
8:00 AM - 9:00 AM	Committee on Awards and Honors Meeting	Greenway I, Hyatt Regency
8:00 AM - 9:00 AM	New Governing Board Member Orientation	Minnehaha, Hyatt Regency
8:00 AM - 10:00 AM	*Journal of Integrated Pest Management* Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
8:00 AM - 12:00 PM	MUVE Section Symposium: 30 Years of Hunting the Tiger. *Aedes albopictus* in America: Current Perspectives and Future Challenges	206 AB, Convention Center
8:00 AM - 12:00 PM	PBT Section Symposium: Insect Resistance to Traits and Weed Resistance to Herbicides: Learnings, Opportunities and Partnerships for Sustainable Management Programs	211 A, Convention Center
8:00 AM - 12:00 PM	PBT Section Symposium: Partnering for Health: Genetic, Behavioral and Environmental Synergies in Insect Immunity	204 AB, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Are We Stressed Enough Yet? Interdisciplinary Partnerships to Evaluate the Consequences of Plant Abiotic and Biotic Stresses	200 F, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Effects of Global Climate Change on Species Interactions and Biological Control	208 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Partnerships for Developing Synergistic Solutions Addressing an Invasive Soybean Pest: A Six-Year Study of the Kudzu Bug, *Megacopta cribraria*	212 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Preparing for the Future: What Every Student Should Know About Getting a Job or Finding a Career	200 A, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Stored-Product Entomology: Partnerships Across and Within Disciplines	200 B, Convention Center
8:00 AM - 11:35 AM	Joint Symposium: Characterizing and Controlling Insects and Bacteria Associated with Manure-Impacted Environments	M101 C, Convention Center

8:00 AM - 12:00 PM	Joint Symposium: Partnering to Understand Complexity: Biogeochemical Cycles in Agricultural Systems	103 A, Convention Center
8:00 AM - 9:30 AM	Ten-Minute Papers, MUVE Section: Ticks	208 CD, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: Applied Ecology	200 H, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: Forest Entomology	200 J, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: Host Plant and Insect Resistance	200 C, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: IPM - Field Crops 1	200 I, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: IPM - Fruit and Nut Trees	200 G, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, SysEB Section: Genomic Data in Systematics and Evolution	210 AB, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, SysEB Section: Phylogenetics	211 D, Convention Center
8:15 AM - 12:00 PM	P-IE Section Symposium: The Larry L. Larson Symposium: Pest Shifting and Invasive Species: The Need For New Technology to Manage New Insect Pests	200 D, Convention Center
8:30 AM - 12:00 PM	Ten-Minute Papers, PBT Section: Toxicology	211 B, Convention Center
9:00 AM - 6:00 PM	Exhibit Hall	Exhibit Hall BC, Convention Center
9:25 AM - 12:00 PM	Joint Symposium: Agroecosystems Research: Integrated Cropping Systems That Promote Ecosystem Services	101 H, Convention Center
9:30 AM - 10:00 AM	Refreshment Break	Exhibit Hall BC, Convention Center
9:30 AM - 10:30 AM	Committee on Diversity	Greenway I, Hyatt Regency
9:35 AM - 12:00 PM	Ten-Minute Papers, MUVE Section: Bed Bugs	208 CD, Convention Center
9:55 AM - 12:15 PM	Joint Symposium: Turfgrass Insect Management: New and Emerging Issues	101 B, Convention Center
10:00 AM - 11:00 AM	Thomas Say Books Editorial Board Meeting	Skyway Suite AB, Hyatt Regency
10:00 AM - 12:00 PM	BCE - MedVet Specialty Exam Writing Committee	Greenway J, Hyatt Regency
10:00 AM - 12:00 PM	Workshop: Making a Compelling Science Message	Board Room 1, Hilton
10:30 AM - 11:30 AM	Student Transition and Early Professionals Committee Meeting	Greenway I, Hyatt Regency
11:00 AM - 12:00 PM	Common Names Committee Meeting	Skyway Suite AB, Hyatt Regency
12:00 PM - 12:30 PM	Moderator Training	205 A, Convention Center
12:00 PM - 1:15 PM	Lunch and Learn: Preparing for the Future: What Every Student Should Know About Getting a Job or Finding a Career	200 A, Convention Center
12:00 PM - 1:30 PM	Entomological Foundation Board of Counselors Meeting	Minnehaha, Hyatt Regency
12:00 PM – 1:30 PM	NCB-ESA Executive Committee Meeting	St. Croix, Hyatt Regency
12:00 PM - 2:00 PM	Organized Meeting: IOBC NRS Annual Meeting	211 D, Convention Center
12:15 PM - 1:15 PM	International Branch Meeting	205 CD, Convention Center
12:15 PM - 1:15 PM	Lunch and Learn: Science Policy: Fellows, Funding, and the Federal Future of Entomology	207 AB, Convention Center
12:15 PM - 1:15 PM	National Insect Photo Salon	205 B, Convention Center
1:00 PM - 2:00 PM	Committee on Membership Meeting	Greenway A, Hyatt Regency
1:00 PM - 4:00 PM	Publications Council Meeting	Skyway Suite AB, Hyatt Regency
1:00 PM - 3:05 PM	Joint Session: Novel Approaches on Site-Specific Integrated Pest Management	M100 F, Convention Center
1:00 PM - 4:00 PM	Joint Symposium: Management and Biological Control of Weeds in Agroecosystems	M101 A, Convention Center
1:15 PM - 3:45 PM	Ten-Minute Papers, MUVE Section: Mosquitoes, Biology, Ecology, and Control	208 CD, Convention Center
1:15 PM - 5:00 PM	Offsite Tour: Ecolab's Global Research, Development, and Engineering Center	Exhibit Hall B Foyer, Convention Center
1:30 PM - 3:00 PM	Joint Interactive Workshop: Writing Manuscripts for Publication	Minneapolis Ballroom B, Hilton
1:30 PM - 4:30 PM	Student Debates	Auditorium Main, Convention Center
1:30 PM - 5:30 PM	Program Symposium: How Can Ecosystem Services Support Resilient and Multifunctional Agriculture Systems to Meet the Challenges of the 21st Century?	Auditorium 1, Convention Center

1:30 PM - 5:30 PM	PBT Section Symposium: Water and Ion Homestasis: Role of Aquaporins and Other Channel Proteins	211 A, Convention Center
1:30 PM - 5:30 PM	P-IE Section Symposium: Ecology and Management of Migratory Moth Pests: Uniting Disciplines to Provide Solutions	211 B, Convention Center
1:30 PM - 5:30 PM	P-IE Section Symposium: Getting Down and Dirty: The Role of Brown Food Webs in Providing Ecosystem Services	200 C, Convention Center
1:30 PM - 5:30 PM	P-IE Section Symposium: Rootworm Management: Status of GM Traits, Insecticides, and Potential New Tools	208 AB, Convention Center
1:30 PM - 5:30 PM	SysEB Section Symposium: Evolution of Castes in Social Organisms: Behavior, Development and Regulating Mechanisms	213 AB, Convention Center
1:30 PM - 5:30 PM	Member Symposium: Entomology: Partnering with Small Liberal Arts Colleges	212 AB, Convention Center
1:30 PM - 5:30 PM	Board Certified Entomologist's (BCE) Member Symposium: State of the Art Insect Monitoring Approaches	206 AB, Convention Center
1:30 PM - 5:30 PM	Member Symposium: Orthopteroids: A Nexus of Synergy Between Scientific Disciplines and Innovative Partnerships	204 AB, Convention Center
1:30 PM - 5:30 PM	Member Symposium: Games, Comics, and Social Media: Outreach Education in Entomology	200 B, Convention Center
1:30 PM - 5:30 PM	Member Symposium: The Bee-Soil Interface: Exploring the Role of Soils in Wild Bee Nesting and Success	200 D, Convention Center
1:30 PM - 5:30 PM	Late Breaking Symposium: A Nexus of Agriculture – Honey Bee Health and Commodity Crop Production: Collision Course or Road to Cooperation?	200 E, Convention Center
1:30 PM - 5:30 PM	Member Symposium: Ecological Engineering to Improve Microbial Control Agents	200 F, Convention Center
1:30 PM - 5:30 PM	Organized Meeting: Partnering to Develop Solutions Against the Infamous Invasive Pest Spotted Wing Drosophila	200 G, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, PBT Section: Chemical Ecology, Behavior Physiology and Biotic Interaction	205 A, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, P-IE Section: Biological Control	200 J, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, P-IE Section: IPM - Field Crops 3	200 I, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, P-IE Section: IPM - Horticultural and Vegetable Crops	200 H, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, SysEB Section: Arthropod-Symbiont Interaction	211 C, Convention Center
2:00 PM - 3:00 PM	Branch Leaders Meeting	Greenway B, Hyatt Regency
2:00 PM - 4:00 PM	Informal Weevil Conference	Greenway C, Hyatt Regency
2:00 PM - 4:00 PM	BCE Core Exam Writing Committee	Greenway J, Hyatt Regency
2:00 PM - 5:00 PM	Joint Workshop/Reception: Women in Science "Breaking the Bias Habit"	102 A-F, Convention Center
2:00 PM - 5:30 PM	P-IE Section Symposium: Insect-Mediated Ecosystem Services: Enhancing Interactions with our Beneficial Partners (IOBC-NRS Symposium)	211 D, Convention Center
2:30 PM - 5:30 PM	Member Symposium: Insects in the City: Urban Ecology and Human Influence on Insect Populations	200 A, Convention Center
3:00 PM - 3:30 PM	Branch Treasurers Meeting	Minnehaha, Hyatt Regency
3:00 PM - 5:00 PM	Committee on Education and Outreach Meeting	Greenway I, Hyatt Regency
3:30 PM - 4:00 PM	Section Treasurers Meeting	Minnehaha, Hyatt Regency
3:45 PM - 5:40 PM	Ten-Minute Papers, MUVE Section: Mosquitoes, Disease Transmission, and Public Health	208 CD, Convention Center
5:30 PM - 6:30 PM	Linnaean Games - Finals	Auditorium Main, Convention Center
5:30 PM - 6:30 PM	Social Hour with Poster Presenters	Exhibit Hall BC, Convention Center
5:30 PM - 7:30 PM	IOBC Mixer	211 D, Convention Center
6:00 PM - 9:00 PM	WERA1021: Spotted Wing Drosophila	200 G, Convention Center
6:00 PM - 10:00 PM	Organized Meeting: Korean Young Entomologists (KYE)	205 B, Convention Center
6:00 PM - 10:00 PM	Organized Meeting: Overseas Chinese Entomologists Association (OCEA): Opportunity, Challenge, Collaboration and Achievement	200 C, Convention Center

6:30 PM - 8:00 PM	University of Wisconsin Joint Mixer: Entomology, Soils and Agronomy	Northstar A, Hyatt Regency
6:45 PM - 8:30 PM	ESA Student Awards Ceremony	Auditorium Main, Convention Center
7:00 PM - 9:00 PM	Organized Meeting: Heteropterist Symposium	210 AB, Convention Center
7:00 PM - 9:00 PM	Organized Meeting: North American Dipterists Society (NADS) Meeting	213 AB, Convention Center
7:00 PM - 9:00 PM	Organized Meeting: Society of Overseas Nepalese Entomologists Meeting	209 AB, Convention Center
7:00 PM - 9:00 PM	Screening of "The PHD Movie 2: Still in Grad School"	102 A-F, Convention Center
7:30 PM - 8:30 PM	IUSSI North American Section Business Meeting	200 D, Convention Center
7:30 PM - 9:30 PM	Organized Meeting: The Coleopterists Society Annual Meeting	208 AB, Convention Center
8:00 PM - 9:00 PM	ESA Editors Reception	Mirage, Hyatt Regency
8:20 PM - 11:00 PM	Korean Young Entomologists (KYE) Mixer	205 B, Convention Center
8:30 PM - 11:30 PM	Student Reception	The Pour House
9:00 PM - 10:00 PM	ESA Governing Board Reception	Regency, Hyatt Regency

WEDNESDAY, NOVEMBER 18

Time	Session/Function	Location
6:30 AM - 7:30 AM	Sunrise Yoga	Fitness Center, Hyatt Regency (6th Floor)
6:45 AM - 7:45 AM	PBT Final Business Meeting	207 AB, Convention Center
7:00 AM - 7:30 AM	Moderator Training	205 A, Convention Center
7:00 AM - 8:00 AM	Open P-IE Section Governing Council and Member Feedback Session	Skyway Suite AB, Hyatt Regency
7:00 AM - 8:15 AM	MUVE Final Business Meeting with Breakfast	208 CD, Convention Center
7:00 AM - 12:00 PM	ESA Registration and Information Center	Exhibit Hall B Foyer, Convention Center.
7:00 AM - 12:00 PM	Presentation Preview Room (PPR)	201 B, Convention Center
8:00 AM - 4:30 PM	MUVE Section Poster Session B	Exhibit Hall BC, Convention Center
8:00 AM - 4:30 PM	P-IE Section Poster Session B	Exhibit Hall BC, Convention Center
8:00 AM - 4:30 PM	PBT Section Poster Session B	Exhibit Hall BC, Convention Center
8:00 AM - 4:30 PM	SysEB Section Poster Session B	Exhibit Hall BC, Convention Center
8:00 AM - 11:30 AM	ESA Governing Board Meeting II	Regency, Hyatt Regency
8:00 AM - 12:00 PM	Program Symposium: Arthropods and Wildlife Conservation: Synergy in Complex Biological Systems	Auditorium 1, Convention Center
8:00 AM - 12:00 PM	PBT Section Symposium: Insect Cell Lines: Models to Study Novel Biological Interactions for Devising Control Strategies	211 A, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Forest Entomology: Synergy from Symbiosis	200 C, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Insecticide Resistance Management (IRM) vs Integrated Pest Management (IPM): Overlap and Conflicts, IRAC US Symposium Series No. 11	200 D, Convention Center
8:00 AM - 12:00 PM	P-IE Section Symposium: Landscape Simplification: Effects on Arthropod Mediated Ecosystem Services and Agricultural Production	200 E, Convention Center
8:00 AM - 12:00 PM	SysEB Section Symposium: Social Wasps, the Model "Non-Model" Organisms: Celebrating the Synergistic Contributions of Robert L. Jeanne (Professor Emeritus, University of Wisconsin-Madison)	200 F, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Advances in Pest Management for Turfgrass and Ornamentals	200 B, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Synergies in Entomophagy: Taking Insect Eating to the Next Level	205 CD, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Urban Soil Ecology: A New Frontier	206 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Leadership in Entomology	210 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Integrating and Synergizing Multidisciplinary Approaches in Science: 3rd Latin American/Hispanic Symposium	211 C, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Arthropod Mediated Associational Effects Among Native and Non-Native Plants	211 D, Convention Center

8:00 AM - 12:00 PM	Member Symposium: Vegetation Management for Beneficial Insect Conservation in Agroecosystems	212 AB, Convention Center
8:00 AM - 12:00 PM	Member Symposium: Citizen Scientists Contribute to Conservation	213 AB, Convention Center
8:00 AM - 10:00 AM	Ten-Minute Papers, MUVE Section: Specialty Areas and Emerging Pests	208 CD, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: Chemical Ecology	200 H, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: Ecology	200 G, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: IPM - Field Crops 2	200 A, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: IPM - General	200 I, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, P-IE Section: Pollinators	200 J, Convention Center
8:00 AM - 12:00 PM	Ten-Minute Papers, SysEB Section: Morphology, Taxonomy and Systematics	211 B, Convention Center
8:15 AM - 9:45 AM	Workshop: Marketing for Scientists	208 AB, Convention Center
8:20 AM - 11:00 AM	Joint Symposium: Applications of UAV-Based Remote Sensing for Assessing Crop Stress	101 A, Convention Center
9:00 AM - 10:30 AM	Joint Session: Grant Application Navigation and Resources for Expanding Early Career Opportunities	Minneapolis Ballroom B, Hilton
9:00 AM - 4:30 PM	Exhibit Hall	Exhibit Hall BC, Convention Center
9:30 AM - 10:00 AM	Refreshment Break	Exhibit Hall BC, Convention Center
10:00 AM - 12:00 PM	Member Symposium: Expand your Brand, Publicize your Publication, and Sell Yourself Well: The Marketing and Communications Toolbox that Every Scientist Needs	208 AB, Convention Center
10:00 AM - 12:05 PM	Ten-Minute Papers, MUVE Section: Social Insects	208 CD, Convention Center
11:00 AM - 2:30 PM	Joint Session: Linking Soil Macrofaunal and Microbial Communities with Crop Dynamics Including Diseases	101 J, Convention Center
11:30 AM - 12:30 PM	Student Affairs Committee Meeting	St. Croix, Hyatt Regency
12:00 PM - 1:30 PM	Joint Town Hall Meeting: Perspectives on Sustainably Supporting the Human Populace in the Future	102 A-F, Convention Center
12:15 PM - 1:15 PM	Lunch and Learn: Meet the ESA Editors	209 AB, Convention Center
12:15 PM - 1:15 PM	Social Hour with Poster Presenters	Exhibit Hall BC, Convention Center
12:30 PM - 1:30 PM	Yearly Meeting of the Society for Regulatory Entomology	211 D, Convention Center
12:30 PM - 2:30 PM	2016 Annual Meeting Program Committee Meeting	Minnehaha, Hyatt Regency
1:30 PM - 5:30 PM	Program Symposium: Molecular Evolution in Social Insects: Insights from the Synergy of Natural History, Diversity, and Genomics	Auditorium 1, Convention Center
1:30 PM - 5:30 PM	MUVE Section Symposium: Advances in Research and Development of Insect Repellents	206 AB, Convention Center
1:30 PM - 5:30 PM	P-IE Section Symposium: How Pollinators Work: The Importance of Integrative Physiology in Natural and Agricultural Systems with Changing Climates	212 AB, Convention Center
1:30 PM - 5:30 PM	P-IE Section Symposium: Integrating Ecological and Social Science to Support Synergies and Applied Solutions in Agro-ecosystems	200 D, Convention Center
1:30 PM - 5:30 PM	P-IE Section Symposium: Synergy in Agricultural Pest Control: Use of Interdisciplinary Approaches to Feed a Growing Population	200 C, Convention Center
1:30 PM - 5:30 PM	SysEB Section Symposium: New Approaches in Big-Data Phylogenetics: Data Harvest and Phylogenomic Analyses That Transform Current Systematic Practice	213 AB, Convention Center
1:30 PM - 5:30 PM	Member Symposium: Challenges Associated with Managing Bt Resistance: Theory, Regulation, and Implementation	208 AB, Convention Center
1:30 PM - 5:30 PM	Member Symposium: Gearing Up Interdisciplinary Science Literacy for the Next Generation	205 CD, Convention Center
1:30 PM - 5:30 PM	Member Symposium: How Cool is Entomology?	200 B, Convention Center
1:30 PM - 5:30 PM	Member Symposium: Pollen Analysis in Bee Research: Sharing Discoveries, Methods, and Resources	204 AB, Convention Center
1:30 PM - 3:30 PM	Member Symposium: Use of Arthropods in Wildlife and Applied Ecology: Recognition of Our Common Goals	211 C, Convention Center

1:30 PM - 5:30 PM	Member Symposium: Regulatory Taxonomy: The Study of Organisms and How You "Phylum"	211 D, Convention Center
1:30 PM - 5:30 PM	Late Breaking Symposium: Monarch Butterfly Conservation in North America: Challenges and Opportunities	200 E, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, MUVE Section: Filth and Biting Flies	208 CD, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, SysEB Section: Insect Evolution	211 A, Convention Center
1:30 PM - 5:30 PM	Ten-Minute Papers, SysEB Section: Evolution and Ecology of Social Insects	211 B, Convention Center
2:30 PM - 3:30 PM	SysEB Final Business Meeting	210 AB, Convention Center
5:30 PM - 7:30 PM	Joint Closing Plenary Session and Old Masters Linnaean Games	Auditorium Main, Convention Center

ESA DAILY SCHEDULE OF SCIENTIFIC PROGRAM

SUNDAY, NOVEMBER 15		
Session	**Time**	**Location**
Program Symposia		
Program Symposium in Honor of Nan Yao Su: How Synergy in Science Led to Innovation	8:00 AM - 12:00 PM	204 AB, Convention Center
Section Symposia		
MUVE Section Symposium: Insects and Their Diseases that Cause Harm to Humans and Animals	9:30 AM - 11:30 AM	206 AB, Convention Center
MUVE Section Symposium: Best Bed Bug Management Practices and Novel Research	1:15 PM - 3:15 PM	207 AB, Convention Center
PBT Section Symposium: Developmental Synergy between Genome Regulation and Environmental Stimuli: From Phenotypic Plasticity to Disease Response	8:00 AM - 12:00 PM	208 C, Convention Center
P-IE Section Symposium: Beyond Bt: Trait Discovery and Breeding for Modified Plant-Insect Interactions	8:00 AM - 12:00 PM	200 B, Convention Center
P-IE Section Symposium: Worldwide Resistance to Bt-toxins: Causes, Consequences, Cures?	8:00 AM - 12:00 PM	200 C, Convention Center
P-IE Section Symposium: Synergy and Partnerships in Biological Control: Honoring the Career of Roy Van Driesche	8:00 AM - 12:00 PM	205 B, Convention Center
SysEB Section Symposium: Conserving Rare Butterflies: Challenges and Successes	8:00 AM - 12:00 PM	209 AB, Convention Center
Member Symposia		
Member Symposium: The Nascent Mason Bee Industry: Researchers, Entrepreneurs, and Agriculturists Partnering for Pollination Solutions	8:00 AM - 12:00 PM	200 A, Convention Center
Member Symposium: What Are The Costs and Benefits for Neonicotinoid Seed Treatments in Field Crops?	8:00 AM - 12:00 PM	200 D, Convention Center
Member Symposium: Brown Marmorated Stink Bug Working Group: Synergizing IPM Research to Deliver Solutions	8:00 AM - 12:00 PM	200 F, Convention Center
Member Symposium: Beyond Corn and Soybeans: Challenges to Integrated Pest Management in Specialty Crops	8:00 AM - 12:00 PM	205 A, Convention Center
Member Symposium: Bed Bugs, *Cimex lectularius*, in Sensitive Areas: Research and Mitigation Techniques	8:00 AM - 12:00 PM	207 AB, Convention Center
Member Symposium: Colony Collapse Disorder Eight Years Later: What We Know Now That We Didn't Know Then	8:00 AM - 12:00 PM	208 AB, Convention Center
Member Symposium: Greenhouse Insect Management: Critical Questions Answered with Collaborative Research	8:00 AM - 12:00 PM	208 D, Convention Center
Member Symposium: Ecological Pest Management: Key for Sustainable Agricultural Production	8:30 AM - 10:30 AM	205 CD, Convention Center
Member Symposium: Synergy in Arthropod Genomics: Integrative Solutions to Functional and Evolutionary Biology	11:30 AM - 3:30 PM	205 CD, Convention Center
Member Symposium: Acarological Society of America Honors James Amrine	12:30 PM - 3:30 PM	212 AB, Convention Center
Member Symposium: Integrated Pest Management Programs for Tropical Crops	1:15 PM - 3:15 PM	200 B, Convention Center
Member Symposium: Thysanoptera of Arid Areas	1:15 PM - 3:15 PM	200 C, Convention Center
Member Symposium: Research Advances in Root Feeding Insect Pests and Their Management	1:15 PM - 3:15 PM	200 D, Convention Center
Member Symposium: Synergy and Partnering with Retired and Emeriti Seniors in Professional Societies (ESA, ASA, CSSA AND SSSA) on their Involvement in Research, Teaching, Special Interests, Travel, and Consulting in Retirement	1:15 PM - 3:15 PM	204 AB, Convention Center

Member Symposium: Using Animation and Music as Tools for Communicating Science	1:15 PM - 3:15 PM	205 A, Convention Center
Member Symposium: The Art of Writing a Successful Research Paper	1:15 PM - 3:15 PM	206 AB, Convention Center
Ten Minute Paper (TMP) Oral		
Ten-Minute Papers, PBT Section: Physiology and Immunity	8:30 AM - 12:00 PM	211 B, Convention Center
Ten-Minute Papers, PBT Section: RNAi, RNA-Seq and Molecular Biology	8:30 AM - 12:00 PM	211 A, Convention Center
Ten-Minute Papers, P-IE Section: Biology and Behavior	8:00 AM - 12:00 PM	200 I, Convention Center
Ten-Minute Papers, SysEB Section: Behavior and Ecology	12:45 PM - 3:30 PM	210 AB, Convention Center
Ten-Minute Papers, SysEB Section: Biodiversity, Bioinformatics & Education	1:00 PM - 3:30 PM	211 B, Convention Center
Organized Meeting		
Organized Meeting: Current Advances in Acarology	8:00 AM - 12:00 PM	212 AB, Convention Center
Organized Meeting: SOLA Scarab Workers	12:30 PM - 3:30 PM	211 D, Convention Center
Organized Meeting: Americas Neuropterists Meeting	1:15 PM - 3:15 PM	205 B, Convention Center
Organized Meeting: International Society of Hymenopterists Symposium and Business Meeting	1:30 PM - 3:30 PM	200 F, Convention Center
MONDAY, NOVEMBER 16		
Session	**Time**	**Location**
Student Poster Competition		
01 - Undergraduate Poster Competition: MUVE - Medical and Veterinary	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
02 - Undergraduate Poster Competition: P-IE - Bees and Arthropod Communities	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
03 - Undergraduate Poster Competition: P-IE - Herbivores, Invasive Species, and Trapping	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
04 - Undergraduate Poster Competition: PBT - Ants, Bees, Beetles, and Moquitoes	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
05 - Undergraduate Poster Competition: SysEB - Honey Bees and other Hymenoptera	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
06 - Undergraduate Poster Competition: SysEB - Aquatic Insects and Trapping	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
07 - Graduate Poster Competition: MUVE - Ticks and Mosquitoes	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
08 - Graduate Poster Competition: MUVE - Bed Bugs, Urban Pests, and Field Populations	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
09 - Graduate Poster Competition: P-IE - Honey Bees and Related Pollinators	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
10 - Graduate Poster Competition: P-IE - Attractants and Pheromone-mediated Behavior	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
11 - Graduate Poster Competition: P-IE - Insect Control, Ecology, and Ecosystems	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
12 - Graduate Poster Competition: P-IE - Nursery and Specialty Crops	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
13 - Graduate Poster Competition: P-IE - Biological Control	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
14 - Graduate Poster Competition: P-IE - Invasive Species	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
15 - Graduate Poster Competition: P-IE - Monarchs, Hemiptera/Heteroptera, and Stored Products	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
16 - Graduate Poster Competition: PBT - Insect Control	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
17 - Graduate Poster Competition: PBT - Biology and Physiology	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
18 - Graduate Poster Competition: SysEB - Phylogeny	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
19 - Graduate Poster Competition: SysEB - Hymenoptera	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
20 - Graduate Poster Competition: SysEB - Evolutionary History	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
21 - Graduate Poster Competition: SysEB - Symbionts and Behavior	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
Student Ten Minute Paper (TMP) Competition		
01 - Graduate Ten-Minute Paper Competition: P-IE - IPM A	7:55 AM - 12:30 PM	200 A, Convention Center

02 - Graduate Ten-Minute Paper Competition: P-IE - IPM B	7:55 AM - 12:30 PM	200 B, Convention Center
03 - Graduate Ten-Minute Paper Competition: P-IE - IPM C	8:10 AM - 12:20 PM	200 C, Convention Center
04 - Graduate Ten-Minute Paper Competition: P-IE - Insecticide A	8:10 AM - 12:30 PM	200 D, Convention Center
05 - Graduate Ten-Minute Paper Competition: P-IE - Insecticide B	8:10 AM - 12:20 PM	200 E, Convention Center
06 - Graduate Ten-Minute Paper Competition: P-IE - Chemical Ecology	7:55 AM - 12:30 PM	200 F, Convention Center
07 - Graduate Ten-Minute Paper Competition: P-IE - Biology/Behavior A	7:55 AM - 12:30 PM	200 G, Convention Center
08 - Graduate Ten-Minute Paper Competition: P-IE - Biology/Behavior B	8:10 AM - 12:30 PM	200 H, Convention Center
09 - Graduate Ten-Minute Paper Competition: P-IE - Ecology A	7:55 AM - 12:30 PM	200 I, Convention Center
10 - Graduate Ten-Minute Paper Competition: P-IE - Ecology B	7:55 AM - 12:30 PM	200 J, Convention Center
11 - Graduate Ten-Minute Paper Competition: P-IE - Bees	7:55 AM - 12:30 PM	204 AB, Convention Center
12 - Graduate Ten-Minute Paper Competition: P-IE - Host Plant Resistance	7:55 AM - 12:30 PM	205 A, Convention Center
13 - Graduate Ten-Minute Paper Competition: P-IE - Biocontrol	7:55 AM - 12:30 PM	205 B, Convention Center
14 - Undergraduate Ten-Minute Paper Competition: SysEB	7:55 AM - 12:30 PM	205 CD, Convention Center
15 - Graduate Ten-Minute Paper Competition: MUVE - Mosquitoes, Midges, and Bed Bugs	8:10 AM - 12:10 PM	206 AB, Convention Center
16 - Undergraduate Ten-Minute Paper Competition: MUVE, PBT, and P-IE	8:25 AM - 10:45 AM	207 AB, Convention Center
17 - Graduate Ten-Minute Paper Competition: MUVE - Diptera	8:25 AM - 12:00 PM	208 AB, Convention Center
18 - Graduate Ten-Minute Paper Competition: MUVE - Control Methods and Traps	7:55 AM - 12:00 PM	208 C, Convention Center
19 - Graduate Ten-Minute Paper Competition: MUVE - Ticks, Termites, Ants, Behavior, and Field Studies	8:25 AM - 12:10 PM	208 D, Convention Center
20 - Graduate Ten-Minute Paper Competition: PBT - Physiology	8:25 AM - 11:10 AM	209 AB, Convention Center
21 - Graduate Ten-Minute Paper Competition: SysEB - Systematics and Taxonomy	7:55 AM - 12:30 PM	210 AB, Convention Center
22 - Graduate Ten-Minute Paper Competition: PBT - Bees and Pesticides	8:10 AM - 12:10 PM	211 A, Convention Center
23 - Graduate Ten-Minute Paper Competition: PBT - Gut, Bt, Microbes, and Immune Response	8:25 AM - 12:00 PM	211 B, Convention Center
24 - Graduate Ten-Minute Paper Competition: SysEB - Behavior, Coevolution, and Symbiotic Associations	7:55 AM - 12:30 PM	211 C, Convention Center
25 - Graduate Ten-Minute Paper Competition: SysEB - Citizen Science, New Methods, and Physiology	8:25 AM - 12:10 PM	211 D, Convention Center
26 - Graduate Ten-Minute Paper Competition: SysEB - Dispersal, Colonization, and Biogeography	8:10 AM - 12:30 PM	212 AB, Convention Center
27 - Graduate Ten-Minute Paper Competition: SysEB - Speciation and Evolutionary Morphology	8:10 AM - 12:10 PM	213 AB, Convention Center
Student Three-Minute Presentation (3MP) Competition		
Student Three-Minute Presentation Competition A	12:30 PM - 2:00 PM	208 C, Convention Center
Student Three-Minute Presentation Competition B	12:30 PM - 2:00 PM	208 D, Convention Center
Organized Meeting		
Organized Meeting: Highlights of Medical, Urban, and Veterinary Entomology (MUVE) in 2015	2:00 PM - 6:00 PM	208 AB, Convention Center
Organized Meeting: Physiology, Biochemistry, and Toxicology (PBT) Networking Section	2:00 PM - 6:00 PM	211 AB, Convention Center
Organized Meeting: Plant-Insect Ecosystem (P-IE) Section Networking, Business, and Learning Session on Effective Communication: How to Avoid Pie in Your Face!	2:00 PM - 6:00 PM	200 A-E, Convention Center
Organized Meeting: Systematics, Evolution, and Biodiversity (SysEB) Section Meeting	2:00 PM - 6:00 PM	205 CD, Convention Center
Joint Sessions		
Joint Symposium: Connecting Phytobiomes with Soil and Plant Health	8:00 AM - 11:00 AM	101 DE, Convention Center
Joint Symposium: Getting More from Data: Science for Sustainable Solutions	9:30 AM - 12:00 PM	Auditorium Main, Convention Center

Joint Symposium: Managing Research Centers for Wildlife and Beneficial Insects	10:15 AM - 11:30 AM	M100 E, Convention Center
Joint Session: Tips from the Experts on the Job Application and Interviewing Process	12:30 PM - 2:00 PM	Marquette Ballroom IV-V, Hilton
Joint Symposium: Insect Ecology in Organic Crop Management Systems	1:00 PM - 4:15 PM	L100 A, Convention Center
Joint Session: Teaching and Extension	2:00 PM - 4:00 PM	Marquette Ballroom IV-V, Hilton
TUESDAY, NOVEMBER 17		
Session	**Time**	**Location**
Poster		
MUVE Section Poster Session A	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
P-IE Section Poster Session A	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
PBT Section Poster Session A	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
SysEB Section Poster Session A	8:00 AM - 6:30 PM	Exhibit Hall BC, Convention Center
Program Symposia		
Program Symposium: Applying a Systems Approach: Emergent Outcomes of Multidimensional Interactions in Agroecosystems	8:00 AM - 12:00 PM	Auditorium 1, Convention Center
Program Symposium: How Can Ecosystem Services Support Resilient and Multifunctional Agriculture Systems to Meet the Challenges of the 21st Century?	1:30 PM - 5:30 PM	Auditorium 1, Convention Center
Section Symposia		
MUVE Section Symposium: 30 Years of Hunting the Tiger. *Aedes albopictus* in America: Current Perspectives and Future Challenges	8:00 AM - 12:00 PM	206 AB, Convention Center
PBT Section Symposium: Insect Resistance to Traits and Weed Resistance to Herbicides: Learnings, Opportunities and Partnerships for Sustainable Management Programs	8:00 AM - 12:00 PM	211 A, Convention Center
PBT Section Symposium: Partnering for Health: Genetic, Behavioral and Environmental Synergies in Insect Immunity	8:00 AM - 12:00 PM	204 AB, Convention Center
P-IE Section Symposium: Are We Stressed Enough Yet? Interdisciplinary Partnerships to Evaluate the Consequences of Plant Abiotic and Biotic Stresses	8:00 AM - 12:00 PM	200 F, Convention Center
P-IE Section Symposium: Effects of Global Climate Change on Species Interactions and Biological Control	8:00 AM - 12:00 PM	208 AB, Convention Center
P-IE Section Symposium: The Larry L. Larson Symposium: Pest Shifting and Invasive Species: The Need For New Technology to Manage New Insect Pests	8:15 AM - 12:00 PM	200 D, Convention Center
PBT Section Symposium: Water and Ion Homestasis: Role of Aquaporins and Other Channel Proteins	1:30 PM - 5:30 PM	211 A, Convention Center
P-IE Section Symposium: Ecology and Management of Migratory Moth Pests: Uniting Disciplines to Provide Solutions	1:30 PM - 5:30 PM	211 B, Convention Center
P-IE Section Symposium: Insect-Mediated Ecosystem Services: Enhancing Interactions with our Beneficial Partners (IOBC-NRS Symposium)	2:00 PM - 5:30 PM	211 D, Convention Center
P-IE Section Symposium: Getting Down and Dirty: The Role of Brown Food Webs in Providing Ecosystem Services	1:30 PM - 5:30 PM	200 C, Convention Center
P-IE Section Symposium: Rootworm Management: Status of GM Traits, Insecticides, and Potential New Tools	1:30 PM - 5:30 PM	208 AB, Convention Center
SysEB Section Symposium: Evolution of Castes in Social Organisms: Behavior, Development and Regulating Mechanisms	1:30 PM - 5:30 PM	213 AB, Convention Center
Member Symposia		
Member Symposium: Partnerships for Developing Synergistic Solutions Addressing an Invasive Soybean Pest: A Six-Year Study of the Kudzu Bug, *Megacopta cribraria*	8:00 AM - 12:00 PM	212 AB, Convention Center
Member Symposium: Preparing for the Future: What Every Student Should Know About Getting a Job or Finding a Career	8:00 AM - 12:00 PM	200 A, Convention Center

Member Symposium: Stored-Product Entomology: Partnerships Across and Within Disciplines	8:00 AM - 12:00 PM	200 B, Convention Center
Member Symposium: Entomology: Partnering with Small Liberal Arts Colleges	1:30 PM - 5:30 PM	212 AB, Convention Center
Board Certified Entomologist's (BCE) Member Symposium: State of the Art Insect Monitoring Approaches	1:30 PM - 5:30 PM	206 AB, Convention Center
Member Symposium: Orthopteroids: A Nexus of Synergy Between Scientific Disciplines and Innovative Partnerships	1:30 PM - 5:30 PM	204 AB, Convention Center
Late Breaking Symposium: A Nexus of Agriculture: Honey Bee Health and Commodity Crop Production: Collision Course or Road to Cooperation?	1:30 PM - 5:30 PM	200 E, Convention Center
Member Symposium: Ecological Engineering to Improve Microbial Control Agents	1:30 PM - 5:30 PM	200 F, Convention Center
Member Symposium: Games, Comics, and Social Media: Outreach Education in Entomology	1:30 PM - 5:30 PM	200 B, Convention Center
Member Symposium: The Bee-Soil Interface: Exploring the Role of Soils in Wild Bee Nesting and Success	1:30 PM - 5:30 PM	200 D, Convention Center
Member Symposium: Insects in the City: Urban Ecology and Human Influence on Insect Populations	2:30 PM - 5:30 PM	200 A, Convention Center
Ten Minute Paper (TMP) Oral		
Ten-Minute Papers, MUVE Section: Ticks	8:00 AM - 9:30 AM	208 CD, Convention Center
Ten-Minute Papers, MUVE Section: Bed Bugs	9:35 AM - 12:00 PM	208 CD, Convention Center
Ten-Minute Papers, P-IE Section: Applied Ecology	8:00 AM - 12:00 PM	200 H, Convention Center
Ten-Minute Papers, P-IE Section: Forest Entomology	8:00 AM - 12:00 PM	200 J, Convention Center
Ten-Minute Papers, P-IE Section: Host Plant and Insect Resistance	8:00 AM - 12:00 PM	200 C, Convention Center
Ten-Minute Papers, P-IE Section: IPM - Field Crops 1	8:00 AM - 12:00 PM	200 I, Convention Center
Ten-Minute Papers, P-IE Section: IPM - Fruit and Nut Trees	8:00 AM - 12:00 PM	200 G, Convention Center
Ten-Minute Papers, SysEB Section: Genomic Data in Systematics and Evolution	8:00 AM - 12:00 PM	210 AB, Convention Center
Ten-Minute Papers, SysEB Section: Phylogenetics	8:00 AM - 12:00 PM	211 D, Convention Center
Ten-Minute Papers, PBT Section: Toxicology	8:30 AM - 12:00 PM	211 B, Convention Center
Ten-Minute Papers, MUVE Section: Mosquitoes, Biology, Ecology, and Control	1:15 PM - 3:45 PM	208 CD, Convention Center
Ten-Minute Papers, MUVE Section: Mosquitoes, Disease Transmission, and Public Health	3:45 PM - 5:40 PM	208 CD, Convention Center
Ten-Minute Papers, PBT Section: Chemical Ecology, Behavior Physiology and Biotic Interaction	1:30 PM - 5:30 PM	205 A, Convention Center
Ten-Minute Papers, P-IE Section: Biological Control	1:30 PM - 5:30 PM	200 J, Convention Center
Ten-Minute Papers, P-IE Section: IPM - Field Crops 3	1:30 PM - 5:30 PM	200 I, Convention Center
Ten-Minute Papers, P-IE Section: IPM - Horticultural and Vegetable Crops	1:30 PM - 5:30 PM	200 H, Convention Center
Ten-Minute Papers, SysEB Section: Arthropod-Symbiont Interaction	1:30 PM - 5:30 PM	211 C, Convention Center
Organized Meeting		
Organized Meeting: IOBC NRS Annual Meeting	12:00 PM - 2:00 PM	211 D, Convention Center
Organized Meeting: Partnering to Develop Solutions Against the Infamous Invasive Pest Spotted Wing Drosophila	1:30 PM - 5:30 PM	200 G, Convention Center
Organized Meeting: Overseas Chinese Entomologists Association (OCEA): Opportunity, Challenge, Collaboration and Achievement	6:00 PM - 10:00 PM	200 C, Convention Center
Organized Meeting: Korean Young Entomologists (KYE)	6:00 PM - 10:00 PM	205 B, Convention Center
Organized Meeting: North American Dipterists Society (NADS) Meeting	7:00 PM - 9:00 PM	213 AB, Convention Center
Organized Meeting: Heteropterist Symposium	7:00 PM - 9:00 PM	210 AB, Convention Center
Organized Meeting: Society of Overseas Nepalese Entomologists Meeting	7:00 PM - 9:00 PM	209 AB, Convention Center
Organized Meeting: The Coleopterists Society Annual Meeting	7:30 PM - 9:30 PM	208 AB, Convention Center

Joint Sessions		
Joint Symposium: Bugs and Dirt: Four Letter Words That Go Together	7:55 AM - 12:00 PM	M100 D, Convention Center
Joint Symposium: Characterizing and Controlling Insects and Bacteria Associated with Manure-Impacted Environments	8:00 AM - 11:35 AM	M101 C, Convention Center
Joint Symposium: Partnering to Understand Complexity: Biogeochemical Cycles in Agricultural Systems	8:00 AM - 12:00 PM	103 A, Convention Center
Joint Symposium: Agroecosystems Research: Integrated Cropping Systems That Promote Ecosystem Services	9:25 AM - 12:00 PM	101 H, Convention Center
Joint Symposium: Turfgrass Insect Management: New and Emerging Issues	9:55 AM - 12:15 PM	101 B, Convention Center
Joint Session: Novel Approaches on Site-Specific Integrated Pest Management	1:00 PM - 3:05 PM	M100 F, Convention Center
Joint Symposium: Management and Biological Control of Weeds in Agroecosystems	1:00 PM - 4:00 PM	M101 A, Convention Center
Joint Interactive Workshop: Writing Manuscripts for Publication	1:30 PM - 3:00 PM	Minneapolis Ballroom B, Hilton
Joint Workshop/Reception: Women in Science “Breaking the Bias Habit”	2:00 PM - 5:00 PM	102 A-F, Convention Center
WEDNESDAY, NOVEMBER 18		
Session	**Time**	**Location**
Poster		
MUVE Section Poster Session B	8:00 AM - 4:30 PM	Exhibit Hall BC, Convention Center
P-IE Section Poster Session B	8:00 AM - 4:30 PM	Exhibit Hall BC, Convention Center
PBT Section Poster Session B	8:00 AM - 4:30 PM	Exhibit Hall BC, Convention Center
SysEB Section Poster Session B	8:00 AM - 4:30 PM	Exhibit Hall BC, Convention Center
Program Symposia		
Program Symposium: Arthropods and Wildlife Conservation: Synergy in Complex Biological Systems	8:00 AM - 12:00 PM	Auditorium 1, Convention Center
Program Symposium: Molecular Evolution in Social Insects: Insights from the Synergy of Natural History, Diversity, and Genomics	1:30 PM - 5:30 PM	Auditorium 1, Convention Center
Section Symposia		
PBT Section Symposium: Insect Cell Lines: Models to Study Novel Biological Interactions for Devising Control Strategies	8:00 AM - 12:00 PM	211 A, Convention Center
P-IE Section Symposium: Forest Entomology: Synergy from Symbiosis	8:00 AM - 12:00 PM	200 C, Convention Center
P-IE Section Symposium: Insecticide Resistance Management (IRM) vs Integrated Pest Management (IPM) – Overlap and Conflicts, IRAC US Symposium Series No. 11	8:00 AM - 12:00 PM	200 D, Convention Center
P-IE Section Symposium: Landscape Simplification: Effects on Arthropod Mediated Ecosystem Services and Agricultural Production	8:00 AM - 12:00 PM	200 E, Convention Center
SysEB Section Symposium: Social Wasps, the Model “Non-Model” Organisms: Celebrating the Synergistic Contributions of Robert L. Jeanne (Professor Emeritus, University of Wisconsin-Madison)	8:00 AM - 12:00 PM	200 F, Convention Center
MUVE Section Symposium: Advances in Research and Development of Insect Repellents	1:30 PM - 5:30 PM	206 AB, Convention Center
P-IE Section Symposium: How Pollinators Work: The Importance of Integrative Physiology in Natural and Agricultural Systems with Changing Climates	1:30 PM - 5:30 PM	212 AB, Convention Center
P-IE Section Symposium: Integrating Ecological and Social Science to Support Synergies and Applied Solutions in Agro-ecosystems	1:30 PM - 5:30 PM	200 D, Convention Center
P-IE Section Symposium: Synergy in Agricultural Pest Control: Use of Interdisciplinary Approaches to Feed a Growing Population	1:30 PM - 5:30 PM	200 C, Convention Center
SysEB Section Symposium: New Approaches in Big-Data Phylogenetics: Data Harvest and Phylogenomic Analyses That Transform Current Systematic Practice	1:30 PM - 5:30 PM	213 AB, Convention Center

Member Symposia		
Member Symposium: Advances in Pest Management for Turfgrass and Ornamentals	8:00 AM - 12:00 PM	200 B, Convention Center
Member Symposium: Synergies in Entomophagy: Taking Insect Eating to the Next Level	8:00 AM - 12:00 PM	205 CD, Convention Center
Member Symposium: Urban Soil Ecology: A New Frontier	8:00 AM - 12:00 PM	206 AB, Convention Center
Member Symposium: Leadership in Entomology	8:00 AM - 12:00 PM	210 AB, Convention Center
Member Symposium: Integrating and Synergizing Multidisciplinary Approaches in Science: 3rd Latin American/Hispanic Symposium	8:00 AM - 12:00 PM	211 C, Convention Center
Member Symposium: Arthropod Mediated Associational Effects Among Native and Non-Native Plants	8:00 AM - 12:00 PM	211 D, Convention Center
Member Symposium: Vegetation Management for Beneficial Insect Conservation in Agroecosystems	8:00 AM - 12:00 PM	212 AB, Convention Center
Member Symposium: Citizen Scientists Contribute to Conservation	8:00 AM - 12:00 PM	213 AB, Convention Center
Member Symposium: Expand your Brand, Publicize your Publication, and Sell Yourself Well: The Marketing and Communications Toolbox that Every Scientist Needs	10:00 AM - 12:00 PM	208 AB, Convention Center
Member Symposium: Use of Arthropods in Wildlife and Applied Ecology: Recognition of Our Common Goals	1:30 PM - 3:30 PM	211 C, Convention Center
Member Symposium: Challenges Associated with Managing Bt Resistance: Theory, Regulation, and Implementation	1:30 PM - 5:30 PM	208 AB, Convention Center
Member Symposium: Gearing Up Interdisciplinary Science Literacy for the Next Generation	1:30 PM - 5:30 PM	205 CD, Convention Center
Member Symposium: How Cool is Entomology?	1:30 PM - 5:30 PM	200 B, Convention Center
Member Symposium: Pollen Analysis in Bee Research: Sharing Discoveries, Methods, and Resources	1:30 PM - 5:30 PM	204 AB, Convention Center
Member Symposium: Regulatory Taxonomy: The Study of Organisms and How You "Phylum"	1:30 PM - 5:30 PM	211 D, Convention Center
Late Breaking Symposium: Monarch Butterfly Conservation in North America: Challenges and Opportunities	1:30 PM - 5:30 PM	200 E, Convention Center
Ten Minute Paper (TMP) Oral		
Ten-Minute Papers, MUVE Section: Specialty Areas and Emerging Pests	8:00 AM - 10:00 AM	208 CD, Convention Center
Ten-Minute Papers, MUVE Section: Social Insects	10:00 AM - 12:05 PM	208 CD, Convention Center
Ten-Minute Papers, P-IE Section: Chemical Ecology	8:00 AM - 12:00 PM	200 H, Convention Center
Ten-Minute Papers, P-IE Section: Ecology	8:00 AM - 12:00 PM	200 G, Convention Center
Ten-Minute Papers, P-IE Section: IPM - Field Crops 2	8:00 AM - 12:00 PM	200 A, Convention Center
Ten-Minute Papers, P-IE Section: IPM - General	8:00 AM - 12:00 PM	200 I, Convention Center
Ten-Minute Papers, P-IE Section: Pollinators	8:00 AM - 12:00 PM	200 J, Convention Center
Ten-Minute Papers, SysEB Section: Morphology, Taxonomy and Systematics	8:00 AM - 12:00 PM	211 B, Convention Center
Ten-Minute Papers, MUVE Section: Filth and Biting Flies	1:30 PM - 5:30 PM	208 CD, Convention Center
Ten-Minute Papers, SysEB Section: Insect Evolution	1:30 PM - 5:30 PM	211 A, Convention Center
Ten-Minute Papers, SysEB Section: Evolution and Ecology of Social Insects	1:30 PM - 5:30 PM	211 B, Convention Center
Joint Sessions		
Joint Symposium: Applications of UAV-Based Remote Sensing for Assessing Crop Stress	8:20 AM - 11:00 AM	101 A, Convention Center
Joint Session: Grant Application Navigation and Resources for Expanding Early Career Opportunities	9:00 AM - 10:30 AM	Minneapolis Ballroom B, Hilton
Joint Session: Linking Soil Macrofaunal and Microbial Communities with Crop Dynamics Including Diseases	11:00 AM - 2:30 PM	101 J, Convention Center
Joint Town Hall Meeting: Perspectives on Sustainably Supporting the Human Populace in the Future	12:00 PM - 1:30 PM	102 A-F, Convention Center

ESA DAILY SCHEDULE OF MEETINGS AND FUNCTIONS

FRIDAY, NOVEMBER 13		
Function	**Time**	**Location**
Annual Review of Entomology Editorial Committee Meeting	8:30 AM - 5:00 PM	St. Croix, Hyatt Regency

SATURDAY, NOVEMBER 14		
Function	**Time**	**Location**
Entomological Collections Network	7:00 AM - 5:00 PM	Greenway C-H, Hyatt Regency
ESA Governing Board Meeting I	7:30 AM - 2:30 PM	Regency, Hyatt Regency
Microbial Control Working Group	8:30 AM - 5:30 PM	Greenway A, Hyatt Regency
Section Leadership Council Meeting	2:00 PM - 5:00 PM	Greenway I, Hyatt Regency
ESA Registration and Information Center	2:00 PM - 6:00 PM	Exhibit Hall B Foyer, Convention Center
Presentation Preview Room (PPR)	2:00 PM - 6:00 PM	201 B, Convention Center
ESA Certification Corporation Governing Board Meeting	2:30 PM - 3:00 PM	Regency, Hyatt Regency
Council of Entomological Department Administrators Meeting	3:00 PM - 6:00 PM	Greenway J, Hyatt Regency
P-IE Governing Council Working Session	5:00 PM - 6:00 PM	Regency, Hyatt Regency
Entomological Collections Network	6:00 PM - 9:00 PM	Northstar A, Hyatt Regency

SUNDAY, NOVEMBER 15		
Function	**Time**	**Location**
ESA Registration and Information Center	7:00 AM - 9:00 PM	Exhibit Hall B Foyer, Convention Center
Presentation Preview Room (PPR)	7:00 AM - 6:00 PM	201 B, Convention Center
Moderator Training	7:00 AM - 7:30 AM	205 A, Convention Center
Entomological Collections Network	7:00 AM - 12:00 PM	Greenway C-H, Hyatt Regency
Environmental Entomology Editorial Board Meeting	8:00 AM - 10:00 AM	Skyway Suite AB, Hyatt Regency
2015 Annual Meeting Program Committee Meeting	9:30 AM - 10:30 AM	Greenway I, Hyatt Regency
Annals of the ESA Editorial Board Meeting	10:00 AM - 12:00 PM	Skyway Suite AB, Hyatt Regency
Presidential Committee on Section Leadership	10:30 AM - 12:00 PM	Greenway B, Hyatt Regency
Certification Board Meeting	11:00 AM - 2:00 PM	Greenway I, Hyatt Regency
Moderator Training	12:00 PM - 12:30 PM	205 A, Convention Center
Judges' Training	12:30 PM - 1:00 PM	200 E, Convention Center
Linnaean Games - Preliminary Rounds	12:30 PM - 3:15 PM	Auditorium Main, Convention Center
Journal of Economic Entomology Editorial Board Meeting	1:00 PM - 3:00 PM	Skyway Suite AB, Hyatt Regency
GDM ARM Software Workshop	1:00 PM - 3:30 PM	Greenway A, Hyatt Regency
Science Policy Capability Committee	1:30 PM - 2:30 PM	Minnehaha, Hyatt Regency
New Member Reception	2:00 PM - 3:00 PM	Seasons, Convention Center
International Organization for Biological Control (IOBC-NRS) Governing Board Meeting	2:00 PM - 3:30 PM	Greenway B, Hyatt Regency
Judges' Training	2:30 PM - 3:00 PM	200 E, Convention Center
Exhibit Hall	7:10 PM - 9:30 PM	Exhibit Hall BC, Convention Center
Welcome Reception	7:10 PM - 9:30 PM	Exhibit Hall BC, Convention Center

MONDAY, NOVEMBER 16		
Function	**Time**	**Location**
Women in Science Breakfast	6:30 AM - 8:00 AM	Seasons, Convention Center
Presentation Preview Room (PPR)	7:00 AM - 6:00 PM	201 B, Convention Center
ESA Registration and Information Center	7:00 AM - 5:00 PM	Exhibit Hall B Foyer, Convention Center
Moderator Training	7:00 AM - 7:30 AM	205 A, Convention Center

Judges' Training	7:00 AM - 7:30 AM	200 E, Convention Center
The Coleopterists Society Executive Council Meeting	7:00 AM - 1:00 PM	Greenway I, Hyatt Regency
Arthropod Management Tests Editorial Board Meeting	8:00 AM - 10:00 AM	Skyway Suite AB, Hyatt Regency
IRAC-US Meeting	8:00 AM - 1:00 PM	Greenway J, Hyatt Regency
Science Policy Fellows Workshop	8:30 AM - 12:30 PM	Minnehaha, Hyatt Regency
Exhibit Hall	9:00 AM - 6:00 PM	Exhibit Hall BC, Convention Center
Refreshment Break	9:30 AM - 10:00 AM	Exhibit Hall BC, Convention Center
Journal of Insect Science Editorial Board Meeting	10:00 AM - 12:00 PM	Skyway Suite AB, Hyatt Regency
Committee on Ethics and Rules	11:00 AM - 12:00 PM	Greenway A, Hyatt Regency
Journal of Medical Entomology Editorial Board Meeting	12:00 PM - 1:30 PM	Skyway Suite AB, Hyatt Regency
ACE Support Committee Meeting	12:00 PM - 2:00 PM	Greenway A, Hyatt Regency
Moderator Training	12:30 PM - 1:00 PM	205 A, Convention Center
ICE 2016 Organizing Committee Meeting	1:00 PM - 2:00 PM	200 G, Convention Center
Grand Challenges Leaders Meeting	2:00 PM - 3:00 PM	Greenway J, Hyatt Regency
ACE Turf and Ornamental Exploratory Committee Meeting	2:00 PM - 4:00 PM	Greenway A, Hyatt Regency
ICE Council Meeting	3:00 PM - 4:00 PM	Minnehaha, Hyatt Regency
American Entomologist Editorial Board Meeting	3:00 PM - 5:00 PM	Skyway Suite AB, Hyatt Regency
Entomological Foundation Board of Directors Annual Meeting	4:30 PM - 6:00 PM	Minnehaha, Hyatt Regency
International Association of Black Entomologists Annual Business Meeting	5:30 PM - 7:00 PM	204 AB, Convention Center
University of Illinois Mixer	6:30 PM - 8:00 PM	Greenway H-I, Hyatt Regency
Colorado State University, Kansas State University and University of Nebraska-Lincoln Mixer	6:30 PM - 8:30 PM	Greenway E-G, Hyatt Regency
Iowa State University Alumni Mixer	6:30 PM - 8:30 PM	LaSalle, Hyatt Regency
Michigan State University and The Ohio State University Joint Mixer	6:30 PM - 8:30 PM	Greenway A, Hyatt Regency
Purdue Mixer	6:30 PM - 8:30 PM	St. Croix, Hyatt Regency
University of Florida Alumni Mixer	6:30 PM - 8:30 PM	Northstar A, Hyatt Regency
University of California Mixer for Alumni and Friends	6:30 PM - 9:00 PM	Studio A-D, 14th Floor, Millennium Hotel
Arkansas, Auburn, Clemson, Kentucky and Tennessee Mixer	7:00 PM - 9:00 PM	Greenway C, Hyatt Regency
Mizzou Mixer	7:00 PM - 9:00 PM	Skyway Suite AB, Hyatt Regency
North Carolina State University Mixer	7:00 PM - 9:00 PM	Greenway J, Hyatt Regency
Northwest Mixer (UI, MSU, OSU, WSU)	7:00 PM - 9:00 PM	Marquis Ballroom, 14th Floor, Millennium Hotel
Texas A&M University, Oklahoma State University & Southwestern Branch Mixer	7:00 PM - 9:00 PM	Northstar B, Hyatt Regency
The LSU, Mississippi State, and UGA Combined Mixer	7:00 PM - 9:00 PM	Regency, Hyatt Regency
Mid Atlantic Mixer	7:00 PM - 9:00 PM	Mirage, Hyatt Regency
Cornell University Entomology Mixer-Reception	8:00 PM - 10:00 PM	Dome, 14th Floor, Millennium Hotel
Minnesota Mixer - Department of Entomology University of Minnesota	8:00 PM - 10:00 PM	Greenway B, Hyatt Regency

TUESDAY, NOVEMBER 17

Function	Time	Location
Southwestern Branch Executive Committee & Program Planning Meeting	6:30 AM - 8:00 AM	Greenway C, Hyatt Regency
USDA ARS All Hands Meeting	6:45 AM - 7:45 AM	200 E, Convention Center
Presentation Preview Room (PPR)	7:00 AM - 6:00 PM	201 B, Convention Center
ESA Registration and Information Center	7:00 AM - 5:00 PM	Exhibit Hall B Foyer, Convention Center
Fire Ant eXtension Network Meeting	7:00 AM - 8:00 AM	Greenway A, Hyatt Regency
Past Presidents' Breakfast	7:00 AM - 8:00 AM	St. Croix, Hyatt Regency
Moderator Training	7:00 AM - 7:30 PM	205 A, Convention Center
Committee on Awards and Honors Meeting	8:00 AM - 9:00 AM	Greenway I, Hyatt Regency

New Governing Board Member Orientation	8:00 AM - 9:00 AM	Minnehaha, Hyatt Regency
School and Urban IPM eXtension Network Meeting	8:00 AM - 9:00 AM	Greenway B, Hyatt Regency
Journal of Integrated Pest Management Editorial Board Meeting	8:00 AM - 10:00 AM	Skyway Suite AB, Hyatt Regency
Exhibit Hall	9:00 AM - 6:00 PM	Exhibit Hall BC, Convention Center
Refreshment Break	9:30 AM - 10:00 AM	Exhibit Hall BC, Convention Center
Committee on Diversity	9:30 AM - 10:30 AM	Greenway I, Hyatt Regency
Thomas Say Books Editorial Board Meeting	10:00 AM - 11:00 AM	Skyway Suite AB, Hyatt Regency
BCE - MedVet Specialty Exam Writing Committee	10:00 AM - 12:00 PM	Greenway J, Hyatt Regency
Student Transition and Early Professionals Committee Meeting	10:30 AM - 11:30 AM	Greenway I, Hyatt Regency
Common Names Committee Meeting	11:00 AM - 12:00 PM	Skyway Suite AB, Hyatt Regency
Entomological Foundation Board of Counselors Meeting	12:00 PM - 1:30 PM	Minnehaha, Hyatt Regency
NCB-ESA Executive Committee Meeting	12:00 PM – 1:30 PM	St. Croix, Hyatt Regency
Moderator Training	12:00 PM - 12:30 PM	205 A, Convention Center
International Branch Meeting	12:15 PM - 1:15 PM	205 CD, Convention Center
National Insect Photo Salon	12:15 PM - 1:15 PM	205 B, Convention Center
Committee on Membership Meeting	1:00 PM - 2:00 PM	Greenway A, Hyatt Regency
Publications Council Meeting	1:00 PM - 4:00 PM	Skyway Suite AB, Hyatt Regency
Branch Leaders Meeting	2:00 PM - 3:00 PM	Greenway B, Hyatt Regency
BCE Core Exam Writing Committee	2:00 PM - 4:00 PM	Greenway J, Hyatt Regency
Informal Weevil Conference	2:00 PM - 4:00 PM	Greenway C, Hyatt Regency
Branch Treasurers Meeting	3:00 PM - 3:30 PM	Minnehaha, Hyatt Regency
Committee on Education and Outreach Meeting	3:00 PM - 5:00 PM	Greenway I, Hyatt Regency
Section Treasurers Meeting	3:30 PM - 4:00 PM	Minnehaha, Hyatt Regency
Linnaean Games - Finals	5:30 PM - 6:30 PM	Auditorium Main, Convention Center
IOBC Mixer	5:30 PM - 7:30 PM	211 D, Convention Center
WERA1021: Spotted Wing Drosophila	6:00 PM - 9:00 PM	200 G, Convention Center
University of Wisconsin Joint Mixer: Entomology, Soils and Agronomy	6:30 PM - 8:00 PM	Northstar A, Hyatt Regency
Screening of "The PHD Movie 2: Still in Grad School"	7:00 PM - 9:00 PM	102 A-F, Convention Center
IUSSI North American Section Business Meeting	7:30 PM - 8:30 PM	200 D, Convention Center
ESA Editors Reception	8:00 PM - 9:00 PM	Mirage, Hyatt Regency
Korean Young Entomologists (KYE) Mixer	8:20 PM - 11:00 PM	205 B, Convention Center
Student Reception	8:30 PM - 11:30 PM	The Pour House
ESA Governing Board Reception	9:00 PM - 10:00 PM	Regency, Hyatt Regency

WEDNESDAY, NOVEMBER 18

Function	**Time**	**Location**
Sunrise Yoga	6:30 AM - 7:30 AM	Fitness Center, Hyatt Regency (6th Floor)
PBT Final Business Meeting	6:45 AM - 7:45 AM	207 AB, Convention Center
Presentation Preview Room (PPR)	7:00 AM - 12:00 PM	201 B, Convention Center
ESA Registration and Information Center	7:00 AM - 12:00 PM	Exhibit Hall B Foyer, Convention Center
Open P-IE Section Governing Council and Member Feedback Session	7:00 AM - 8:00 AM	Skyway Suite AB, Hyatt Regency
MUVE Final Business Meeting with Breakfast	7:00 AM - 8:15 AM	208 CD, Convention Center
Moderator Training	7:00 AM - 7:30 AM	205 A, Convention Center
ESA Governing Board Meeting II	8:00 AM - 11:30 AM	Regency, Hyatt Regency
Exhibit Hall	9:00 AM - 4:30 PM	Exhibit Hall BC, Convention Center
Refreshment Break	9:30 AM - 10:00 AM	Exhibit Hall BC, Convention Center
Student Affairs Committee Meeting	11:30 AM - 12:30 PM	St. Croix, Hyatt Regency
Yearly Meeting of the Society for Regulatory Entomology	12:30 PM - 1:30 PM	211 D, Convention Center
2016 Annual Meeting Program Committee Meeting	12:30 PM - 2:30 PM	Minnehaha, Hyatt Regency
SysEB Final Business Meeting	2:30 PM - 3:30 PM	210 AB, Convention Center

ASA, CSSA, SSSA SCIENTIFIC PROGRAM

ACS530 Early Career Members		
Negotiation Strategies for Early Career Scientists	Mon., Nov. 16, 9:00 AM - 10:30 AM	Convention Center, L100 F
Tips from the Experts on the Job Application and Interviewing Process	Mon., Nov. 16 12:30 PM - 2:00 PM	Hilton, Marquette Ballroom IV-V
Teaching and Extension	Mon., Nov. 16 2:00 PM - 4:00 PM	Hilton, Marquette Ballroom IV-V
How to Publish a Manuscript in ASA, CSSA and SSSA Journals	Tue., Nov. 17 10:35 AM - 11:45 AM	Hilton, Minneapolis Ballroom C
Interactive Workshop: Writing Manuscripts for Publication	Tue., Nov. 17 1:30 PM - 3:00 PM	Hilton, Minneapolis Ballroom C
Grant Application Navigation and Resources for Expanding Early Career Opportunities	Wed., Nov. 18 9:00 AM - 10:30 AM	Hilton, Minneapolis Ballroom C
ASA Section: Agronomic Production Systems		
Symposium–Exploring Genetic Diversity for Fiber Improvement	Sun., Nov. 15 3:00 PM - 4:35 PM	Convention Center, M101 B
Business Meeting–Cotton and Other Fibers Community	Sun., Nov. 15 4:35 PM - 5:00 PM	Convention Center, M101 B
Sensor-Based Nutrient Management Graduate Student Oral Competition	Mon., Nov. 16 9:45 AM - 10:20 AM	Convention Center, 102 D
General Organic Management Systems: I	Mon., Nov. 16 10:00 AM - 12:15 PM	Convention Center, 101 C
Applied Soybean Research: I (includes graduate student oral competition)	Mon., Nov. 16 10:00 AM - 3:00 PM	Convention Center, 102 A
Symposium–Comparison of in-Season Nitrogen Application Management Strategies	Mon., Nov. 16 10:30 AM - 11:35 AM	Convention Center, 102 D
Business Meeting–Sensor-Based Nutrient Management Community	Mon., Nov. 16 11:45 AM - 12:15 PM	Convention Center, 102 D
General Bioenergy Systems: I	Mon., Nov. 16 12:55 PM - 3:45 PM	Convention Center, 102 D
Symposium–Insect Ecology in Organic Crop Management Systems	Mon., Nov. 16 12:55 PM - 4:15 PM	Convention Center, L100 A
Symposium–Rigor and Relevance in Semiarid Dryland Cropping Systems	Mon., Nov. 16 1:00 PM - 3:20 PM	Convention Center, 101 C
Digital Soil Mapping for Precision Agriculture: I	Mon., Nov. 16 1:00 PM - 3:35 PM	Convention Center, 102 F
Business Meeting–Applied Soybean Research Community	Mon., Nov. 16 3:00 PM - 3:45 PM	Convention Center, 102 A
Business Meeting–Semi-Arid Dryland Cropping Systems Community	Mon., Nov. 16 3:20 PM - 4:20 PM	Convention Center, 101 C
Applied Soybean Research: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Bioenergy Systems Graduate Student Poster Competition (Voluntary for Graduate Students)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Business Meeting–Crop Management Professionals Community	Mon., Nov. 16 6:00 PM - 7:00 PM	Convention Center, 102 D
Business Meeting–Integrated Pest Management Professionals Community	Mon., Nov. 16 6:00 PM - 7:00 PM	Convention Center, 102 D
Business Meeting–Nutrient Management Professionals Community	Mon., Nov. 16 6:00 PM - 7:00 PM	Convention Center, 102 D
Business Meeting–Soil and Water Management Professionals Community	Mon., Nov. 16 6:00 PM - 7:00 PM	Convention Center, 102 D
Symposium–Bioenergy and Climate	Tue., Nov. 17 8:00 AM - 10:40 AM	Convention Center, 102 D

Symposium–Going from Big Data to Agronomic Decisions	Tue., Nov. 17 8:55 AM - 11:30 AM	Convention Center, 103 A
Business Meeting–Bioenergy Systems Community (Open to Members)	Tue., Nov. 17 10:40 AM - 11:40 AM	Convention Center, 102 D
Business Meeting–Precision Agriculture Systems Community	Tue., Nov. 17 11:30 AM - 12:45 PM	Convention Center, 103 A
Semiarid Dryland Cropping Systems: I	Tue., Nov. 17 12:55 PM - 4:00 PM	Convention Center, L100 C
Agronomic Production Systems: I	Tue., Nov. 17 12:55 PM - 4:15 PM	Convention Center, M101 C
Adaptive Nutrient Management: I	Tue., Nov. 17 1:00 PM - 3:00 PM	Convention Center, M100 D
Novel Approaches on Site-Specific Integrated Pest Management	Tue., Nov. 17 1:00 PM - 3:05 PM	Convention Center, M100 F
Symposium–Management and Biological Control of Weeds in Agroecosystems	Tue., Nov. 17 1:00 PM - 4:00 PM	Convention Center, M101 A
General Organic Management Systems: II	Tue., Nov. 17 1:00 PM - 4:15 PM	Convention Center, L100 B
Business Meeting–Adaptive Nutrient Management Community	Tue., Nov. 17 3:00 PM - 4:00 PM	Convention Center, M100 D
Business Meeting–Weedy and Invasive Plant Species Community	Tue., Nov. 17 4:00 PM - 4:15 PM	Convention Center, M101 A
Adaptive Nutrient Management: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Digital Soil Mapping for Precision Agriculture: II (Includes Student Competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
General Bioenergy Systems: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
General Organic Management Systems: III (includes graduate student competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Semiarid Dryland Cropping Systems: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Agronomic Production Systems: III	Wed., Nov. 18 7:55 AM - 12:15 PM	Convention Center, M101 A
Symposium–the Solar Corridor's Potential to Capture Collaborative Synergy, in the Development of Critical Solutions	Wed., Nov. 18 8:20 AM - 12:00 PM	Convention Center, M100 D
Business Meeting–Organic Management Systems Community	Wed., Nov. 18 1:00 PM - 2:00 PM	Convention Center, M100 B
Science Based Solar Corridor, Economic and Sociological Yield Strategies for Small Holder Farms	Wed., Nov. 18 1:00 PM - 2:05 PM	Convention Center, M100 D
Business Meeting–Agronomic Production Systems Section	Wed., Nov. 18 1:30 PM - 2:30 PM	Convention Center, M101 A
Business Meeting–Crop Irrigation Strategies and Management Community	Wed., Nov. 18 1:30 PM - 2:30 PM	Convention Center, M100 A
Business Meeting–Solar Corridor Crop System Community	Wed., Nov. 18 2:05 PM - 2:30 PM	Convention Center, M100 D
Agronomic Production Systems: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Strategies to Improve Water Use Efficiency in Crop Rotations and Cover Crop Systems	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
ASA Section: Biometry and Statistical Computing		
Biometry and Statistical Computing: I	Tue., Nov. 17 1:00 PM - 3:10 PM	Hilton, Marquette Ballroom VI
Business Meeting–Biometry and Statistical Computing Section	Tue., Nov. 17 3:10 PM - 4:00 PM	Hilton, Marquette Ballroom VI
Business Meeting–Bioinformatics in Crops and Soils Community	Tue., Nov. 17 3:40 PM - 4:00 PM	Hilton, Conrad A

Business Meeting–Spatial Statistics Applications Community	Tue., Nov. 17 3:40 PM - 4:00 PM	Hilton, Conrad B
Business Meeting–Statistical Education/Training for Researchers Community	Tue., Nov. 17 3:40 PM - 4:00 PM	Hilton, Conrad C
Biometry and Statistical Computing: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
ASA Section: Climatology & Modeling		
Agricultural Remote Sensing: I	Mon., Nov. 16 12:55 PM - 3:45 PM	Convention Center, L100 GH
Management, Analysis, and Interpretation of High-Frequency Sensor Data	Mon., Nov. 16 1:00 PM - 1:55 PM	Convention Center, M100 E
Evapotranspiration Measurement and Modeling: I (includes student oral competition)	Mon., Nov. 16 1:00 PM - 3:45 PM	Convention Center, M100 F
Symposium–Adapting Agricultural Practices to Extreme Weather Events	Mon., Nov. 16 1:00 PM - 4:30 PM	Convention Center, L100 IJ
Business Meeting–Sensor-Based Water Management Community	Mon., Nov. 16 1:55 PM - 2:45 PM	Convention Center, M100 E
Symposium–Research Data Stewardship: What Are the Costs/Limitations Associated with Data Sharing?	Mon., Nov. 16 3:00 PM - 4:30 PM	Convention Center, M100 E
Business Meeting–Airborne and Satellite Remote Sensing Community	Mon., Nov. 16 3:45 PM - 4:00 PM	Convention Center, L100 GH
Agricultural Remote Sensing: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Evapotranspiration Measurement and Modeling: II (includes student poster competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil-Plant-Water-Relations (includes graduate student competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Business Meeting–Agroclimatology and Agronomic Modeling Community	Mon., Nov. 16 6:00 PM - 8:00 PM	Convention Center, 101 A
Business Meeting–Climatology & Modeling Section	Mon., Nov. 16 6:00 PM - 8:00 PM	Convention Center, 101 A
Climatology & Modeling: I	Tue., Nov. 17 8:00 AM - 11:30 AM	Convention Center, 103 BC
Symposium–Quantitative Assessment of Management Impacts on Soil-Plant-Water Relations	Tue., Nov. 17 8:00 AM - 11:40 AM	Convention Center, 101 I
Agroclimatology and Agronomic Modeling	Tue., Nov. 17 8:00 AM - 11:50 AM	Convention Center, 102 BC
Symposium–Beyond the Penman-Monteith: Instruments and Approaches for Precision Water Stress	Tue., Nov. 17 8:00 AM - 12:15 PM	Convention Center, 101 J
Model Applications in Field Research: I	Tue., Nov. 17 8:55 AM - 10:45 AM	Convention Center, 102 A
Business Meeting–Model Applications in Field Research Community	Tue., Nov. 17 11:00 AM - 11:45 PM	Convention Center, 102 A
Business Meeting–Soil-Plant-Water Relations Community	Tue., Nov. 17 11:40 AM - 12:10 PM	Convention Center, 101 I
Business Meeting–Biophysical Measurements and Sensors Community	Tue., Nov. 17 12:30 PM - 1:30 PM	Convention Center, 101 B
Global Climate Change: I (includes student competition)	Tue., Nov. 17 1:05 PM - 3:10 PM	Convention Center, L100 E
Symposium–Model Simulation Comparisons with Experimental Observations of Evapotranspiration	Tue., Nov. 17 1:15 PM - 4:00 PM	Convention Center, L100 F
Business Meeting–Evapotranspiration Measurement and Modeling Community	Tue., Nov. 17 2:20 PM - 2:45 PM	Convention Center, L100 F
Business Meeting– Global Climate Change Community	Tue., Nov. 17 3:10 PM - 4:00 PM	Convention Center, L100 E
Global Climate Change: II (includes student competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC

Model Applications in Field Research: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Biophysical Measurements and Sensors: I	Wed., Nov. 18 1:00 PM - 2:00 PM	Convention Center, 101 B
Biophysical Measurements and Sensors: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Climatology & Modeling: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
ASA Section: Education & Extension		
Extension Materials on Display: I	Mon., Nov. 16 7:00 AM - 6:00 PM	Convention Center, Exhibit Hall BC
Applied Agronomic Research and Extension: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
General Extension Education: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Extension Materials on Display: II	Tue., Nov. 17 7:00 AM - 6:00 PM	Convention Center, Exhibit Hall BC
Business Meeting–K-12 Outreach and Activities Community	Tue., Nov. 17 8:10 AM - 8:45 AM	Convention Center, L100 C
Lessons Learned from Yield and Efficiency Contests	Tue., Nov. 17 8:55 AM - 11:00 AM	Convention Center, L100 D
Connecting Agronomy and STEM Education in K-12	Tue., Nov. 17 9:00 AM - 9:50 AM	Convention Center, L100 C
Undergraduate Education: I	Tue., Nov. 17 10:00 AM - 11:35 AM	Convention Center, L100 C
Business Meeting–Extension Education Community	Tue., Nov. 17 11:00 AM - 12:00 PM	Convention Center, L100 D
Business Meeting–Undergraduate Education Community	Tue., Nov. 17 11:40 AM - 12:00 PM	Convention Center, L100 C
Symposium–Showing Your Work Matters: Program Evaluation and Impact Strategies for Agricultural Programs	Tue., Nov. 17 1:10 PM - 4:45 PM	Convention Center, L100 D
Undergraduate Education: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Business Meeting–Social Media in Education/Extension Community	Tue., Nov. 17 5:15 PM - 5:45 PM	Convention Center, M100 A
Extension Materials on Display: III	Wed., Nov. 18 7:00 AM - 4:30 PM	Convention Center, Exhibit Hall BC
Business Meeting–Education & Extension Section	Wed., Nov. 18 8:00 AM - 8:45 AM	Convention Center, L100 D
General Extension Education: I	Wed., Nov. 18 8:45 AM - 12:05 PM	Convention Center, L100 D
Applied Agronomic Research and Extension: I	Wed., Nov. 18 1:00 PM - 3:15 PM	Convention Center, L100 D
ASA Section: Environmental Quality		
Reducing Nitrogen Loss through Subsurface Drainage: Practices, Efficiencies and Impacts: I	Mon., Nov. 16 9:30 AM - 12:00 PM	Convention Center, 102 E
Business Meeting–By-product Gypsum Uses in Agriculture Community	Mon., Nov. 16 10:00 AM - 11:00 AM	Convention Center, 102 F
Influence of Soil & Crop Management on Soil Health & Environmental Quality: I	Mon., Nov. 16 10:10 AM - 11:45 AM	Convention Center, 102 BC
Gypsum Uses in Agriculture: I	Mon., Nov. 16 11:00 AM - 12:00 PM	Convention Center, 102 F
Symposium–Reducing Nitrogen Loss through Subsurface Drainage: Practices, Efficiencies and Impacts: II	Mon., Nov. 16 12:45 PM - 3:40 PM	Convention Center, M101 B
Management Practices and Land-Use Impact on Global Warming Potential and Greenhouse Gas Intensity	Mon., Nov. 16 12:55 PM - 3:30 PM	Convention Center, 102 E

Fate and Transport of Agrochemicals, Microbes, and Nutrients in Biochar-Amended Soils: I	Mon., Nov. 16 1:00 PM - 3:35 PM	Convention Center, M101 C
Emissions from Livestock Production: I	Mon., Nov. 16 1:00 PM - 3:45 PM	Convention Center, M100 D
Business Meeting–Managing Denitrification in Agronomic Systems Community	Mon., Nov. 16 3:40 PM - 4:30 PM	Convention Center, M101 B
Agricultural Practices to Improve Nitrogen-Use Efficiency and Mitigate Greenhouse Gas Emission: I (includes student competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Agronomic, Environmental, and Industrial Uses of Biochar: I (includes graduate student competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Gypsum Uses in Agriculture: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Influence of Soil & Crop Management on Soil Health & Environmental Quality: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Improving Accuracy and Precision of Soil Carbon and Greenhouse Gas Emission Measurements and Quantification: I	Tue., Nov. 17 7:55 AM - 11:00 AM	Convention Center, M101 A
Agricultural Practices to Improve Nitrogen-Use Efficiency and Mitigate Greenhouse Gas Emission: II	Tue., Nov. 17 7:55 AM - 2:55 PM	Convention Center, M100 C
Agronomic, Environmental, and Industrial Uses of Biochar : II	Tue., Nov. 17 8:00 AM - 11:05 AM	Convention Center, M101 B
Symposium–Characterizing and Controlling Insects and Bacteria Associated with Manure-Impacted Environments	Tue., Nov. 17 8:00 AM - 11:35 AM	Convention Center, M101 C
Business Meeting–Biochar: Agronomic and Environmental Uses Community	Tue., Nov. 17 11:05 AM - 12:00 PM	Convention Center, M101 B
Symposium–Field Management for Improved Soil Health and Environmental Quality	Tue., Nov. 17 12:55 PM - 3:15 PM	Convention Center, 101 A
Symposium–Novel and Value-Added Uses of Biochar	Tue., Nov. 17 1:00 PM - 4:00 PM	Convention Center, M101 B
Case Studies in Managing Denitrification in Agronomic Systems	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Emissions from Livestock Production: II (includes student competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Improving Accuracy and Precision of Soil Carbon and Greenhouse Gas Emission Measurements and Quantification: II (includes student competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–a Critical Assessment of Phosphorus Reduction Goals and Mitigation Strategies (SERA 17)	Wed., Nov. 18 7:55 AM - 12:00 PM	Convention Center, 101 FG
Agronomic Practices: Influence on Environmental Quality: I	Wed., Nov. 18 8:55 AM - 11:15 AM	Convention Center, 103 A
Business Meeting–Environmental Quality Section	Wed., Nov. 18 11:15 AM - 12:00 PM	Convention Center, 103 A
Soil-Plant-Atmosphere Interactions and Soil Carbon Dynamics in Long-Term Research Experiments	Wed., Nov. 18 12:55 PM - 2:00 PM	Convention Center, M100 C
Water Quality Protection with Cover Crops	Wed., Nov. 18 12:55 PM - 2:15 PM	Convention Center, 103 A
Environmental Implications of Using Poultry Litter in Agriculture	Wed., Nov. 18 1:00 PM - 2:05 PM	Convention Center, M100 E
Business Meeting–Animal Agriculture and the Environment Community	Wed., Nov. 18 2:05 PM - 2:30 PM	Convention Center, M100 E
Business Meeting–Nutrients and Environmental Quality Community	Wed., Nov. 18 2:15 PM - 2:45 PM	Convention Center, 103 A
Business Meeting–Soil Carbon and Greenhouse Gas Emissions Community	Wed., Nov. 18 2:15 PM - 3:00 PM	Convention Center, M100 C
Agronomic Practices: Influence on Environmental Quality: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Nutrients and Environmental Quality	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC

ASA Section: Global Agronomy		
Global Agronomy: I	Sun., Nov. 15 2:00 PM - 4:50 PM	Convention Center, M101 C
Symposium–Application of Data Meta-Analysis for Smallholder Conditions.	Mon., Nov. 16 1:00 PM - 3:10 PM	Convention Center, M100 A
Business Meeting–Field Diagnosis for Smallholder Agriculture Community	Mon., Nov. 16 3:25 PM - 4:00 PM	Convention Center, M100 A
Breeding and Managing Perennial Crops for Food, Fiber, and Fuel	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Access to Agronomic Inputs: A Global Challenge to Improve Food Security	Tue., Nov. 17 8:00 AM - 11:00 AM	Hilton, Marquette Ballroom IX
Symposium–Innovative Approaches and Technologies in Soil and Crop Management - Decades of China-US Collaborative Research	Tue., Nov. 17 8:00 AM - 11:20 AM	Hilton, Marquette Ballroom VII-VIII
Business Meeting–Gaining Access to Agronomic Inputs Community	Tue., Nov. 17 11:00 AM - 12:00 PM	Hilton, Marquette Ballroom IX
Business Meeting–U.S.-Sino Agricultural Research Forum Community	Tue., Nov. 17 11:20 AM - 12:30 PM	Hilton, Marquette Ballroom VII-VIII
Business Meeting–Perennial Grain Development Community	Tue., Nov. 17 4:00 PM - 5:00 PM	Convention Center, M100 C
Global Agronomy: II	Wed., Nov. 18 8:00 AM - 11:20 AM	Convention Center, M100 E
Business Meeting–Global Agronomy Section	Wed., Nov. 18 11:20 AM - 12:20 PM	Convention Center, M100 E
Global Agronomy: III	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
ASA Section: Land Management & Conservation		
Military Land Use and Management: I	Sun., Nov. 15 2:30 PM - 4:00 PM	Convention Center, M100 E
Business Meeting–Military Land Use and Management Community	Sun., Nov. 15 4:00 PM - 4:45 PM	Convention Center, M100 E
Managing Research Centers for Wildlife and Beneficial Insects	Mon., Nov. 16 10:15 AM - 11:30 AM	Convention Center, M100 E
Business Meeting–Agricultural Experiment Station Management Community	Mon., Nov. 16 11:30 AM - 12:15 PM	Convention Center, M100 E
Symposium–Cover Crop Breeding Efforts	Mon., Nov. 16 12:55 PM - 4:30 PM	Hilton, Symphony Ballroom I
Military Land Use and Management: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Health in Agroecosystems: I (includes graduate student competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Business Meeting–Land Management & Conservation Section	Tue., Nov. 17 8:00 AM - 9:00 AM	Convention Center, M100 B
Land Management & Conservation: I	Tue., Nov. 17 9:00 AM - 9:45 AM	Convention Center, M100 B
Cover Crop Management: I	Tue., Nov. 17 9:55 AM - 2:30 PM	Convention Center, M100 B
Business Meeting–Cover Crop Management Community	Tue., Nov. 17 3:00 PM - 3:30 PM	Convention Center, M100 B
Cover Crop Management: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Land Management & Conservation: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Health Research for Agroecosystems: II	Wed., Nov. 18 8:00 AM - 10:50 AM	Convention Center, M100 B
Cover Crop Management: III	Wed., Nov. 18 8:55 AM - 11:20 AM	Convention Center, M100 C

Business Meeting–Soil Health Community	Wed., Nov. 18 11:05 AM - 12:00 PM	Convention Center, M100 B
Cover Crop Management: IV	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
C01 Crop Breeding & Genetics		
Crop Breeding and Genetics: I	Mon., Nov. 16 8:00 AM - 12:05 PM	Convention Center, 101 FG
Ron Phillips Plant Genetics Lectureship	Mon., Nov. 16 1:00 PM - 1:55 PM	Convention Center, 101 I
Symposium–Crop Breeding Databases	Tue., Nov. 17 1:00 PM - 4:00 PM	Convention Center, L100 A
Crop Breeding and Genetics: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Crop Breeding and Genetics Student Poster Competition	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Moderated Discussion on Intellectual Property (IP) Protection of Plant–related Inventions in the U.S.	Wed., Nov. 18 1:30 PM - 2:30 PM	Convention Center, 101 DE
Symposium–Applications of UAV-Based Remote Sensing for Assessing Crop Stress	Wed., Nov. 18 8:20 AM - 11:00 AM	Convention Center, 101 A
Joint Div. C01 & C07 Business Meetings	Wed., Nov. 18 11:05 AM - 12:00 PM	Convention Center, 101 A
Crop Breeding and Genetics: III	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
C02 Crop Physiology and Metabolism		
C-2/C-4 Graduate Student Oral Competition – I	Mon., Nov. 16 8:55 AM - 12:00 PM	Convention Center, M100 GH
108Symposium–Efficient Resource Utilization for Improving Crop Productivity and Environmental Stewardship	Mon., Nov. 16 1:00 PM - 3:55 PM	Convention Center, M100 GH
C-2/C-4 Graduate Student Poster Competition (includes student competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
C-2/C-4 Graduate Student Oral Competition – II	Tue., Nov. 17 10:00 AM - 12:05 PM	Hilton, Marquette Ballroom VI
Symposium–Role of Secondary Metabolites in Biotic and Abiotic Stress Tolerance	Tue., Nov. 17 1:00 PM - 3:35 PM	Convention Center, M100 GH
Crop Physiology and Metabolism: Posters	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Crop Physiology and Metabolism	Wed., Nov. 18 8:10 AM - 4:00 PM	Convention Center, 101 C
Div. C02 Business Meeting–Crop Physiology and Metabolism	Wed., Nov. 18 1:00 PM - 2:00 PM	Convention Center, 101 C
C03 Crop Ecology, Management & Quality		
Crop Ecology, Management & Quality: I	Mon., Nov. 16 8:55 AM - 3:00 PM	Convention Center, M100 IJ
Division C-3 MS Graduate Student Poster Contest Guidelines for 2015	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Division C-3 PhD Graduate Student Poster Contest Guidelines for 2015	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Agroecosystems Research: Integrated Cropping Systems That Promote Ecosystem Services	Tue., Nov. 17 9:25 AM - 12:00 PM	Convention Center, 101 H
Symposium–Cropping System Adaptations for Resilience to Climate Change	Tue., Nov. 17 12:55 PM - 4:20 PM	Convention Center, 101 H
Crop Ecology, Management & Quality: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC

Div. C03 Business Meeting–Crop Ecology, Management & Quality	Wed., Nov. 18 9:00 AM - 10:00 AM	Convention Center, 101 H
C04 Seed Physiology, Production & Technology		
C-2/C-4 Graduate Student Oral Competition – I	Mon., Nov. 16 8:55 AM - 12:00 PM	Convention Center, M100 GH
C-2/C-4 Graduate Student Poster Competition (includes student competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Seed Physiology, Production & Technology: I	Mon., Nov. 16 1:15 PM - 2:55 PM	Hilton, Marquette Ballroom III
Div. C04 Business Meeting–Seed Physiology, Production & Technology	Mon., Nov. 16 3:00 PM - 3:30 PM	Hilton, Marquette Ballroom III
Seed Physiology, Production & Technology: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Vivid Properties of Seeds: Updates from W-3168 on Aging, Preharvest Sprouting & Dormancy	Tue., Nov. 17 10:00 AM - 12:00 PM	Hilton, Marquette Ballroom IV-V
C05 Turfgrass Science		
What's New in the Turfgrass Industry	Sun., Nov. 15 3:30 PM - 5:30 PM	Convention Center, M100 GH
Graduate Student Oral Competition: Turfgrass Weeds, Diseases, and Insect Pests	Mon., Nov. 16 7:55 AM - 9:20 AM	Convention Center, L100 GH
Graduate Student Oral Competition: Golf Course Management and Cultural Practices	Mon., Nov. 16 12:55 PM - 3:30 PM	Convention Center, Auditorium 2
Graduate Student Oral Competition: Turfgrass Cultural Practices, Ecology and Environment	Mon., Nov. 16 12:55 PM - 4:00 PM	Convention Center, 103 BC
Graduate Student Oral Competition: Turfgrass Breeding and Genetics, Stress Tolerance	Mon., Nov. 16 12:55 PM - 4:15 PM	Convention Center, 103 DE
Graduate Student Poster Competition: Golf Course Management and Cultural Practices	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Graduate Student Poster Competition: Turfgrass Breeding and Genetics, Stress Tolerance	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Graduate Student Poster Competition: Turfgrass Cultural Practices, Ecology and Environment	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Graduate Student Poster Competition: Turfgrass Weeds, Diseases, and Insect Pests	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Turfgrass Insect Management: New and Emerging Issues	Tue., Nov. 17 9:55 AM - 12:15 PM	Convention Center, 101 B
Turfgrass Science: I	Tue., Nov. 17 9:55 AM - 12:15 PM	Convention Center, M100 GH
Martin and Ruth Massengale Lectureship	Tue., Nov. 17 11:00 AM - 11:45 AM	Convention Center, 101 C
Golf Course Management and Cultural Practices	Tue., Nov. 17 12:55 PM - 3:30 PM	Hilton, Symphony Ballroom I
Turfgrass Breeding and Genetics, Stress Tolerance	Tue., Nov. 17 12:55 PM - 4:15 PM	Hilton, Marquette Ballroom IV-V
Symposium–USDA-SCRI Turfgrass Breeding Projects	Tue., Nov. 17 1:40 PM - 4:15 PM	Hilton, Marquette Ballroom VII-VIII
Turfgrass Weeds, Diseases, and Insect Pests	Wed., Nov. 18 7:55 AM - 9:20 AM	Convention Center, M100 A
Turfgrass Cultural Practices, Ecology and Environment	Wed., Nov. 18 7:55 AM - 9:35 AM	Convention Center, 101 DE
Div. C05 Business Meeting–Turfgrass Science	Wed., Nov. 18 10:00 AM - 12:00 PM	Convention Center, 101 DE
Turfgrass Science: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC

C06 Forage and Grazinglands		
Robert F Barnes Graduate Student Oral Contest, Ph.D.	Mon., Nov. 16 8:30 AM - 11:35 AM	Convention Center, 101 A
Robert F Barnes Graduate Student Poster Contest, MS Students	Mon., Nov. 16 2:00 PM - 4:00 PM	Convention Center, Exhibit Hall BC
Symposium– the Value of Condensed Tannins in Forages	Tue., Nov. 17 1:00 PM - 4:15 PM	Hilton, Minneapolis Ballroom B
Forage and Grazinglands: I	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Forage and Grazinglands: II	Wed., Nov. 18 8:15 AM - 9:35 AM	Convention Center, M100 F
Symposium–Forage Roundtable	Wed., Nov. 18 9:45 AM - 10:45 AM	Convention Center, M100 F
Div. C06 Business Meeting–Forage and Grazinglands	Wed., Nov. 18 11:00 AM - 12:00 PM	Convention Center, M100 F
Forage and Grazinglands: III	Wed., Nov. 18 1:00 PM - 2:20 PM	Convention Center, M100 F
C07 Genomics, Molecular Genetics & Biotechnology		
Symposium–Gene Editing for Crop Improvement	Sun., Nov. 15 2:00 PM - 4:40 PM	Convention Center, 101 H
Symposium–QTL That Matter	Mon., Nov. 16 2:10 PM - 4:20 PM	Convention Center, 101 H
Ron Phillips Plant Genetics Lectureship	Mon., Nov. 16 1:00 PM - 1:55 PM	Convention Center, 101 I
Genomics, Molecular Genetics & Biotechnology: I	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Genomics, Molecular Genetics & Biotechnology: II	Wed., Nov. 18 8:00 AM - 11:05 AM	Convention Center, 101 B
Joint Div. C07 & C01 Business Meetings	Wed., Nov. 18 11:05 AM - 12:00 PM	Convention Center, 101 A
C08 Plant Genetic Resources		
Symposium–Conserving and Using Crop Wild Relatives: Partnering for Success	Mon., Nov. 16 2:10 PM - 4:15 PM	Convention Center, 101 I
Ron Phillips Plant Genetics Lectureship	Mon., Nov. 16 1:00 PM - 1:55 PM	Convention Center, 101 I
Calvin Sperling Memorial Biodiversity Lectureship	Tue., Nov. 17 10:00 AM - 11:00 AM	Convention Center, L100 GH
Div. C08 Business Meeting–Plant Genetic Resources	Tue., Nov. 17 11:00 AM - 12:00 PM	Convention Center, L100 GH
Symposium–Harvesting Genetic Resources: Resequencing and Other Approaches	Tue., Nov. 17 12:55 PM - 4:35 PM	Convention Center, M100 IJ
Symposium–Moderated Discussion on Intellectual Property (IP) Protection of Plant–related Inventions in the U.S.	Wed., Nov. 18 1:30 PM - 2:30 PM	Convention Center, 101 DE
Frank N. Meyer Medal for Plant Genetic Resources Award and Breakfast	Wed., Nov. 18 6:30 AM - 8:00 AM	Hilton, Rochester Room
Plant Genetic Resources: I	Wed., Nov. 18 10:00 AM - 12:15 PM	Convention Center, 103 F
Plant Genetic Resources: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
C09 Biomedical, Health-Beneficial & Nutritionally Enhanced Plants		
Ron Phillips Plant Genetics Lectureship	Mon., Nov. 16 1:00 PM - 1:55 PM	Convention Center, 101 I
Biomedical, Health-Beneficial & Nutritionally Enhanced Plants: I	Tue., Nov. 17 1:15 PM - 3:05 PM	Hilton, Marquette Ballroom IX

Div. C09 Business Meeting–Biomedical, Health-Beneficial & Nutritionally Enhanced Plants	Tue., Nov. 17 3:05 PM - 3:40 PM	Hilton, Marquette Ballroom IX
Biomedical, Health-Beneficial & Nutritionally Enhanced Plants: II (includes student competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Improving Pulse Crops for Nutrition and Health	Wed., Nov. 18 8:00 AM - 12:00 PM	Convention Center, M100 IJ
Exhibit Hall Activities		
Career Fair	Tue., Nov. 17 3:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC, Career Center
Demonstration Stage: ACSESS DL "Publishing for Your Sciences" Event: I	Mon., Nov. 16 3:00 PM - 4:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: ACSESS DL "Publishing for Your Sciences" Event: II	Mon., Nov. 16 4:00 PM - 5:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: ALMACO "Seed Processing Line"	Wed., Nov. 18 10:00 AM - 11:00 AM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Apogee Instruments, Inc. "Instrumentation Advances in Net Radiation, PAR, and Spectral Reflectance"	Mon., Nov. 16 12:00 PM - 1:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Campbell Scientific, Inc.	Wed., Nov. 18 2:00 PM - 3:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: CHS: I	Mon., Nov. 16 1:00 PM - 2:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: CHS: II	Tue., Nov. 17 1:00 PM - 2:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Conviron	Tue., Nov. 17 3:00 PM - 4:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Dairy One-Forage Analysis	Tue., Nov. 17 2:00 PM - 3:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Dow AgroSciences	Mon., Nov. 16 2:00 PM - 3:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: FIAlab Instrument Inc.-Flow Injection Analyzer Demo	Wed., Nov. 18 1:00 PM - 2:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Gasmet Technologies, Inc.	Tue., Nov. 17 11:00 AM - 12:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Gylling Data Management: Data Preservation Through Structured Research Data Management	Wed., Nov. 18 3:00 PM - 4:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Gypsoil "What Gypsum Can Do For You"	Wed., Nov. 18 11:00 AM - 12:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: LECO Corporation "Optimizing Total Nitrogen Combustion Instruments for Maximum Sample Throughput and Lowest Cost-per-Analysis"	Tue., Nov. 17 4:00 PM - 5:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Midland Scientific, Inc. (New Product)	Tue., Nov. 17 10:00 AM - 11:00 AM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Picarro	Tue., Nov. 17 12:00 PM - 1:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Trimble: I	Mon., Nov. 16 11:00 AM - 12:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Demonstration Stage: Trimble: II	Wed., Nov. 18 12:00 PM - 1:00 PM	Convention Center, Exhibit Hall BC, Demonstration Stage
Exhibits & Career Center Open	Sun., Nov. 15 7:00 PM - 9:00 PM	Convention Center, Exhibit Hall BC, Career Center
Graduate School Forum	Sun., Nov. 15 7:00 PM - 9:00 PM	Convention Center, Exhibit Hall BC
Welcome Reception	Sun., Nov. 15 7:10 PM - 9:00 PM	Convention Center, Exhibit Hall BC

Live Streaming CEU Program		
Symposium–Adapting Agricultural Practices to Extreme Weather Events	Mon., Nov. 16 1:00 PM - 4:30 PM	Convention Center, L100 IJ
Symposium–Soil and Vegetation Management for Stormwater Control	Mon., Nov. 16 8:00 AM - 11:50 AM	Convention Center, L100 IJ
Symposium–Sustainability in the Food Supply Chain	Tue., Nov. 17 1:00 PM - 4:30 PM	Convention Center, L100 IJ
Symposium–Performance Based Metrics for Efficient Nitrogen Management and Policy Making	Tue., Nov. 17 8:00 AM - 11:15 AM	Convention Center, L100 IJ
Symposium–The Intersection of Water Quality and Agriculture: Partnering with Agriculture on Issues, Challenges and Promising Solutions	Wed., Nov. 18 8:00 AM - 5:00 PM	Convention Center, L100 IJ
SSSA Cross-Divisional Symposium		
Symposium–the Beauty of Soils: The Nexus of Soil Science and the Arts	Tue., Nov. 17 1:10 PM - 5:00 PM	Convention Center, 101 I
Symposium–SSSA IYS Celebration	Wed., Nov. 18 9:45 AM - 11:00 AM	Convention Center, Auditorium Main
SSSA Division: Consulting Soil Scientists		
SSSA Business Meeting–Consulting Soil Scientists	Sun., Nov. 15 1:05 PM - 2:00 PM	Hilton, Conrad B
Symposium–Hydric Soil Management for Wetland Restoration and Creation	Tue., Nov. 17 8:20 AM - 11:35 AM	Hilton, Marquette Ballroom I
Symposium–New Technologies for Soil Scientists in the 21st Century	Wed., Nov. 18 1:00 PM - 3:00 PM	Hilton, Marquette Ballroom III
SSSA Division: Forest, Range & Wildland Soils		
Forest, Range & Wildland Soils: I (includes student competition)	Mon., Nov. 16 7:55 AM - 4:00 PM	Convention Center, 103 F
Symposium–Advances in Understanding Impacts of Organic Matter Removal on Soils and Forest Productivity: I	Mon., Nov. 16 1:00 PM - 4:55 PM	Convention Center, 101 A
Symposium–Biological Weathering	Tue., Nov. 17 7:55 AM - 11:55 AM	Hilton, Marquette Ballroom II
Advances in Understanding Impacts of Organic Matter Removal on Soils and Forest Productivity: II (includes graduate student competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Forest, Range & Wildland Soils: II (includes student competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Forest, Range and Wildland Poster Discussion	Tue., Nov. 17 6:00 PM - 7:00 PM	Convention Center, 101 H
Sergei A. Wilde Distinguished Lectureship on Forest Soils	Wed., Nov. 18 11:00 AM - 12:00 PM	Convention Center, L100 C
SSSA Business Meeting–Forest, Range & Wildland Soils	Wed., Nov. 18 1:00 PM - 2:15 PM	Convention Center, L100 C
SSSA Division: Nutrient Management & Soil & Plant Analysis		
Ph.D. Graduate Student Oral Competition	Mon., Nov. 16 8:00 AM - 3:20 PM	Convention Center, L100 D
M.S. Graduate Student Oral Competition	Mon., Nov. 16 8:00 AM - 4:35 PM	Convention Center, L100 B
Soil Fertility & Plant Nutrition: I	Mon., Nov. 16 9:30 AM - 4:00 PM	Convention Center, L100 C
M.S. Graduate Student Poster Competition	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Ph.D. Graduate Student Poster Competition	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Phosphorus Science & Management Posters	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC

The Science & Management of Secondary & Micronutrients Posters	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Fertilizer from Rock to Crop	Tue., Nov. 17 1:25 PM - 4:00 PM	Convention Center, 101 DE
SSSA Business Meeting–Nutrient Management & Soil & Plant Analysis	Tue., Nov. 17 4:00 PM - 5:00 PM	Convention Center, 101 DE
Leo M. Walsh Soil Fertility Distinguished Lectureship	Tue., Nov. 17 5:15 PM - 7:45 PM	Convention Center, 101 DE
Symposium–Performance Based Metrics for Efficient Nitrogen Management and Policy Making	Tue., Nov. 17 8:00 AM - 11:15 AM	Convention Center, L100 IJ
Nitrogen Science & Management	Tue., Nov. 17 8:00 AM - 3:50 PM	Convention Center, 103 DE
SSSA Business Meeting–Soil Fertility & Plant Nutrition	Tue., Nov. 17 4:00 PM - 5:00 PM	Convention Center, 101 DE
Advances in Soil and Plant Analytical Techniques	Wed., Nov. 18 11:00 AM - 12:20 PM	Convention Center, 103 DE
Polyhalites As a Nutrient Source	Wed., Nov. 18 2:20 PM - 3:25 PM	Convention Center, 103 DE
Nutrient Management & Soil & Plant Analysis Poster Session	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Phosphorus Science & Management	Wed., Nov. 18 11:00 AM - 2:35 PM	Convention Center, L100 B
Potassium Science and Management	Wed., Nov. 18 1:00 PM - 2:20 PM	Convention Center, L100 E
The Science & Management of Secondary & Micronutrients	Wed., Nov. 18 1:00 PM - 2:55 PM	Convention Center, L100 A
Nitrogen Science & Management Posters	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Potassium Science and Management Posters	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Soil Fertility & Plant Nutrition: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
SSSA Division: Pedology		
Fire Effects on the Soil System: I	Sun., Nov. 15 2:25 PM - 3:30 PM	Convention Center, M100 F
Symposium–Soil Survey: Present and Future: I	Mon., Nov. 16 8:00 AM - 11:55 AM	Convention Center, M100 A
Pedology: I (includes student competition)	Mon., Nov. 16 10:25 AM - 4:15 PM	Convention Center, L100 E
Pedology: II (includes student competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Survey Present and Future: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Advancing Pedology Colloquium	Tue., Nov. 17 8:00 AM - 9:20 AM	Convention Center, 101 C
SSSA Business Meeting—Pedology	Tue., Nov. 17 9:30 AM - 10:30 AM	Convention Center, 101 C
Symposium–Innovations in International Pedology: I	Tue., Nov. 17 1:00 PM - 3:10 PM	Convention Center, 101 C
Innovations in International Pedology: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Digital Soil Morphometrics	Wed., Nov. 18 11:00 AM - 12:20 PM	Convention Center, L100 E
Fire Effects on the Soil System: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC

SSSA Division: Soil & Water Management & Conservation		
Developing Sustainable Bioenergy Cropping Systems: I	Mon., Nov. 16 8:00 AM - 11:05 AM	Convention Center, M101 A
Management Impacts on Soil Properties and Soil C and N Dynamics: I	Mon., Nov. 16 1:00 PM - 4:35 PM	Convention Center, M101 A
Developing Sustainable Bioenergy Cropping Systems: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Management Impacts on Soil Properties and Soil C and N Dynamics: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil & Water Management & Conservation: I	Tue., Nov. 17 7:55 AM - 11:15 AM	Convention Center, 102 F
Soil & Water Management & Conservation: II	Tue., Nov. 17 1:00 PM - 3:50 PM	Convention Center, M100 A
Symposium–Soils and Human Health: Linking Soil, Plants, and the Environment to Human and Animal Health	Tue., Nov. 17 1:00 PM - 5:05 PM	Convention Center, 103 A
Soil and Water Conservation and Management II: Graduate Student Research	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil & Water Management & Conservation: III	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Business Meeting–Soil & Water Management & Conservation	Wed., Nov. 18 1:15 PM - 2:15 PM	Convention Center, 103 F
Soil Erosion and Runoff: Impacts on Productivity and Environmental Quality	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Soil Tillage and Crop Residue Management: Impacts on Sustaining Soil and Water Resources	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC

SSSA Division: Soil Biology & Biochemistry		
Soil Biology & Biochemistry: I	Mon., Nov. 16 8:00 AM - 2:45 PM	Convention Center, 101 B
Symposium–International Year of Soils: Soil Biology and Biochemistry Research Across the Globe: I	Mon., Nov. 16 1:00 PM - 4:30 PM	Convention Center, 101 FG
Soil Biology and Biochemistry-Graduate Student Poster Competition	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Strategies for Managing Microbial Communities and Soil Health (Pathogen Control, Cover Crops and Tillage): I	Tue., Nov. 17 8:00 AM - 10:45 AM	Convention Center, M100 A
Symposium–Integrating Omics and Geochemical Knowledge to Explore Soil Microbial Community and Nutrient Dynamics: I	Tue., Nov. 17 8:00 AM - 12:00 PM	Convention Center, 101 FG
Francis E. Clark Distinguished Lectureship on Soil Biology	Tue., Nov. 17 1:00 PM - 2:30 PM	Convention Center, 101 FG
SSSA Business Meeting–Soil Biology & Biochemistry	Tue., Nov. 17 2:30 PM - 4:00 PM	Convention Center, 101 FG
Integrating Omics and Geochemical Knowledge to Explore Soil Microbial Community and Nutrient Dynamics: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Biology & Biochemistry: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Strategies for Managing Microbial Communities and Soil Health: III	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Role of Soil Microbial Communities and Processes in Ecosystem Reclamation and Restoration: I	Wed., Nov. 18 11:00 AM - 2:15 PM	Convention Center, 101 I
Linking Soil Macrofaunal and Microbial Communities with Crop Dynamics Including Diseases	Wed., Nov. 18 11:00 AM - 2:30 PM	Convention Center, 101 J
Nitrification: New Players and Environmental Drivers: I	Wed., Nov. 18 11:00 AM - 2:30 PM	Convention Center, 103 BC
Strategies for Managing Microbial Communities and Soil Health (Biochar, Biofertilizers, and other Organic Amendments): II	Wed., Nov. 18 1:00 PM - 4:15 PM	Convention Center, M100 IJ
International Year of Soils: Soil Biology and Biochemistry Research Across the Globe: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC

Nitrification: New Players and Environmental Drivers: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Role of Soil Microbial Communities and Processes in Ecosystem Reclamation and Restoration: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
SSSA Division: Soil Chemistry		
Chemical Processes Responsible for Carbon Fluxes: I	Mon., Nov. 16 8:30 AM - 11:20 AM	Convention Center, M100 B
Microbial Mediated Processes for Contaminants and Minerals: I	Mon., Nov. 16 2:00 PM - 3:05 PM	Convention Center, M100 B
Chemical Processes Responsible for Carbon Fluxes: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Microbial Mediated Processes for Contaminants and Minerals: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Soil Biogeochemical Dynamics from Molecular to Landscape Scale: I	Tue., Nov. 17 8:15 AM - 11:55 AM	Convention Center, 103 F
Soil Chemistry: I	Tue., Nov. 17 1:00 PM - 4:35 PM	Convention Center, 103 F
Risks and Remediation of Post-Mining Soils: II (Includes Student Competition)	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Biogeochemistry of Redox Driven Processes and Effects on Chemical Cycling of Nutrients and Contaminants: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Chemistry: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
SSSA Business Meeting–Soil Chemistry	Tue., Nov. 17 5:45 PM - 6:45 PM	Convention Center, 103 F
Soil Biogeochemistry of Redox Driven Processes and Effects on Chemical Cycling of Nutrients and Contaminants: I	Wed., Nov. 18 1:00 PM - 4:05 PM	Convention Center, 101 H
SSSA Division: Soil Education and Outreach		
Symposium–The International Year of Soils Monthly Themes	Sun., Nov. 15 4:30 PM - 5:30 PM	Convention Center, Exhibit Hall BC
Soil Education and Outreach: I	Mon., Nov. 16 8:00 AM - 11:20 AM	Convention Center, M100 C
SSSA Business Meeting–Soil Education and Outreach	Mon., Nov. 16 11:35 AM - 12:30 PM	Convention Center, M100 C
Soil Education and Outreach: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Embedding Soils in STEM Education	Tue., Nov. 17 8:00 AM - 12:00 PM	Convention Center, L100 B
Symposium–the Beauty of Soils: The Nexus of Soil Science and the Arts	Tue., Nov. 17 1:10 PM - 5:00 PM	Convention Center, 101 I
SSSA Division: Soil Fertility & Plant Nutrition		
Ph.D. Graduate Student Oral Competition	Mon., Nov. 16 8:00 AM - 3:20 PM	Convention Center, L100 D
M.S. Graduate Student Oral Competition	Mon., Nov. 16 8:00 AM - 4:35 PM	Convention Center, L100 B
Soil Fertility & Plant Nutrition: I	Mon., Nov. 16 9:30 AM - 4:00 PM	Convention Center, L100 C
M.S. Graduate Student Poster Competition	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Ph.D. Graduate Student Poster Competition	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Phosphorus Science & Management Posters	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC

The Science & Management of Secondary & Micronutrients Posters	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Fertilizer from Rock to Crop	Tue., Nov. 17 1:25 PM - 4:00 PM	Convention Center, 101 DE
SSSA Business Meeting–Nutrient Management & Soil & Plant Analysis	Tue., Nov. 17 4:00 PM - 5:00 PM	Convention Center, 101 DE
Leo M. Walsh Soil Fertility Distinguished Lectureship	Tue., Nov. 17 5:15 PM - 7:45 PM	Convention Center, 101 DE
Symposium–Performance Based Metrics for Efficient Nitrogen Management and Policy Making	Tue., Nov. 17 8:00 AM - 11:15 AM	Convention Center, L100 IJ
Nitrogen Science & Management	Tue., Nov. 17 8:00 AM - 3:50 PM	Convention Center, 103 DE
SSSA Business Meeting–Soil Fertility & Plant Nutrition	Tue., Nov. 17 4:00 PM - 5:00 PM	Convention Center, 101 DE
Advances in Soil and Plant Analytical Techniques	Wed., Nov. 18 11:00 AM - 12:20 PM	Convention Center, 103 DE
Polyhalites As a Nutrient Source	Wed., Nov. 18 2:20 PM - 3:25 PM	Convention Center, 103 DE
Nutrient Management & Soil & Plant Analysis Poster Session	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Phosphorus Science & Management	Wed., Nov. 18 11:00 AM - 2:35 PM	Convention Center, L100 B
Potassium Science and Management	Wed., Nov. 18 1:00 PM - 2:20 PM	Convention Center, L100 E
The Science & Management of Secondary & Micronutrients	Wed., Nov. 18 1:00 PM - 2:55 PM	Convention Center, L100 A
Nitrogen Science & Management Posters	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Potassium Science and Management Posters	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
Soil Fertility & Plant Nutrition: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
SSSA Division: Soil Mineralogy		
Soil Mineralogy: I (Includes Student Competition)	Mon., Nov. 16 2:40 PM - 4:00 PM	Convention Center, 103 A
Soil Mineralogy: II (Includes Student Competition)	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Symposium–Bugs and Dirt: Four Letter Words That Go Together (includes graduate student competition)	Tue., Nov. 17 7:55 AM - 12:00 PM	Convention Center, M100 D
SSSA Business Meeting–Soil Mineralogy	Tue., Nov. 17 6:30 PM - 8:00 PM	Convention Center, 103 A
SSSA Division: Soil Physics and Hydrology		
Environmental Soil Physics and Hydrology Student Competition: Lightning Orals with Posters: I	Mon., Nov. 16 7:55 AM - 10:05 AM	Convention Center, 103 BC
Symposium–Grand Challenges in Modeling Soil Processes: I	Mon., Nov. 16 7:55 AM - 12:00 PM	Convention Center, 103 DE
Symposium–Long-Term Terrestrial Observatories: Outdoor Laboratories for Soil-Plant-Atmosphere Interactions: I	Mon., Nov. 16 1:00 PM - 4:05 PM	Convention Center, 102 BC
Environmental Soil Physics and Hydrology Student Competition: Lightning Orals with Posters: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Grand Challenges in Modeling Soil Processes/Long-Term Observatories: II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Physics and Hydrology: Honoring the Contributions of Bob Luxmoore, John Letey, and John Hanks: I	Tue., Nov. 17 7:55 AM - 12:00 PM	Convention Center, 101 DE

Soil Physics and Hydrology: I	Tue., Nov. 17 12:55 PM - 4:40 PM	Convention Center, 101 J
Soil Physics and Hydrology: Honoring the Contributions of Bob Luxmoore, John Letey, and John Hanks: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Soil Physics and Hydrology: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
SSSA Business Meeting–Soil Physics and Hydrology	Wed., Nov. 18 11:30 AM - 1:30 PM	Convention Center, L100 GH
Remote Sensing of Soil Water: Soil Moisture Active Passive and Beyond	Wed., Nov. 18 1:45 PM - 4:30 PM	Convention Center, L100 F
SSSA Division: Soils & Environmental Quality		
Symposium–Agrochemical Soil Interactions: Honoring the Contributions of Bill Koskinen	Mon., Nov. 16 7:50 AM - 12:00 PM	Convention Center, M100 F
Tracking Legacy Phosphorus in Lakes and Rivers – I	Mon., Nov. 16 8:00 AM - 11:50 AM	Convention Center, M101 B
Environmental Impacts of Land Application of Waste	Mon., Nov. 16 12:55 PM - 4:15 PM	Convention Center, M100 C
Agrochemical Soil Interactions	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Environmental Impacts of Land Application of Waste – II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Tracking Legacy Phosphorus in Lakes and Rivers – II	Mon., Nov. 16 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Environmental Fate of Chemicals of Emerging Concern – I	Tue., Nov. 17 7:55 AM - 12:00 PM	Convention Center, M100 E
Soils & Environmental Quality: I	Tue., Nov. 17 8:00 AM - 11:50 AM	Convention Center, M100 F
Symposium–Environmental Fate and Resistance of Antibiotics, Herbicides and Pesticides – I	Tue., Nov. 17 1:00 PM - 4:15 PM	Convention Center, M100 E
Environmental Fate and Resistance of Antibiotics, Herbicides and Pesticides – II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
Environmental Fate of Chemicals of Emerging Concern – II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC
SSSA Business Meeting–Soils & Environmental Quality	Tue., Nov. 17 4:30 PM - 5:30 PM	Convention Center, M100 E
Winter Manure Application and Nutrient Loss in Runoff	Wed., Nov. 18 11:00 AM - 11:50 AM	Convention Center, M101 B
Nitrogen Fertilizer: Practices for Minimizing Environmental Impacts	Wed., Nov. 18 11:00 AM - 2:00 PM	Convention Center, M101 C
Soil Quality - What Does It Mean and How Can It be Measured	Wed., Nov. 18 1:00 PM - 2:20 PM	Convention Center, M101 B
Soils & Environmental Quality: II	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC
SSSA Division: Urban and Anthropogenic Soils		
Symposium–Soil and Vegetation Management for Stormwater Control	Mon., Nov. 16 8:00 AM - 11:50 AM	Convention Center, L100 IJ
Symposium–Carbon Storage and Dynamics in Urban Soils	Mon., Nov. 16 1:00 PM - 4:00 PM	Hilton, Marquette Ballroom I
SSSA Business Meeting–Urban and Anthropogenic Soils	Mon., Nov. 16 4:00 PM - 5:00 PM	Hilton, Marquette Ballroom I
Urban and Anthropogenic Soils: I	Tue., Nov. 17 1:00 PM - 3:40 PM	Hilton, Marquette Ballroom II
Urban and Anthropogenic Soils: II	Tue., Nov. 17 4:00 PM - 6:00 PM	Convention Center, Exhibit Hall BC

SSSA Division: Wetland Soils		
Wetland Soils: I (includes student competition)	Mon., Nov. 16 8:20 AM - 11:40 AM	Convention Center, 103 A
Symposium–Wetland Response to Climate Change	Mon., Nov. 16 1:05 PM - 4:00 PM	Hilton, Marquette Ballroom II
Symposium–Hydric Soil Management for Wetland Restoration and Creation	Tue., Nov. 17 8:20 AM - 11:35 AM	Hilton, Marquette Ballroom I
William H. Patrick, Jr. Memorial Lectureship	Tue., Nov. 17 4:15 PM - 7:10 PM	Convention Center, 101 A
SSSA Business Meeting–Wetland Soils	Wed., Nov. 18 1:00 PM - 2:00 PM	Convention Center, 101 A
Wetland Soils: II (includes student competition)	Wed., Nov. 18 2:30 PM - 4:30 PM	Convention Center, Exhibit Hall BC

Special Sessions		
Graduate Student Leadership Conference	Sat., Nov. 14 11:00 AM - 10:00 PM	Hilton, Marquette Ballroom IV-V
Graduate Student Networking Session- Building Professional Relations	Sun., Nov. 15 4:00 PM - 6:00 PM	Convention Center, L100 GH
Women in Science Networking Breakfast	Mon., Nov. 16 6:15 AM - 8:00 AM	Convention Center, Seasons
Symposium–Connecting Phytobiomes with Soil and Plant Health	Mon., Nov. 16 8:00 AM - 11:00 AM	Convention Center, 101 DE
Symposium–ASA-CSSA-SSSA-ESA Plenary: Getting More from Data: Science for Sustainable Solutions	Mon., Nov. 16 9:30 AM - 12:00 PM	Convention Center, Auditorium Main
So What's Next? a Panel Discussion on Career Opportunities for Graduate Students	Mon., Nov. 16 11:00 AM - 12:30 PM	Convention Center, L100 GH
Symposium–Public Private Partnerships to Improve Soil Health and Agronomic Resiliency	Mon., Nov. 16 1:00 PM - 4:00 PM	Hilton, Marquette Ballroom VII-VIII
Symposium–Building Agroecosystem Resilience for an Uncertain Future	Mon., Nov. 16 1:00 PM - 4:20 PM	Convention Center, L100 F
Symposium–AgMIP and Partners	Mon., Nov. 16 1:00 PM - 5:05 PM	Convention Center, 101 DE
5K Fun Run (registration required)	Tue., Nov. 17 6:30 AM - 8:00 AM	Loring Park
Gateway Scholars Orientation	Tue., Nov. 17 8:00 AM - 9:45 AM	Convention Center, 101 B
Symposium–Long-Term Agricultural Research: A Means to Achieve Resilient Agricultural Production for the 21st Century and Beyond	Tue., Nov. 17 8:00 AM - 11:30 AM	Convention Center, L100 F
Symposium–Restoring Soil Health - Local Actions, Global Implications, Partnering for Solutions	Tue., Nov. 17 8:00 AM - 11:45 AM	Convention Center, 101 A
Symposium–Partnering to Understand Complexity: Biogeochemical Cycles in Agricultural Systems	Tue., Nov. 17 8:00 AM - 12:00 PM	Convention Center, 102 E
Symposium–Meta-Analysis Applications in Agricultural Research	Tue., Nov. 17 8:30 AM - 12:00 PM	Convention Center, L100 E
Symposium–Improving Climate Information for Midwestern Crop Production	Tue., Nov. 17 9:30 AM - 11:50 AM	Convention Center, L100 A
Science Policy Graduate Student Luncheon	Tue., Nov. 17 12:00 PM - 1:30 PM	Hilton, Minneapolis Ballroom D
Symposium–Soils As the New Frontier in Antibiotic and Antibiotic Resistance Discovery	Tue., Nov. 17 1:00 PM - 4:10 PM	Convention Center, L100 GH
Symposium–Sustainability in the Food Supply Chain	Tue., Nov. 17 1:00 PM - 4:30 PM	Convention Center, L100 IJ
Gateway Scholars Program	Tue., Nov. 17 2:00 PM - 5:00 PM	Convention Center, 101 B
Women in Science "Breaking the Bias Habit" Workshop/ Reception	Tue., Nov. 17 2:00 PM - 5:00 PM	Convention Center, 102 A-F

Long-Term Agricultural Research: A Means to Achieve Resilient Agricultural Production for the 21st Century and Beyond (Poster Session)	Tue., Nov. 17 3:30 PM - 5:30 PM	Convention Center, Exhibit Hall BC
ACS528 Diversity Student Poster Competition	Tue., Nov. 17 5:00 PM - 8:00 PM	Convention Center, 101 B
Annual Committee Meeting of ACS 528 - Diversity in Agronomy, Crops, Soils and Environmental Sciences Committee	Tue., Nov. 17 5:00 PM - 8:00 PM	Convention Center, 101 B
Screening of "The PHD Movie 2: Still in Grad School."	Tue., Nov. 17 7:00 PM - 9:00 PM	Convention Center, 102 A-F
Symposium–The Intersection of Water Quality and Agriculture: Partnering with Agriculture on Issues, Challenges and Promising Solutions	Wed., Nov. 18 8:00 AM - 5:00 PM	Convention Center, L100 IJ
Symposium–Benefits and Barriers to Data Sharing	Wed., Nov. 18 8:15 AM - 11:55 AM	Convention Center, M100 GH
Symposium–Soil and Manure Laboratory Proficiency and Certification Programs	Wed., Nov. 18 9:00 AM - 11:05 AM	Convention Center, L100 A
Symposium–Perspectives on Sustainably Supporting the Human Populace in the Future	Wed., Nov. 18 12:00 PM - 1:30 PM	Convention Center, 102 A-F
Introduction to the Foundation for Food and Agriculture Research	Wed., Nov. 18 1:30 PM - 2:30 PM	Convention Center, 102 A-F
Symposium–Moderated Discussion on Intellectual Property (IP) Protection of Plant–related Inventions in the U.S.	Wed., Nov. 18 1:30 PM - 2:30 PM	Convention Center, 101 DE
Students of Agronomy, Soils and Environmental Sciences (SASES)		
SASES Registration	Fri., Nov. 13 5:00 PM - 9:00 PM	Convention Center, Registration Center
SASES National Officer Meeting	Fri., Nov. 13 7:00 PM - 7:55 PM	Hilton, Symphony Ballroom III
SASES Committee Member Meeting	Fri., Nov. 13 8:00 PM - 9:00 PM	Hilton, Symphony Ballroom III
SASES Registration II	Sat., Nov. 14 6:00 AM - 7:30 AM	Convention Center, Registration Center
SASES Tours	Sat., Nov. 14 7:30 AM - 6:00 PM	Convention Center, Registration Center
Presidents Trophy Competition	Sat., Nov. 14 7:00 PM - 8:30 PM	Convention Center, Auditorium 2
SASES Business Meeting I	Sat., Nov. 14 8:30 PM - 9:30 PM	Convention Center, Auditorium 2
SASES Social	Sat., Nov. 14 10:00 PM - 11:55 PM	Hilton, Marquette Ballroom I
SASES Registration: III	Sun., Nov. 15 7:30 AM - 9:00 AM	Convention Center, Registration Center
SASES Brunch and Keynote Speaker	Sun., Nov. 15 9:00 AM - 10:30 AM	Hilton, Minneapolis Ballroom D
SASES Business Meeting II	Sun., Nov. 15 10:30 AM - 11:30 AM	Hilton, Minneapolis Ballroom D
Symposium–Undergraduate Research Symposium Contest - Oral I	Sun., Nov. 15 12:00 PM - 2:15 PM	Convention Center, M100 B
Symposium–Undergraduate Research Symposium Contest - Oral II	Sun., Nov. 15 12:00 PM - 2:15 PM	Convention Center, M100 D
SASES National Speech Contest Prelims: II	Sun., Nov. 15 2:30 PM - 4:00 PM	Convention Center, M101 A
SASES National Speech Contest - Prelims: I	Sun., Nov. 15 2:30 PM - 4:00 PM	Convention Center, M100 A
Undergraduate Professional Development	Sun., Nov. 15 3:30 PM - 5:00 PM	Convention Center, L100 DE
SASES Club Poster Contest	Sun., Nov. 15 5:00 PM - 6:00 PM	Convention Center, Registration Center
SASES National Speech Contest – Finals	Sun., Nov. 15 8:00 PM - 9:00 PM	Convention Center, 101 DE

SASES Quiz Bowl	Sun., Nov. 15 9:00 PM - 11:00 PM	Convention Center, Auditorium 2
SASES Club Presidents' Round Table	Mon., Nov. 16 8:30 AM - 10:00 AM	Hilton, Duluth Room
CCA Career Accelerator Round Table	Mon., Nov. 16 10:00 AM - 12:00 PM	Hilton, Minneapolis Ballroom C
Grad School Workshop for Undergrads	Mon., Nov. 16 10:00 AM - 12:00 PM	Hilton, Symphony Ballroom I
SASES Advisor Luncheon	Mon., Nov. 16 12:00 PM - 1:00 PM	Hilton, Duluth Room
Pop with the Presidents	Mon., Nov. 16 12:00 PM - 1:30 PM	Hilton, Minneapolis Ballroom D
Crops Judging Contest Showcase	Mon., Nov. 16 1:00 PM - 3:00 PM	Hilton, Minneapolis Ballroom E
Undergraduate Research Symposium Contest – Poster	Mon., Nov. 16 3:00 PM - 5:00 PM	Convention Center, Exhibit Hall BC
Delegate Training for SASES Clubs	Mon., Nov. 16 5:45 PM - 6:30 PM	Hilton, Minneapolis Ballroom D
SASES Dinner, Awards, and Elections	Mon., Nov. 16 6:30 PM - 9:00 PM	Hilton, Minneapolis Ballroom D
SASES Dance	Mon., Nov. 16 9:30 PM - 11:55 PM	Hilton, Minneapolis Ballroom A
Professional Tours		
C5-Turfgrass Division Tour	Sat., Nov. 14 9:00 AM - 4:00 PM	
Upper Midwest Organic Agriculture Tour	Sat., Nov. 14 7:30 AM - 4:30 PM	
Workshops		
Analyses of Microbial Community Composition and Metagenomics Using Qiime	Sun., Nov. 15 8:30 AM - 4:30 PM	Convention Center, L100 A
Analysis of Grazing Data II - Regression Techniques	Wed., Nov. 18 1:00 PM - 5:00 PM	Hilton, Marquette Ballroom I-II
Asreml-R: Analysis of Breeding Trials	Sat., Nov. 14 8:00 AM - 5:30 PM	Convention Center, L100 A
Comet-Farm: Agricultural and Forestry Carbon and Greenhouse Gas Accounting at Your Fingertips.	Sun., Nov. 15 9:00 AM - 12:30 PM	Convention Center, L100 B
Data Handling and Analysis Tricks They Don't Teach You in Grad School	Sun., Nov. 15 1:30 PM - 5:30 PM	Convention Center, L100 B
Making a Compelling Science Message: I	Mon., Nov. 16 1:30 PM - 3:30 PM	Hilton, Board Room 1
Making a Compelling Science Message: II	Tue., Nov. 17 10:00 AM - 12:00 PM	Hilton, Board Room 1
Measuring Nitrous Oxide Emissions from Soils: Methodology, Instrumentation, Modeling, Data Stewardship and Analysis	Thu., Nov. 19 8:30 AM - 4:00 PM	Hilton, Marquette Ballroom I-II
Mechanical Measurements of Crops and Soils: Principles and Techniques	Mon., Nov. 16 11:00 AM - 1:30 PM	Hilton, Rochester Room
Meta-Analysis for the Synthesis of Evidence in Agriculture	Sun., Nov. 15 9:00 AM - 4:30 PM	Convention Center, L100 C
Writing an Abstract for a Paper, Talk, or Poster	Sun., Nov. 15 1:00 PM - 3:00 PM	Hilton, Board Room 1
Women in Science "Breaking the Bias Habit" Workshop/ Reception	Tue., Nov. 17 2:00 PM - 5:00 PM	Convention Center, 102 A-F

ASA, CSSA, SSSA COMMITTEE AND MEETING SCHEDULE

COMMITTEE MEETINGS (SOCIETY AND OTHER)		
Saturday		
1:00 PM - 4:00 PM	ACSESS Board of Directors Meeting	Hilton Minneapolis, Symphony Ballroom III
1:00 PM - 5:00 PM	Legume Cover Crop Breeding Team	Hilton Minneapolis, Conrad A
4:00 PM - 6:30 PM	Soil Science Certifying Board	Hilton Minneapolis, Conrad B
Sunday		
7:00 AM - 7:30 AM	Presiding Officer Training: I	Minneapolis Convention Center, 205 A
8:00 AM - 10:00 AM	AgMIP PI Meeting	Hilton Minneapolis, Conrad A
8:00 AM - 11:00 AM	SSSA Board of Directors Meeting	Hilton Minneapolis, Symphony Ballroom III
12:00 PM - 12:30 PM	Presiding Officer Training: II	Minneapolis Convention Center, 205 A
1:00 PM - 2:00 PM	S302 SSSA Journal Technical Editors	Hilton Minneapolis, Symphony Ballroom III
2:00 PM - 3:00 PM	S302 SSSA Journal New Editor Training	Hilton Minneapolis, Symphony Ballroom III
2:00 PM - 5:00 PM	ATIP-REAP-GRACEnet Reveiw & Business Meeting	Hilton Minneapolis, Symphony Ballroom I
2:00 PM - 5:00 PM	Isee Project Meeting	Hilton Minneapolis, Rochester Room
2:00 PM - 5:30 PM	Planting Science Mentor Meeting (ACS531 Committee)	Hilton Minneapolis, Conrad A
3:00 PM - 5:00 PM	S302 SSSA Journal Editorial Board	Hilton Minneapolis, Symphony Ballroom III
3:30 PM - 5:30 PM	Department Heads/Chairs Roundtable	Hilton Minneapolis, Conrad B
3:45 PM - 4:45 PM	Golden Opportunity Scholars Orientation	Minneapolis Convention Center, 102 D
4:00 PM - 6:00 PM	Korean Scientists Night	Hilton Minneapolis, Conrad C
5:00 PM - 6:30 PM	Joint Meeting “Clover and Special Purpose Legumes” with “Forage and Turfgrass” Crop Germplasm Committees	Hilton Minneapolis, Rochester Room
Monday		
6:30 AM - 8:30 AM	SSSA (S591) K-12 Committee Meeting	Hilton Minneapolis, Conrad C
7:00 AM - 7:30 AM	Presiding Officer Training: III	Minneapolis Convention Center, 205 A
7:00 AM - 8:00 AM	Pan-SSSA Soil Change Working Group	Hilton Minneapolis, Director’s Row 1
9:00 AM - 12:00 PM	Agronomic Science Foundation Board of Directors Meeting	Hilton Minneapolis, Conrad B
10:00 AM - 12:00 PM	AC315 Crop, Forage & Turfgrass Management Editorial Board	Hilton Minneapolis, Symphony Ballroom III
10:30 AM - 12:00 PM	S304 Soil Horizons Editorial Board	Hilton Minneapolis, Conrad A
11:30 AM - 1:00 PM	ACS324.1 Journal of Environmental Quality Technical Editors	
12:30 PM - 1:00 PM	Presiding Officer Training: IV	Minneapolis Convention Center, 205 A
1:00 PM - 2:00 PM	C302 Crop Science Technical Editors	Hilton Minneapolis, Symphony Ballroom II
1:30 PM - 3:30 PM	Soil and Plant Analysis Council Board Meeting	Hilton Minneapolis, Director’s Row 1
2:00 PM - 3:00 PM	C302 Crop Science Editorial Board	Hilton Minneapolis, Symphony Ballroom II
2:00 PM - 4:00 PM	USDA-ARS All Hands Meeting	Minneapolis Convention Center, Auditorium 3
3:00 PM - 4:00 PM	C312 Journal of Plant Registrations	Hilton Minneapolis, Conrad B
3:30 PM - 6:00 PM	NAPT Oversight Committee and NAPT-PAP Meeting	Hilton Minneapolis, Conrad C
4:30 PM - 5:30 PM	ACS330 Agricultural & Environmental Letters Journal Editorial Board	Hilton Minneapolis, Conrad B
5:30 PM - 7:00 PM	ACS732 Annual Meeting Planning Committee	Hilton Minneapolis, Conrad D
5:30 PM - 8:00 PM	Association of Agricultural Scientists of Indian Origin (AASIO) Annual Meeting	Hilton Minneapolis, Symphony Ballroom I

5:30 PM - 8:30 PM	Annual Meeting of the Association of Chinese Soil & Plant Scientists in North America (ACSPSNA)	Minneapolis Convention Center, 102 E
6:30 PM - 7:15 PM	Soil Glossary Working Group S837	Hilton Minneapolis, Conrad C
7:00 PM - 9:30 PM	Christian Fellowship Meeting	Hilton Minneapolis, Minneapolis Ballroom C
7:30 PM - 9:00 PM	2016 Program Planning Meeting	Hilton Minneapolis, Marquette Ballroom VII-VIII
7:30 PM - 9:30 PM	DSSAT Foundation Open Forum	Hilton Minneapolis, Symphony Ballroom II
Tuesday		
7:00 AM - 7:30 AM	Presiding Officer Training: V	Minneapolis Convention Center, 205 A
9:00 AM - 10:00 AM	ACS449 Undergrad Contest Committee Meeting	Hilton Minneapolis, Conrad A
9:00 AM - 11:00 AM	Farmlink Data Analytics	Hilton Minneapolis, Conrad C
9:30 AM - 11:00 AM	ACS321 Editorial Affairs	Hilton Minneapolis, Conrad B
11:30 AM - 12:30 PM	Soil Methods Editorial Board	Hilton Minneapolis, Conrad B
12:00 PM - 12:30 PM	Presiding Officer Training: VI	Minneapolis Convention Center, 205 A
1:00 PM - 2:00 PM	ACS320 Book and Multimedia Publishing	Hilton Minneapolis, Conrad B
2:30 PM - 3:00 PM	AE Training for A302 Agronomy Journal Editorial Board	Hilton Minneapolis, Marquette Ballroom I
2:30 PM - 4:30 PM	Usable: The U2U Midwest Agricultural Decision Support Tools in Practice	Hilton Minneapolis, Symphony Ballroom II
3:00 PM - 5:00 PM	A302 Agronomy Journal Editorial Board	Hilton Minneapolis, Marquette Ballroom I
4:00 PM - 5:00 PM	SSSA 2019 Program Planning Meeting	Hilton Minneapolis, Conrad D
5:30 PM - 7:00 PM	S303 Vadose Zone Journal Editorial Board	Hilton Minneapolis, Conrad B
6:00 PM - 8:00 PM	SSSA Higher Education Materials Committee	Hilton Minneapolis, Conrad C
Wednesday		
7:00 AM - 7:30 AM	Presiding Officer Training: VII	Minneapolis Convention Center, 205 A
7:00 AM - 8:00 AM	North American Forest Soils Conference Planning Committee Meeting	Hilton Minneapolis, Conrad A
7:00 AM - 8:30 AM	ACS Graduate Student Committee	Hilton Minneapolis, Symphony Ballroom III
9:30 AM - 10:30 AM	Crops & Soils Editorial Board Meeting	Hilton Minneapolis, Conrad B
10:00 AM - 11:00 AM	National Academies (BANR)/Societies Meeting	Hilton Minneapolis, Conrad C
10:00 AM - 12:00 PM	ACS324.1 Journal of Environmental Quality Editorial Board	Hilton Minneapolis, Marquette Ballroom III
10:30 AM - 11:30 AM	ACS 530 Early Career Committee Meeting	Hilton Minneapolis, Conrad A
1:00 PM - 2:00 PM	Kirkham Conference Committee Meeting	Hilton Minneapolis, Conrad B
2:00 PM - 3:00 PM	ASA Community & Section Feedback Meeting	Hilton Minneapolis, Symphony Ballroom III
Thursday		
7:00 AM - 9:00 AM	ASA Board of Directors Meeting	Hilton Minneapolis, Symphony Ballroom III
9:00 AM - 11:00 AM	CSSA Board of Directors Meeting	Hilton Minneapolis, Symphony Ballroom I-II
9:00 AM - 11:00 AM	SERA-17 Meeting	Hilton Minneapolis, Marquette Ballroom III-IV
FOOD FUNCTIONS/RECEPTIONS		
Sunday		
7:10 PM - 9:00 PM	Welcome Reception	Minneapolis Convention Center, Exhibit Hall BC
Monday		
6:15 AM - 8:00 AM	Women in Science Networking Breakfast	Minneapolis Convention Center, Seasons
5:00 PM - 7:00 PM	Colorado State University Alumni Reception	Hilton Minneapolis, Director's Row 1

5:30 PM - 7:00 PM	ASA Pigout	Hilton Minneapolis, Red Wing Room
5:30 PM - 7:30 PM	ISU Mixer	Hilton Minneapolis, Duluth Room
5:30 PM - 7:30 PM	Minnesota Mixer	Hilton Minneapolis, Rochester Room
6:00 PM - 7:30 PM	University of Florida - Agronomy & Soil and Water Science Gator Gathering	McCormick & Schmick's Seafood & Steaks (9th St. and Nicollet Mall)
Tuesday		
12:00 PM - 1:30 PM	Golden Opportunity Scholars and Greenfield Scholars Luncheon	Hilton Minneapolis, Minneapolis Ballroom A
5:30 PM - 7:30 PM	Kansas State University, Department of Agronomy "Purple Coat" Reception	Hilton Minneapolis, Rochester Room
6:30 PM - 8:30 PM	University of Nebraska-Lincoln Department of Agronomy & Horticulture, Big Red Mixer	Hilton Minneapolis, Duluth Room
8:30 PM - 11:30 PM	Graduate Student Social	The Pour House
Wednesday		
4:30 PM - 5:30 PM	Closing Reception	Minneapolis Convention Center, Auditorium Main
5:00 PM - 7:00 PM	SERA-17 Kick-Off Mixer	Hilton Minneapolis, Conrad A

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SUNDAY, NOVEMBER 15, 2015, MORNING

Program Symposium in Honor of Nan Yao Su: How Synergy in Science Led to Innovation

204 AB (Convention Center)

Moderators and Organizers: Walter Leal[1] and Anthony James[2], [1]Univ. of California, Davis, CA, [2]Univ. of California, Irvine, CA

8:00 Welcoming Remarks

8:05 0001 Welcome Address. **Phillip G. Mulder, Jr.** (phil.mulder@okstate.edu), Oklahoma State Univ., Stillwater, OK

8:10 0002 Premier Presentation: Mosquitoes and malaria: role of vector control in the eradication agenda. **Anthony A. James** (aajames@uci.edu), Univ. of California, Irvine, CA

8:40 0003 Premier Presentation: Exploiting plant behavior and chemical ecology for developing new crop protection strategies for Africa. **Zeyaur Khan** (zkhan@icipe.org)[1], Charles Midega[1], Toby Bruce[2], Tony Hooper[2], Michael Birkett[2] and John Pickett[2], [1]International Centre of Insect Physiology and Ecology, Nairobi, Kenya, [2]Rothamsted Research, Harpenden, Hertfordshire, United Kingdom

9:10 0004 A cast of thousands and one DEET receptor: How we synergized to address long-standing entomology questions. **Walter Leal** (wsleal@ucdavis.edu), Univ. of California, Davis, CA

9:40 Break

9:55 0005 Imagination, curiosity, and perseverance yields creativity: Highlights of a career in entomology. **John A. Byers** (john.byers@ars.usda.gov), USDA - ARS, Maricopa, AZ

10:25 0006 Synergy between plant virus and Bt toxin research results in novel transgenes for plant resistance to aphids. **Bryony Bonning** (bbonning@iastate.edu), Iowa State Univ., Ames, IA

10:55 0007 Genetic control of pest insects. **Luke Alphey** (luke.alphey@pirbright.ac.uk), The Pirbright Institute, Woking, United Kingdom

11:25 0008 Insect resistance to transgenic Bt crops: Lessons from the first billion acres. **Bruce Tabashnik** (brucet@Ag.arizona.edu), Univ. of Arizona, Tucson, AZ

11:55 Concluding Remarks

MUVE Section Symposium: Insects and Their Diseases that Cause Harm to Humans and Animals

206 AB (Convention Center)

Moderator and Organizer: Janet Hurley, Texas A&M AgriLife Extension Service, Dallas, TX

9:30 Introductory Remarks

9:40 0009 Prevalence of *Trypanosoma cruzi* in free-ranging mammalian populations in Bexar County, Texas. **Mathew Kramm** (mathew.kramm@us.af.mil), US Air Force, JBSA-Randolph, TX

10:00 0010 The biology of the triatomine bugs native to Texas and IPM tactics to reduce the risk for Chagas' disease exposure. **Edward Wozniak** (edward.wozniak@dshs.state.tx.us), Texas Dept. of State Health Services, Uvalde, TX

10:20 0011 Arthropods associated with companion animals and animals treated as companions. **Nancy Hinkle** (nhinkle@uga.edu), Univ. of Georgia, Athens, GA

10:40 Break

10:50 0012 The up-tick in tick-borne diseases. **Phillip E. Kaufman** (pkaufman@ufl.edu), Univ. of Florida, Gainesville, FL

11:10 0013 Ectoparasite loads and their implications from rats trapped in New Orleans, LA. Claudia Riegel[1], **Eric Guidry[1]**, Anna Peterson[2], Bruno Ghersi[2], Friederike Bauder[1], Timothy Madere[1] and Michael J. Blum[2], [1]City of New Orleans Mosquito, Termite & Rodent Control Board, New Orleans, LA, [2]Tulane Univ., New Orleans, LA

PBT Section Symposium: Developmental Synergy between Genome Regulation and Environmental Stimuli: From Phenotypic Plasticity to Disease Response

208 C (Convention Center)

Moderators and Organizers: Brendan Hunt[1] and Hongmei Li-Byarlay[2], [1]Univ. of Georgia, Griffin, GA, [2]North Carolina State Univ., Raleigh, NC

8:00 Introductory Remarks

8:05 0014 The condition-responsive development of *Onthophagus* beetles: Origins, mechanisms, and consequences. Armin P. Moczek and **Cristina Ledon-Rettig** (crisledo@indiana.edu), Indiana Univ., Bloomington, IN

8:25 0015 The molecular mechanisms underlying transgenerational wing polyphenism in pea aphids. **Jennifer A. Brisson** (jbrisso3@ur.rochester.edu), Univ. of Rochester, Rochester, NY

8:45 0016 Variable gene expression and transcriptional memory as mechanisms of plasticity: Physiological learning in caterpillars. **Emilie C. Snell-Rood** (emilies@umn.edu), Univ. of Minnesota, St. Paul, MN

9:05 SP0017 The role of insulin signaling in development of wing morphs in the soapberry bug, *Jadera haematoloma*. **David Angelini** (dave.angelini@colby.edu), Meghan Fawcett, Alice Grubb Jones, Stacey Hou, Mary Parks, Elizabeth Richards and Juan Camilo Vanegas, Colby College, Waterville, ME

9:17 Break

9:32 0018 Premier Presentation: The developmental basis of phenotypic evolution in ants: Hormones, genes, and epigenetics. **Rajendhran Rajakumar** (rajendhran.rajakumar@mail.mcgill.ca) and Ehab Abouheif, McGill Univ., Montreal, QC, Canada

9:52 0019 Evolutionary insights into DNA methylation in Hymenoptera. **Brendan Hunt** (huntbg@uga.edu)[1], Karl Glastad[2], Michael AD. Goodisman[2] and Sarah Kocher[3], [1]Univ. of Georgia, Griffin, GA, [2]Georgia Institute of Technology, Atlanta, GA, [3]Harvard Univ., Cambridge, MA

10:12 0020 Premier Presentation: Aggression and metabolism in hybrid honey bees is linked to allele specific expression. **Joshua Gibson** (gibson85@purdue.edu), Purdue Univ., West Lafayette, IN

10:32 Break

10:47 0021 Transcriptomic analysis of lethal IAPV infection in honey bee pupae. **Hongmei Li-Byarlay** (hlibyar@ncsu.edu)[1], Humberto F. Boncristiani[2], David Tarpy[3], Micheline Strand[4] and Olav Rueppell[2], [1]North Carolina State Univ., Raleigh, NC, [2]Univ. of North Carolina, Greensboro, NC, [3]Cornell Univ., Ithaca, NY, [4]Chemical and Biological Defense Laboratories, Durham, NC

11:07 0022 Differential transcriptional activity of mutualistic viruses in parasitoid wasps and their hosts. **Gaelen Burke** (grburke@uga.edu), Univ. of Georgia, Athens, GA

11:27 0023 Parallel epigenomic and transcriptomic responses to viral infection in honey bees, *Apis mellifera*. **David Galbraith** (dag5031@gmail.com), Pennsylvania State Univ., University Park, PA

11:47 SP0024 Transcriptomics of gnotobiotic and axenic larval *Aedes aegypti* reveal effects of gut community on development and homeostasis. **Kevin J. Vogel** (kjvogel@uga.edu), Luca Valzania, Mark R. Brown and Michael R. Strand, Univ. of Georgia, Athens, GA

P-IE Section Symposium: Beyond Bt: Trait Discovery and Breeding for Modified Plant-Insect Interactions

200 B (Convention Center)

Moderators and Organizers: Jarrad Prasifka and Brent Hulke, USDA - ARS, Fargo, ND

8:00 0025 Introduction: Challenges in the development of native crop traits for altered plant-insect interactions. **Brent Hulke** (brent.hulke@ars.usda.gov), USDA - ARS, Fargo, ND

8:10 0026 Induced susceptibility affects *Aphis glycines* virulence on resistant soybean: Implications for managing this pest in the future. **Adam Varenhorst** (ajv@iastate.edu)[1], Michael T. McCarville[2] and Matt O'Neal[1], [1]Iowa State Univ., Ames, IA, [2]Bayer CropScience, Johnston, IA

8:35 0027 Characterizing cereal aphid resistance in a perennial bioenergy feedstock. **Kyle G. Koch** (kylegkoch@gmail.com)[1], Tiffany Heng-Moss[1], Jeffrey Bradshaw[2] and Gautam Sarath[3], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, Scottsbluff, NE, [3]USDA - ARS, Lincoln, NE

9:00 0028 Molecular mimicry underlies insect-induced plant-gall formation and plant defense to galling insects. **Lucio Navarro** (lucionavarroe@gmail.com)[1], Chaoyang Zhao[1], Stephen Richards[2], Richard Shukle[1,3], Ming-Shun Chen[4] and Jeffrey J. Stuart[1], [1]Purdue Univ., West Lafayette, IN, [2]Baylor Univ., Houston, TX, [3]USDA - ARS, West Lafayette, IN, [4]Kansas State Univ., Manhattan, KS

9:25 0029 A quest for ash resistance to emerald ash borer guided by a coevolutionary perspective. **Daniel A. Herms** (herms.2@osu.edu)[1], Don Cipollini[2], Kathleen S. Knight[3], Jennifer Koch[3], Therese Poland[4], Chad M. Rigsby[2], Justin G. A. Whitehill[5] and Pierluigi Bonello[6], [1]The Ohio State Univ., Wooster, OH, [2]Wright State Univ., Dayton, OH, [3]USDA - Forest Service, Delaware, OH, [4]USDA - Forest Service, Lansing, MI, [5]Univ. of British Columbia, Vancouver, BC, Canada, [6]The Ohio State Univ., Columbus, OH

9:55 Break

10:05 0030 Native resistance of maize against the western corn rootworm, *Diabrotica virgifera virgifera* LeConte. **Martin Bohn** (mbohn@uiuc.edu)[1] and Bruce Hibbard[2], [1]Univ. of Illinois, Champaign, IL, [2]USDA - ARS, Columbia, MO

10:35 0031 Plant resistance traits for sunflower insect pests. **Jarrad Prasifka** (jarrad.prasifka@ars.usda.gov) and Brent Hulke, USDA - ARS, Fargo, ND

11:00 0032 Eating and being eaten: Importance of higher trophic levels for plant-insect interactions. **M. Deane Bowers** (deane.bowers@colorado.edu), Univ. of Colorado, Boulder, CO

11:30 0033 Marker-assisted enhancement of novel oilseed crops as a nutritional resource for pollinators. **Clay Carter** (cjcarter@umn.edu)[1], M. Marks[1] and Frank Forcella[2], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - ARS, Morris, MN

P-IE Section Symposium: Worldwide Resistance to Bt-toxins: Causes, Consequences, Cures?

200 C (Convention Center)

Moderators and Organizers: Michael Caprio[1] and Rick Roush[2], [1]Mississippi State Univ., Mississippi State, MS, [2]Pennsylvania State Univ., University Park, PA

8:00 Introductory Remarks

8:10 0034 Modeling the impacts of response strategies to the evolution of resistance. **Nicholas Friedenberg** (nick@ramas.com)[1], Jeannette Martinez[2] and Michael Caprio[2], [1]Applied Biomathematics, Setauket, NY, [2]Mississippi State Univ., Mississippi State, MS

8:30 0035 Premier Presentation: Resistance to *Bacillus thuringiensis* Cry2Ab toxin in *Helicoverpa* spp. is conferred by mutations in a novel ABC transporter. Wee Tek Tay[1], Rod Mahon[1], Tom Walsh[1], Sharon Downes[2], William James[1], Siu Fai Lee[3], Annette Reineke[4], Adam Williams[3], Karl Gordon[1] and **David G. Heckel** (heckel@ice.mpg.de)[5], [1]CSIRO, Canberra, Australia, [2]CSIRO, Narrabri, Australia, [3]Univ. of Melbourne, Parkville, Australia, [4]Geisenheim Univ., Geisenheim, Germany, [5]Max Planck Institute for Chemical Ecology, Jena, Germany

8:50 0036 EPA's experiences with corn rootworm IRM: Past, present, and future. **Alan Reynolds** (reynolds.alan@epa.gov) and Jeannette Martinez, USEPA, Washington, DC

9:10 0037 Resistance management for Bt cotton in Australia: A 20 year success of governance. **Rick Roush** (rtr10@psu.edu), Pennsylvania State Univ., University Park, PA

9:30 0038 Bt resistance and India. **Timothy J. Dennehy** (timothy.dennehy@bayer.com), Univ. of Arizona, Tucson, AZ

9:50 Break

10:10 0039 A multi-tactic, multi-layer approach to achieving effective IRM implementation for Bt crops in Brazil. **Samuel Martinelli** (samuel.martinelli@monsanto.com)[1], Renato A. de Carvalho[2] and Graham P. Head[1], [1]Monsanto Company, St. Louis, MO, [2]Monsanto do Brasil Ltda., São Paulo, Brazil

10:30 0040 Global initiatives to enhance IRM for Bt crops. **Graham P. Head** (graham.p.head@monsanto.com), Monsanto Company, St. Louis, MO

10:50 0041 Managing Bt resistance: A Mexican perspective. **David Mota-Sanchez** (motasanc@msu.edu)[1], Carlos A. Blanco[2],

Concepcion Rodriguez Maciel[3], Jose Luis Martinez-Carrillo[4], Urbano Nava-Camberos[5], Sotero Aguilar-Medel[6] and Antonio Terán-Vargas[7], [1]Michigan State Univ., East Lansing, MI, [2]Univ. of New Mexico, Albuquerque, NM, [3]Colegio de Postgraduados, Montecillo, Mexico, [4]Instituto Tecnológico de Sonora, Ciudad Obregón, Mexico, [5]Universidad Juárez del Estado de Durango, Gómez Palacio, Mexico, [6]Universidad Autónoma del Estado de México, Tenancingo, Mexico, [7]INIFAP, Cuauhtemoc, Mexico

11:10 0042 Managing Bt resistance: A Canadian regulatory perspective. **Martine de Graaff** (martine.degraaff@inspection.gc.ca), Canadian Food Inspection Agency, Ottawa, ON, Canada

11:30 Discussion

P-IE Section Symposium: Synergy and Partnerships in Biological Control: Honoring the Career of Roy Van Driesche

205 B (Convention Center)

Moderators and Organizers: Mark S. Hoddle[1] and Joseph Elkinton[2], [1]Univ. of California, Riverside, CA, [2]Univ. of Massachusetts, Amherst, MA

8:00 Introductory Remarks

8:15 0043 The meaning of percent parasitism revisited. **Joseph Elkinton** (elkinton@ent.umass.edu), Univ. of Massachusetts, Amherst, MA

8:45 0044 Arthropod biological control in support of conservation: A prescient approach for invasive species management. **Mark S. Hoddle** (mark.hoddle@ucr.edu), Univ. of California, Riverside, CA

9:15 0045 Threats posed to rare or endangered insects by invasions of non-native species. **David L. Wagner** (david.wagner@uconn.edu), Univ. of Connecticut, Storrs, CT

9:45 0046 Biological control of the invasive emerald ash borer: Potential for success according to Roy Van Driesche's biocontrol text book. **Jian Duan** (jian.duan@ars.usda.gov), USDA - ARS, Newark, DE

10:15 0047 Roy Van Driesche's dedication to keeping research from residing only in the archives: Development and implementation of IPM-based biological control in protected culture. **Kevin Heinz** (kevin.heinz@ag.tamu.edu), Texas A&M Univ., College Station, TX

10:45 0048 The role and status of agricultural development in African economies. **Agnes Kalibata** (AKalibata@agra.org), Minister of Agriculture and Animal Resources, Kigala, Rwanda

11:15 0049 Coccinellids, imidacloprid, *Lecanicillium*, and the hemlock woolly adelgid keeps rolling along. **Daniel Simberloff** (tebo@utk.edu) and Christy Leppanen, Univ. of Tennessee, Knoxville, TN

11:45 Concluding Remarks

SysEB Section Symposium: Conserving Rare Butterflies: Challenges and Successes

209 AB (Convention Center)

Moderators and Organizers: Karen Oberhauser[1], Nick M. Haddad[2] and Scott Black[3], [1]Univ. of Minnesota, St. Paul, MN, [2]North Carolina State Univ., Raleigh, NC, [3]The Xerces Society for Invertebrate Conservation, Portland, OR

8:00 Welcoming Remarks

8:05 0050 The rarest of the rare: Protecting critically endangered butterflies. **Nick M. Haddad** (nick_haddad@ncsu.edu), North Carolina State Univ., Raleigh, NC

8:25 0051 Premier Presentation: The status of North America's butterflies: Are once-common species in trouble? **Scott Black** (sblack@xerces.org), The Xerces Society for Invertebrate Conservation, Portland, OR

8:45 0052 Using butterfly monitoring programs to assess rare species. **Maxim Larrivée** (maxim.larrivee@ville.montreal.qc.ca), Montreal Space for Life, Montreal, QC, Canada

9:05 0053 Monarchs: Can a common species be threatened? **Karen Oberhauser** (oberh001@umn.edu), Univ. of Minnesota, St. Paul, MN

9:20 0054 Conservation of Schaus' swallowtail in south Florida. **Jaret C. Daniels** (jdaniels@flmnh.ufl.edu), Univ. of Florida, Gainesville, FL

9:35 0055 Complex declines of Dakota skipper, Poweshiek skipperling and other endangered prairie butterflies. **Erik B. Runquist** (erik.runquist@state.mn.us), Minnesota Zoo, Apple Valley, MN

9:50 0056 Bartram's scrub-hairstreak and the need for disturbance. **Erica Henry** (henry_eh@yahoo.com), North Carolina State Univ., Raleigh, NC

10:05 0057 How science and partnerships lead to better conservation and management of the Karner blue butterfly in Wisconsin. **Paula Kleintjes Neff** (kleintpk@uwec.edu)[1], Robert J. Hess[2] and Anna N. Hess[3], [1]Univ. of Wisconsin, Eau Claire, WI, [2]Wisconsin Dept. of Natural Resources, Madison, WI, [3]Division of Ecological and Water Resources, Two Harbors, MN

10:20 0058 Roadsides and butterflies: Problematic or valuable habitat? **Jennifer L. Hopwood** (jennifer@xerces.org), Univ. of Kansas, Lawrence, KS

10:40 0059 Conservation design and rare butterflies. **Cheryl Schultz** (schultzc@vancouver.wsu.edu), Washington State Univ., Vancouver, WA

11:00 0060 Ecological restoration as a strategy for conserving imperiled butterfly communities. **John Shuey** (jshuey@tnc.org), The Nature Conservancy, Indianapolis, IN

11:20 0061 Using fire as a management tool for butterfly conservation: A cautionary tale? **Rich Hatfield** (rich@xerces.org), The Xerces Society for Invertebrate Conservation, Portland, OR

11:40 0062 Atmospheric nitrogen deposition and conservation of the threatened bay checkerspot butterfly. **Stuart Weiss** (stu@creeksidescience.com), Creekside Center for Earth Observation, Menlo Park, CO

Member Symposium: The Nascent Mason Bee Industry: Researchers, Entrepreneurs, and Agriculturists Partnering for Pollination Solutions

200 A (Convention Center)

Moderators and Organizers: Derek R. Artz[1] and Cory Stanley-Stahr[2], [1]USDA - ARS, Logan, UT, [2]Univ. of Florida, Gainesville, FL

8:00 Introductory Remarks

8:10 0063 Developing alternative manageable bee species for crop pollination. **Corey Andrikopoulos** (cja576@gmail.com)[1], James H. Cane[2] and Diane G. Alston[1], [1]Utah State Univ., Logan, UT, [2]USDA - ARS, Logan, UT

8:32 0064 Crop pollination studies with the blue orchard bee, *Osmia lignaria,* in Canada: Winners and losers. **S. Frier** (s.d.frier@gmail.com) and Cory Sheffield, Royal Saskatchewan Museum, Regina, SK, Canada

8:54 0065 Developing strategies to manage the alternative pollinator, *Osmia cornifrons*, in Michigan cherry orchards. **Nikki Rothwell** (rothwel3@msu.edu), Michigan State Univ., Traverse City, MI

9:16 0066 The influence of floral enhancements on the reproduction of *Osmia lignaria* in almond orchards. **Derek R. Artz** (derek.artz@ars.usda.gov) and Theresa L. Pitts-Singer, USDA - ARS, Logan, UT

9:38 0067 Lessons learned for large scale propagation of *Osmia lignaria* in California. **Gorden Wardell** (gordonw@paramountfarming.com), Paramount Farming Co., Bakersfield, CA

10:00 Break

10:10 0068 Presentation withdrawn

10:32 0069 Pesticide exposure risks for blue orchard bees in managed systems. **Andi Kopit** (andikopit16@gmail.com)[1,2], Theresa L. Pitts-Singer[2], Ricardo Ramirez[3], John J. Adamczyk[3] and Blair Sampson[3], [1]Utah State Univ., [2]USDA - ARS, Logan, UT, [3]USDA - ARS, Poplarville, MS

10:54 0070 You are what you eat: The effects of pesticides and diet diversity on mason bees in apple. **Mary Centrella** (mlc344@cornell.edu), Bryan N. Danforth, Katja Poveda, Eleanor Blitzer and Laura Russo, Cornell Univ., Ithaca, NY

11:16 0071 Presentation withdrawn

11:38 Concluding Remarks

Member Symposium: What Are The Costs and Benefits for Neonicotinoid Seed Treatments in Field Crops?

200 D (Convention Center)

Moderators and Organizers: Matt O'Neal and Erin W. Hodgson, Iowa State Univ., Ames, IA

8:00 Introductory Remarks

8:05 0072 Impact of neonicotinoid seed treatments on Mid-South crops. **Fred Musser** (fm61@msstate.edu)[1], Angus Catchot[1], John North[1], Jeff Gore[2], Don Cook[2], David Kerns[3], Scott Stewart[4] and Gus Lorenz[5], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS, [3]Texas AgriLife Extension Service, Lubbock, TX, [4]Univ. of Tennessee, Jackson, TN, [5]Univ. of Arkansas, Lonoke, AR

8:25 0073 Seed treatments and their role in crop production and IPM. **Michael T. McCarville** (michael.mccarville@bayer.com), Bayer CropScience, Johnston, IA

8:45 0074 A cost-benefit analysis from multistate research on insecticidal seed treatments in soybean. Christian Krupke[1], **Kelley Tilmon** (kelley.tilmon@sdstate.edu)[2], Eileen M. Cullen[3], Erin W. Hodgson[4], Janet Knodel[5], Brian McCornack[6], Paul D. Mitchell[3] and Bruce D. Potter[7], [1]Purdue Univ., West Lafayette, IN, [2]South Dakota State Univ., Brookings, SD, [3]Univ. of Wisconsin, Madison, WI, [4]Iowa State Univ., Ames, IA, [5]North Dakota State Univ., Fargo, ND, [6]Kansas State Univ., Manhattan, KS, [7]Univ. of Minnesota, Lamberton, MN

9:05 Break

9:15 0075 Field-level economic benefits of neonicotinoid seed treatments in corn and soybean. **Nicholas Tinsley** (tinsley@illinois.edu)[1], Paul D. Mitchell[2] and Nicola Wille[2], [1]Univ. of Illinois, Champaign, IL, [2]Univ. of Wisconsin, Madison, WI

9:35 0076 Do neonicotinoid seed treatments contribute to area-wide suppression of soybean aphids and multicolored Asian lady beetle? **Christie Bahlai** (cbahlai@msu.edu)[1], Wopke vander Werf[2], Lia Hemerik[2], Matt O'Neal[3] and Douglas A. Landis[1], [1]Michigan State Univ., East Lansing, MI, [2]Wageningen Univ., Wageningen, Netherlands, [3]Iowa State Univ., Ames, IA

9:55 Break

10:05 0077 Non-target effects of insecticidal seed treatments on beneficial insects in sunflower. **J. P. Michaud** (jpmi@ksu.edu)[1], Valeria Moscardini[2] and Pablo Gontijo[2], [1]Kansas State Univ., Hays, KS, [2]Federal Univ. of Lavras, Minas Gerais, Brazil

10:25 0078 Cost-benefit analyses and U.S. pesticide registrations: Options for neonicotinoid seed treatments. **Steven Bradbury** (spbrad@iastate.edu), Iowa State Univ., Ames, IA

10:45 Discussion

Member Symposium: Brown Marmorated Stink Bug Working Group: Synergizing IPM Research to Deliver Solutions

200 F (Convention Center)

Moderators and Organizers: Nik G. Wiman[1], Kevin Rice[2], Tracy C. Leskey[3] and George C. Hamilton[4], [1]Oregon State Univ., Corvallis, OR, [2]Pennsylvania State Univ., University Park, PA, [3]USDA - ARS, Kearneysville, WV, [4]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

8:00 Welcoming Remarks

8:20 0079 Coming together on brown marmorated stink bug: Genesis of the BMSB Working Group. **George C. Hamilton** (hamilton@aesop.rutgers.edu)[1] and Tracy C. Leskey[2], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]USDA - ARS, Kearneysville, WV

8:35 0080 Communicating the science of IPM for brown marmorated stink bug. **Stephen Young** (sly27@cornell.edu), Chris Gonzales, Kevin Judd and Yifen Liu, Northeastern IPM Center, Cornell Univ., Ithaca, NY

8:50 0081 Development of monitoring tools for brown marmorated stink bug in tree fruit. **Brent Short** (brent.short@ars.usda.gov)[1], J. Christopher Bergh[2], John P. Cullum[2] and Tracy C. Leskey[1], [1]USDA - ARS, Kearneysville, WV, [2]Virginia Polytechnic Institute and State Univ., Winchester, VA

9:05 0082 Implementing a classical biological control program for brown marmorated stink bug. **Kim A. Hoelmer** (kim.hoelmer@ars.usda.gov) and Christine Dieckhoff, USDA - ARS, Newark, DE

9:20 0083 Parasitism of *Halyomorpha halys* by indigenous parasitoids. **Christine Dieckhoff** (christine.dieckhoff@ars.usda.gov), Kim A. Hoelmer and Kathleen Tatman, USDA - ARS, Newark, DE

9:35 0084 Current status of brown marmorated stink bug in Europe: Invasion history and potential for biological control. **Tim Haye** (t.haye@cabi.org)[1], Lara Maistrello[2] and Tara Gariepy[3], [1]CABI, Delémont, Switzerland, [2]Università degli studi di Modena e Reggio Emilia, Modena, Italy, [3]Agriculture and Agri-Food Canada, London, ON, Canada

9:50 Break with Poster Session

SD0085 Outreaching invasive species information using land grant university clientele. **Rachel Suits** (rsuits@ncsu.edu)[1] and Todd Murray[2], [1]Oregon State Univ., Hood River, OR, [2]Washington State Univ., Stevenson, WA

SD0086 Host plant growth stage influences brown marmorated stink bug development and survival. **Kevin Rice** (kbr10@psu.edu), Shelby J. Fleischer and John Tooker, Pennsylvania State Univ., University Park, PA

SD0087 Assessing the use of antimicrobials to sterilize brown marmorated stink bug, *Halyomorpha halys* (Stål), egg masses to prevent symbiont acquisition. **Christopher Taylor** (cmjtaylor3@gmail.com), Veronica Johnson and Galen Dively, Univ. of Maryland, College Park, MD

SD0088 Native biological control of *Halyomorpha halys* in Michigan. **Kristin Deroshia** (deroshia@msu.edu) and Matthew Grieshop, Michigan State Univ., East Lansing, MI

SD0089 Nutrient profiles of brown marmorated stink bug over the season. **Victoria Skillman** (skillmav@onid.orst.edu)[1], Nik G. Wiman[1] and Jana C. Lee[2], [1]Oregon State Univ., Corvallis, OR, [2]USDA - ARS, Corvallis, OR

SD0090 Contributions to the knowledge gaps in the urban management of brown marmorated stink bug, *Halyomorpha halys*. **John D. Aigner** (daigner@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

SD0091 Relationship of brown marmorated stink bug infestations in tree borders to subsequent patterns of movement into soybean fields. **Benjamin L. Aigner** (baigner@vt.edu)[1], Thomas P. Kuhar[1], D. Ames Herbert[2], Carlyle C. Brewster[1], S. Malone[2], Jamie Hogue[1], Galen Dively[3] and Joanne Whalen[4], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]Virginia Polytechnic Institute and State Univ., Suffolk, VA, [3]Univ. of Maryland, College Park, MD, [4]Univ. of Delaware, Newark, DE

SD0092 Temperature-dependent life table statistics for *Haylomorpha halys*. **Erika Maslen** (maslene@onid.oregonstate.edu), Vaughn Walton and Nik G. Wiman, Oregon State Univ., Corvallis, OR

SD0093 Exploring the role of diapause and microclimate for overwintering success of brown marmorated stink bug. **Theresa M. Cira** (cirax002@umn.edu)[1], Robert Venette[2], Robert Koch[1], Eric C. Burkness[1] and William Hutchison[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - Forest Service, St. Paul, MN

SD0094 Sublethal effects of insecticides on the behavior of *Halyomorpha halys*: Mobility and flight capacity. **William R. Morrison** (william.morrison@ars.usda.gov), Brittany Poling and Tracy C. Leskey, USDA - ARS, Kearneysville, WV

SD0095 Post harvest impact of brown marmorated stink bug: Effect on wine quality and control measures. **Pallavi Mohekar** (pallavi.mohekar@oregonstate.edu), Elizabeth Tomasino, Nik G. Wiman, Vaughn Walton and James Osborne, Oregon State Univ., Corvallis, OR

SD0096 Making sense of the distribution of *Halyomorpha halys* populations on fine and broad scales. **Noel Hahn** (nghahn@gmail.com)[1], Cesar Rodriguez-Saona[2] and George C. Hamilton[1], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

SD0097 A time and place for everything: Peaches and stink bugs. **John Cambridge** (john.cambridge000@gmail.com) and George C. Hamilton, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

SD0098 Cold acclimation of *Trissolcus japonicus*, a potential biological control agent of *Halyomorpha halys*, the brown marmorated stink bug. **Erica Nystrom Santacruz** (enystrom16@gmail.com)[1], Robert Koch[2], Robert Venette[3], Kim A. Hoelmer[4] and Christine Dieckhoff[4], [1]Univ. of Minnesota, Falcon Heights, MN, [2]Univ. of Minnesota, St. Paul, MN, [3]USDA - Forest Service, St. Paul, MN, [4]USDA - ARS, Newark, DE

SD0099 Overwintering site selection for brown marmorated stink bug: Results generated by citizen scientists. **Torri Hancock** (torri.hancock@ars.usda.gov)[1], Doo-Hyung Lee[2], J. Christopher Bergh[3] and Tracy C. Leskey[1], [1]USDA - ARS, Kearneysville, WV, [2]Gachon Univ., Gyeonggi-do, South Korea, [3]Virginia Polytechnic Institute and State Univ., Winchester, VA

SD0100 Tridecane, a brown marmorated stink bug volatile attracts and arrests *Orius* spp. **Diego Felisbino Fragal**[1,2], Cesar Rodriguez-Saona[1], George C. Hamilton[3], Anne Nielsen[4] and Antonio Carlos Busoli[5], [1]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, [2]São Paulo State Univ., UNESP, São Paulo, Brazil, [3]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [4]Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, [5]Univ. Estadual Paulista, Jaboticabal, Brazil

10:40 0101 Making scents of brown marmorated stink bug host selection. **Brett Blaauw** (brett.r.blaauw@gmail.com)[1], Clarissa Mathews[2], Cesar Rodriguez-Saona[3] and Anne Nielsen[1], [1]Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, [2]Shepherd Univ., Shepherdstown, WV, [3]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

10:55 0102 Current status of brown marmorated stink bug in Michigan. **Matthew Grieshop** (grieshop@msu.edu), Kristin Deroshia, Ernest Delfosse and Larry Gut, Michigan State Univ., East Lansing, MI

11:10 0103 Dealing with brown marmorated stink bug in the Pacific Northwest is a multi-state effort. **Peter W. Shearer** (peter.shearer@oregonstate.edu)[1], Jay Brunner[2], Jana C. Lee[3], Tracy C. Leskey[4], Todd Murray[5], Vaughn Walton[6], Nik G. Wiman[6] and Silvia Rondon[7], [1]Oregon State Univ., Hood River, OR, [2]Washington State Univ., Wenatchee, WA, [3]USDA - ARS, Corvallis, OR, [4]USDA - ARS, Kearneysville, WV, [5]Washington State Univ., Stevenson, WA, [6]Oregon State Univ., Corvallis, OR, [7]Oregon State Univ., Hermiston, OR

11:25 0104 Distribution, pest status, and research programs for the brown marmorated stink bug in the southeastern US. **James F. Walgenbach** (jim_walgenbach@ncsu.edu)[1], D. Ames Herbert[2], Thomas P. Kuhar[3], Dominic Reisig[4] and Michael Toews[5], [1]North Carolina State Univ., Fletcher, NC, [2]Virginia Polytechnic Institute

and State Univ., Suffolk, VA, [3]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [4]North Carolina State Univ., Plymouth, NC, [5]Univ. of Georgia, Tifton, GA

11:40 0105 Beavers, bears and brown marmorated stink bug: Welcome to Canada! **Hannah Fraser** (hannah.fraser@ontario.ca)[1], Cynthia Scott-Dupree[2], Tara Gariepy[3] and Tracey Baute[4], [1]Ontario Ministry of Agriculture and Food, and Ministry of Rural Affairs, Vineland, ON, Canada, [2]Univ. of Guelph, Guelph, ON, Canada, [3]Agriculture and Agri-Food Canada, London, ON, Canada, [4]Ontario Ministry of Agriculture and Food, and Ministry of Rural Affairs, Ridgetown, ON, Canada

Member Symposium: Beyond Corn and Soybeans: Challenges to Integrated Pest Management in Specialty Crops

205 A (Convention Center)

Moderators and Organizers: Silvia Rondon, Amber Vinchesi and Matthew Klein, Oregon State Univ., Hermiston, OR

8:00 Welcoming Remarks

8:10 0106 IPM challenges in Mid-Atlantic vegetable production. **Thomas P. Kuhar** (tkuhar@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

8:30 0107 Challenges of reducing insecticide dependency in IPM programs for high-value vegetable crops. **Brian A. Nault** (ban6@cornell.edu), Cornell Univ., Geneva, NY

8:50 0108 Truck farming, farmers markets and local foods: Challenges with implementing IPM with small diversified farms. **Ric Bessin** (rbessin@uky.edu), Univ. of Kentucky, Lexington, KY

9:10 0109 Refined management of arthropod pests of mint to improve sustainability and protect water quality. **Larry D. Godfrey** (ldgodfrey@ucdavis.edu)[1], Kris Tollerup[2] and Jhalendra Rijal[1], [1]Univ. of California, Davis, CA, [2]Univ. of California, Parlier, CA

9:30 0110 Managing non-persistently transmitted aphid-borne viruses: Perceptions and reality. **Andrei Alyokhin** (andrei.alyokhin@umit.maine.edu), Univ. of Maine, Orono, ME

9:50 Break

10:10 0111 Turf pest management: It's getting easier to be green. **Jonathan Larson** (jonathan.larson@unl.edu)[1] and Daniel Potter[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Kentucky, Lexington, KY

10:30 0112 Hop IPM in the US: Protecting the 26,000 acres that flavor 10 billion pints per year. **Douglas Walsh** (dwalsh@wsu.edu)[1] and James Barbour[2], [1]Washington State Univ., Prosser, WA, [2]Univ. of Idaho, Parma, ID

10:50 0113 Challenges in blueberry pest management: Insect invasions. **Cesar Rodriguez-Saona** (crodriguez@aesop.rutgers.edu) and Dean Polk, Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

11:10 0114 An integrated crop pollination strategy for almond. **Theresa L. Pitts-Singer** (Theresa.Pitts-Singer@ars.usda.gov) and Derek R. Artz, USDA - ARS, Logan, UT

11:30 0115 BEE-ing safe in specialty crops. **Kimberly Skyrm** (kskyrm@umass.edu)[1], Anne Averill[1], Kimberly Stoner[2] and Frank Drummond[3], [1]Univ. of Massachusetts, Amherst, MA, [2]Connecticut Agricultural Experiment Station, New Haven, CT, [3]Univ. of Maine, Orono, ME

11:50 Concluding Remarks

Member Symposium: Bed Bugs, *Cimex lectularius,* in Sensitive Areas: Research and Mitigation Techniques

207 AB (Convention Center)

Moderator and Organizer: Sherry Glick, USEPA, Dallas, TX

8:00 Introductory Remarks

8:05 0116 Bed bugs, *Cimex lectularius,* in sensitive areas: Research and mitigation techniques. Dini Miller[1], Michael Merchant[2], Susan Jennings[3] and **Sherry Glick** (Glick.sherry@epa.gov)[4], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]Texas A&M Univ., Dallas, TX, [3]USEPA, Washington, DC, [4]USEPA, Dallas, TX

8:45 0117 Managing bed bugs in sensitive areas: Myths and realities. **Dini Miller** (dinim@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:25 Break

9:35 0118 Texas AgriLife bed bug grant discussion: Training, IPM strategies and impacts in homeless shelters in Texas. **Michael Merchant** (m-merchant@tamu.edu), Texas A&M Univ., Dallas, TX

10:15 0119 The federal government's bed bug strategy: Discussion and implementation. **Changlu Wang** (cwang@aesop.rutgers.edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

10:55 Concluding Remarks

Member Symposium: Colony Collapse Disorder Eight Years Later: What We Know Now That We Didn't Know Then

208 AB (Convention Center)

Moderators and Organizers: Dennis vanEngelsdorp[1] and Richard Levine[2], [1]Univ. of Maryland, College Park, MD, [2]Entomological Society of America, Annapolis, MD

8:00 0120 Introduction. **May R. Berenbaum** (maybe@illinois.edu), Univ. of Illinois, Champaign, IL

8:16 0121 Varroa: The monster in our midst. **Dennis vanEngelsdorp** (dvane@umd.edu)[1], Kirsten Traynor[1], Karen Rennich[1], Robyn Rose[2], Jeffrey Pettis[3], Eva Forsgren[4], Grace Kunkel[1], Shayne Madella[1], Jay Evans[3] and Dawn L. Lopez[3], [1]Univ. of Maryland, College Park, MD, [2]USDA - APHIS, Riverdale, MD, [3]USDA - ARS, Beltsville, MD, [4]Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

8:32 0122 Honey bee health and the pathosphere. Jay Evans and **Ryan Schwarz** (ryan.schwarz@ars.usda.gov), USDA - ARS, Beltsville, MD

8:48 0123 The economics of honey bee health. **Kathy Baylis** (baylis@illinois.edu)[1], Miriam Bixby[2] and Guyu Ye[1], [1]Univ. of Illinois, Champaign, IL, [2]Univ. of British Columbia, Vancouver, BC, Canada

9:04 0124 Pesticides in pollen: A national survey of bee bread residues. **Kirsten Traynor** (ktraynor@umd.edu)[1], Dennis

vanEngelsdorp[1], Karen Rennich[1], Robyn Rose[2] and Jeffrey Pettis[3], [1]Univ. of Maryland, College Park, MD, [2]USDA - APHIS, Riverdale, MD, [3]USDA - ARS, Beltsville, MD

9:20 0125 Do pesticide co-formulants and adjuvants impact bee health? **Chris Mullin** (camullin@psu.edu), Julia Fine, Maryann Frazier and Ryan Reynolds, Pennsylvania State Univ., University Park, PA

9:36 0126 A year in the life: Honey bees living near corn fields. **Christian Krupke** (ckrupke@purdue.edu), Jeffrey Holland and Elizabeth Long, Purdue Univ., West Lafayette, IN

9:52 0127 Forage and nutrition in agricultural lands for honey bee colonies in the northern Great Plains region of the US. **Matthew Smart** (msmart@usgs.gov)[1], Marla Spivak[2] and Clint Otto[1], [1]U.S. Geological Survey, Jamestown, ND, [2]Univ. of Minnesota, St. Paul, MN

10:08 Break

10:24 0128 Collaboration for healthy bees, healthy people, healthy planet: The honey bee health coalition. **Todd Peterson** (tapeterson2@landolakes.com), Winfield (a Land O'Lakes Company), Des Moines, IA

10:40 0129 Is there a genetic component to colony collapse disorder? **David Tarpy** (drtarpy@ncsu.edu), North Carolina State Univ., Raleigh, NC

10:56 0130 Long live the queen: Factors affecting honey bee queen health. **Jeffrey Pettis** (jeff.pettis@ars.usda.gov), USDA - ARS, Beltsville, MD

11:12 0131 Tech-transfer teams: Working for beekeepers. **Katie Lee** (leex1444@umn.edu) and Marla Spivak, Univ. of Minnesota, St. Paul, MN

11:28 0132 Tech-transfer teams: Helping honey bee breeders. **Marla Spivak** (spiva001@umn.edu) and Katie Lee, Univ. of Minnesota, St. Paul, MN

11:44 0133 Precarious lives: The making of the modern honey bee. **Jake Kosek** (jake@berkeley.edu), Univ. of California, Berkeley, CA

Member Symposium: Greenhouse Insect Management – Critical Questions Answered with Collaborative Research

208 D (Convention Center)

Moderator and Organizer: Luis A. Cañas, The Ohio State Univ., Wooster, OH

12:00 Welcoming Remarks

8:00 0134 Entomology meets plant pathology: The connection between root diseases and foliar pests. **Rose Buitenhuis** (rose.buitenhuis@vinelandresearch.com), Anissa Poleatewich and Michael Brownbridge, Vineland Research and Innovation Centre, Vineland Station, ON, Canada

8:20 0135 Silicon supplementation and its utility in IPM. **Daniel Klittich** (dsklittich@ucdavis.edu) and Michael P. Parrella, Univ. of California, Davis, CA

8:40 0136 Intra-plant spatial interaction between *Delphastus catalinae* (Coleoptera: Coccinellidae) and *Bemisia tabaci* biotype B (Hemiptera: Aleyrodidae) and its effect on predation rates. **Diego Rincon** (rincon-rueda.1@osu.edu), Casey W. Hoy and Luis A. Cañas, The Ohio State Univ., Wooster, OH

9:00 0137 Bolstering plant defenses to combat insect attack: A bottom-up approach to greenhouse pest management. **Danica Maxwell** (dfmaxwell@ucdavis.edu), Edwin Lewis and Michael P. Parrella, Univ. of California, Davis, CA

9:20 0138 Diamide control of leafminers in *Gerbera*. **Bryan Vander Mey** (bvandermey@ucdavis.edu)[1] and James A. Bethke[2], [1]Univ. of California, San Marcos, CA, [2]Univ. of California Cooperative Extension, San Diego, CA

9:40 Break

9:50 0139 "Suck-it-up": Are systemic insecticides really effective against mealybugs? **Raymond Cloyd** (rcloyd@ksu.edu) and Amy Raudenbush, Kansas State Univ., Manhattan, KS

10:10 0140 IR-4 Collaborations addressing pest management in greenhouses. **Cristi L. Palmer** (palmer@aesop.rutgers.edu), Rutgers, The State Univ. of New Jersey, North Brunswick, NJ

10:30 0141 How can we streamline biological control in greenhouses: Compatibility with insecticides and automation of releases. **Luis A. Cañas** (canas.4@osu.edu), The Ohio State Univ., Wooster, OH

10:50 0142 Destination assessment of pre-ship treatments with biologicals on ornamental plant cuttings. **James A. Bethke** (jabethke@ucanr.edu)[1], Lance Osborne[2], Arnold Hara[3] and Cristi L. Palmer[4], [1]Univ. of California Cooperative Extension, San Diego, CA, [2]Univ. of Florida, Apopka, FL, [3]Univ. of Hawai'i, Hilo, HI, [4]Rutgers, The State Univ. of New Jersey, North Brunswick, NJ

11:10 0143 An analysis of biological control in greenhouses. **Michael P. Parrella** (mpparrella@ucdavis.edu) and Edwin Lewis, Univ. of California, Davis, CA

11:30 0144 Profitability and sustainability of IPM/biological programs in a large scale multi crop greenhouse. **Renato Zardo** (rzardo@greencirclegrowers.com)[1], Danielle Ferreira[1], Evan Boucher[1] and Luis A. Cañas[2], [1]Green Circle Growers, Oberlin, OH, [2]The Ohio State Univ., Wooster, OH

11:50 Concluding Remarks and Business Meeting

Member Symposium: Ecological Pest Management: Key for Sustainable Agricultural Production

205 CD (Convention Center)

Moderators and Organizers: Megha N. Parajulee and Abdul Hakeem, Texas A&M Univ., Lubbock, TX

8:30 Introductory Remarks

8:35 0145 Cotton pest management in the Texas High Plains: Cropping systems approach. **Megha N. Parajulee** (m-parajulee@tamu.edu), Texas A&M Univ., Lubbock, TX

8:55 0146 Ecological pest management in the forest: It can't be sustainable if you can't see the forest for the trees. **Jerome F. Grant** (jgrant@utk.edu)[1], Paris L. Lambdin[1], Gregory J. Wiggins[1] and Robert Webster[2], [1]Univ. of Tennessee, Knoxville, TN, [2]National Parks Service, Gatlinburg, TN

9:15 0147 Integrated thrips management in cotton agroecosystems. **Abdul Hakeem** (abdul.hakeem@ag.tamu.edu) and Megha N. Parajulee, Texas A&M Univ., Lubbock, TX

9:30 0148 Pest management for sustainable agriculture under subsistence farming in the semi-arid tropics in Asia and Africa. **Hari Sharma** (h.sharma@cgiar.org), International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, India

9:50 SP0149 Insect resistance management for western corn rootworm. **Matthew Carroll** (matthew.carroll@monsanto.com) and Graham P. Head, Monsanto Company, St. Louis, MO

10:02 SP0150 Modifying IPM programs to integrate pollinator health: A case study of rosy apple aphid management in apple orchards. **David J. Biddinger** (djb134@psu.edu) and Neelendra K. Joshi, Pennsylvania State Univ., Biglerville, PA

10:14 0151 Community IPM of mealybugs in the Himalayan region of Pakistan. **Rehana Ali** (rehana_ely89@yahoo.com)[1], Babar Khan[2], Muhammad Zafar Khan[3], Muhammad Saeed Awan[3], Iqbal Hussain Shah[4], Javaid Iqbal[5] and Abdul Hakeem[6], [1]PMAS, Arid Agriculture Univ., Rawalpindi, Pakistan, [2]WWF Pakistan, Gilgit, Pakistan, [3]Karakorum International Univ., Gilgit, Pakistan, [4]Dept. of Agriculture, Gilgit-Baltistan, Gilgit, Pakistan, [5]The Islamia Univ. of Bahawalpur, Bahawalpur, Pakistan, [6]Texas A&M Univ., Lubbock, TX

Member Symposium: Synergy in Arthropod Genomics: Integrative Solutions to Functional and Evolutionary Biology

205 CD (Convention Center)

Moderators and Organizers: Amelia Lindsey, James Ricci and Eric Smith, Univ. of California, Riverside, CA

11:30 Introductory Remarks

11:35 0152 Condition dependent growth of beetle weapons is regulated by a diverse network of signaling pathways. **Laura C. Lavine** (lavine@wsu.edu), Washington State Univ., Pullman, WA

11:54 0153 The genomics of hybridization and speciation in *Heliconius* butterflies. **Brian A. Counterman** (bcounterman@biology.msstate.edu)[1], Steven Van Belleghem[2] and Ricardo Papa[2], [1]Mississippi State Univ., Mississippi State, MS, [2]Univ. of Puerto Rico - Rio Piedras, San Juan, PR

12:13 0154 Genome-wide analysis of desiccation resistance in the malaria mosquito *Anopheles gambiae*. **Nora J. Besansky** (nbesansk@nd.edu), Univ. of Notre Dame, Notre Dame, IN

12:32 Break

12:47 0155 Genomic islands of divergence and speciation in *Anopheles gambiae*. **Gregory C. Lanzaro** (gclanzaro@ucdavis.edu), Yoosook Lee, Bradley Main and Travis Collier, Univ. of California, Davis, CA

1:06 0156 Using genomics to define the taxonomic and functional diversity of gut microbiota in drosophilid flies. **Alyssa Bost** (ab43@cornell.edu)[1], Vince Martinson[2], John Jaenike[2], Gregory M. Loeb[3] and Angela E. Douglas[1], [1]Cornell Univ., Ithaca, NY, [2]Univ. of Rochester, Rochester, NY, [3]Cornell Univ., Geneva, NY

1:25 0157 Sex chromosome dosage compensation in Lepidoptera: Insights from nymphalid butterflies, coddling moth, and demasculinized silkworms. **Jamie Walters** (jrwalters@ku.edu)[1], Thomas Hardcastle[2], Aloy Gu[3], Douglas Knipple[3] and Chris Jiggins[2], Univ. of Kansas, Lawrence, KS, [2]Univ. of Cambridge, Cambridge, United Kingdom, [3]Cornell Univ., Geneva, NY

1:44 0158 Positive selection, repertoire size, and antiquity of arthropod chemoreceptors. **Hugh M. Robertson** (hughrobe@life.uiuc.edu), Univ. of Illinois, Champaign, IL

2:03 Break

2:18 0159 DNA methylation and insect life with pathogens. **Soojin Yi** (soojin.yi@biology.gatech.edu)[1], Dan Sun[1], Amelia Lindsey[2], John H. Werren[3], Richard Stouthamer[2], Christina M. Grozinger[4], David Galbraith[4], Elina L. Niño[4] and Xingyu Yang[1], [1]Georgia Institute of Technology, Atlanta, GA, [2]Univ. of California, Riverside, CA, [3]Univ. of Rochester, Rochester, NY, [4]Pennsylvania State Univ., University Park, PA

2:37 0160 Genome evolution in heritable symbioses of leafhoppers (Cicadellidae). **Gordon Bennett** (gordon.bennett@utexas.edu)[1] and Nancy Moran[2], [1]The Univ. of Hawai'i at Manoa, Honolulu, HI, [2]Univ. of Texas, Austin, TX

2:56 0161 The antennal transcriptome of *Aedes aegypti* pre- and post-blood meal. **Michel A. Slotman** (maslotman@ag.tamu.edu), Luciano Cosme and Craig J. Coates, Texas A&M Univ., College Station, TX

3:15 Concluding Remarks

Organized Meeting: Current Advances in Acarology

212 AB (Convention Center)

Moderators and Organizers: H. Joel Hutcheson[1] and Ronald Ochoa[2], [1]USDA - APHIS, Ames, IA, [2]USDA - ARS, Beltsville, MD

8:00 Welcoming Remarks

8:00 0162 Recent advances in endoparasitic avian nasal mite research (Rhinonyssidae, Turbinoptidae, and Ereynetidae) in Canada. **Wayne Knee** (kneew@agr.gc.ca), Canadian National Collection of Insects, Arachnids and Nematodes, and Agriculture and Agri-Food Canada, Ottawa, ON, Canada

8:15 0163 The *Neoseiulus californicus* (McGregor) conundrum: A biocontrol agent with a mistaken identity? **Fred Beaulieu** (frederic.beaulieu@agr.gc.ca)[1] and Jenny Beard[2], [1]Agriculture and Agri-Food Canada, Ottawa, ON, Canada, [2]Queensland Museum, South Brisbane, Australia

8:30 0164 Environment, neighbors, and season: The importance of host circumstances for phoretic mite diversity. **Kaitlin U. Campbell** (uppstrka@miamioh.edu) and Thomas O. Crist, Miami Univ., Oxford, OH

8:45 0165 Mites of the family Canestriniidae (Acari: Astigmata) associated with Nearctic tortoise beetles (Coleoptera: Chrysomelidae: Cassidinae). **Barry M. OConnor**, Univ. of Michigan, Ann Arbor, MI

9:00 0166 Mite- and tick-borne pathogens from Pacific military bases. **Will K. Reeves** (will.reeves@wpafb.af.mil), USAFSAM - PHR, Wright-Patterson Air Force Base, OH

9:15 0167 Occurrence of the genus *Oligonychus* Berlese (Acari: Tetranychidae) in Saudi Arabia, with some ecological notes on *Oligonychus afrasiaticus* (McGregor). **Fahad Alatawi** (falatawi@ksu.edu.sa) and Muhammad Kamran, King Saud Univ., Al-Riyadh, Saudi Arabia

9:30 0168 Flat mites of Saudi Arabia, with description of a new species and new records. **Muhammad Kamran** (kamran1513@gmail.com) and Fahad Alatawi, King Saud Univ., Al-Riyadh, Saudi Arabia

9:45 Break

SD0169 Quantitative survey of stored products mites infesting wheat flour in Jeddah Governorate. **Abir Al-Nasser** (al-nasser.abir@hotmail.com), Umm Al-Qura Univ., Makkah, Saudi Arabia

SD0170 Macrochelid mite fauna from Pakistan. **Muhammad Qayyoum** (asifqayyoum@gmail.com) and Bilal Khan, Univ. of Agriculture, Faisalabad, Pakistan

SD0171 Field observations of questing and dispersal of nymphal *Amblyomma maculatum* Koch (Acari: Ixodidae). **José Portugal III** (jsp281@msstate.edu) and Jerome Goddard, Mississippi State Univ., Mississippi State, MS

SD0172 Phylogenetic evaluation of *Oligonychus perseae* and *Oligonychus punicae* (Acari: Tetranychidae) populations from different hosts. Ma. Teresa Santillán, **Stephanie Guzman** (guzman.stephanie@colpos.mx) and Ariel Guzmán, Colegio de Postgraduados, Estado de Mexico, Mexico

SD0173 Suppression or differential induction? Indirect defence of tomato plants attacked by *Tetranychus evansi*. Felipe Lemos[1,2], **Angelo Pallini** (pallini@ufv.br)[1], Eraldo Rodrigues Lima[1] and Arne Janssen[2], [1]Federal Univ. of Viçosa, Viçosa, Brazil, [2]Univ. of Amsterdam, Amsterdam, Netherlands

10:00 0174 Functional response of *Cydnoseius negevi* Swirski and Amitai (Acari: Phytoseiidae) against *Oligonychus punicae* Hirst (Acari: Tetranychidae). **Jawwad Mirza** (jawwadmirza2010@hotmail.com), Muhammad Rafique and Fahad Alatawi, King Saud Univ., Al-Riyadh, Saudi Arabia

10:12 0175 Use of the ion torrent PGM for studying the microbiome and metagenome of ticks. **Zachary Holmes** (ymg2@cdc.gov), Brian Shirey, Brian Raphael, Amanda Jo Williams-Newkirk, Maria L. Zambrano and Gregory A. Dasch, Centers for Disease Control and Prevention, Atlanta, GA

10:24 0176 Resolving some taxonomic conflicts within the genus *Amblyomma* (Acari: Ixodidae). **Paula Lado** (pl00967@georgiasouthern.edu)[1], Danielle Hibbs[1], Santiago Nava[2], Lance Durden[1] and Lorenza Beati[1], [1]Georgia Southern Univ., Statesboro, GA, [2]Instituto Nacional de Tecnologia Agropecuaria, Santa Fe, Argentina

10:36 0177 Do chiggers prefer female hosts? A case study of *Hirsutiella zachvatkini*, supported by intraspecific variation of molecular traits. **Hanna Moniuszko** (joanna.makol@up.wroc.pl), Grzegorz Zalesny and Joanna Makol, Wroclaw Univ. of Environmental and Life Sciences, Wroclaw, Poland

10:48 0178 Microbiome of the phytophagous mite *Brevipalpus yothersi* (Acari: Tenuipalpidae). **Oscar Ospina** (oscar.ospina@upr.edu), José Carlos V. Rodrigues and Steven Massey, Univ. of Puerto Rico, San Juan, PR

11:00 0179 Investigations on blood-feeding and host responses caused by the northern fowl mite, *Ornithonyssus sylviarum*. **Amy C. Murillo** (alock001@ucr.edu) and Bradley Mullens, Univ. of California, Riverside, CA

11:12 Concluding Remarks

Ten-Minute Papers, PBT Section: Physiology and Immunity

211 B (Convention Center)

Moderators: Michael R. Strand[1] and Julian F. Hillyer[2], [1]Univ. of Georgia, Athens, GA, [2]Vanderbilt Univ., Nashville, TN

8:30 Introductory Remarks

8:32 0180 Ligand-induced internalization of sex peptide/myoinhibiting peptide receptors. **Joe Hull** (joe.hull@ars.usda.gov), USDA - ARS, Maricopa, AZ

8:44 0181 Periostial hemocyte aggregation on the surface of the mosquito heart. **Julian F. Hillyer** (julian.hillyer@vanderbilt.edu) and Leah T. Sigle, Vanderbilt Univ., Nashville, TN

8:56 0182 Digestive enzymes of the southern green stink bug, *Nezara viridula* (Linnaeus). **Purushottam Lomate** (prlomate@iastate.edu) and Bryony Bonning, Iowa State Univ., Ames, IA

9:08 0183 Biogenic amines, juvenile hormone and reproduction in the western tarnished plant bug, *Lygus hesperus*. **Colin Brent** (colin.brent@ars.usda.gov), USDA - ARS, Maricopa, AZ

9:20 0184 Protein level responses of *Reticulitermes flavipes* gut fed on corn stover and soybean residue. **Swapna Priya Rajarapu** (prajarapu@purdue.edu) and Michael Scharf, Purdue Univ., West Lafayette, IN

9:32 0185 Laser ablation tomography: Rapid serial dissections, 3D modeling & quantitative analysis. **Benjamin Hall** (hall.benjamin@gmail.com), Brian Reinhardt and Andrew Yanders, L4iS | Lasers for Innovative Solutions, LLC, State College, PA

9:44 0186 Dietary fatty acids affect honey bee thermotolerance and oxidative stress. **Steven Cook** (steven.cook@ars.usda.gov), USDA - ARS, Beltsville, MD

9:56 0187 Adult honey bee microsomal preparations: How to make them work. **Marion Zaworra** (marion.zaworra@bayer.com)[1,2] and Ralf Nauen[2], [1]Univ. of Bonn, Bonn, Germany, [2]Bayer CropScience, Monheim, Germany

10:08 0188 Presentation withdrawn

Ten-Minute Papers, PBT Section: RNAi, RNA-Seq and Molecular Biology

211 A (Convention Center)

Moderators: Peter Jensen[1] and Qisheng Song[2], [1]Monsanto Company, St. Louis, MO, [2]Univ. of Missouri, Columbia, MO

8:30 Introductory Remarks

8:32 0189 Initial analysis of the transcriptome of pupal diapause in the flesh fly, *Sarcophaga crassipalpis*. **Karl H. Joplin** (joplin@etsu.edu) and Michelle Duffourc, East Tennessee State Univ., Johnson City, TN

8:44 0190 Control of mosquitoes and the Asian citrus psyllids using RNAi targeting JH biosynthetic pathway. **Dov Borovsky** (dovborovsky@gmail.com)[1], Evelien Van Ekert[2], Charles A. Powell[2], Pierre Rougé[3], Siddarame Gowda[4], William Dawson[4] and Robert Shatters[1], [1]USDA - ARS, Fort Pierce, FL, [2]Univ. of Florida - IFAS, Fort Pierce, FL, [3]Univ. Paul Sabatier, Toulouse, France, [4]Univ. of Florida, Lake Alfred, FL

8:56 0191 Study of the transcriptional response to intoxication by Cry toxins in *Aedes aegypti* midgut. **Pablo Emiliano Canton** (emiliano@ibt.unam.mx), Mario Soberón and Alejandra Bravo, Instituto de Biotecnología, UNAM, Cuernavaca, Mexico

9:08 0192 Recent developments in RNAi for western corn rootworm management. **Ana Maria Vélez** (anamaria.velez@gmail.com)[1], Elane Fishilevich[2], Kenneth Narva[2] and Blair Siegfried[3], [1]Univ. of Nebraska, Lincoln, NE, [2]Dow AgroSciences, Indianapolis, IN, [3]Univ. of Florida, Gainesville, FL

9:20 0193 Novel RNAi targets to control western corn rootworm, *Diabrotica virgifera virgifera* (Coleoptera: Chrysomelidae). **M Rangasamy** (mrangasamy@dow.com)[1], Kenneth Narva[1], Meghan Frey[1], Elane Fishilevich[1], Sarah Worden[2] and Premchand Gandra[1], [1]Dow AgroSciences, Indianapolis, IN, [2]Dow AgroSciences, Indianapolis, IN

9:32 0194 Transcriptional responses of western corn rootworm, *Diabrotica virgifera virgifera* LeConte, neonates feeding on potential host plants. **Neetha Nanoth Vellichirammal** (neetha@unl.edu)[1], Blair Siegfried[2], Hugh M. Robertson[3] and Nicholas Miller[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL, [3]Univ. of Illinois, Champaign, IL

9:44 0195 RNA interference targets for invasive ant control. **Margaret Allen** (meg.allen@ars.usda.gov), USDA - ARS, Stoneville, MS

9:56 0196 Mechanisms underlying matrotrophic viviparity in the cockroach, *Diploptera punctata*, revealed through RNA-Seq analysis. Emily C. Jennings and **Joshua Benoit** (benoitja@ucmail.uc.edu), Univ. of Cincinnati, Cincinnati, OH

10:08 0197 RNAi in *Lygus hesperus*: From functional characterization to biorational control. **Evelien Van Ekert** (evelien.vanekert@ars.usda.gov), Jeffrey Fabrick, Joe Hull and Colin Brent, USDA - ARS, Maricopa, AZ

10:20 0198 Both clathrin-mediated endocytosis and two SID transmembrane proteins are involved in double-stranded RNA uptake in the Colorado potato beetle midgut. **Kaat Cappelle** (kaat.cappelle@ugent.be)[1], Caio Oliveira[2], Olivier Christiaens[1], Benigna Van Eynde[1] and Guy Smagghe[1], [1]Ghent Univ., Ghent, Belgium, [2]Univ. of Campinas, São Paulo, Brazil

Ten-Minute Papers, P-IE Section: Biology and Behavior

200 I (Convention Center)

Moderators: John Diaz-Montano[1] and Rebeccah A. Waterworth[2], [1]USDA - ARS, Manhattan, KS, [2]Univ. of Maryland, College Park, MD

8:00 Introductory Remarks

8:02 0199 Evaluation of light attraction for psocid species. **John Diaz-Montano** (john.diaz-montano@ars.usda.gov)[1], James Throne[2], Lee Cohnstaedt[1], Thomas Phillips[3] and James Campbell[1], [1]USDA - ARS, Manhattan, KS, [2]USDA - ARS, Parlier, CA, [3]Kansas State Univ., Manhattan, KS

8:14 0200 Maternal effects and performance of *Delia platura* (Diptera: Anthomyiidae) in a native and an introduced crop. **Patricia Guerra** (pguerra123@gmail.com)[1], Clifford Keil[2], Phil Stevenson[1], Diego Mina[3], Servio Samaniego[3], Eduardo Peralta[3], Nelson Mazon[3] and Timothy Chancellor[1], [1]Univ. of Greenwich, Kent, United Kingdom, [2]Pontifical Catholic Univ. of Ecuador, Quito, Ecuador, [3]Instituto Nacional de Investigaciones Agropecuarias, Quito, Ecuador

8:26 0201 Presentation withdrawn

8:38 0202 Impact of nest manipulation on the developmental stages of an orchard pollinator. **Neelendra K. Joshi** (nkj105@psu.edu) and David J. Biddinger, Pennsylvania State Univ., Biglerville, PA

8:50 0203 Dynamics of egg load in the psyllid *Bactericera cockerelli*. **Sean Prager** (Sean.prager@ucr.edu) and John T. Trumble, Univ. of California, Riverside, CA

9:02 0204 Seasonal phenology and winter morph status of spotted wing drosophila, *Drosophila suzukii*, in Wisconsin. **Katie Hietala-Henschell** (kghietal@mtu.edu) and Christelle Guédot, Univ. of Wisconsin, Madison, WI

9:14 0205 Oviposition and survival of *Tamarixia radiata*, an ectoparasitoid of the Asian citrus psyllid, *Diaphorina citri*, on hosts exposed to the entomopathogenic fungus, *Isaria fumosorosea*. **Andrew Chow** (andrew.chow@tamuk.edu)[1], Christopher Dunlap[2], Mark A. Jackson[2], Daniel Flores[3], Mamoudou Setamou[1] and Joseph Patt[4], [1]Texas A&M Univ., Weslaco, TX, [2]USDA - ARS, Peoria, IL, [3]USDA - APHIS, Edinburg, TX, [4]USDA - ARS, Ft. Pierce, FL

9:26 0206 Mixed diets may produce suboptimal performance in the grasshopper *Melanoplus differentialis*. **Jerry Howard** (jjhoward@uno.edu), The Univ. of New Orleans, New Orleans, LA

9:38 0207 Host selection by the eastern larch beetle, *Dendroctonus simplex* LeConte, in relation to host quality during a large-scale outbreak in the Great Lakes Region of North America. **Fraser McKee** (fraser_mckee@hotmail.com) and Brian Aukema, Univ. of Minnesota, St. Paul, MN

9:50 Break

10:00 0208 Variable gene expression and fitness in a host-switching herbivore: Assessing the cost of polyphagy. **Steven J. Castle** (steven.castle@ars.usda.gov), Charles Cowden and Joe Hull, USDA - ARS, Maricopa, AZ

10:12 0209 Why "when" and "where" matters: Characterizing mating behavior of swede midge, *Contarinia nasturtii* (Diptera: Cecidomyiidae). **Elisabeth Hodgdon** (ehodgdon@uvm.edu) and Yolanda Chen, Univ. of Vermont, Burlington, VT

10:24 0210 Picky generalists: Nutrient selection influences slug foraging behavior. **Marion Le Gall** (marionlegall314@gmail.com) and John Tooker, Pennsylvania State Univ., University Park, PA

10:36 0211 Random mating and factors influencing mate choice in western corn rootworm, *Diabrotica virgifera virgifera* LeConte. **Sally Taylor** (svtaylor@ncsu.edu)[1] and Christian Krupke[2], [1]North Carolina State Univ., Raleigh, NC, [2]Purdue Univ., West Lafayette, IN

10:48 0212 Pollination, herbivory and the geographic mosaic of floral scent in evening primroses. **Tania Jogesh** (tjogesh@life.illinois.edu)[1], Rick Overson[1], Jeremie Fant[1], Robert Raguso[2] and Krissa Skogen[1], [1]Chicago Botanic Garden, Glencoe, IL, [2]Cornell Univ., Ithaca, NY

11:00 0213 Hawk moths as agents of long-distance gene flow in evening primroses. **Rick Overson** (rickoverson@gmail.com)[1], Tania Jogesh[1], Norman Wickett[2], Jeremie Fant[1] and Krissa Skogen[1], [1]Chicago Botanic Garden, Glencoe, IL, [2]Northwestern Univ., Evanston, IL

11:12 0214 Determinants of host choice in *Trissolcus japonicus*: Potential biological control agent of *Halyomorpha halys*. **Christine Dieckhoff** (christine.dieckhoff@ars.usda.gov) and Kim A. Hoelmer, USDA - ARS, Newark, DE

11:24 0215 Varroa mite, *Varroa destructor* migration into honey bee, *Apis mellifera* colonies affects mite population levels and control strategies. **Gloria DeGrandi-Hoffman** (gloria.hoffman@ars.usda.gov)[1], Fabiana Ahumada[2], Victor Zazueta[1], Mona Chambers[1], Geoffrey Hidalgo[1] and Emily Watkins deJong[1], [1]USDA - ARS, Tucson, AZ, [2]AgScience Consulting, Tucson, AZ

11:36 0216 A regional assessment of eastern apple grower knowledge, perceptions, and attitudes of alternative pollinators. **Mia Park** (mia.park@und.edu)[1,2], Neelendra K. Joshi[3], Edwin Rajotte[4], David J. Biddinger[3], John Losey[2] and Bryan N. Danforth[2], [1]Univ. of North Dakota, Grand Forks, ND, [2]Cornell Univ., Ithaca, NY, [3]Pennsylvania State Univ., Biglerville, PA, [4]Pennsylvania State Univ., University Park, PA

11:48 0217 Interactions of a native and exotic parasitoid of brown marmorated stink bug, *Halyomorpha halys*. **Rebeccah A. Waterworth** (rwater@umd.edu)[1], Samuel Ramsey[1], Kim A. Hoelmer[2], Christine Dieckhoff[2] and Paula M. Shrewsbury[1], [1]Univ. of Maryland, College Park, MD, [2]USDA - ARS, Newark, DE

SUNDAY, NOVEMBER 15, 2015, AFTERNOON

Lunch and Learn: Exploring Careers in Extension: Advice for Students and Early Professionals

200 A (Convention Center)

Moderator and Panelists: Rebecca Schmidt-Jeffris[1], Jonathan Larson[2], Elizabeth H. Beers[3], Rachel Elkins[4] and Casey Hoy[5], [1]Cornell Univ., Geneva, NY, [2]Univ. of Nebraska, Omaha, NE, [3]Washington State Univ., Wenatchee, WA, [4]Univ. of California, Lakeport, CA, [5]The Ohio State Univ., Wooster, OH

12:15 PM - 1:15 PM

Lunch and Learn: Fitting the 'Narrative': How Media Hype can Hijack Your Research Findings

208 D (Convention Center)

Moderator, Organizer and Panelists: Joshua Gilder[1], G. Philip Hughes[1], G. Christopher Cutler[2], Scott Stewart[3] and David Zaruk[4], [1]White House Writers Group, Washington, DC, [2]Dalhousie Univ., Truro, NS, Canada, [3]Univ. of Tennessee, Jackson, TN, [4]Vesalius College, Brussels, Belgium

12:15 PM - 1:15 PM

Member Symposium: Acarological Society of America Honors James Amrine

212 AB (Convention Center)

Moderators and Organizers: Mariam Lekveishvili[1] and Enrico de Lillo[2], [1]Strayer Univ., Arlington, VA, [2]Univ. of Bari, Bari, Italy

12:30 Welcoming Remarks

12:32 0218 Ultra-structural studies of eriophyoid mites. **Gary R. Bauchan** (gary.bauchan@ars.usda.gov)[1], Ronald Ochoa[1] and C. W. Welbourn[2], [1]USDA - ARS, Beltsville, MD, [2]Univ. of Florida, Gainesville, FL

12:52 0219 The gnathosoma of the Eriophyoidea (Acari: Trombidiformes: Prostigmata): A review and update with particular emphasis on external morphology. Charnie Craemer[1,2], Enrico de Lillo[3], Philipp Chetverikov[4], **Ronald Ochoa** (ron.ochoa@ars.usda.gov)[5] and Gary R. Bauchan[5], [1]ARC-Plant Protection Research Institute, Pretoria Queenswood, South Africa, [2]Univ. of Pretoria, Pretoria, South Africa, [3]Univ. of Bari, Bari, Italy, [4]Saint Petersburg State Univ., Saint Petersburg, Russia, [5]USDA - ARS, Beltsville, MD

1:12 0220 Application of confocal laser scanning microscopy for the study of microarthropods: A case study of eriophyoid mites (Acari: Eriophyoidea). **Philipp Chetverikov** (philipp-chetverikov@yandex.ru), Saint Petersburg State Univ., Saint Petersburg, Russia

1:32 0221 Eriophyoid mites in Brazil: State of art and perspectives. **Denise Navia Magalhaes Ferreira** (denise.navia@embrapa.br)[1] and Carlos Flechtmann[2], [1]Embrapa Genetic Resources and Biotechnology - CENARGEN, Asa Norte, Brazil, [2]Univ. of São Paulo, Piracicaba, Brazil

1:52 Break

1:57 0222 Current knowledge on eriophyid-virus vectoring. **Enrico de Lillo** (enrico.delillo@uniba.it)[1], Domenico Valenzano[1] and Pasquale Saldarelli[2], [1]Univ. of Bari, Bari, Italy, [2]National Research Council (CNR), Bari, Italy

2:17 0223 *Aceria tosichella*: Cryptic but diverse. **Gary Hein** (ghein@unl.edu), Univ. of Nebraska, Lincoln, NE

2:37 0224 Tribute: Some memories of James W. Amrine, Jr. **Vikram Prasad** (v.prasad@ix.netcom.com), International Journal of Acarology, West Bloomfield, MI

2:57 Concluding Remarks

3:00 Acarological Society of America business meeting

Organized Meeting: SOLA Scarab Workers

211 D (Convention Center)

Moderator and Organizer: Andrew B. T. Smith, Canadian Museum of Nature, Ottawa, ON, Canada

12:30 Introductory Remarks

12:40 0225 A review of the *Serica* of Mexico. **Reese J. Worthington** (rworthin@go.olemiss.edu), Univ. of Mississippi, University, MS

1:00 0226 Developing scarab identification tools for Hawaii and Guam. **Joshua Dunlap** (niceae24@yahoo.com), Wichita State Univ., Wichita, KS

1:20 0227 Transcriptomic data reveal the tribal-level phylogeny of Dynastinae (Coleoptera: Scarabaeidae). **Matthew Moore** (mrmoore19@ufl.edu), Univ. of Florida, Gainesville, FL

1:40 Break

2:00 0228 Scarabs of Canada - progress report on a survey and inventory project. **Andrew B. T. Smith** (asmith@unl.edu), Canadian Museum of Nature, Ottawa, ON, Canada

2:20 0229 Rare and wanted: A review of dung beetle fossils (Coleoptera: Scarabaeinae). **Sergei Tarasov** (sergxf@yandex.ru)[1] and Fernando Vaz-de-Mello[2], [1]Univ. of Oslo, Oslo, Norway, [2]Univ. Federal de Mato Grosso, Cuiaba, Brazil

2:40 0230 Phylogeny of the genus *Yumtaax* Boucher (Coleoptera: Passalidae: Proculini): Taxonomic and evolutionary implications with descriptions of three new species. **Cristian Beza** (cristianbeza@msn.com), Univ. of Memphis, Memphis, TN

3:00 0231 The Dynastinae of the United States and Canada. **Ronald Cave** (rdcave@ufl.edu)[1] and Brett C. Ratcliffe[2], [1]Univ. of Florida, Ft. Pierce, FL, [2]Univ. of Nebraska, Lincoln, NE

3:20 Discussion

Workshop: Big Data Meets Insect Ecology: Examining Insects Continentally using NEON Data and R

208 AB (Convention Center)

Moderator and Organizer: Katherine LeVan, National Ecological Observatory Network, Boulder, CO

1:00 PM - 3:00 PM

MUVE Section Symposium: Best Bed Bug Management Practices and Novel Research

207 AB (Convention Center)

Moderators and Organizers: Changlu Wang[1] and Dini Miller[2], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:15 Introductory Remarks

1:20 0232 Designing bed bug management protocols for efficacy in different environments. **Dini Miller** (dinim@vt.edu) and Molly L. Stedfast, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:35 0233 Stakes and silver bullets: Slaying bed bugs with chemicals. **Michael F. Potter** (mpotter@uky.edu), Univ. of Kentucky, Lexington, KY

1:50 0234 Using research to create a replicable bed bug treatment protocol. **Jeffrey White** (Jeff.white@bedbugcentral.com), Bed Bug Central, Lawrenceville, NJ

2:05 0235 Premier Presentation: Best bed bug monitoring practices. **Changlu Wang** (cwang@aesop.rutgers.edu) and Narinderpal Singh, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

2:20 0236 Updates on chemical ecology of bed bug. **Dong-Hwan Choe** (donghwan.choe@ucr.edu), Univ. of California, Riverside, CA

2:35 0237 Video tracking and analysis of locomotor activity of bed bugs in the presence of aggregation factors. **Alvaro Romero** (aromero2@nmsu.edu), New Mexico State Univ., Las Cruces, NM

2:50 0238 Recent developments in bed bug detection and management strategies. **Narinderpal Singh** (nsingh@aesop.rutgers.edu) and Changlu Wang, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

3:05 Questions and closing remarks

Member Symposium: Integrated Pest Management Programs for Tropical Crops

200 B (Convention Center)

Moderator and Organizer: Rangaswamy Muniappan, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:15 0239 The role of IPM in USAID's Feed the Future initiative. **John Bowman** (jobowman@usaid.gov), USAID - BFS, Washington, DC

1:30 0240 IPM Innovation Lab: Renewed commitment to Africa and Asia. **Amer Fayad** (afayad@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:45 0241 Novel attract and kill technologies for IPM of tropical crops. **Kim Spencer** (kim.spencer@iscatech.com), ISCA Technologies, Riverside, CA

2:00 0242 Management of virus diseases of vegetable crops in developing countries. **Naidu Rayapati** (naidu@wsu.edu), Washington State Univ., Prosser, WA

2:15 0243 Augmentative on-farm releases of parasitoids to control the millet head miner in Niger. **Laouali Amadou** (amadoulaouali@gmail.com), National Institute of Agricultural Research, Maradi, Niger

2:30 0244 Management of sunn pest in west and central Asia. **Mustapha El-Bouhssini** (m.bohssini@cgiar.org), International Center for Agricultural Research in the Dry Areas, Manhattan, KS

2:45 0245 Rice IPM in Cambodia. **Ngin Chhay** (chhay.ipm@online.com.kh), Dept. of Rice Crop, Phnom Penh, Cambodia

3:00 0246 IPM for cowpea in Africa. **Manuel Tamo** (m.tamo@cgiar.org), IITA-Benin, Cotonou, Benin

Member Symposium: Thysanoptera of Arid Areas

200 C (Convention Center)

Moderator and Organizer: Sabah Razi, Univ. of Biskra, Batna, Algeria

1:15 Introductory Remarks

1:20 0247 Pest thrips in arid areas of Iran and Iraq. **Majid Mirabbalou** (majid.mirab@gmail.com), South China Agricultural Univ., Guangzhou, China

1:40 0248 Cucurbitaceae thrips of Biskra, an arid area of Algeria. **Farid Alleche** (allechefarid@yahoo.fr), Plant Protection, Biskra, Algeria

2:00 0249 Crop thrips of Biskra, an arid area in Algeria. **Sabah Razi** (sabah_razi@yahoo.fr), Univ. of Biskra, Batna, Algeria

2:20 0250 Pest thrips of citrus in Algeria. **F. Bounaceur** (fbounaceur@yahoo.fr), Univ. IBN Khaldoun, Tiaret, Algeria

2:40 Discussion

3:00 Concluding Remarks

Member Symposium: Research Advances in Root Feeding Insect Pests and Their Management

200 D (Convention Center)

Moderators and Organizers: Sudan Gyawaly[1,2] and Roshan Manandhar[3,4], [1]Society of Overseas Nepalese Entomologists (SONE), VA, [2]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [3]Lincoln Univ., Jefferson City, MO, [4]Society of Overseas Nepalese Entomologists (SONE), Jefferson City, MO

1:15 0251 Advances in the use of entomopathogenic nematodes for white grub management. **Albrecht Koppenhöfer** (koppenhofer@aesop.rutgers.edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

1:35 0252 Rootworms: Updates on an adaptive soil pest. **Bruce Hibbard** (bruce.hibbard@ars.usda.gov), USDA - ARS, Columbia, MO

1:55 0253 Behavioral and ecological factors associated with root feeding insects and implications for IPM-based pest management. **Jhalendra Rijal** (jrijal@ucdavis.edu)[1], Kris Tollerup[2] and Larry D. Godfrey[1], [1]Univ. of California, Davis, CA, [2]Univ. of California, Parlier, CA

2:15 0254 Acoustic monitoring of grape root borers, white grubs, and other hidden soil insect pests. **Richard W. Mankin** (richard.mankin@ars.usda.gov), USDA - ARS, Gainesville, FL

2:35 0255 Approaches considered to manage cabbage maggot in *Brassica* vegetables in central coast of California. **Shimat V. Joseph** (svjoseph@ucanr.edu), Univ. of California Cooperative Extension, Salinas, CA

2:55 0256 Red ant, *Dorylus orientalis,* (Westwood) and its management in Nepal. **Samudra Joshi** (samudralaljoshi@hotmail.com), Kathmandu, Nepal

Member Symposium: Synergy and Partnering with Retired and Emeriti Seniors in Professional Societies (ESA, ASA, CSSA AND SSSA) on their Involvement in Research, Teaching, Special Interests, Travel, and Consulting in Retirement

204 AB (Convention Center)

Moderators and Organizers: Kenneth A. Sorensen[1] and Ken Pruess[2], [1]North Carolina State Univ., Raleigh, NC, [2]Univ. of Nebraska, Lincoln, NE

1:15 Welcoming Remarks

1:25 0257 Senior professionals and students: Networks and mentoring. **Kenneth A. Sorensen** (kenneth_sorensen@ncsu.edu), North Carolina State Univ., Raleigh, NC

1:45 0258 Three entomological activities after retirement. **Ken Pruess** (kpruess2@unl.edu), Univ. of Nebraska, Lincoln, NE

2:05 0259 Insect taxonomists after retirement. **Charles W. O'Brien** (cobrien6@cox.net) and Lois O'Brien, Univ. of Arizona, Tucson, AZ

2:25 0260 Soil science, pedology, and repurposing. **Mary Collins** (mec@ufl.edu), Univ. of Florida, Gainesville, FL

2:45 Open remarks and discussion by retired ASA, CSSA, SSSA and ESA professional scientists

3:05 Senior member ESA open business session

3:14 Concluding Remarks

Member Symposium: Using Animation and Music as Tools for Communicating Science

205 A (Convention Center)

Moderators and Organizers: Anthony S. DiMeglio, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

1:15 0261 Entomology in motion: Making the connection with visual artists. **Cable Hardin** (cable.hardin@sdstate.edu), South Dakota State Univ., Brookings, SD

1:35 0262 Animation students offer fresh ideas for communicating science: Collaboration is key. **Tynesha Foreman** (nesha4man@gmail.com), Maryland Institute College of Art (MICA), Baltimore, MD

1:55 0263 Plants, pests, bodyguards: Is a picture worth more than a thousand words? **Elvira de Lange** (elvira.de.lange@gmail.com), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

2:15 0264 The chemical symphony of distress, a plant defensive recital to herbivorous insects. **Ivan Hiltpold** (i.hiltpold@uws.edu.au), Univ. of Western Sydney, Penrith, Australia

2:35 0265 Soil biomes sing with life: Music and animation bring soil science into the classroom. **Anthony S. DiMeglio** (tonydimeglio@gmail.com)[1], Max Ernst[2] and Spencer Ernst[2], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]The Walking Sticks, Silver Spring, MD

2:55 0266 Animation makes big impacts in outreach and research: A panel discussion on how to animate your works. **Jorge Cham** (jorge@phdcomics.com), PHD Comics, Los Angeles, CA

Member Symposium: The Art of Writing a Successful Research Paper

206 AB (Convention Center)

Moderator and Organizer: Elliot Shubert, The Natural History Museum, London, United Kingdom

1:15 Introductory Remarks

1:20 0267 What makes a paper excellent? **Rosalind James** (rosalind.james@ars.usda.gov), USDA - ARS, Logan, UT

1:40 0268 Avoiding common pitfalls during scientific writing. **Timothy J. Lysyk** (lysykt@agr.gc.ca), Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

2:00 0269 The Keep It Simple Students (K.I.S.S.) method to successful scientific writing. **John J. Adamczyk** (john.adamczyk@ars.usda.gov), USDA - ARS, Poplarville, MS

2:20 0270 Publishing science: Advice from an editor and teacher. **Karen Sime** (karen.sime@oswego.edu), State Univ. of New York, Oswego, NY

2:40 0271 Tips and tricks for writing a successful paper. **Elliot Shubert** (e.shubert@nhm.ac.uk), The Natural History Museum, London, United Kingdom

3:00 Summary, Conclusion and Questions

Organized Meeting: Americas Neuropterists Meeting

205 B (Convention Center)

Moderators and Organizers: Ben Diehl and Renato Machado, Texas A&M Univ., College Station, TX

1:15 Welcoming Remarks

1:20 0272 The spongillaflies (Neuroptera: Sisyridae) of Asia and Oceania. **David E. Bowles** (david_bowles@nps.gov), United States National Park Service, Republic, MO

1:40 0273 Morphological studies within the antlion tribe Myrmeleontini (Neuroptera: Myrmeleontidae). **Benjamin Diehl** (b-diehl@neo.tamu.edu), Texas A&M Univ., College Station, TX

2:00 0274 Five new antlions species from the subtribe Periclystina (Myrmeleontidae: Dendroleontini). **Renato Machado** (rjpmachado@neo.tamu.edu), Texas A&M Univ., College Station, TX

2:20 Break

2:35 0275 (1R,2S,5R,8R)-Iridodial and Z,E-nepetalactol: First long-rangechemical attractants for antlions (Neuroptera: Myrmeleontidae). **Qing-He Zhang** (qing-he@rescue.com)[1], Guiji Zhou[1], Doreen Hoover[1], Neil Michaelson[1], Paul Bryant[2], Armen Margaryan[1], Kamlesh R. Chauhan[2], Jeffrey R. Aldrich[3] and Rod G. Schneidmiller[1], [1]Sterling International, Inc., Spokane, WA, [2]USDA - ARS, Beltsville, MD, [3]Univ. of California, Davis, CA

2:55 0276 What do we really know about the biologies of the Neuropterida? Actually very little. **John D. Oswald** (joswald@ag.tamu.edu), Texas A&M Univ., College Station, TX

12:00 Concluding Remarks

Organized Meeting: International Society of Hymenopterists Symposium and Business Meeting

200 F (Convention Center)

Moderator and Organizer: James Whitfield, Univ. of Illinois, Champaign, IL

1:30 Welcoming Remarks

1:35 0277 The diverse roles that microorganisms play in the biology of parasitoid wasps. **Michael R. Strand** (michael.strand@uga.edu), Univ. of Georgia, Athens, GA

2:05 Business Meeting

Ten-Minute Papers, SysEB Section: Behavior and Ecology

210 AB (Convention Center)

Moderators: Christina Kwapich[1] and Michael Sitvarin[2], [1]Arizona State Univ., Tempe, AZ, [2]Univ. of Kentucky, Lexington, KY

12:45 Welcoming Remarks

12:47 0278 Life-history traits of the Asian corn borer, *Ostrinia furnacalis,* in relation to temperature and geographical latitude. **Fangsen Xue** (xue_fangsen@hotmail.com), Jiangxi Agricultural Univ., Nanchang, China

12:59 0279 Song analysis of South African bladder cicadas (Hemiptera: Cicadidae). **Allen Sanborn** (asanborn@barry.edu)[1] and Polly K. Phillips[2], [1]Barry Univ., Miami Shores, FL, [2]Miramar, FL

1:11 0280 Seasonal changes in intraguild predation and prey utilization among wolf spiders: A molecular assessment. **Michael Sitvarin** (michaelsitvarin@uky.edu), Kacie J. Athey, Thomas D. Whitney and James D. Harwood, Univ. of Kentucky, Lexington, KY

1:23 0281 Misdirected courtship in a community of colorful jumping spiders. **Lisa Taylor** (lisa.taylor@ufl.edu)[1] and Kevin McGraw[2], [1]Univ. of Florida, Gainesville, FL, [2]Arizona State Univ., Tempe, AZ

1:35 0282 Is secondary sexual trait size an indicator of ability to resist oxidative stress? **Rebecca Fehn** (fehnra@gmail.com), Michal Polak, Jorge Hurtado-Gonzales and Lauren Roberto, Univ. of Cincinnati, Cincinnati, OH

1:47 0283 Presentation withdrawn

1:59 Break

2:11 0284 Behavioral interactions of the harvester ant *Veromessor pergandei* and three nest-associated, predatory spiders. **Christina Kwapich** (ckwapich@bio.fsu.edu) and Bert Hoelldobler, Arizona State Univ., Tempe, AZ

2:23 0285 Experimental colony transplants in the western harvester ant, *Pogonomyrmex occidentalis*: Effects of food, mating frequency and lineage. **Blaine J. Cole** (bcole@uh.edu) and Diane Wiernasz, Univ. of Houston, Houston, TX

2:35 0286 Sexual and ecologically based reproductive isolation in the walnut-infesting *Rhagoletis suavis* species group. **Mary Glover** (mglover@nd.edu) and Jeffrey Feder, Univ. of Notre Dame, Notre Dame, IN

2:47 0287 Relative effects of habitat amount and patch size on ground-dwelling arthropod communities in small forest remnants. **Federica Lacasella** (federicalaca@hotmail.it)[1], Silvio Marta[2], Stefano De Felici[2], Marco Isaia[3], Marzio Zapparoli[4] and Claudio Gratton[1], [1]Univ. of Wisconsin, Madison, WI, [2]Univ. of Rome Tor Vergata, Rome, Italy, [3]Univ. of Torino, Torino, Italy, [4]Università degli Studi della Tuscia, Viterbo, Italy

2:59 0288 Visual navigation in honey bees, *Apis mellifera*: A neuroethological approach. **Bahram Kheradmand** (bkheradm@ucsd.edu) and James C. Nieh, Univ. of California, San Diego, CA

3:11 0289 Tephritid fruit flies below the radar: How sub-detectable populations persist and spread in California. **Caroline Larsen** (carwright@ucdavis.edu), James R. Carey, Richard E. Plant and Robert Hijmans, Univ. of California, Davis, CA

3:23 Concluding Remarks

Ten-Minute Papers, SysEB Section: Biodiversity, Bioinformatics & Education

211 B (Convention Center)

Moderators: Andrew Deans[1] and Torsten Dikow[2], [1]Pennsylvania State Univ., University Park, PA, [2]Cornell Univ., Ithaca, NY

1:00 Welcoming Remarks

1:02 0290 Catching them all: A case-study in sampling arthropod diversity. **Michael Skvarla** (mskvarla36@gmail.com) and Ashley Dowling, Univ. of Arkansas, Fayetteville, AR

1:14 0291 Tall grass, small wasps: Measuring the biodiversity of braconid wasps (Hymenoptera: Ichneumonoidea) in two warm season grasslands. **Noah P. Winters** (winters.noahp@gmail.com)[1], Abigail A.R. Kula[2] and Robert R. Kula[3], [1]Smithsonian Institution National Museum of Natural History, Washington, DC, [2]Mount St. Mary's Univ., Emmitsburg, MD, [3]USDA - ARS, Washington, DC

1:26 0292 Keep calm and beetle on: How volcanic eruptions affect arthropod biodiversity. **Ainsley Seago** (ainsley.seago@dpi.nsw.gov.au)[1] and Charlie Crisafulli[2], [1]NSW Dept. of Primary Industries, Orange, NSW, Australia, [2]Pacific Northwest Research Station, Amboy, WA

1:38 0293 Is Malaise trapping for braconid wasps in grasslands worth the malaise? **Robert R. Kula** (robert.kula@ars.usda.gov)[1], Marion A. Leménager[2], Morgan P. Rondinelli[2,3], Noah P. Winters[2] and Abigail A.R. Kula[4], [1]USDA - ARS, Washington, DC, [2]Smithsonian Institution National Museum of Natural History, Washington, DC, [3]Univ. of Michigan, Ann Arbor, MI, [4]Mount St. Mary's Univ., Emmitsburg, MD

1:50 0294 Got stink bugs? We do! Collecting Pentatomoidea in Michigan. Ernest Delfosse, **Patricia Samota** (samotapa@msu.edu) and Paul Botch, Michigan State Univ., East Lansing, MI

2:02 Break

2:14 0295 Effects of contamination on scavenging beetles. **Ansley Silva** (daily.puja@gmail.com)[1], Kamal Gandhi[1], David R. Coyle[1], James Beasley[1,2], Kelsey Turner[2] and Erin Abernethy[2], [1]Univ. of Georgia, Athens, GA, [2]Savannah River Ecology Laboratory, Aiken, SC

2:26 0296 Taxonomic revisions and catalogs as current science: Cybertaxonomic tools to accelerate dissemination of and access to data. **Torsten Dikow** (dikowt@si.edu), Smithsonian Institution National Museum of Natural History, Washington, DC

2:38 0297 Taxonomic revisions and biodiversity informatics: Lessons learned. **Ana Dal Molin** (adalmolin@tamu.edu)[1] and James Woolley[2], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Texas A&M Univ., College Station, TX

2:50 0298 Presentation withdrawn

3:02 0299 Buzz Brains: A framework for exploring pollination knowledge of undergraduates. **Douglas Golick** (dgolick2@unl.edu), Jenny Dauer, Louise Lynch and Erin Ingram, Univ. of Nebraska, Lincoln, NE

3:14 0300 Know your insects! New approaches to teaching insect morphology and systematics. **Andrew Deans** (adeans@psu.edu) and István Mikó, Pennsylvania State Univ., University Park, PA

3:26 Concluding Remarks

ESA Opening Plenary Session and Founders' Memorial Lecture

Auditorium Main (Convention Center)

Moderators and Organizers: C. David Gammel[1] and Phillip G. Mulder, Jr.[2], [1]Entomological Society of America, Annapolis, MD, [2]Oklahoma State Univ., Stillwater, OK

3:30-5:30

0307 Love At First Sniff: Harry Shorey and the Dawn of the Age of Pheromones. **Thomas C. Baker** (tcb10@psu.edu), Pennsylvania State University, University Park, PA

SUNDAY, NOVEMBER 15, 2015, EVENING

ASA, CSSA, SSSA, and ESA Opening Keynote: Partnering for Solutions to Supply Chain Sustainability

Auditorium Main (Convention Center)

Presiding: Paul E. Fixen, American Society of Agronomy; Michael A. Grusak, Crop Science Society of America; Harold van Es, Soil Science Society of America; and Phillip G. Mulder, Jr., Entomological Society of America

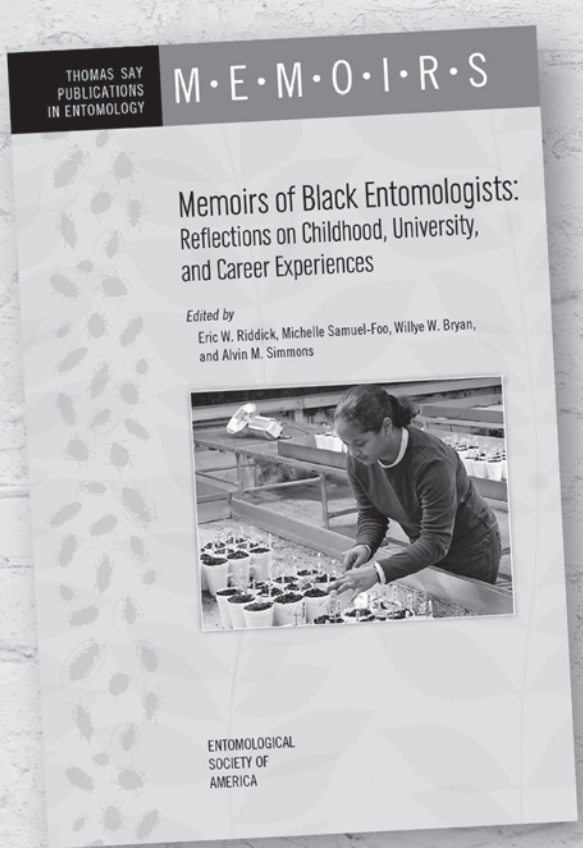
6:00-7:10

0308 From field to market: How the supply chain is partnering to improve agricultural sustainability. **Rod Snyder**, President, Field to Market, Washington, DC

0309 Synergy of science and communications to sustainably solve the nine billion problem. **Sonny Ramaswamy**, Director of the National Institute of Food and Agriculture, U.S. Department of Agriculture, Washington, DC

Memoirs of Black Entomologists:
Reflections on Childhood, University, and Career Experiences

Edited by Eric W. Riddick, Michelle Samuel-Foo, Willye W. Bryan, and Alvin M. Simmons



This first-of-its-kind Thomas Say Memoir presents the personal stories of 20 black entomologists who recall their unique paths to successful, fulfilling careers in entomology.

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ENTOMOLOGICAL SOCIETY OF AMERICA

MONDAY, NOVEMBER 16, 2015, MORNING

Joint Symposium: Connecting Phytobiomes with Soil and Plant Health

101 DE (Convention Center)

Moderators and Organizers: Veronica Acosta-Martinez[1] and Ronald Turco[2], [1]USDA - ARS, Lubbock, TX, [2]Purdue Univ., West Lafayette, IN

8:00 Introductory Remarks

8:05 0310 Phytobiomes and plant health: Science and policy. **Jan Leach** (jan.leach@colostate.edu), Colorado State Univ., Fort Collins, CO

8:35 0311 Mediation of induced plant defenses by the gut symbionts of insect herbivores. **Gary Felton** (gwf10@psu.edu), Pennsylvania State Univ., University Park, PA

9:05 0312 Nematodes and microarthropods as environmental indicators for terrestrial and wetland soils. **Deborah Neher** (deborah.neher@uvm.edu), Univ. of Vermont, Burlington, VT

9:35 Break

9:45 0313 Microorganisms impacting production of forage crops. **Deborah Young** (cayoung@noble.org), Samuel Roberts Noble Foundation, Ardmore, OK

10:15 0314 Connecting soil microbial communities to soil functioning and soil health. **Jennifer Moore-Kucera** (jennifer.moore-kucera@ttu.edu), Texas Tech Univ., Lubbock, TX

10:40 0315 The role of enzyme activities in soil ecosystem services: Location, origin and connection to the phytobiome. **Veronica Acosta-Martinez** (veronica.acostamart@ars.usda.gov), USDA - ARS, Lubbock, TX

11:00 Adjorn

01 - Undergraduate Poster Competition: MUVE - Medical and Veterinary

Exhibit Hall BC (Convention Center)

D3000 Comparing various counting methods used to estimate individual horn fly (Diptera: Muscidae) populations on cattle. **Susana Urias** (surias@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM

D3001 The characterization of microbiota changes pre/post larval mosquito treatment in post-Hurricane Sandy tree divot habitat. **Joseph Receveur** (jpreceve@millersville.edu)[1], Gary Donato[2], Tadhgh Rainey[2], Jennifer L. Pechal[3], M. Eric Benbow[3] and John R. Wallace[1], [1]Millersville Univ., Millersville, PA, [2]Hunterdon County Division of Health Services, Flemington, NJ, [3]Michigan State Univ., East Lansing, MI

D3002 Plant extract effects on mosquito survivorship: Determining the efficacy of Ailanthone to control adult mosquitoes. **Calen Wylie** (cawylie2012@hotmail.com) and John R. Wallace, Millersville Univ., Millersville, PA

D3003 A three-year survey of mosquito populations in Brown County, South Dakota, USA, and implications for West Nile virus. **Tessa Durnin** (tessa.durnin@wolves.northern.edu), Samantha Bahr, Alison Byrd, Courtney Henschel, Larissa Kempf, April Moeller, Ian Muirhead, Annika Van Oosbree, Miranda Ristau, Paige Sommers, Alyssa Anderson and Jon Mitchell, Northern State Univ., Aberdeen, SD

D3004 Effects of arsenic exposure on *Aedes aegypti* and *Aedes albopictus.* **Brenda Hernandez-Barron** (bchernandez@broncs.utpa.edu) and Christopher Vitek, Univ. of Texas Rio Grande Valley, Edinburg, TX

02 - Undergraduate Poster Competition: P-IE - Bees and Arthropod Communities

Exhibit Hall BC (Convention Center)

D3005 Bee (Hymenoptera: Apoidea) diversity and floral use in remnant and planted tallgrass prairies of Northeast Iowa. **Isaac Jensen** (jensis01@luther.edu) and Kirk J. Larsen, Luther College, Decorah, IA

D3006 A survey of bee diversity between urban and rural lawns using blue and yellow vane traps. **Rachel Larson** (rappert13@gmail.com), D. Bryan Bishop, Scott Opatril, Jens Hulden and Alana Lopes, Concordia College, Moorhead, MN

D3007 Presentation withdrawn

D3008 Diversity of bees in burned and unburned praries in NW Minnesota. **Jens Hulden** (jhulden1@cord.edu) and Scott Opatril, Concordia College, Moorhead, MN

D3009 A comparison of adult butterfly communities on remnant and planted prairies in Northeast Iowa. **Emma Stivers** (stivem01@luther.edu)[1], Jacob Wittman[2] and Kirk J. Larsen[1], [1]Luther College, Decorah, IA, [2]DREAM Technical Academy, Willmar, MN

D3010 Ground beetle communities of remnant and planted tallgrass prairies in northeastern Iowa: Influence of plant community structure and recent fire. **Clare Brandt** (brancl01@luther.edu) and Kirk J. Larsen, Luther College, Decorah, IA

D3011 Survey of the arthropod community in an outdoor mushroom growing operation. **Jaana Iverson** (jaana.iverson@gmail.com), Theresa M. Cira, Eric C. Burkness and William Hutchison, Univ. of Minnesota, St. Paul, MN

D3012 Insect communities changed by broadleaf herbicide application in central Oklahoma hayfields. **Andrea Will** (awill@mail.snu.edu), Greg Sattler and David Hoekman, Southern Nazarene Univ., Bethany, OK

D3013 A framework for modeling repertoire expansion in *Pheidole dentata*. **Ivan Kent** (ivan.kent@scranton.edu), Jason Graham and Marc Seid, Univ. of Scranton, Scranton, PA

D3014 Billbug species composition on Missouri zoysiagrass golf course fairways. **Michael Patterson** (mep625@mail.missouri.edu), Bruce A. Barrett and Xi Xiong, Univ. of Missouri, Columbia, MO

D3015 The suitability of novel hosts for *Grosmannia clavigera* and *Ophiostoma montium*, two common fungal associates of mountain pine beetle (Coleoptera:Curculionidae). **Jonah Widmer** (widme019@umn.edu)[1], Derek Rosenberger[1], Robert Blanchette[1], Bejamin Held[1], Robert Venette[2] and Brian Aukema[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - Forest Service, St. Paul, MN

03 - Undergraduate Poster Competition: P-IE - Herbivores, Invasive Species, and Trapping

Exhibit Hall BC (Convention Center)

D3016 An investigation of the impact of urban riparian forest composition and diversity on carabid assemblages. Tierney R. Brosius, Michael Reisner and **Diana Schultz** (dianaschultz12@augustana.edu), Augustana College, Rock Island, IL

D3017 Aquatic macroinvertebrate diversity within an urbanized gradient. **Jacob Torres** (jacobtorres13@augustana.edu), Kevin Geedey, Michael Reisner and Tierney R. Brosius, Augustana College, Rock Island, IL

D3018 The spatial distribution and density of the emerald ash borer infestation in Rock Island and Moline, IL. **Victoria Lason** (victorialason13@augustana.edu), Morgan Conely, Michael Reisner and Tierney R. Brosius, Augustana College, Rock Island, IL

D3019 Predation of the invasive brown marmorated stink bug (Hemiptera: Pentatomidae) by spiders associated with human dwellings. **Brittany Poling** (brittany.poling@ymail.com)[1], William R. Morrison[2], Alexandria N. Bryant[3], Nicole F. Quinn[4] and Tracy C. Leskey[2], [1]Shepherd Univ., Shepherdstown, WV, [2]USDA - ARS, Kearneysville, WV, [3]Univ. of Kentucky, Breckinridge County Extension Service, Hardinsburg, KY, [4]Michigan State Univ., East Lansing, MI

D3020 Oviposition of spotted wing drosophila, *Drosophila suzukii*, in damaged and undamaged fruit. **Sarah Holle** (holle248@umn.edu), Theresa M. Cira, Eric C. Burkness and William Hutchison, Univ. of Minnesota, St. Paul, MN

D3021 Glassy-winged sharpshooter, *Homalodisca vitripennis*, oviposition effects on foliar grapevine and red-tipped photinia terpenoid levels. **Julie Pedraza** (pedraza.julie@gmail.com)[1], Christopher Wallis[2] and Rodrigo Krugner[2], [1]California State Univ., Fresno, CA, [2]USDA - ARS, Parlier, CA

D3022 Survey for the invasive spotted lanternfly, *Lycorma delicatula* (White) (Hemiptera: Fulgoridae), on forty plant species in southeastern Pennsylvania. **Cathryn Pugh** (cpugh853@live.kutztown.edu), Evan Williams and Gregory Setliff, Kutztown Univ., Kutztown, PA

D3023 Examining grasshopper herbivory and foraging strategies in a diverse grasshopper community from central New Mexico. **Allyson Richins** (arichins@unm.edu)[1], David C. Lightfoot[2] and Seth Newsome[2], [1]Univ. of New Mexico, Las Cruces, NM, [2]Univ. of New Mexico, Albuquerque, NM

D3024 Evaluation of mass trapping as a management strategy for grape berry moth. **Hayley Sisson** (sissonha@msu.edu), Keith Mason and Rufus Isaacs, Michigan State Univ., East Lansing, MI

D3025 Are survival, mating and oviposition of grape berry moth, *Paralobesia viteana* (Clemens), affected by temperature? **Laura Bizzarri** (bizzarri@msu.edu), Keith Mason and Rufus Isaacs, Michigan State Univ., East Lansing, MI

D3026 Trichomes: The first line of defense against herbivores, *Trichoplusia ni*. **Fhallon Ware-Gilmore** (ware-gilmoref@uwa.edu)[1], Michelle Peiffer[2], Ketia Shumaker[1], Dawn Luthe[2] and Gary Felton[2], [1]Univ. of West Alabama, Livingston, AL, [2]Pennsylvania State Univ., University Park, PA

D3027 Surface morphology and asymmetric transmural diffusion of *Diprion similis* (Hymenoptera: Diprionidae) cocoons. **Elizabeth Henderson** (elizabeth.henderson@maine.edu) and Joseph Staples, Univ. of Southern Maine, Portland, ME

D3028 Population genetic structure of the white-lined sphinx moth, *Hyles lineata,* in the southwestern United States. **Andrea Gruver** (andreagruver@gmail.com), Rick Overson, Tania Jogesh and Jeremie Fant, Chicago Botanic Garden, Glencoe, IL

D3029 Video evaluation of an attract and kill device for Japanese beetle, *Popillia japonica*. **Michael Mueller** (muell192@hotmail.com) and Matthew Grieshop, Michigan State Univ., East Lansing, MI

04 - Undergraduate Poster Competition: PBT - Ants, Bees, Beetles, and Moquitoes

Exhibit Hall BC (Convention Center)

D3030 Presentation withdrawn

D3031 Transcriptional regulation of temperature stress response during development in the alfalfa leafcutting bee, *Megachile rotundata*. **Sean A. Nash** (sean.a.nash@ndsu.edu)[1], Alex S. Torson[1], Julia H. Bowsher[1], George D. Yocum[2] and Joseph P. Rinehart[2], [1]North Dakota State Univ., Fargo, ND, [2]USDA - ARS, Fargo, ND

D3032 Effects of chronic neonicotinoid exposure on expression of antimicrobial peptides in the bumble bee, *Bombus impatiens*. **William Simmons** (wsimmons@colby.edu) and David Angelini, Colby College, Waterville, ME

D3033 Neurodevelopmental effects of octopamine on isolation-induced social behaviors in *Pheidole dentata*. **Reshma Gore** (reshmagore92@gmail.com) and Marc Seid, The Univ. of Scranton, Scranton, PA

D3034 Flexible schedule in the development of the red flour beetles, *Tribolium castaneum* Herbst and *T. freemani* Hinton, associated with cannibalism. **Taewoo Kang** (nicholask@ksu.edu), Krissana Ruang-Rit, David C. Margolies and Yoonseong Park, Kansas State Univ., Manhattan, KS

D3035 Expression of yellow fever mosquito, *Aedes aegypti* L., cationic amino acid transporters in yeast. **Julia Vulcan** (jvulcan@nmsu.edu), Hitoshi Tsujimoto and Immo Hansen, New Mexico State Univ., Las Cruces, NM

05 - Undergraduate Poster Competition: SysEB - Honey Bees and other Hymenoptera

Exhibit Hall BC (Convention Center)

D3036 Development of an automated computer tool for bee identification from wing venation. **Emad Sadeghi** (ssadeghi@wisc.edu), William Sethares and Claudio Gratton, Univ. of Wisconsin, Madison, WI

D3037 Wing interference patterns of Neotropical parasitoid wasps (Braconidae: Microgastrinae). **Shuyang Jin** (sjin22@illinois.edu), James Whitfield and Kyle Parks, Univ. of Illinois, Champaign, IL

D3038 Respiring after retiring: Changes in ventilation when honey bees and paper wasps sleep. **Travis Harrison** (harrison.trav@uwlax.edu) and Barrett Klein, Univ. of Wisconsin, La Crosse, WI

D3039 Presentation withdrawn

D3040 Evaluation of sociality in a Caribbean halictid bee. **Emilio Grau-Cruz** (egrau7266@gmail.com) and Bert Rivera-Marchand, Inter American Univ. of Puerto Rico, Bayamón, PR

D3041 Comparison of genetic and morphospecies identification techniques to examine a restored grassland pollinator community. **Rebecca Devine** (rebecca.devine@my.und.edu), Tiffany Huwe, Leslie Yellow Hammer, Sami Swartz, Rebecca B. Simmons, Mia Park, Brett Goodwin and Kathryn Yurkonis, Univ. of North Dakota, Grand Forks, ND

D3042 Convergence in the ovipositor system of Platygastroidea. **Dylan Johnston-Jordan** (dylanjj@gmail.com)[1], Elijah Talamas[2] and István Mikó[3], [1]SUNY Purchase, Ithaca, NY, [2]USDA - ARS, Washington, DC, [3]Pennsylvania State Univ., University Park, PA

06 - Undergraduate Poster Competition: SysEB - Aquatic Insects and Trapping

Exhibit Hall BC (Convention Center)

D3043 Experimental acidification effects on aquatic macroinvertebrates in a tropical stream. **Crystal Purcell** (cpurcell@udallas.edu)[1] and Pablo Gutiérrez-Fonseca[2], [1]Purdue Univ., West Lafayette, IN, [2]Univ. of Puerto Rico Rio Piedras, San Juan, PR

D3044 A population-level study of *Cyanallagma* (Odonata: Coenagrionidae) in Patagonia utilizing EPIC DNA sequence markers. **Taylor King** (taylor.leigh.king1@gmail.com)[1], Preston Arnold[1], Yelena Pacheco[1], Pablo Pessacq[2] and Seth M. Bybee[1], [1]Brigham Young Univ., Provo, UT, [2]Laboratorio de Investigaciones en Ecologia y Sistematica Animal (LIESA), Chubut, Argentina

D3045 Night versus day warming: Asymmetrical impacts on predatory insects. **Bobbi Carter** (carterb@bgsu.edu) and Shannon Pelini, Bowling Green State Univ., Bowling Green, OH

D3046 Relative abundance changes in Minnesota Point coccinellid aggregations. **Ryan Lumen** (hasti152@d.umn.edu) and Rachel MaKarrall, Univ. of Minnesota, Duluth, MN

D3047 Novel markers to distinguish Tephritid pest species. **Robert Mier** (robert.mier01@utrgv.edu), USDA - APHIS, Weslaco, TX

D3048 The technical and performance characteristics of a low-cost, simply-constructed, black light insect trap. **Katharine Glover** (gloverka@msu.edu)[1], Amanda Rice[2], Joel Stewart[3] and Peter White[3], [1]Michigan State Univ., While Lake, MI, [2]Michigan State Univ., St. Clair Shores, MI, [3]Michigan State Univ., East Lansing, MI

D3049 Is pan trapping an effective method for estimating hymenopteran diversity in grasslands? **Morgan P. Rondinelli** (morganrondinelli@gmail.com)[1,2], Sam Droege[3], Abigail A.R. Kula[4], David R. Smith[5] and Robert R. Kula[5], [1]Smithsonian Institution National Museum of Natural History, Washington, DC, [2]Univ. of Michigan, Ann Arbor, MI, [3]USGS, Beltsville, MD, [4]Mount St. Mary's Univ., Emmitsburg, MD, [5]USDA - ARS, Washington, DC

07 - Graduate Poster Competition: MUVE - Ticks and Mosquitoes

Exhibit Hall BC (Convention Center)

D3050 Detection of *Rickettsia* spp. in field-collected ticks using loop-mediated isothermal amplification. **Jaclyn Martin** (jaclyn.e.martin@okstate.edu) and Bruce Noden, Oklahoma State Univ., Stillwater, OK

D3051 Elucidating the molecular action of tick saliva in the induction of a-galactose in red meat allergy. **Gary Crispell** (gary.crispell@eagles.usm.edu), Rebekah Bullard, Karthik Balamurugan and Shahid Karim, Univ. of Southern Mississippi, Hattiesburg, MS

D3052 Nocturnal questing behavior of the blacklegged tick, *Ixodes scapularis*. **Xia Lee** (xlee@wisc.edu) and Susan Paskewitz, Univ. of Wisconsin, Madison, WI

D3053 Monitoring ambrosia beetles in ornamental nurseries: The influence of flood-stress and protective sprays. **A. Anderson** (alander5@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

D3054 Effect of container size and food availability on adult fitness of *Aedes aegypti* and *Aedes albopictus* (Diptera: Culicidae). **Allison Parker** (aparker9@illinois.edu), Brian F. Allan and Ephantus J. Muturi, Univ. of Illinois, Champaign, IL

D3055 *In vivo* tissue distribution of the *Ehrlichia muris*-like agent in *Ixodes scapularis* ticks. **Geoffrey Lynn** (lynnx044@umn.edu), Jonathan Oliver, Curtis Nelson, Roderick Felsheim, Timothy Kurtti and Ulrike Munderloh, Univ. of Minnesota, St. Paul, MN

D3056 Assessing the impact of nutrition availability, competition and predation threat on survival and fitness of *Aedes aegypti*. **Karthikeyan Chandrasegaran** (kchand1@ilstu.edu)[1,2,3], Samyuktha Kandregula[3], Suhel Quader[3,4] and Steven Juliano[1], [1]Illinois State Univ., Normal, IL, [2]SASTRA Univ., Thanjavur, India, [3]National Centre for Biological Sciences, Bangalore, India, [4]Nature Conservation Foundation, Mysore, India

D3057 Estimating age structure of wild *Anopheles* populations using the captive cohort method. **Stephanie Kurniawan** (skurniawan@ucdavis.edu), Kong Cheung, James R. Carey, Ed Lewis and Shirley Luckhart, Univ. of California, Davis, CA

D3058 A comparative study of species abundance and diversity of mosquitoes at two different sites in Lower Rio Grande Valley. **Lopamudra Chakraborty** (lopamudra.chakraborty01@utrgv.edu) and Christopher Vitek, Univ. of Texas Rio Grande Valley, Edinburg, TX

08 - Graduate Poster Competition: MUVE - Bed Bugs, Urban Pests, and Field Populations

Exhibit Hall BC (Convention Center)

D3059 Chlorfenapyr susceptibility monitoring in bed bug, *Cimex lectularius* L., field populations from the United States. **Aaron Ashbrook** (aashbroo@purdue.edu), Michael E. Scharf, Gary Bennett and Ameya D. Gondhalekar, Purdue Univ., West Lafayette, IN

D3060 RNAi mediated gene silencing in bed bugs, *Cimex lectularius* L. **Sanjay Basnet** (sbasnet2@unl.edu) and Shripat Kamble, Univ. of Nebraska, Lincoln, NE

D3061 Laboratory and field efficacy of granular baits against the Asian cockroach, *Blattella asahinai*, and German cockroach, *B. germanica*. **Yvonne Matos** (ymatos@ncsu.edu) and Coby Schal, North Carolina State Univ., Raleigh, NC

D3062 Evaluating the prevalence and effects of within-nest colonies of the odorous house ant, *Tapinoma sessile,* on nestling survivorship and success in five species of midwestern birds. **Josh Gibson** (jcgibso2@illinois.edu), Loren Merrill, Andrew Suarez, Thomas Benson and Scott Chiavacci, Univ. of Illinois, Champaign, IL

D3063 Prevalence of non-O157 shiga toxin-producing *Escherichia coli* (STEC) in house flies, *Musca domestica* L., from cattle feedlots and dairies. **Rukmini Puri Giri** (rukmini@ksu.edu), Anuradha Ghosh, Jessica Thomson and Ludek Zurek, Kansas State Univ., Manhattan, KS

D3064 Contributions of *Reticulitermes flavipes* (Isoptera: Rhinotermitidae) to greenhouse gases, CO_2 and CH_4, on the Oklahoma Tallgrass Prairie Preserve. **Charles Konemann** (charles.e.konemann@okstate.edu) and Brad Kard, Oklahoma State Univ., Stillwater, OK

D3065 The possibility of selecting pesticide-resistant strains of natural enemies. **Takahiro Nishimori** (d146169@hiroshima-u.ac.jp)[1] and Kazuki Miura[2], [1]Hiroshima Univercity, Hukuyama, Japan, [2]NARO Western Region Agricultural Research Center, Hukuyama, Japan

D3066 Survey of anthophilous insects in managed wildflower habitat and lightly managed wildflower-free habitat along interstates in North Carolina. **Jennifer O'Brien** (jeobrien@ncsu.edu), Danesha Seth Carley, Thomas Rufty, David Tarpy, Rich McLaughlin and Margarita Lopez-Uribe, North Carolina State Univ., Raleigh, NC

09 - Graduate Poster Competition: P-IE - Honey Bees and Related Pollinators

Exhibit Hall BC (Convention Center)

D3067 Occurrence of *Nosema ceranae* in Arkansas honey bees. **Dylan Cleary** (dylan.a.cleary@gmail.com), Allen L. Szalanski and Donald C. Steinkraus, Univ. of Arkansas, Fayetteville, AR

D3068 Bee diversity and pollen foraging specificity in cultivated highbush blueberry, *Vaccinium corymbosum* L. (Ericaceae), plantings in Rhode Island. **Zachary Scott** (zachary_scott@my.uri.edu)[1], Howard Ginsberg[2], Steven Alm[1], Mark Mello[1] and Rebecca Wicks[1], [1]Univ. of Rhode Island, Kingston, RI, [2]USGS, Patuxent Wildlife Research Center, Kingston, RI

D3069 Comparing the foraging patterns of the honey bee, *Apis mellifera*, and common eastern bumble bee, *Bombus impatiens*, in a suburban-agricultural landscape. **Danny Minahan** (dfminahan@wisc.edu) and Johanne Brunet, Univ. of Wisconsin, Madison, WI

D3070 Diversity patterns of native bees (Hymenoptera: Apoidea) in native prairies and cropland landscapes at the Southern High Plains (Texas, USA). **Samuel Discua Duarte** (samuel.discua@ttu.edu) and Scott Longing, Texas Tech Univ., Lubbock, TX

D3071 Wild bee conservation using large-scale pollinator wildflower plantings within bioenergy cropping systems. **Kiley Friedrich** (kfriedrich@wisc.edu), Univ. of Wisconsin, Madison, WI

D3072 Attractiveness of potentially beneficial flowering plants to natural enemies. **Elsaid Elnabawy** (said19832007@yahoo.com), Katsuo Tsuda and Yositaka Sakamaki, Kagoshima Univ., Kagoshima, Japan

D3073 Pollinators, pumpkins and primers, oh my! A preliminary exploration of wild *Bombus impatiens* population trends in Pennsylvania. **R. Carley Miller** (rxm452@psu.edu)[1], Anna Devin Taylor[2], Shelby J. Fleischer[1], James Strange[3] and Amber D. Tripodi[3], [1]Pennsylvania State Univ., University Park, PA, [2]Univ. of West Alabama, Greensboro, AL, [3]USDA - ARS, Logan, UT

D3074 Foraging activity and pollination by managed colonies of *Bombus impatiens* (Hymenoptera: Apidae) in highbush blueberry, *Vaccinium corymbosum*. **Knute Gundersen** (gundersenknute@gmail.com), Jason Gibbs, Cecily Kowitz, Katherine Odanaka, Gabriela Quinlan and Rufus Isaacs, Michigan State Univ., East Lansing, MI

D3075 The response of three distinct pollinators to alfalfa floral volatile emissions. **Rosabeth Link** (rlink2@wisc.edu) and Johanne Brunet, Univ. of Wisconsin, Madison, WI

D3076 Bumble bees do it better: The importance of wild bees for the pollination of Haskap crops. **S. Frier** (s.d.frier@gmail.com)[1], Christopher Somers[2] and Cory Sheffield[1], [1]Royal Saskatchewan Museum, Regina, SK, Canada, [2]Univ. of Regina, Regina, SK, Canada

D3077 Local and landscape level relationships of habitat type and insect pollinator communities in an urban center on the Southern High Plains (Texas, USA). **Alicia Patridge** (alicia.patridge@ttu.edu), Samuel Discua, Cynthia McKenney and Scott Longing, Texas Tech Univ., Lubbock, TX

D3078 Impact of soybean on wild and managed bee health within a landscape context. **Ashley St. Clair** (astclair@iastate.edu), Ge Zhang, Shelby Pritchard, Matt O'Neal, Amy L. Toth and Adam Dolezal, Iowa State Univ., Ames, IA

D3079 A comparative study of pollinator diversity among perennial irrigated crops and adjacent habitats in eastern Washington. **Courtney Grula** (courtneygrula@gmail.com) and Douglas Walsh, Washington State Univ., Prosser, WA

10 - Graduate Poster Competition: P-IE - Attractants and Pheromone-mediated Behavior

Exhibit Hall BC (Convention Center)

D3080 Electroantennogram and behavioral responses of the parasitoid *Microplitis croceipes* to single compounds and blends of volatiles identified in the headspace of plant-fed *Heliothis virescens* larvae. **Tolulope Morawo** (tom0002@auburn.edu), Matthew Burrows and Henry Fadamiro, Auburn Univ., Auburn, AL

D3081 The effect of host plant secondary metabolites on development and survival of *Grammia* spp. (Lepidoptera: Erebidae: Arctiinae: Arctiini). **Katherine Hernandez** (katherine.hernandez@my.und.edu), Alena Kubátová and Rebecca B. Simmons, Univ. of North Dakota, Grand Forks, ND

D3082 Biogeochemical interactions between an invasive scarab, *Popillia japonica* Newman, and its subterranean environment. **Garrett Price** (price41@purdue.edu), Brittany Peterson, Michael Scharf, Matthew Ginzel and Douglas Richmond, Purdue Univ., West Lafayette, IN

D3083 *cis*-Jasmone induces tomato defense and affects oviposition preference of beet armyworm, *Spodoptera exigua*. **Joseph Disi** (jod0003@auburn.edu), Simon Zebelo and Henry Fadamiro, Auburn Univ., Auburn, AL

D3084 Host mediated speciation: Elucidating patterns of diversification in the microlepidopteran genus *Mompha.* **Daniel Bruzzese** (danielbruzzese2016@u.northwestern.edu), Northwestern Univ., Glencoe, IL

D3085 Methyl salicylate and how it affects green lacewing predation on the azalea lace bug. **Michael Flores** (floressa@onid.oregonstate.edu)[1], Jana C. Lee[2] and Robin Rosetta[3], [1]Oregon State Univ., Corvallis, OR, [2]USDA - ARS, Corvallis, OR, [3]Oregon State Univ., Aurora, OR

D3086 Laboratory assessment of plant volatile organic compounds as potential attractants for spotted wing drosophila. **Grant Bolton** (lgbcm4@mail.missouri.edu)[1], Bruce A. Barrett[1] and Jaime Pinero[2], [1]Univ. of Missouri, Columbia, MO, [2]Lincoln Univ., Jefferson City, MO

D3087 The use of synthetic pheromone lures to assess presence of Cerambycidae species at several sites across Idaho. **Claudia D. Lyons-Yerion** (yeri5309@vandals.uidaho.edu)[1], Stephen P. Cook[1], Lawrence M. Hanks[2], Jocelyn G. Millar[3], Christopher J. Williams[1],

Renae Shrum[1] and James D. Barbour[4], [1]Univ. of Idaho, Moscow, ID, [2]Univ. of Illinois, Champaign, IL, [3]Univ. of California, Riverside, CA, [4]Univ. of Idaho, Parma, ID

D3088 Detailed study of corn plant response to green leafy volatiles. **Arash Maleki** (fum123@psu.edu), Irmgard Seidl-Adams, Gary Felton and James Tumlinson, Pennsylvania State Univ., University Park, PA

D3089 Regional variation in pheromone-mediated behaviors in grape berry moth. **Keith Mason** (masonk@msu.edu) and Rufus Isaacs, Michigan State Univ., East Lansing, MI

D3090 Generalist predator behavior in response to olfactory cues of an invasive pest, brown marmorated stink bug, *Halyomorpha halys*. **Leslie Potts** (lesliej.potts@gmail.com), Univ. of Kentucky, Lexington, KY

D3091 Response of navel orangeworm, *Amyelois transitella*, females to their own sex pheromone. **Nancy Power** (npowe001@ucr.edu), Univ. of California, Riverside, CA

D3092 Preliminary investigations of North American click beetle pheromones. **Jacqueline Serrano** (jserr005@ucr.edu), R. Maxwell Collignon and Jocelyn G. Millar, Univ. of California, Riverside, CA

11 - Graduate Poster Competition: P-IE - Insect Control, Ecology, and Ecosystems

Exhibit Hall BC (Convention Center)

D3093 Landscape structure and intraspecific diversity in *Brassica oleracea* crops significantly influence herbivore dynamics. **Lauren Snyder** (lds97@cornell.edu) and Alison Power, Cornell Univ., Ithaca, NY

D3094 Relative importance of plant quality and habitat structure on consumptive and non-consumptive effects. **Margaret Lund** (melund@g.clemson.edu) and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

D3095 Natural enemy biodiversity in urban gardens. **David Lowenstein** (dlowen2@uic.edu) and Emily Minor, Univ. of Illinois, Chicago, IL

D3096 Effects of fire-generated disturbance on insect abundance. **Laurel C. Cepero** (laurel.cepero@du.edu) and Shannon M. Murphy, Univ. of Denver, Denver, CO

D3097 Sampling of adult wheat stem sawfly, *Cephus cinctus* Norton, to predict larval infestation. **Christopher McCullough** (ctmccull@cord.edu)[1], Jeffrey Bradshaw[2] and Gary Hein[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, Scottsbluff, NE

D3098 Characterization of the arthropod community associated with perennial warm-season grasses (Poaceae) in Nebraska. **Kathryn O'Brien** (katieo_505@hotmail.com), Univ. of Nebraska, Lincoln, NE

D3099 Arthropod community patterns and associations along soil environmental gradients in a fine-scale northern grassland habitat. **Bryon Deal** (bryon.deal@my.und.edu), Brett Goodwin, Brian Darby and Kathryn Yurkonis, Univ. of North Dakota, Grand Forks, ND

D3100 The effect of ecosystem simplification on arthropod predation in southeastern Minnesota. **Hannah Gray** (grayx379@umn.edu) and David A. Andow, Univ. of Minnesota, St. Paul, MN

D3101 Estimating non-target effects to better assess the risk of biological weed control. **Madison Olson** (olsonmad@science.oregonstate.edu) and Peter McEvoy, Oregon State Univ., Corvallis, OR

D3102 Cattle grazing practices influence dung beetle communities on rangeland. **Patrick Wagner** (pwagner@huskers.unl.edu)[1], Jeffrey Bradshaw[2] and Martha Mamo[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, Scottsbluff, NE

D3103 Relationships between biotic indices and neonicotinoid insecticide detections in Wisconsin's groundwater-fed streams. **Benjamin Bradford** (bbradford@wisc.edu) and Russell L. Groves, Univ. of Wisconsin, Madison, WI

D3104 Tolerance as a potential method for hessian fly control. **Kirsten Roe** (roek@purdue.edu)[1], Jeffrey Holland[1], Richard Shukle[2] and Brandon Schemerhorn[1], [1]Purdue Univ., West Lafayette, IN, [2]USDA - ARS, Purdue Univ., West Lafayette, IN

D3105 Turnabout is fair play: Maize chitinase in fall armyworm frass induces pathogen defenses in maize. **Swayamjit Ray** (szr146@psu.edu)[1], Patrick Alves[2], Imtiaz Ahmad[3], Michelle Peiffer[1], Shan Jin[1], Gary Felton[1] and Dawn Luthe[1], [1]Pennsylvania State Univ., University Park, PA, [2]Univ. Federal de Lavras, Lavras, Brazil, [3]Quaid-i-azam Univ., Islamabad, Pakistan

D3106 One ant's trash is another plant's treasure: How the canopy ant *Azteca trigona* connects above- and below-ground processes in a wet tropical forest. **Jane Lucas** (Jane.M.Lucas-1@ou.edu)[1], Natalie Clay[1,2], Adam Kay[3] and Michael Kaspari[1], [1]Univ. of Oklahoma, Norman, OK, [2]Louisana Tech Univ., Ruston, LA, [3]Univ. of St. Thomas, St. Paul, MN

12 - Graduate Poster Competition: P-IE - Nursery and Specialty Crops

Exhibit Hall BC (Convention Center)

D3107 Further evidence that seed blend refuges may accelerate resistance evolution in Lepidoptera. **Sydney Glass** (glass151@umn.edu)[1], Patrick Porter[2] and Ed Bynum[3], [1]Univ. of Minnesota, Roseville, MN, [2]Texas A&M AgriLife Extension, Lubbock, TX, [3]Texas A&M AgriLife Extension, Amarillo, TX

D3108 Effects of soil and larval sterilization on the mortality of white grubs in bioassays. **Sudan Gyawaly** (gyawaly17@gmail.com), Curt A. Laub and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3109 Activity of soil drenching and foliar insecticide applications on flea beetles (Chrysomelidae) in cabbage and eggplant transplants. **James Mason** (jmason91@vt.edu)[1], Thomas P. Kuhar[1], James F. Walgenbach[2] and Hélène Doughty[3], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]North Carolina State Univ., Fletcher, NC, [3]Virginia Polytechnic Institute and State Univ., Virginia Beach, VA

D3110 Assessing the role of onion thrips, *Thrips tabaci*, in bacterial leaf blight of onion. **Ari Grode** (grodeari@msu.edu), Prissana Wiriyajitsomboon, Mary Hausbeck and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

D3111 Attraction of female sciarid flies, *Lycoriella ingenua* Dufour, to *Trichoderma aggressivum* infested substrate and the capacity to vector the fungal spores in commercial *Agaricus bisporus* mushroom production. **Maria Mazin** (mtm267@psu.edu), Kevin Cloonan, Nina Jenkins and Edwin Rajotte, Pennsylvania State Univ., University Park, PA

D3112 Damage potential of *Spodoptera litura* (Fabricius) in various citrus nursery plantations. Muhammad Arshad[1], **Muhammad Afzal** (chafzal64@yahoo.com)[1], Muhammad Ullah[1], Muqadas Salim[1], Muhammad Ahmad[1] and Abdul Aziz[2], [1]Univ. of Sargodha, Sargodha, Pakistan, [2]Citrus Research Institute, Sargodha, Pakistan

D3113 Geranium intoxication circumvents detoxification enzymes in Japanese beetles, *Popillia japonica* Newman. **Adekunle Adesanya** (awa0004@tigermail.auburn.edu), David Held and Nannan Liu, Auburn Univ., Auburn, AL

D3114 Cultural and chemical pest control methods alter habitat suitability for biological control agents: An example from Wisconsin commercial cranberry. **Janet Van Zoeren** (vanzoeren@wisc.edu)[1], Shawn Steffan[2] and Elissa M. Chasen[1], [1]Univ. of Wisconsin, Madison, WI, [2]USDA - ARS, Madison, WI

D3115 Abundance of twospotted spider mites and *Neoseiulus californicus* on strawberry varieties in organic production. **Omotola Dosunmu** (toladosunmu@gmail.com) and Oscar Liburd, Univ. of Florida, Gainesville, FL

D3116 Weeds and arthropod pest management: Two-spotted spider mite, *Tetranychus urticae*, fecundity on four weed species. **Robert Brenner** (robert.brenner@ndsu.edu) and Deirdre Prischmann-Voldseth, North Dakota State Univ., Fargo, ND

D3117 Host range expansion of the Argentine cactus moth, *Cactoblastis cactorum*, onto dragon fruit, *Hylocereus* spp. **Angela Galette** (angela.galette@ars.usda.gov)[1], Stephen Hight[2], James E. Carpenter[3] and Anthony Ananga[1], [1]Florida A&M Univ., Tallahassee, FL, [2]USDA - ARS, Tallahassee, FL, [3]USDA - ARS, Tifton, GA

13 - Graduate Poster Competition: P-IE - Biological Control

Exhibit Hall BC (Convention Center)

D3118 Surveying parasitoids of cucurbit pests in conventional and organic cucurbits in Kentucky. **Amanda Skidmore** (amanda.skidmore@gmail.com) and Ric Bessin, Univ. of Kentucky, Lexington, KY

D3119 Relative toxicity of spirotetramat on *Riptortus pedestris* (Hemiptera: Alydidae) and its egg parasitoids. **Naresh Dangi** (frennaresh1@gmail.com) and Un Taek Lim, Andong National Univ., Andong, South Korea

D3120 Working together for a common goal: How complementary consumptive and non-consumptive effects of parasitoid wasps suppress pea aphid populations. **Kathryn Ingerslew** (ksiggc@mail.missouri.edu) and Debbie Finke, Univ. of Missouri, Columbia, MO

D3121 Engineering a host defense regulatory gene, *phytoalexin DEFICIENT4* (*PAD4*), for enhancing resistance to soybean aphid. **Patrick Selig** (selipr01@ipfw.edu), Kumud Joshi, Punya Nachappa and Vamsi Nalam, Indiana Univ.-Purdue Univ., Fort Wayne, IN

D3122 Predatory arthropods in two soybean cropping systems. **Rebecca Whalen** (wrebec9@vt.edu)[1], D. Ames Herbert[2] and Sean Malone[2], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]Virginia Polytechnic Institute and State Univ., Suffolk, VA

D3123 Effect of soybean trichome density on soybean aphid and its natural enemies. **Shelby Pritchard** (srp@iastate.edu), Adam Varenhorst, Arti Singh, Asheesh Singh, Ivair Valmorbida and Matt O'Neal, Iowa State Univ., Ames, IA

D3124 Parasitization of drosophilids in Virginia fruit crop environments. **James C. E. Wahls** (jcew90@vt.edu), Douglas G. Pfeiffer and Scott Salom, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3125 Measuring difference in prey detectability for predator molecular gut content analysis using half-life detectability. **J. Sunny Evans** (ejessis@okstate.edu), Ashley Bussell, T. Royer and F. M. Ochoa Corona, Oklahoma State Univ., Stillwater, OK

D3126 Influence of alternative cover cropping on ground dwelling predators in a cotton agroecosystem. **Marissa Verdi** (marissa.verdi25@uga.edu)[1], Michael Toews[1], Nicholas Hill[2] and Jason M. Schmidt[1], [1]Univ. of Georgia, Tifton, GA, [2]Univ. of Georgia, Athens, GA

D3127 Understanding the cold tolerance of the salvinia weevil, *Cyrtobagous salviniae* Calder and Sands (Coleoptera: Curculionidae), and its implications for biological control of giant salvinia in temperate regions. **Alana Russell** (aruss45@lsu.edu), Seth Johnson and Rodrigo Diaz, Louisiana State Univ., Baton Rouge, LA

D3128 Do diverse endosymbiont compositions affect parasitism rates of different parasitoids? **James Kopco** (jk729@cornell.edu), Jason Harmon and Aleix Valls, North Dakota State Univ., Fargo, ND

D3129 Application of novel insecticides to control balsam woolly adelgid, *Adelges piceae* (Hemiptera: Adelgidae), on Fraser fir, *Abies fraseri* (Pinales: Pinaceae). **Holly Wantuch** (wholly3@vt.edu), Scott Salom and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

14 - Graduate Poster Competition: P-IE - Invasive Species

Exhibit Hall BC (Convention Center)

D3130 Alternative methods for managing spotted wing drosophila, *Drosophila suzukii*. **Haley Butler** (haley.butler@okstate.edu) and Jackie Lee, Oklahoma State Univ., Stillwater, OK

D3131 Exclusion netting for spotted wing drosophila control in Michigan raspberries. **Heather Leach** (leachhea@msu.edu), Tobias Marks and Rufus Isaacs, Michigan State Univ., East Lansing, MI

D3132 Presentation withdrawn

D3133 Evidence of distribution limitations of the Asian citrus psyllid, *Diaphorina citri* Kuwayama (Hemiptera: Psyllidae), based on physiographic regions and Holdridge life zones. **Luis Santiago-Rosario** (luis.santiagoros@outlook.com)[1], Edda Martínez[2], Rafael Canales-Pastrana[1] and Bert Rivera-Marchand[1], [1]Inter American Univ. of Puerto Rico, Bayamón, PR, [2]Museum of Entomology and Tropical Biodiversity, San Juan, PR

D3134 Post-drought population changes of *Hyles lineata* in the Chihuahuan Desert. **Kate Seideman-Barclay** (ks1790@txstate.edu), Texas State Univ., San Marcos, TX

D3135 Presentation withdrawn

D3136 The sugarcane aphid, *Melanaphis sacchari*, a new pest on sorghum, *Sorghum bicolor* (L.), in Alabama. **Adrian Pekarcik** (ajp0042@auburn.edu), Alana Jacobson and Kathy Flanders, Auburn Univ., Auburn, AL

D3137 Inheritance of Cry1A.105 resistance in fall armyworm, *Spodoptera frugiperda*. **Ying Niu** (yniu@agcenter.lsu.edu)[1], Graham P. Head[2], Fei Yang[1], Guoqing Yang[1] and Fangneng Huang[1], [1]Louisiana State Univ., Baton Rouge, LA, [2]Monsanto Company, St. Louis, MO

D3138 Infection by rice blast makes rice more attractive to fall armyworm. **Lina Bernaola** (lbernaola@agcenter.lsu.edu), Michael Stout and Raghuwinder Singh, Louisiana State Univ., Baton Rouge, LA

D3139 Modeling corn rootworm, *Diabrotica* spp., emergence in light of Bt-RW traits and resistance. **Edwin Benkert III** (benke017@umn.edu), Zach Polfliet and Ken Ostlie, Univ. of Minnesota, St. Paul, MN

15 - Graduate Poster Competition: P-IE - Monarchs, Hemiptera/Heteroptera, and Stored Products

Exhibit Hall BC (Convention Center)

D3140 Which native milkweeds are acceptable host plants for larval monarch butterflies, *Danaus plexippus*, within the Midwestern U.S? **Victoria Pocius** (pociusv@iastate.edu)[1], Keith Bidne[1,2] and Diane Debinski[1], [1]Iowa State Univ., Ames, IA, [2]USDA - ARS, Ames, IA

D3141 Spatial and temporal patterns in milkweed availability for monarchs in the southern Great Plains. **Mark Webb** (alexander.webb@okstate.edu), Abigail Randle and Kristen Baum, Oklahoma State Univ., Stillwater, OK

D3142 Does density of host plant *Asclepias syriaca* influence monarch butterfly, *Danaus plexippus*, oviposition? **Teresa Blader** (teresa.blader@gmail.com)[1], Richard Hellmich[2], Sue Blodgett[1], Steven Bradbury[1], Ray Moranz[1], John Pleasants[1] and Diane Debinski[1], [1]Iowa State Univ., Ames, IA, [2]USDA - ARS, Ames, IA

D3143 Diapause, climate, or generation gap: Determining the causes of the summer disappearance of adult olive fruit flies, *Bactrocera oleae*, in California populations. **Margaret Scampavia** (mrscampavia@ucdavis.edu)[1], Ed Lewis[2], Hung Kieu[3], Miguel Davila[2], Amarpreet Deol[2] and Bradford Matheus[2], [1]Univ. of California, Oakland, CA, [2]Univ. of California, Davis, CA, [3]Univ. of California, Sacramento, CA

D3144 Comparisons of photosynthetic parameters in tomato genotypes with differing levels of fatty acid desaturation and aphid resistance. **Janithri Wickramanayake** (jswickra@uark.edu), Junhuan Xu and Fiona L. Goggin, Univ. of Arkansas, Fayetteville, AR

D3145 Effects of high-fat diet on development in *Manduca sexta*. **Lizzette Cambron** (liz.cambron@ndsu.edu), North Dakota State Univ., Fargo, ND

D3146 Predicting effects of climate change on the geographical distribution of true bugs (Heteroptera) in Korea using the Maxent model. **Aejin Hwang** (jin6138@snu.ac.kr), Hyoseok Lee, Jong Kook Jung and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

D3147 Saline soil: Bad for crops, good for spider mites, *Tetranychus urticae*. **Jaclyn Eichele** (jaclyn.eichele@my.ndsu.edu), Jason Harmon, Deirdre Prischmann-Voldseth and Abbey Wick, North Dakota State Univ., Fargo, ND

D3148 Effectiveness of the ZeroFly® Storage Bag as a barrier to stored-product insect pests. **Sulochana Paudyal** (sulochana.paudyal@okstate.edu), George Opit and Sandipa G. Gautam, Oklahoma State Univ., Stillwater, OK

D3149 Exploring trait mediated interaction units in the pest complex of rice, *Oryza sativa.* **Emily Kraus** (ekraus@agcenter.lsu.edu) and Michael Stout, Louisiana State Univ., Baton Rouge, LA

D3150 Analysis of competence of thrips species to transmit soybean vein necrosis virus and impact of the virus on thrips vector biology and behavior. **Jinlong Han** (hanj01@ipfw.edu), Stacy Keough and Punya Nachappa, Indiana Univ.-Purdue Univ., Fort Wayne, IN

16 - Graduate Poster Competition: PBT - Insect Control

Exhibit Hall BC (Convention Center)

D3151 Dietary quercetin enhances flight endurance and insecticide tolerance in honey bees. **Ling-Hsiu Liao** (liao19@illinois.edu) and May R. Berenbaum, Univ. of Illinois, Champaign, IL

D3152 Susceptibility of southern and western corn rootworms adult and larva to *v-ATPase-A* and *Snf7* dsRNAs. **Adriano Pereira** (aelias374@yahoo.com.br)[1], Newton Carneiro[1] and Blair Siegfried[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL

D3153 Presentation withdrawn

D3154 Next generation sequencing as a tool to proactively assess the risk of insecticide resistance in *Drosophila suzukii* (Diptera: Drosophilidae). **Ruchir Mishra** (ruchirjd@gmail.com)[1], Joanna Chiu[2], Gang Hua[1], Michael J. Adang[1] and Ash Ahmad[1], [1]Univ. of Georgia, Athens, GA, [2]Univ. of California, Davis, CA

D3155 Trunk injection of systemic pesticides for control of apple pests. **Charles Coslor** (ccoslor@gmail.com), Christine Vandervoort and John C. Wise, Michigan State Univ., East Lansing, MI

D3156 Phosphine resistance in the lesser grain borer, *Rhyzopertha dominica*: The North American perspective. **Edwin Afful** (eddafful@ksu.edu) and Thomas Phillips, Kansas State Univ., Manhattan, KS

D3157 Evaluation of biouptake of total mercury and methylmercury in terrestrial invertebrates. **Chelsea Standish** (bxn875@vols.utk.edu)[1], Jerome F. Grant[1], Teresa Mathews[2], Kevin Moulton[1] and John Smith[2], [1]Univ. of Tennessee, Knoxville, TN, [2]Oak Ridge National Laboratory, Oak Ridge, TN

D3158 Biodegradation of endosulfan and pendimethalin by three types of bacteria isolated from pesticides polluted soils. **Abd Elaziz Ishag** (a.aziz30@gmail.com)[1], Azhari Abdelbagi[1], Ahmed Hammad[1], Osama Elsaid[2] and Elsiddig Elsheikh[1], [1]Univ. of Khartoum, Khartoum North, Sudan, [2]Al-Neelain Univ., Khartoum, Sudan

D3159 Investigating the immunotoxic effects of fumagillin exposure in honey bees. **Rodney Richardson** (richardson.827@osu.edu)[1], Feng Qian[1], Megan Ballinger[1], John Christman[1] and Reed Johnson[2], [1]The Ohio State Univ., Columbus, OH, [2]The Ohio State Univ., Wooster, OH

D3160 Characterization of the field-evolved resistance mechanism to Bt corn in *Spodoptera frugiperda*. **Rahul Banerjee** (rbanerje@utk.edu)[1], Lucas Hietala[1], Fangneng Huang[2] and Juan Luis Jurat-Fuentes[1], [1]Univ. of Tennessee, Knoxville, TN, [2]Louisiana State Univ., Baton Rouge, LA

D3161 Evaluation of RNAi as a control method for the small hive beetle. **Steven Reyna** (smreyna@ncsu.edu) and Marcé Lorenzen, North Carolina State Univ., Raleigh, NC

17 - Graduate Poster Competition: PBT - Biology and Physiology

Exhibit Hall BC (Convention Center)

D3162 Multiple Toll-Spätzle pathways in *Drosophila melanogaster* innate immunity. **Munmun Chowdhury** (mc8b9@mail.umkc.edu) and Xiao-Qiang Yu, Univ. of Missouri, Kansas City, MO

D3163 Trade-off between virulence and immune evasion in the entomopathogenic bacteria *Xenorhabdus nematophila*. **Ángel Casanova-Torres** (amcasanova@wisc.edu), Neta Morag and Heidi Goodrich-Blair, Univ. of Wisconsin, Madison, WI

D3164 Analysis of DNA from *Wolbachia* infected *Folsomia candida* (Collembola: Isotomidae): Evidence for a nucleolytic activity. **Yang Li** (lixx2038@umn.edu) and Ann M. Fallon, Univ. of Minnesota, St. Paul, MN

D3165 Changes in the plasma proteome of *Manduca sexta* larvae in relation to the transcriptome variations after an immune challenge provide evidence for a high molecular weight immune complex. **Yan He** (yanhe@okstate.edu), Xiaolong Cao, Shuguang Zhang, Janet Rogers, Steve Hartson and Haobo Jiang, Oklahoma State Univ., Stillwater, OK

D3166 Effects of age and feeding on lipid content and flight capacity of *Agrilus planipennis*. **Dylan Tussey** (tusse001@umn.edu)[1], Brian Aukema[1] and Robert Venette[2], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - Forest Service, St. Paul, MN

D3167 Phenology model of *Leptocorisa chinensis* (Hemiptera: Alydidae). **Hwang Kim** (stennes@naver.com)[1], Hyoseok Lee[1], Jong Kook Jung[1], Soon Hwa Kwon[2] and Joon-Ho Lee[1], [1]Seoul National Univ., Seoul, South Korea, [2]Jeju National Univ., Jeju-si, South Korea

D3168 Is cold tolerance plasticity in *Epiphyas postvittana* (Lepidoptera: Tortricidae) related to variation in phosphoglucose isomerase? **Amy C. Morey** (morey041@umn.edu)[1], Robert Venette[2], Erica C. Nystrom Santacruz[1] and William Hutchison[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - Forest Service, St. Paul, MN

D3169 Expression of HIF-1-α and HIF-1-β in *Manduca sexta* under normoxic and hypoxic conditions. **Taylor Lundquist** (taylor.lundquist@ndsu.edu), Kendra Greenlee and Jeffrey Kittilson, North Dakota State Univ., Fargo, ND

D3170 Biology and fertility of *Melanaphis sacchari* at different temperatures. **Monique de Souza** (monique.mfs@hotmail.com)[1] and Jeff Davis[2], [1]Louisiana State Univ., Baton Rouge, LA, [2]Univ. of Minnesota, St. Paul, MN

D3171 The organization of the spider nervous system as revealed by dopamine immunolabeling and confocal microscopy. **Anthony Auletta** (aulet002@umn.edu), Cynthia Harley and Karen Mesce, Univ. of Minnesota, St. Paul, MN

D3172 Next-gen sequencing of odonate gut content. **Danielle Restuccia** (dmr816@neo.tamu.edu), Texas A&M Univ., College Station, TX

D3173 Ecological risk assessment of RNAi in a non-target arthropod, *Folsomia candida*. **Jeffrey Noland** (jeffrey.noland@uky.edu), Huipeng Pan, Xiaowei Yang and Xuguo Zhou, Univ. of Kentucky, Lexington, KY

D3174 Nitrogen fixation in *Cryptocercus punctulatus* Scudder (Blattodea: Cryptocercidae) and lower termites (Isoptera: Kalotermitidae, Rhinotermitidae). **Aaron Mullins** (amull81@ufl.edu)[1] and Nan-Yao Su[2], [1]Univ. of Florida, Ft. Lauderdale, FL, [2]Univ. of Florida, Davie, FL

18 - Graduate Poster Competition: SysEB - Phylogeny

Exhibit Hall BC (Convention Center)

D3175 Re-descriptions, life cycles and diversity of the cockroaches (Order: Blattodea) of southern Louisiana. **Forest Huval** (lavuh07@yahoo.com), Louisiana State Univ., Baton Rouge, LA

D3176 Morphological and molecular phylogeny of the genus *Phlaeopterus* (Coleoptera: Staphylinidae: Omaliinae: Anthophagini). **Logan Mullen** (ljmullen2@alaska.edu), Univ. of Alaska Museum, Fairbanks, AK

D3177 A preliminary revision of *Cosmosoma* (Arctiini: Euchromiina) using conventional and novel adult morphology. **Melissa Sisson** (melissa.sisson@my.und.edu) and Rebecca B. Simmons, Univ. of North Dakota, Grand Forks, ND

D3178 Phylogeny of Nearctic *Auplopus* Spinola (Hymenoptera; Pompilidae). **Clinton E. Trammel** (cetramme@uark.edu) and Allen L. Szalanski, Univ. of Arkansas, Fayetteville, AR

D3179 Preliminary phylogeny of the South American xyleborine genera *Coptoborus* and *Theoborus* (Coleoptera: Curculionidae: Scolytinae). **Rachel Osborn** (rachelkosborn@gmail.com) and Anthony I. Cognato, Michigan State Univ., East Lansing, MI

D3180 A revision of *Bactridium* LeConte (Coleoptera: Monotomidae). **Thomas McElrath** (tmcelrat@uga.edu) and Joseph V. McHugh, Univ. of Georgia, Athens, GA

D3181 Reconstructing the family level phylogeny of weevils. **Alex Aitken** (aaitken@memphis.edu)[1], Seunggwan Shin[2], Alan Lemmon[3] and Duane D. McKenna[1], [1]Univ. of Memphis, Memphis, TN, [2]North Carolina State Univ., Raleigh, NC, [3]Florida State Univ., Tallahassee, FL

D3182 Molecular phylogenetics complicating the taxonomic revision of New World ant parasitoids (*Orasema coloradensis* species group). **Austin Baker** (bakerau73@gmail.com) and John M. Heraty, Univ. of California, Riverside, CA

D3183 A morphological review of the *Calyptra minuticornis* (Guenée) subspecies complex (Insecta: Lepidoptera: Erebidae: Calpinae). **Julia Snyder** (Snyder65@purdue.edu)[1], Alberto Zilli[2] and Jennifer Zaspel[1], [1]Purdue Univ., West Lafayette, IN, [2]Natural History Museum, London, London, United Kingdom

D3184 Systematics and biogeography of the Cychrines, with particular reference to the North American genus *Scaphinotus* (Coleoptera: Carabidae: Cychrini). **Meghan Culpepper** (mculpepper@berkeley.edu), Univ. of California, Berkeley, CA

D3185 Molecular phylogenetics reveals paraphyly in the New World velvet ant genus *Pseudomethoca* Ashmead (Hymenoptera: Mutillidae). **George Waldren** (george.waldren@aggiemail.usu.edu) and James P. Pitts, Utah State Univ., Logan, UT

19 - Graduate Poster Competition: SysEB - Hymenoptera

Exhibit Hall BC (Convention Center)

D3186 Ant communities are structured by patch and landscape level factors. **Kaitlin U. Campbell** (uppstrka@miamioh.edu) and Thomas O. Crist, Miami Univ., Oxford, OH

D3187 Composition and species richness of ground-dwelling ants in tropical rainforest of Colombian inter-Andean valley. **Rafael Achury** (achurym2@illinois.com) and Andrew Suarez, Univ. of Illinois, Champaign, IL

D3188 Response of litter-dwelling ants to experimental removals of white-tailed deer and Amur honeysuckle in eastern deciduous forest. **Michael Mahon** (mahonmb@miamioh.edu), Kaitlin U. Campbell and Thomas Crist, Miami Univ., Oxford, OH

D3189 Factors affecting ant tending in Fender's blue butterfly, *Plebejus icarioides fenderi*: Implications for habitat restoration and species recovery. **Cameron Thomas** (cameron.thomas@email.wsu.edu) and Cheryl Schultz, Washington State Univ., Vancouver, WA

D3190 Trap-nesting of solitary wasps (Hymenoptera: Aculeata) in the Parque Estadual do Porto Ferreira, Porto Ferreira, SP, Brazil. **Marlene Lucía Aguilar Benavides** (maluaguilarb@gmail.com)[1,2] and Carlos Alberto Garófalo[2], [1]Nueva Granada Military Univ., Bogotá, Colombia, [2]Univ. of São Paulo, Ribeirão Preto, Brazil

D3191 New species of *Theocolax* Westwood (Hymenoptera: Pteromalidae: Cerocephalinae) thought to attack the walnut twig beetle, *Pityophthorus juglandis* Blackman (Coleoptera: Curculionidae: Scolytinae). **Crystal McEwen** (clmcewen@gmail.com), Univ. of Maryland, College Park, MD

D3192 The evolution of *Leptomyrmex* (Hymenoptera: Formicidae: Dolichoderinae): Insights from the discovery of an extant Neotropical relict species. **Brendon Boudinot** (boudinotb@gmail.com)[1], Rodolfo Probst[2], Rodrigo Feitosa[3], Carlos R. F. Brandão[4] and Philip S. Ward[1], [1]Univ. of California, Davis, CA, [2]Univ. de São Paulo, São Paulo, Brazil, [3]Univ. Federal do Paraná, Curitiba - PR, Brazil, [4]Museu de Zoologia da Univ. de São Paulo, São Paulo, Brazil

D3193 The good, the brown, and the ugly: Comparative historical biogeography of nocturnal wasps (Hymenoptera: Chyphotidae, Mutillidae, Tiphiidae). **Emily A. Sadler** (sadler.e@gmail.com) and James P. Pitts, Utah State Univ., Logan, UT

D3194 Nuances in diet quality and quantity influence phenotypic dimorphism during honey bee, *Apis mellifera,* caste determination. **Garett Slater** (garett.p.slater@ndsu.edu)[1], George D. Yocum[2] and Julia Bowsher[1], [1]North Dakota State Univ., Fargo, ND, [2]USDA - ARS, Fargo, ND

D3195 The New World species of the genus *Calliscelio* (Hymenoptera: Platygastridae), parasitic wasps of cricket eggs (Orthoptera: Gryllidae). **Huayan Chen** (huayanc@gmail.com)[1], Lubomir Masner[2] and Norman Johnson[1], [1]The Ohio State Univ., Columbus, OH, [2]Agriculture and Agri-Food Canada, Ottawa, ON, Canada

D3196 Alarming, but true: The chemical ecology of phorid flies attracted to injured ants. **Katherine Noble** (k.g.noble@utah.edu), Univ. of Utah, Salt Lake City, UT

20 - Graduate Poster Competition: SysEB - Evolutionary History

Exhibit Hall BC (Convention Center)

D3197 Exploring the evolutionary history of a novel trait in Sepsidae. **Dacotah Melicher** (dacotah.melicher@ndsu.edu) and Julia Bowsher, North Dakota State Univ., Fargo, ND

D3198 Divergent selection on oviposition traits generates reproductive isolation between *Neodiprion lecontei* and *Neodiprion pinetum*. **Emily Bendall** (emily.bendall@uky.edu), Kim Vertacnik and Catherine Linnen, Univ. of Kentucky, Lexington, KY

D3199 Two new species in the genus *Atopsyche*, subgenus *Dolochorema*, from Peru (Trichoptera: Hydrobiosidae). **Luis Rázuri Gonzales** (razur001@umn.edu) and Ralph W. Holzenthal, Univ. of Minnesota, St. Paul, MN

D3200 Species traits and functional diversity patterns of carabid beetles (Coleoptera: Carabidae) along a forest age gradient in the Piedmont, North Carolina. **Kathryn Riley** (rilekn8@wfu.edu) and Robert A. Browne, Wake Forest Univ., Winston-Salem, NC

D3201 A synopsis of *Gymnetron* (Curculionidae: Coleoptera) from China with descriptions of adult and immature stages. **Chunyan Jiang** (jiangchunyan2006@163.com)[1] and Charles W. O'Brien[2], [1]Chinese Academy of Sciences, Beijing, China, [2]Univ. of Arizona, Tucson, AZ

D3202 Arthropod biodiversity of Nouragues Natural Reserve, French Guiana: A preliminary exploration. **Sarah Meierotto** (s.meierotto@uky.edu) and Michael J. Sharkey, Univ. of Kentucky, Lexington, KY

D3203 Investigating the effects of *Parasitodiplogaster* infection on the life history characteristics of a northern Mexican fig wasp community. **Justin Van Goor** (jvangoor@iastate.edu) and John D. Nason, Iowa State Univ., Ames, IA

D3204 Will a greater diversity of arthropods in insectariums increase invertebrate literacy in visitors? **Steven Nichols** (nicho381@msu.edu) and Anthony I. Cognato, Michigan State Univ., East Lansing, MI

D3205 Influence of vegetation characteristics and climatic variables on arboreal spider communities in grassland-shrub systems. **Eric Knutson** (knutson75@gmail.com), Colorado State Univ., Fort Collins, CO

D3206 A MOBAT analysis of species diversity in the *Phanuromyia galeata* group (Hymenoptera: Platygastridae). **Katherine Nesheim** (nesheim.1@buckeyemail.osu.edu)[1], Lubomir Masner[2] and Norman Johnson[1], [1]The Ohio State Univ., Columbus, OH, [2]Agriculture and Agri-Food Canada, Ottawa, ON, Canada

D3207 Exploring hemipteroid morphology with microCT. **Chip Austin** (crausti2@illinois.edu), Univ. of Illinois, Champaign, IL

D3208 Spatial scales of predator-prey interactions in model and experimental ladybug-aphid systems. **Wei-Ting Lin** (weiting.lin.lin@gmail.com) and Steven C. Pennings, Univ. of Houston, Houston, TX

21 - Graduate Poster Competition: SysEB - Symbionts and Behavior

Exhibit Hall BC (Convention Center)

D3209 Can defensive symbionts change the composition of natural enemies attacking the pea aphid? **Laura Kraft** (laura11@uga.edu), Clesson Higashi and Kerry M. Oliver, Univ. of Georgia, Athens, GA

D3210 Surveying the presence of *Wolbachia* in the Missouri River ecosystem. **Eric Sazama** (ericjsazama@gmail.com), Jeff Wesner and Scot Ouellette, Univ. of South Dakota, Vermillion, SD

D3211 Does the X-type symbiont protect the pea aphid, *Acyrthosiphon pisum*, from parasitism? **Matthew Doremus** (mdore7@uga.edu) and Kerry M. Oliver, Univ. of Georgia, Athens, GA

D3212 Attraction and repulsion: Preliminary observations on semiochemicals and lacewing evolution (Neuroptera: Chrysopidae).

Laura Breitkreuz (l-breitkreuz@ku.edu) and Michael S. Engel, Univerisity of Kansas, Lawrence, KS

D3213 The influence of population density on communal gall sharing and parasitism rates for the manzanita leaf-gall aphid, *Tamalia coweni*. **Clara Buchholtz** (cbuchholtz@mail.csuchico.edu), California State Univ., Chico, CA

D3214 Gene expression profiling of undertaking behavior in the eastern subterranean termite, *Reticulitermes flavipes*. **Qian Sun** (qian.sun@uky.edu), Kenneth F. Haynes and Xuguo Zhou, Univ. of Kentucky, Lexington, KY

D3215 Chemosensory annotations in *Neodiprion lecontei*, a plant-feeding hymenopteran, and implications for the relationship between ecology and gene family size. **Kim Vertacnik** (kim.duong@uky.edu) and Catherine Linnen, Univ. of Kentucky, Lexington, KY

D3216 Individual specialization on spider prey by the black and yellow mud dauber, *Sceliphron caementarium*. **Erin Powell** (erinpowell@ufl.edu) and Lisa Taylor, Univ. of Florida, Gainesville, FL

D3217 Optimized joint envelope score ecological niche models of four species of tamarisk beetles, *Diorhabda* spp., introduced to North America. **James Tracy** (JamesLTracy@tamu.edu)[1], Robert Coulson[1] and Allen Knutson[2], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M Univ., Dallas, TX

D3218 Future mating expectations of a male praying mantis. **Tyler Christensen** (chri5603@fredonia.edu) and William Brown, State Univ. of New York, Fredonia, NY

D3219 Land use effect on the sexually selected signal of the cabbage white butterfly, *Pieris rapae*. **Anne Espeset** (aespeset@nevada.unr.edu) and Matthew L. Forister, Univ. of Nevada, Reno, NV

D3220 Vision, behavior and coloration matches light environment in Neotropical butterflies. **Rachel Olzer** (olzer001@umn.edu)[1,2,3], Brett Seymoure[1,2], E. R. Loew[4], W.O. McMillan[2] and R. L. Rutowski[1], [1]Arizona State Univ., Tempe, AZ, [2]Smithsonian Tropical Research Institute, Gamboa, Panama, [3]Univ. of Minnesota, St. Paul, MN, [4]Cornell Univ., Ithaca, NY

Student Virtual Poster Competition: Undergraduate

Exhibit Hall BC (Convention Center)

VP0001 Auchenorrhyncha associated with olive trees in Greece: Species and population trends. **Dimitrios Afentoulis** (dafentoulis@yahoo.gr)[1], Antonios Tsagkarakis[1], Argyro Kalaitzaki[2] and Ioannis Zarboutis[3], [1]Agricultural Univ. of Athens, Athens, Greece, [2]Institute of Olive Tree , Subtropical Crops & Viticulture, Chania, Greece, [3]Rural Agronomy Economy Regional Unit Fthiotida, Lamia, Greece

VP0002 Biological parameters and control of the eucalyptus red gum lerp psyllid, *Glycaspis brimblecombei* Moore (Hemiptera: Psyllidae), in Greece. **Evangelos Fytros** (vagfitros24@gmail.com), Kalliopi Arkoumanea and Antonios Tsagkarakis, Agricultural Univ. of Athens, Athens, Greece

Student Virtual Poster Competition: Graduate

Exhibit Hall BC (Convention Center)

VP0003 Life history traits and demographic parameters of *Triatoma infestans* (Hemiptera: Reduviidae) fed on human blood. **Paula Medone** (paulamedone@gmail.com)[1], Agustin Balsalobre[1], Jorge Rabinovich[1], Gerardo Marti[1] and Frédéric Menu[2], [1]Univ. Nacional de La Plata Centro de Estudios Parasitologicos y de Vectores, La Plata, Argentina, [2]Claude Bernard Univ., Villeurbanne, France

VP0004 Prevalence and distribution of spotted fever group rickettsiae in American dog ticks, *Dermacentor variabilis*, in Manitoba, Canada. **Matthew Yunik** (matt.yunik@gmail.com)[1,2], Terry Galloway[1] and L. Robbin Lindsay[3], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Univ. of Saskatchewan, Saskatoon, SK, Canada, [3]Public Health Agency of Canada, Winnipeg, MB, Canada

VP0005 Myiasis of the tracheostomy wound caused by *Sarcophaga* (*Liopygia*) *argyrostoma* (Robineau-Desvoidy, 1830): Molecular identification based on the mitochondrial cytochrome c oxidase I gene. **Eamanuela Nocita** (nocita.emanuela@gmail.com), Francesco Severini and Fabio Tosini, Istituto Superiore di Sanità, Rome, Italy

VP0006 Land use change and seasonality influence mosquito community composition and disease risk. **Dagmar Meyer Steiger** (dagmar.meyersteiger@my.jcu.edu.au), Scott Ritchie and Susan Laurance, James Cook Univ., Cairns, Australia

VP0007 Study of malaria vector, kdr and ace 1 gene mutations in two eco-climatic zones of Mauritania. **Khadijetou Mint Lekweiry** (pekou2006@yahoo.fr)[1], Mohamed Salem Ould Ahmedou Salem[1], Christelle Cotteaux-Lautard[2], Fanny Jarjaval[2], Adeline Marin-Jauffre[2], Hervé Bogreau[2], Ali Ould Mohamed Salem Boukhary[1], Sébastien Briolant[3] and Frédéric Pages[4], [1]Univ. des Sciences, de Technologies et de Médecine, Nouakchott, Mauritania, [2]Institut de Recherche Biomédicale des Armées, Brétigny-sur-Orge, France, [3]Institut Pasteur de la Guyane, Cayenne, France, [4] French Institute for Public Health Surveillance, Cire Océan Indien, Saint-Denis, Reunion

VP0008 Analysis of ground beetle (Coleoptera: Carabidae) diversity in inland temperate rainforest habitats in British Columbia, Canada. **Ian Higgins** (higginsi@unbc.ca), Brent W. Murray and Lisa Poirier, Univ. of Northern British Columbia, Prince George, BC, Canada

VP0009 Cerambycidae fauna in plantation and fruit crop ecosystems of Western Ghats in Karnataka. **Sangamesh Hiremath** (sangu3711@gmail.com)[1], C. Viraktamath[2] and Revanna Revannavar[1], [1]Univ. of Agricultural and Horticultural Sciences, Shivamogga, India, [2]Univ. of Agricultural Sciences, Bangalore, India

VP0010 Side-effects of five acaricides on *Typhlodromus pyri* (Acari: Phytoseiidae) under field conditions in vineyard. **Beatriz López Manzanares** (beatriz.lopez@icvv.es)[1], Francisco Javier Sáenz de Cabezón Irigaray[2], Vicente Santiago Marco Mancebón[2] and Ignacio Pérez Moreno[2], [1]Instituto de Ciencias de la Vid y del Vino, Logroño, Spain, [2]Univ. of La Rioja, Logroño, Spain

VP0011 Sexual selection in aphidophagous ladybird beetles: A case study in *Menochilus sexmaculatus*. **Ankita Dubey** (dubeyankita14@gmail.com), Desh Deepak, Swati Saxena, Geetanjali Mishra and Prof. Omkar, Univ. of Lucknow, Lucknow, India

VP0012 First report of a parasitoid attacking eggs or neonate larvae of a tephritid in the Neotropics. **Felix D. Murillo** (fmurillo@ecosur.edu.mx)[1], Hector Cabrera-Mireles[1], Juan F. Barrera[1], Pablo Liedo[1] and Pablo Montoya[2], [1]El Colegio de la Frontera Sur, Tapachula, Mexico, [2]SAGARPA-SENASICA, Tapachula, Mexico

VP0013 Evaluation of biotypisation assays of grape phylloxera, *Daktulosphaira vitifoliae* Fitch, on *Vitis* spp. **Markus Eitle** (markus.eitle@boku.ac.at) and Astrid Forneck, Univ. of Natural Resources and Life Sciences, Tulln, Austria

VP0014 Genetic variability and physico-chemical basis of resistance in sorghum to shoot fly, *Atherigona soccata*. **Riyazaddin Mohammed** (riyazaddin@gmail.com)[1,2], Ashok Kumar Are[2], Polavarapu B. Kavi Kishor[1] and Hari Sharma[2], [1]Osmania Univ.,

Hyderabad, India, [2]International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, India

VP0015 Investigating the possible effects of VOCs emitted by *Quercus pyrenaica* Willd. on saproxylic beetle assemblages of Mediterranean forests. **Pablo Ramilo** (pabloramilo@gmail.com), Juan Ramón Guerrero, Estefanía Micó and Eduardo Galante, Univ. of Alicante, San Vicente del Raspeig, Spain

VP0016 Behavioural orientation of pod borer, *Helicoverpa armigera* (Noctuidae: Lepidoptera), to alternate weed host plant induced infochemicals. **Jaba Jagdish** (jaba.jagdish@gmail.com)[1] and Meena Agnihotri[2], [1]ICRISAT, Hyderabad, India, [2]G. B. Pant Univ. of Agricultural Science & Technology, Udham Singh Nagar, India

VP0017 Midgut microbes influence the biological activity and binding of Cry toxins with BBMV in the midgut of *Helicoverpa armigera*. **Visweshwar Regode** (vissu4@gmail.com)[1], Sreeramulu Kuruba[2], S. M. D. Akbar[1] and Hari Sharma[1], [1]International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, India, [2]Gulbarga Univ., Kalaburagi, India

VP0018 Characterization of insecticidal activity of black pepper seed protease inhibitor for deployment in transgenics to control *Helicoverpa armigera*. **S. M. D. Akbar** (akbar.pg@gmail.com) and Hari Sharma, International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, India

VP0019 Genetically modified corn effect over *Chaetocnema pulicaria* (Coleoptera: Chrysomelidae) as a non-target pest. **Agustín Hernández-Juárez** (chinoahj14@hotmail.com), Luis Aguirre-Uribe, Mariano Flores-Dávila, Gustavo Frías-Treviño, Ernesto Cerna-Chávez and Jerónimo Landeros-Flores, Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico

VP0020 Molecular characterization of *Beauveria bassiana,* mycovirus detection and their potential use for aphid biocontrol in Costa Rica. **Ruth Castro** (bioruthi@gmail.com)[1,2], Tania Leandro-Espinoza[2], Alejandro Vargas-Martínez[1], Ramón Molina-Bravo[1], Lisela Moreira[2] and Mauricio Montero-Astúa[2], [1]Universidad Nacional de Costa Rica, Heredia, Costa Rica, [2]Universidad de Costa Rica, San José, Costa Rica

VP0021 Natural occurrence and bioefficacy of Himalayan strains of *Heterorhabditis* spp. nematodes against major lepidopteran insects. **Sumit Vashisth** (sumitvashisth_hpau@yahoo.co.in)[1], Y. S. Chandel[2] and R. S. Chandel[2], [1]ICRISAT, Hyderabad, India, [2]Himachal Pradesh Agricultural Univ., Palampur, India

01 - Graduate Ten-Minute Paper Competition: P-IE - IPM A

200 A (Convention Center)

Moderator: Ram B. Shrestha, Texas A&M AgriLife Research and Extension Center, Lubbock, TX

7:55 Introductory Remarks

8:00 0316 From Petri dishes to plants: Scaling up the functional response of a whitefly predator. **Diego Rincon** (rincon-rueda.1@osu.edu), Casey Hoy and Luis A. Cañas, The Ohio State Univ., Wooster, OH

8:12 0317 Spray coverage and pest management efficacy of a prototype solid set canopy delivery system in high density apples. **Paul Owen-Smith** (pcowensmith@gmail.com), Ron Perry, John C. Wise, Larry Gut and Matthew Grieshop, Michigan State Univ., East Lansing, MI

8:24 0318 Developing integrated pest management practices for tadpole shrimp, *Triops longicaudatus*, in California rice fields. **Joanna Bloese** (jbbloese@ucdavis.edu)[1], Luis Espino[2], Kevin Goding[1] and Larry D. Godfrey[1], [1]Univ. of California, Davis, CA, [2]Univ. of California Cooperative Extension, Colusa, CA

8:36 0319 Integrated pest management methods used to increase abundance of natural enemies of squash bugs, *Anasa tristis* (DeGeer) (Hempitera: Coreidae), in squash. **Conor Fair** (cfair13@uga.edu)[1] and S. Kristine Braman[2], [1]Univ. of Georgia, Athens, GA, [2]Univ. of Georgia, Griffin, GA

8:48 0320 Attractiveness of the kudzu bug, *Megacopta cribraria*, to different legume varieties: In the quest for better management options. **Blessing Ademokoya** (bfa0003@auburn.edu), Rammohan Rao Balusu and Henry Fadamiro, Auburn Univ., Auburn, AL

9:00 0321 Reducing the abundance of Mexican bean beetle, *Epilachna varivestis*, and increasing yields in snap beans, *Phaseolus vulgaris*, using reflective plastic mulches. **Louis Nottingham** (louisn@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:12 0322 The effects of crop rotation on western corn rootworm adult abundance, root injury, and Bt resistance. **Mike W. Dunbar** (dunbar@iastate.edu), Ram B. Shrestha, Matt O'Neal and Aaron J. Gassmann, Iowa State Univ., Ames, IA

9:24 0323 Effect of using early-planted soybeans as a trap crop for *Megacopta cribraria* in commercial soybeans. **Alejandro Del Pozo** (aidelpoz@ncsu.edu)[1], Dominic Reisig[2], Clyde E. Sorenson[1] and Jack S. Bacheler[1], [1]North Carolina State Univ., Raleigh, NC, [2]North Carolina State Univ., Plymouth, NC

9:36 0324 Management strategies for tarnished plant bug, *Lygus lineolaris*, in the mid-south cotton belt. **Scott Graham** (sg595@msstate.edu)[1], Angus Catchot[1], Jeff Gore[2], Don Cook[2], Darrin Dodds[1] and Fred Musser[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS

9:48 0325 Kudzu bug: Can Tennessee shake it off? **Kadie Britt** (kbritt5@vols.utk.edu)[1], Jerome F. Grant[1], Scott Stewart[2], Gregory J. Wiggins[1] and Steve D. Powell[3], [1]Univ. of Tennessee, Knoxville, TN, [2]Univ. of Tennessee, Jackson, TN, [3]Tennessee Dept. of Agriculture, Nashville, TN

10:00 Break

10:12 0326 Impact assessment of *Laricobius nigrinus* (Coleoptera: Derodontidae), a predator of hemlock woolly adelgid, *Adelges tsugae* (Hemiptera: Adelgidae). **Ariel Heminger** (arielrh@vt.edu)[1], Albert Mayfield[2], Gregory J. Wiggins[3], Jerome F. Grant[3], Joseph Elkinton[4], Thomas McAvoy[1], Andrew Tait[5] and Scott Salom[1], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]USDA - Forest Service, Asheville, NC, [3]Univ. of Tennessee, Knoxville, TN, [4]Univ. of Massachusetts, Amherst, MA, [5]Camcore, North Carolina State Univ., Asheville, NC

10:24 0327 Evaluation of planting date on insect pests in Mississippi soybean. **Nicholas R. Bateman** (nickbateman@msstate.edu)[1], Angus Catchot[2], Jeff Gore[3], Fred Musser[2] and Trent Irby[2], [1]Mississippi State Univ., Starkville, MS, [2]Mississippi State Univ., Mississippi State, MS, [3]Mississippi State Univ., Stoneville, MS

10:36 0328 Impacts of cover crop diversification on attraction, dispersal, and pest suppression by two key generalist predators. **Jermaine Hinds** (jxh557@psu.edu)[1], James Hagler[2] and Mary Barbercheck[1], [1]Pennsylvania State Univ., University Park, PA, [2]USDA - ARS, Maricopa, AZ

10:48 0329 Effects of red clover living mulch on arthropod communities and bell pepper yield. **Hanna Kahl** (hannamariakahl@gmail.com) and Cerruti Hooks, Univ. of Maryland, College Park, MD

11:00 0330 Transforming vacant land to urban agriculture influences ground beetle (Carabidae) and rove beetle (Staphylinidae) communities in Cleveland, OH. **Yvan Delgado de la Flor** (delgadodelaflor.1@osu.edu), Caitlin Burkman and Mary Gardiner, The Ohio State Univ., Wooster, OH

11:12 0331 Influence of delayed corn planting on corn rootworm, *Diabrotica* spp., emergence phenology, Bt corn efficacy, and implications for scouting. **Trisha Leaf** (trisha.franz@gmail.com)[1], Ken Ostlie[1] and Elizabeth Schacht[2], [1]Univ. of Minnesota, St. Paul, MN, [2]Washington State Univ., Bellingham, WA

11:24 0332 Effects of non-crop habitat on *Drosophila suzukii* infestation in commercial blackberry fields in North Carolina. **Katharine Swoboda Bhattarai** (kaswobod@ncsu.edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

11:36 0333 An integrated pest management approach for chilli thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae), on roses under field conditions. **Luis Aristizabal** (larist@ufl.edu)[1], Steven P. Arthurs[1], Yan Chen[2], Ronald H. Cherry[3] and Ronald Cave[4], [1]Univ. of Florida, Apopka, FL, [2]Louisiana State Univ., Hammond, LA, [3]Univ. of Florida, Belle Glade, FL, [4]Univ. of Florida, Ft. Pierce, FL

11:48 0334 Measuring spatial distribution of seasonal dispersal of the kudzu bug, *Megacopta cribraria* (Hemiptera: Plataspidae), in kudzu and soybean. **Ian Knight** (ianak@uga.edu)[1], Francis Reay-Jones[2], Dominic Reisig[3], Patricia Moore[4] and Michael Toews[1], [1]Univ. of Georgia, Tifton, GA, [2]Clemson Univ., Florence, SC, [3]North Carolina State Univ., Plymouth, NC, [4]Univ. of Georgia, Athens, GA

12:00 0335 Effects of landscape composition on crop yield mediated by specialist herbivores. **Ricardo Perez-Alvarez** (mrp245@cornell.edu)[1], Brian A. Nault[2] and Katja Poveda[1], [1]Cornell Univ., Ithaca, NY, [2]Cornell Univ., Geneva, NY

12:12 0336 Crop sequence and cover crop species affect Carabidae assemblages in an organically-managed cover-crop based reduced tillage cropping system. **Ariel Rivers** (arielrivers@psu.edu), Mary Barbercheck, Christina Mullen and John Wallace, Pennsylvania State Univ., University Park, PA

02 - Graduate Ten-Minute Paper Competition: P-IE - IPM B

200 B (Convention Center)

Moderators: Mark R. Abney[1] and Brian McCornack[2], [1]Univ. of Georgia, Tifton, GA, [2]Kansas State Univ., Manhattan, KS

7:55 Introductory Remarks

8:00 0337 Determining pest status of threecornered alfalfa hopper, *Spissistilus festinus*, in peanut, *Arachis hypogaea.* **Brendan Beyer** (brenman7@uga.edu)[1], Phillip M. Roberts[2], Rajagopalbabu Srinivasan[2] and Mark R. Abney[2], [1]Univ. of Georgia, Athens, GA, [2]Univ. of Georgia, Tifton, GA

8:12 0338 Effects of defoliation on midsouth soybean yields. **Benjamin Thrash** (bct157@msstate.edu)[1], Angus Catchot[2], Jeff Gore[3], Don Cook[3] and Fred Musser[2], [1]Mississippi State, Starkville, MS, [2]Mississippi State Univ., Mississippi State, MS, [3]Mississippi State Univ., Stoneville, MS

8:24 0339 Sugarcane aphids: A new pest in Mississippi grain sorghum. **Brittany Lipsey** (bse37@msstate.edu)[1], Angus Catchot[1], Jeff Gore[2], Don Cook[2], Erick Larson[1] and Fred Musser[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS

8:36 0340 Detection of twospotted spider mite, *Tetranychus urticae* Koch, damage on strawberries, using digital imagery and leaf spectroscopy. **Christopher Crockett** (crockettcd@ufl.edu)[1], Oscar Liburd[1] and Amr Abd-Elrahman[2], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Florida, Plant City, FL

8:48 0341 Towards lower-cost, user friendly acoustic detection systems for hidden insect infestations in trees. **Barukh Rohde** (barukh94-school@yahoo.com)[1], Emily Pregmon[2], Sylvia Lujo[2], Daniel Fialkovsky[3], Avraham-Nachum Brun-Kestler[4], Hassan Y. Al-Ayied[5] and Richard W. Mankin[2], [1]Univ. of Florida, Gainesville, FL, [2]USDA - ARS, Gainesville, FL, [3]City Univ. of New York, Bronx, NY, [4]Custom Engineered Solutions, West Hempstead, NY, [5]King Abdulaziz City for Science & Technology, Riyadh, Saudi Arabia

9:00 0342 Risk assessment of the root-weevil, *Mogulones crucifer,* a biocontrol agent released against *Cynoglossum officinale* in Canada and prohibited in the United States. **Basu Kafle** (kafl6134@vandals.uidaho.edu), Mark Schwarzländer and Sanford Eigenbrode, Univ. of Idaho, Moscow, ID

9:12 0343 Corn earworm, *Helicoverpa zea*, and fall armyworm, *Spodoptera frugiperda*, threshold review and recommendation in Mississippi grain sorghum. **Chris Dobbins** (cdobbins@drec.msstate.edu)[1], Jeff Gore[1], Angus Catchot[2], Don Cook[1] and Fred Musser[2], [1]Mississippi State Univ., Stoneville, MS, [2]Mississippi State Univ., Mississippi State, MS

9:24 0344 Assessment of simulated damage by *Anthonomus signatus* (Say) in southeastern plasticulture strawberry production. **Douglas McPhie** (drmcphie@ncsu.edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

9:36 0345 Endosymbiont mediation of stylet-born plant virus dynamics. Ian Kaplan[1], Jennifer White[2] and **Gina M. Angelella** (gangelel@purdue.edu)[1], [1]Purdue Univ., West Lafayette, IN, [2]Univ. of Kentucky, Lexington, KY

9:48 0346 An integrated pest management trap: Discovering the pheromone of the celery leaftier, *Udea rubigalis*. **Jessica Kansman** (kansmanj@msu.edu) and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

10:00 0347 Evaluating a potential area-wide IPM strategy for managing hemlock woolly adelgid in the eastern United States. **Kenton Sumpter** (kenton.sumpter@myactv.net), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

10:12 Break

10:24 0348 Tools for IPM: A degree-day model for billbugs, *Sphenophorus* spp., in intermountain west turf. **Madeleine Dupuy** (madeleine.dupuy@usu.edu) and Ricardo Ramirez, Utah State Univ., Logan, UT

10:36 0349 Linking plant genes to associated insect communities. **Hilary Barker** (hlbultman@wisc.edu)[1], Jennifer F. Riehl[1], Liza Holeski[2], Pär Ingvarsson[3] and Richard L. Lindroth[1], [1]Univ. of Wisconsin, Madison, WI, [2]Northern Arizona Univ., Flagstaff, AZ, [3]Umeå Univ., Umeå, Sweden

10:48 0350 Temporal patterns of a Missouri prairie stream macroinvertebrate community. **Jessica Warwick** (jmwx86@mail.missouri.edu) and Robert W. Sites, Univ. of Missouri, Columbia, MO

11:00 0351 Managing two soybean pests to optimize yield. **Eric H. Clifton** (eclifton@iastate.edu), Erin W. Hodgson, Gregory Tylka and Aaron J. Gassmann, Iowa State Univ., Ames, IA

11:12 0352 The detection and differentiation of soybean aphid and brown stem rot on soybean using hyperspectral remote sensing. **Zach Marston** (mars0368@umn.edu)[1], Tavvs Alves[1], Ian MacRae[2], Dean Malvick[1] and Robert Koch[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Minnesota, Crookston, MN

11:24 0353 Defining thrips injury and damage relationships in strawberries to determine economic injury levels and economic thresholds. **Iris Strzyzewski** (istrz228@ufl.edu), Joe Funderburk and Mrittunjai Srivastava, Univ. of Florida, Quincy, FL

11:36 0354 Soybean plant response to *Dectes texanus* infestations under field conditions. **Alice Harris** (alice3@k-state.edu) and Brian McCornack, Kansas State Univ., Manhattan, KS

11:48 0355 Linking pollinator behavior to selfing rate for three distinct pollinators. **Emmanuel Santa-Martinez** (santamartnez@wisc.edu)[1] and Johanne Brunet[2], [1]Univ. of Wisconsin, Madison, WI, [2]USDA - ARS, Madison, WI

12:00 0356 Costs and benefits of alates in a soybean aphid colony under predation. **Aldo Ríos Martínez** (aldorios@live.com) and Alejandro Costamagna, Univ. of Manitoba, Winnipeg, MB, Canada

12:12 0357 A meta-analysis of factors associated with the intensity of ant-honeydew producing insect interactions. **Nicole Bisang** (nicolebisang@tamu.edu)[1], Katherine LeVan[2], David A. Holway[2] and Micky Eubanks[1], [1]Texas A&M Univ., College Station, TX, [2]Univ. of California, San Diego, CA

03 - Graduate Ten-Minute Paper Competition: P-IE - IPM C

200 C (Convention Center)

Moderators: David Buntin[1] and Ash Ahmad[2], [1]Univ. of Georgia, Griffin, GA, [2]Univ. of Georgia, Athens, GA

8:10 Introductory Remarks

8:15 0358 The role of pest resistant grass endophyte on western corn rootworm, *Diabrotica virgifera virgifera.* **Claire Bestul** (Claire.Bestul@sdstate.edu)[1,2] and Jonathan G. Lundgren[2], [1]South Dakota State Univ., Brookings, SD, [2]USDA - ARS, Brookings, SD

8:27 0359 Risk for alternate oversummering hosts for the wheat-mite-virus complex in winter wheat. **Anthony J. McMechan** (justin.mcmechan@gmail.com), Everlyne Wosula and Gary Hein, Univ. of Nebraska, Lincoln, NE

8:39 0360 Influence of *Squash vein yellowing virus* on the biology and behavior of its whitefly vector. **Deepak Shrestha** (dshrestha@ufl.edu)[1], Susan Webb[1], Scott Adkins[2] and Heather J. McAuslane[1], [1]Univ. of Florida, Gainesville, FL, [2]USDA - ARS, Fort Pierce, FL

8:51 0361 Acquisition of whitefly-transmitted *Tomato yellow leaf curl virus* through sexual and transovarial transmission. **Wendy G. Marchant** (wmar@uga.edu)[1], Kerry M. Oliver[1] and Rajagopalbabu Srinivasan[2], [1]Univ. of Georgia, Athens, GA, [2]Univ. of Georgia, Tifton, GA

9:03 0362 Exchange of virus and vector populations between natural and managed habitats. **Paul Chisholm** (paul.chisholm@email.wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

9:15 0363 Transcriptional changes associated with *Tomato spotted wilt virus* infection in various life stages of its thrips vector, *Frankliniella fusca* [Hinds]. **Anita Shrestha** (anita25@uga.edu)[1], Rajagopalbabu Srinivasan[1], Donald Champagne[2], Albert K. Culbreath[1], Dorith Rotenberg[3] and Anna Whitfield[3], [1]Univ. of Georgia, Tifton, GA, [2]Univ. of Georgia, Athens, GA, [3]Kansas State Univ., Manhattan, KS

9:27 0364 Influence of tobacco thrips, *Frankliniella fusca*, and reniform nematodes, *Rotylenchulus reniformis* on cotton. **Whitney Crow** (wdc165@msstate.edu)[1], Angus Catchot[1], Jeff Gore[2], Darrin Dodds[1], Thomas W. Allen[1] and Don Cook[2], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS

9:39 0365 Don't wilt, frass happens: A new vector, *Acalymma trivattatum*, provides potential geographic expansion of bacterial wilt of cucurbits. **Dana C. Roberts** (dcr5101@psu.edu), Shelby J. Fleischer, Jason Rasgon and Joyce Sakamoto, Pennsylvania State Univ., University Park, PA

9:51 0366 The impact of *Tomato spotted wilt virus* (TSWV) resistant peanut genotypes on TSWV transmission by thrips and thrips fitness. **Pin-Chu Lai** (pclai@uga.edu)[1], Mark R. Abney[1], Albert K. Culbreath[1], Shyam Tallury[2] and Rajagopalbabu Srinivasan[1], [1]Univ. of Georgia, Tifton, GA, [2]Clemson Univ., Florence, SC

10:03 0367 Feeding and oviposition preference of kudzu bug, *Megacopta cribraria* (Hemiptera: Plataspidae), to six bean crops. **Liu Yang** (lzy0017@auburn.edu) and Xing Ping Hu, Auburn Univ., Auburn, AL

10:15 0368 Aggressive management of satellite populations of emerald ash borer can delay population growth. **Samuel J. Fahrner** (fahr0051@umn.edu)[1], Mark Abrahamson[2], Robert Venette[3] and Brian Aukema[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Minnesota Dept. of Agriculture, St. Paul, MN, [3]USDA - Forest Service, St. Paul, MN

10:27 Break

10:39 0369 The effect of brown marmorated stink bugs, *Halyomorpha halys*, on California Rice. **Mohammad-Amir Aghaee** (maghaee@ucdavis.edu), Larry D. Godfrey and Jhalendra Rijal, Univ. of California, Davis, CA

10:51 0370 Thousand cankers disease: Scolytine beetles and fungal pathogens associated with symptomatic eastern black walnut. **Tyler Stewart** (stewar23@purdue.edu)[1], Margaret McDermott-Kubeczko[2], Jennifer Juzwik[3] and Matthew Ginzel[1], [1]Purdue Univ., West Lafayette, IN, [2]Univ. of Minnesota, St. Paul, MN, [3]USDA - Forest Service, St. Paul, MN

11:03 0371 Multitrophic effects of colony-level variation in red imported fire ant foraging behavior. **Alison Bockoven** (abockoven@tamu.edu) and Micky Eubanks, Texas A&M Univ., College Station, TX

11:15 0372 Herbivore-induced responses mediate feeding guild interactions in potato, *Solanum tuberosum* L. **Elizabeth Davidson-Lowe** (david216@msu.edu) and Jared Ali, Michigan State Univ., East Lansing, MI

11:27 0373 Scales of influence: Evaluating southern pine beetle risk in the New Jersey Pinelands. **Carissa Aoki** (carissa.f.aoki.gr@dartmouth.edu) and Matthew P. Ayres, Dartmouth College, Hanover, NH

11:39 0374 Global weather and local butterflies: Variable responses to a large-scale climate phenomenon. **Nick Pardikes** (nickpardikes@gmail.com)[1], Arthur M. Shapiro[2], Lee A. Dyer[1] and Matthew L. Forister[1], [1]Univ. of Nevada, Reno, NV, [2]Univ. of California, Davis, CA

11:51 0375 Urban plant heterogeneity influences cavity nesting bees and wasps. **Katherine J. Todd** (todd.489@osu.edu) and Mary Gardiner, The Ohio State Univ., Wooster, OH

12:03 0376 How climate change and host-specific cold tolerance may mediate invasion potential of mountain pine beetle, *Dendroctonus ponderosae*, in novel eastern forests. **Derek Rosenberger** (rose0675@umn.edu)[1], Brian Aukema[2] and Robert Venette[3], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Minnesota, St. Paul, MN, [3]USDA - Forest Service, St. Paul, MN

04 - Graduate Ten-Minute Paper Competition: P-IE - Insecticide A

200 D (Convention Center)

Moderators: Sunil Tewari[1] and Nathan Little[2], [1]Dow AgroSciences, Fowler, IN, [2]USDA - ARS, Stoneville, MS

8:10 Introductory Remarks

8:15 0377 Systemic efficacy of the diamide insecticides targeting corn earworm, *Helicoverpa zea*, in Mississippi soybean production. **Andrew Adams** (aadams@entomology.msstate.edu)[1], Jeff Gore[2], Angus Catchot[1], Don Cook[2], Fred Musser[1] and Trent Irby[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS

8:27 0378 Impacts of neonicotinoid resistance on tobacco thrips, *Frankliniella fusca,* in the mid-south. **Chelsie Darnell** (chd102@msstate.edu)[1], Angus Catchot[1], Fred Musser[1], Don Cook[2], Jeff Gore[2], Darrin Dodds[1] and Shannon Morsello[3], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS, [3]North Carolina State Univ., Raleigh, NC

8:39 0379 Non-target effects of neonicotinoid seed treatments on milkweeds and monarch butterflies. **Paola Olaya-Arenas** (polayaar@purdue.edu) and Ian Kaplan, Purdue Univ., West Lafayette, IN

8:51 0380 Evaluating the effect of foliar insecticides on populations of suspected Bt-resistant western corn rootworm beetles in rotated soybean. Nicholas Tinsley, **Alexandra Kaluf** (amcmill2@illinois.edu), Ronald Estes, Michael Gray and Joseph Spencer, Univ. of Illinois, Champaign, IL

9:03 0381 Assessing efficacy, exposure, and risk for insecticide drift reduction technologies. **Collin Preftakes** (cjpreftakes@gmail.com)[1], Robert K. D. Peterson[1] and Jerome J. Schleier[2], [1]Montana State Univ., Bozeman, MT, [2]Dow AgroSciences, Indianapolis, IN

9:15 0382 Chemigation to manage stink bugs in cotton. **Xing Wei** (xingwei@uga.edu)[1], Wes Porter[1], Calvin Perry[2], Phillip Roberts[1] and Michael Toews[1], [1]Univ. of Georgia, Tifton, GA, [2]Univ. of Georgia, Camilla, GA

9:27 0383 Monitoring the susceptibility to insecticides in *Helicoverpa armigera* (Lepidoptera: Noctuidae) populations in Brazil. **Mariana Durigan** (mariana.durigan@yahoo.com), Rogério Pereira, Natália Leite, Douglas Amado and Celso Omoto, Univ. of São Paulo, Piracicaba, Brazil

9:39 0384 Effects of insecticides and fungicides commonly used in tomato production on *Phytoseiulus persimillis*. **Jessica Ditillo** (jlditillo@gmail.com)[1], George G. Kennedy[1] and James F. Walgenbach[2], [1]North Carolina State Univ., Raleigh, NC, [2]North Carolina State Univ., Fletcher, NC

9:51 0385 Evaluation of trunk injected systemic insecticides to control stem and leaf gall wasps, *Josephiella* species (Agaonidae, Hymenoptera), on *Ficus microcarpa* in Hawai'i. **Bishnu Bhandari** (bishnu@hawaii.edu) and Zhiqiang Cheng, Univ. of Hawai'i at Manoa, Honolulu, HI

10:03 0386 Impact of neonicotinoid seed treatments on mid-south row crops. **John North** (jhn39@msstate.edu)[1], Jeff Gore[2], Angus Catchot[1], Fred Musser[1], Don Cook[2] and Darrin Dodds[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS

10:15 Break

10:27 0387 Pesticide compatibility with *Aphidius colemani* (Hymenoptera: Braconidae) for biological control applications in greenhouse production systems. **Tracey Payton Miller** (tracey.payton@okstate.edu)[1], Eric Rebek[1], Steven Frank[2], Kris Giles[1] and Mike Schnelle[1], [1]Oklahoma State Univ., Stillwater, OK, [2]North Carolina State Univ., Raleigh, NC

10:39 0388 Interactions between neonicotinoids and water stress lead to Banks grass mite outbreaks in corn. **Alice Ruckert** (alice.ruckert@usu.edu) and Ricardo Ramirez, Utah State Univ., Logan, UT

10:51 0389 Analyzing effects of ivermectin on cattle dung arthropod communities. **Jacob Pecenka** (jacob.pecenka@gmail.com), South Dakota State Univ., Brookings, SD

11:03 0390 Systemic insecticides and reflective mulch for Asian citrus psyllid, *Diaphorina citri*, control in new citrus plantings. **Scott D. Croxton** (croxtsd@ufl.edu) and Philip A. Stansly, Univ. of Florida, Immokalee, FL

11:15 0391 Barley residue and herbicide management practices: Effects on insects and weeds in soybean. **Armando Rosario-Lebron** (arosario@umd.edu), Univ. of Maryland, College Park, MD

11:27 0392 Insecticide bioassays against Florida's most destructive sweet corn pests. **David Owens** (owensd119@ufl.edu)[1], Gregg Nuessly[1], Dakshina Seal[2] and Thomas Colquhoun[3], [1]Univ. of Florida, Belle Glade, FL, [2]Univ. of Florida, Homestead, FL, [3]Univ. of Florida, Gainesville, FL

11:39 0393 Integrating plant and microbial metabolites as a biorational control for striped cucumber beetle. **Margaret Lewis** (mtl183@psu.edu)[1], Shelby J. Fleischer[1] and Timothy Elkner[2], [1]Pennsylvania State Univ., University Park, PA, [2]Pennsylvania State Univ., Manheim, PA

11:51 0394 Effects of soybean seed treatments and foliar applications of neonicotinoid insecticides on *Megacopta cribraria* (Hemiptera: Plataspidae). **Francesca Stubbins** (sstubbi@clemson.edu)[1], Jeremy K. Greene[1] and Francis Reay-Jones[2], [1]Clemson Univ., Blackville, SC, [2]Clemson Univ., Florence, SC

12:03 0395 Lethal and sublethal effects of sulfoxaflor on *Chrysoperla rufilabris* (Neuroptera: Chrysopidae). **Anh K. Tran** (aktran@umn.edu) and Robert Koch, Univ. of Minnesota, St. Paul, MN

12:15 0396 Impact of imidacloprid treatments for hemlock woolly adelgid on surface water quality: Real or perceived? **Elizabeth P. Benton** (ebenton3@utk.edu)[1], Jerome F. Grant[1], T. C. Mueller[1], R. Jesse Webster[2] and Becky Nichols[2], [1]Univ. of Tennessee, Knoxville, TN, [2]National Park Service, Gatlinburg, TN

05 - Graduate Ten-Minute Paper Competition: P-IE - Insecticide B

200 E (Convention Center)

Moderator: Lisa Neven, USDA - ARS, Wapato, WA

8:10 Introductory Remarks

8:15 0397 Testing the robustness of GLM, Bayesian GLM and Maximum Likelihood for the estimation of LC50 in different experimental setups using simulations. **H. Alejandro Merchan** (hamercha@ncsu.edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

8:27 0398 The inter- and intraspecific differential responses of *Frankliniella fusca* and *Frankliniella occidentalis* (Thysanoptera: Thripidae) to systemically-applied imidacloprid and cyantraniliprole. **Damon A. D'Ambrosio** (dadambro@ncsu.edu) and George G. Kennedy, North Carolina State Univ., Raleigh, NC

8:39 0399 Limited translocation of clothianidin seed treatments in corn. **Adam Alford** (AdamMAlford@gmail.com) and Christian Krupke, Purdue Univ., West Lafayette, IN

8:51 0400 Comparing the efficacy of season-long chemically based management strategies for *Drosophila suzukii* in southeastern blueberry crops. **Danielle Rosensteel** (drosenst@uga.edu) and Ashfaq Sial, Univ. of Georgia, Athens, GA

9:03 0401 Neonicotinoid impacts on pollinators in apple orchards. **Sarah Shugrue** (ses1075@psu.edu)[1], Edwin Rajotte[1], Neelendra K. Joshi[2] and David J. Biddinger[2], [1]Pennsylvania State Univ., University Park, PA, [2]Pennsylvania State Univ., Biglerville, PA

9:15 0402 Saving our ash: Insecticides and neighboring blue ash protect green and white ash in forests invaded by emerald ash borer. **Erin M. O'Brien** (obrien.501@osu.edu) and Daniel A. Herms, The Ohio State Univ., Wooster, OH

9:27 0403 Corn plant and seedling insect complex interactions with seed-applied and in-furrow insecticides. **Forrest Howell** (fchowell@ncsu.edu), North Carolina State Univ., Raleigh, NC

9:39 0404 A novel attract and kill technology for oriental beetle, *Anomala orientalis*, control in blueberries. **Robert Holdcraft** (rholdcra@rci.rutgers.edu) and Cesar Rodriguez-Saona, Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

9:51 0405 Brown marmorated stink bug: Can we control it with organic insecticides? **John Morehead** (adamm91@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

06 - Graduate Ten-Minute Paper Competition: P-IE - Chemical Ecology

200 F (Convention Center)

Moderators: Tracy C. Leskey, USDA - ARS, Kearneysville, WV

7:55 Introductory Remarks

8:00 0406 Chemical ecological interactions among grape, *Vitis vinifera*, grey mould, *Botrytis cinerea*, and light brown apple moth, *Epiphyas postvittana*, and their implications in pest management. **Syed Rizvi** (srizvi@csu.edu.au) and Anantanarayanan Raman, Charles Sturt Univ., Orange, Australia

8:12 0407 Olfactory mediated responses to host and non-host plant volatiles by female grape berry moths, *Paralobesia viteana*. **Michael Wolfin** (msw266@cornell.edu), Gregory M. Loeb and Charles E. Linn, Cornell Univ., Geneva, NY

8:24 0408 Emergency Alert: Plant communication about herbivory through arbuscular mycorrhizal fungi. **Zoe Getman-Pickering** (zg94@cornell.edu) and Jennifer Thaler, Cornell Univ., Ithaca, NY

8:36 0409 Crop domestication in the Solanaceae: Consequences for indirect plant defense. **Michael Garvey** (garveym@purdue.edu)[1], Curtis Creighton[2] and Ian Kaplan[1], [1]Purdue Univ., West Lafayette, IN, [2]Purdue Univ., Hammond, IN

8:48 0410 Semiochemical-baited traps to monitor the invasive pea leaf weevil, *Sitona lineatus* L., during two distinct periods of adult activity. **Amanda St.Onge** (ajstonge@ualberta.ca)[1], Héctor A. Cárcamo[2] and Maya Evenden[1], [1]Univ. of Alberta, Edmonton, AB, Canada, [2]Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

9:00 0411 Specialization and simple sensory environments increase accuracy in host-searching cabbage white butterflies. **Meredith K. Steck** (steck047@umn.edu) and Emilie C. Snell-Rood, Univ. of Minnesota, St. Paul, MN

9:12 0412 Efficacy of various attractant baits and lures for monitoring *Drosophila suzukii* (Diptera: Drosophilidae). **Alix Whitener** (alix.crilly@wsu.edu) and Elizabeth H. Beers, Washington State Univ., Wenatchee, WA

9:24 0413 Can't you smell that smell? Asparagus beetle, *Crioceris asparagi*, feeding induces volatile organic compound production in asparagus. **Adam Ingrao** (ingraoad@msu.edu) and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

9:36 0414 Picky caterpillars: Feeding preferences of the European corn borer, *Ostrinia nubialis* (Hübner), over a range of host plants. **Kelsey Fisher** (kefisher@udel.edu) and Charles Mason, Univ. of Delaware, Newark, DE

9:48 0415 Olfactory plasticity in *Microplitis croceipes* is influenced by nutritional status. **Matthew Burrows**, Auburn Univ., Auburn, AL

10:00 Break

10:12 0416 The active space of Mexican rice borer, *Eoreuma loftini*, pheromone traps. **Blake E. Wilson** (bwils26@lsu.edu)[1], Matthew T. VanWeelden[1], Julien M. Beuzelin[2] and T. E. Reagan[1], [1]Louisiana State Univ., Baton Rouge, LA, [2]Louisiana State Univ., Alexandria, LA

10:24 0417 Responses of parasitoid wasps to pheromones of cerambycid beetles. **Todd D. Johnson** (tdjohns2@illinois.edu) and Lawrence M. Hanks, Univ. of Illinois, Champaign, IL

10:36 0418 Chemically-mediated billbug, *Sphenophorus* spp., behavior. **Alexandra Duffy** (duffy14@purdue.edu), Matthew David Ginzel and Douglas S. Richmond, Purdue Univ., West Lafayette, IN

10:48 0419 Species-specific blends of shared pheromone components minimize interspecific attraction among cerambycid beetles in the subfamily Lamiinae. **Linnea Meier** (lrmeier2@life.uiuc.edu)[1], Gabriel Hughes[2], Matthew Ginzel[2], Judy A. Mongold-Diers[1], Yunfan Zou[3], Jocelyn G. Millar[3] and Lawrence M. Hanks[1], [1]Univ. of Illinois, Champaign, IL, [2]Purdue Univ., West Lafayette, IN, [3]Univ. of California, Riverside, CA

11:00 0420 Hessian fly, *Mayetiola destructor* (Diptera: Cecidomyiidae), attraction to visual and olfactory cues in Y-tube studies and under semi-field conditions. **Ryan Schmid** (rbschmid@ksu.edu)[1,2], Darren

Snyder[1,3], Lee Cohnstaedt[1,3] and Brian McCornack[1,2], [1]Kansas State Univ., Manhattan, KS, [2]Plant Biosecurity Cooperative Research Centre, Bruce, Australia, [3]USDA - ARS, Manhattan, KS

11:12 0421 Alightment of spotted wing drosophila, *Drosophila suzukii* (Diptera: Drosophilidae), on disks with varying visual and olfactory stimuli. **Danielle Kirkpatrick** (kirkpa42@msu.edu)[1], Peter S. McGhee[1], Sara Hermann[2], Larry Gut[1] and James R. Miller[1], [1]Michigan State Univ., East Lansing, MI, [2]Cornell Univ., Ithaca, NY

11:24 0422 Thousand cankers disease: Attraction of *Pityophthorus juglandis* to volatiles of black walnut and *Geosmithia morbida*. **Bridget Blood** (bblood@purdue.edu)[1], Matthew A. Paschen[1], Jennifer Juzwik[2], William Klingeman[3] and Matthew Ginzel[1], [1]Purdue Univ., West Lafayette, IN, [2]USDA - Forest Service, St. Paul, MN, [3]Univ. of Tennessee, Knoxville, TN

11:36 0423 A single compound in the goldenrod gall fly, *Eurosta solidaginis*, volatile emission primes anti-herbivore defenses in tall goldenrod, *Solidago altissima*. **Anjel Helms** (amh468@psu.edu)[1], Consuelo De Moraes[2], Mark Mescher[2] and John Tooker[1], [1]The Pennsylvania State Univ., University Park, PA, [2]Swiss Federal Institute of Technology, Zürich, Switzerland

11:48 0424 Helping our partners: Herbivore-induced plant volatiles increase natural enemy attraction and function in an agro-ecosystem. **Jordano Salamanca** (jordanosalamanca@gmail.com)[1], Cesar Rodriguez-Saona[2] and Brígida Souza[1], [1]Univ. Federal de Lavras, Lavras, Brazil, [2]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

12:00 0425 Stink lover: A predator uses a common stink bug volatile to find an invasive host pest. **Diego F. Fraga** (diegoffraga@gmail.com)[1], Cesar Rodriguez-Saona[2], George C. Hamilton[3], Anne Nielsen[4] and Antonio Carlos Busoli[1], [1]Univ. Estadual Paulista, Jaboticabal, Brazil, [2]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, [3]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [4]Rutgers, The State Univ. of New Jersey, Bridgeton, NJ

12:12 0426 Influence of host plant volatiles on the response and production of pheromones for a longhorn beetle species. **R. Maxwell Collignon** (rmcollig@gmail.com) and Jocelyn G. Millar, Univ. of California, Riverside, CA

07 - Graduate Ten-Minute Paper Competition: P-IE - Biology/Behavior A

200 G (Convention Center)

Moderator: John Ruberson, Kansas State Univ., Manhattan, KS

7:55 Introductory Remarks

8:00 0427 Measuring oviposition preference and survival of an invasive stem borer (Lepidoptera: Crambidae) on conventional and bioenergy crops. **Matthew T. VanWeelden** (mvanwe2@lsu.edu)[1], Blake E. Wilson[1], Julien Beuzelin[1], T. E. Reagan[1] and M. O. Way[2], [1]Louisiana State Univ., Baton Rouge, LA, [2]Texas AgriLife Extension Service (TAES), Beaumont, TX

8:12 0428 Isolation and pathogenicity of naturally-occurring entomopathogenic fungi to unique bark beetle field crop pest. **Anis Lestari** (anislestari1@gmail.com) and Sujaya Rao, Oregon State Univ., Corvallis, OR

8:24 0429 Attraction of female fungus gnats, *Lycoriella ingenua* (Diptera: Sciaridae), to mushroom-growing substrates and the green mold, *Trichoderma aggressivum*. **Kevin Cloonan** (krc204@psu.edu), Stefanos Andreadis and Thomas C. Baker, Pennsylvania State Univ., University Park, PA

8:36 0430 Life history analysis and field study monitoring the sugarcane aphid, *Melanaphis sacchari,* on different sorghum hybrids. **Devin Tillman** (debeach@tamu.edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX

8:48 0431 Exploring the landscape of fear: The role of non-lethal predator effects in manipulating *Pieris rapae*. **Sara Hermann** (slh@msu.edu) and Douglas A. Landis, Michigan State Univ., East Lansing, MI

9:00 0432 Pollination and floral fragrance of the clamshell orchid, *Prosthechea cochleata* (Orchidaceae). **Haleigh Ray** (hray12@ufl.edu)[1], Charles Stuhl[2] and Jennifer Gillett-Kaufman[1], [1]Univ. of Florida, Gainesville, FL, [2]USDA - ARS, Gainesville, FL

9:12 0433 Colonies of *Aphis gossypii* (Hemiptera: Aphididae) vary in their attraction to *Solenopsis invicta* (Hymenoptera: Formicidae). **Rande Patterson** (rrp5@tamu.edu) and Micky Eubanks, Texas A&M Univ., College Station, TX

9:24 0434 Virginia wine grape susceptibility to *Drosophila suzukii* oviposition and resulting larval survivorship. **Meredith Shrader** (mcassell@vt.edu) and Doug Pfeiffer, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:36 0435 Temporal and directional patterns of nymphal *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae) movement on the trunk of selected wild and fruit tree hosts. **Angelita Acebes-Doria** (aacebes@vt.edu)[1], Tracy C. Leskey[2] and J. Christopher Bergh[1], [1]Virginia Polytechnic Institute and State Univ., Winchester, VA, [2]USDA - ARS, Kearneysville, WV

9:48 0436 How blueberry attributes influence oviposition behavior of the invasive spotted wing drosophila, *Drosophila suzukii* (Matsumura). **Lindsy Iglesias** (liglesias@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

10:00 Break

10:12 0437 Gall insects: Plant mediated interactions impact insect preference and performance. Paul Ode[1], Dan W. Bean[2] and **Theresa Barosh** (Theresa.barosh@colostate.edu)[1], [1]Colorado State Univ., Fort Collins, CO, [2]Colorado Dept. of Agriculture, Palisade, CO

10:24 0438 The effect of clubroot disease infection on oviposition preference of bertha armyworm, *Mamestra configurata* Walker (Lepidoptera: Noctuidae). **Chaminda De Silva Weeraddana** (weeradda@ualberta.ca), Maya L. Evenden, Stephen Strelkov and Victor Manolii, Univ. of Alberta, Edmonton, AB, Canada

10:36 0439 An insight into the antioxidant responses to exogenous oxidative stress agents and a glimpse into the role of catalase in the reproductive fitness of the Gulf Coast tick, *Amblyomma maculatum*. **Deepak Kumar** (Deepak.Kumar@eagles.usm.edu) and Shahid Karim, Univ. of Southern Mississippi, Hattiesburg, MS

10:48 0440 The relative importance of emerald ash borer-caused tree mortality and abundance of the invasive shrub Amur honeysuckle on tree seedling survival and recruitment in Midwestern deciduous forests. **Brian Hoven** (hovenbm@miamioh.edu)[1], David Gorchov[1], Kathleen S. Knight[2] and Valerie Peters[1], [1]Miami Univ., Oxford, OH, [2]USDA - Forest Service, Delaware, OH

11:00 0441 Fungal endophytes can affect plant-herbivore interactions above and belowground. **Wenqing Zhou** (zhouwq@tamu.edu)[1], Terry Wheeler[2], James Starr[1] and Gregory Sword[1], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M AgriLife Research & Extension Center, Lubbock, TX

11:12 0442 A glimpse of changes to come: Effects of elevated CO_2 on a tri-trophic system. **Ryan Paul** (rlpaul@rams.colostate.edu)[1], Paul Ode[1], Dhaval Vyas[1], Dan Lecain[2] and Dana Blumenthal[2], [1]Colorado State Univ., Fort Collins, CO, [2]USDA - ARS, Fort Collins, CO

11:24 0443 Hyperspectral soybean reflectance to predict soybean aphid (Hemiptera: Aphididae) feeding under greenhouse conditions. **Tavvs Alves** (alves011@umn.edu)[1], Zach Marston[1], Ian MacRae[2] and Robert Koch[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Minnesota, Crookston, MN

11:36 0444 Assembling the draft *Reticulitermes flavipes* CYPome to enhance the understanding of cytochrome P450 functions in relation to xenobiotic metabolism. **Mary Kubiszak-Rushton** (mkubisza@purdue.edu) and Michael E. Scharf, Purdue Univ., West Lafayette, IN

11:48 0445 Mortality from soil insecticides among Bt-resistant populations of western corn rootworm (Coleoptera: Chrysomelidae). **Kenneth E. Masloski** (masloski@iastate.edu), Joel R. Coats and Aaron J. Gassmann, Iowa State Univ., Ames, IA

12:00 0446 Finding the mechanism for female bias caused by a *Rickettsia* bacterial endosymbiont, nr *R. bellii*, in the sweet potato whitefly, *Bemisia tabaci*. **Elizabeth Bondy** (ebond@email.arizona.edu) and Martha Hunter, Univ. of Arizona, Tucson, AZ

12:12 0447 Host plant driven plasticity in the salivary glands of *Trichoplusia ni*. **Loren Rivera-Vega** (lriveravega@gmail.com), David Galbraith and Gary Felton, Pennsylvania State Univ., University Park, PA

08 - Graduate Ten-Minute Paper Competition: P-IE - Biology/Behavior B

200 H (Convention Center)

Moderators: Alton Sparks[1] and Elvira de Lange[2], [1]Univ. of Georgia, Tifton, GA, [2]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

8:10 Introductory Remarks

8:15 0448 Evaluation of mature soybean pod as a food source of *Riptortus pedestris* (Hemiptera: Alydidae) and *Halyomorpha halys* (Hemiptera: Pentatomidae). **M. Mahbubur Rahman** (pintubau85@gmail.com) and Un Taek Lim, Andong National Univ., Andong, South Korea

8:27 0449 Effects of temperature on larval development of Asian gypsy moth, *Lymantria dispar asiatica* and *L. dispar japonica*: A laboratory study. **Samita Limbu** (szl175@psu.edu)[1], Melody A. Keena[2], Fang Chen[3], Gericke Cook[4], Hannah Nadel[5] and Kelli Hoover[1], [1]Pennsylvania State Univ., University Park, PA, [2]USDA - Forest Service, Hamden, CT, [3]Beijing Forestry Univ., Beijing, China, [4]USDA - APHIS, Fort Collins, CO, [5]USDA - APHIS, Buzzards Bay, MA

8:39 0450 Functional response of generalist predators to *Halyomorpha halys*. **Kristin Deroshia** (deroshia@msu.edu) and Matthew Grieshop, Michigan State Univ., East Lansing, MI

8:51 0451 Ovary development of *Larinus minutus* Gyllenhal (Coleoptera: Curculionidae). **Beth Ferguson** (mef005@email.uark.edu), Timothy J. Kring and Robert N. Wiedenmann, Univ. of Arkansas, Fayetteville, AR

9:03 0452 Temperature-dependent development of *Galendromus flumenis* (Acari: Phytoseiidae), a predator of Banks grass mite. **Fatemeh Ganjisaffar** (fatemeh.ganjisaffar@email.ucr.edu) and Thomas M. Perring, Univ. of California, Riverside, CA

9:15 0453 Presentation withdrawn

9:27 0454 E-probe diagnostic nucleic acid assay (EDNA) detection of *Spiroplasma kunkelii* in gray lawn leafhopper, *Exitianus exitiosus* (Uhl.), transcriptome sequencing datasets. **Sharon Andreason** (sharon.andreason@okstate.edu) and Astri Wayadande, Oklahoma State Univ., Stillwater, OK

9:39 0455 Reproduction by parasitized aphids: Just a drop in the bucket or enough to make a splash? **Matthew C. Kaiser** (kais0101@umn.edu) and George E. Heimpel, Univ. of Minnesota, St. Paul, MN

9:51 0456 The effect of fluctuating temperature regimes on the life history of the Asian citrus psyllid and its parasitoid, *Tamarixia radiata.* **Kelsey Schall** (kscha008@ucr.edu) and Mark S. Hoddle, Univ. of California, Riverside, CA

10:03 0457 Cold tolerance of the crape myrtle bark scale, *Eriococcus lagerstroemiae* Kuwana (Hemiptera: Eriococcidae), and prediction of its potential distribution in United States. **Zinan Wang** (zwang67@tigers.lsu.edu)[1], Rodrigo Diaz[1] and Yan Chen[2], [1]Louisiana State Univ., Baton Rouge, LA, [2]Louisiana State Univ., Hammond, LA

10:15 Break

10:27 0458 Reproduction of walnut twig beetle (Coleoptera: Scolytidae) on walnut and allied *Juglans* species. **Andrea Hefty** (hefty012@umn.edu)[1], Mark Coggeshall[2], James McKenna[3], Brian Aukema[1], Robert Venette[4] and Steven Seybold[5], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Missouri, Columbia, MO, [3]Hardwood Tree Improvement and Regeneration Center, West Lafayette, IN, [4]USDA - Forest Service, St. Paul, MN, [5]USDA - Forest Service, Davis, CA

10:39 0459 Impact of ecological light pollution on nocturnal Lepidoptera. **Kylee Grenis** (kgrenis@gmail.com) and Shannon M. Murphy, Univ. of Denver, Denver, CO

10:51 0460 Comparison of anatomical structures and physical barriers to *Diaphorina citri* feeding in four species of Rutaceae. **Holly Shugart** (hshugart@ufl.edu) and Michael Rogers, Univ. of Florida, Lake Alfred, FL

11:03 0461 Caterpillar gut symbionts mediate the intersection of insect and plant immunity. **Jie Wang** (jiewang0813@163.com)[1,2], Michelle Peiffer[1], Rensen Zeng[3] and Gary Felton[1], [1]Pennsylvania State Univ., University Park, PA, [2]South China Agricultural Univ., Guangzhou, China, [3]Fujian Agriculture and Forestry Univ., Fuzhou, China

11:15 0462 Impact of flight on reproductive success of the navel orangeworm (Lepidoptera: Pyralidae). **Angela Rovnyak** (angelamrovnyak@gmail.com)[1], Thomas W. Sappington[1] and Charles S. Burks[2], [1]USDA - ARS, Ames, IA, [2]USDA - ARS, Parlier, CA

11:27 0463 Presentation withdrawn

11:39 0464 Antifeedant effect of non-crucifer extracts on adults of *Microtheca ochroloma* Stål (Coleoptera: Chrysomelidae). **Angie A. Niño** (anino@ufl.edu) and Ronald Cave, Univ. of Florida, Ft. Pierce, FL

11:51 0465 A *Rickettsia* endosymbiont influences whitefly, *Bemisia tabaci*, mortality by the fungal pathogen *Beauveria bassiana.* **James Conway** (jimmygconway@gmail.com), Suzanne Kelly and Martha Hunter, Univ. of Arizona, Tucson, AZ

12:03 0466 The role of temperature in structuring a Sierra Nevadan ant community. **Marshall McMunn** (msmcmunn@ucdavis.edu), Univ. of California, Davis, CA

12:15 0467 Optimization of an artificial diet for western corn rootworm, *Diabrotica virgifera virgifera,* bioassays. **Man Huynh** (mphd32@mail.missouri.edu)[1,2], Lisa Meihls[3], Dalton Ludwick[1], Andrea Hitchon[4], Louis Bjostad[5], Elisa Bernklau[5], Arthur W. Schaafsma[4], Randall P. Niedz[6], Stephen L. Lapointe[6], Thomas A. Coudron[3] and Bruce Hibbard[3], [1]Univ. of Missouri, Columbia, MO, [2]Can Tho Univ., Can Tho, Vietnam, [3]USDA - ARS, Columbia, MO, [4]Univ. of Guelph, Ridgetown, ON, Canada, [5]Colorado State Univ., Fort Collins, CO, [6]USDA - ARS, Fort Pierce, FL

09 - Graduate Ten-Minute Paper Competition: P-IE - Ecology A

200 I (Convention Center)

Moderators: Megha N. Parajulee[1] and Diane G. Alston[2], [1]Texas A&M Univ., Lubbock, TX, [2]Utah State Univ., Logan, UT

7:55 Introductory Remarks

8:00 0468 Urbanization in mesic environments increases the frequency of terrestrial invertebrate water stress. **Jamie Becker** (jambeck@bgsu.edu), Nadejda Mirochnichenko, Haley Ingram and Kevin McCluney, Bowling Green State Univ., Bowling Green, OH

8:12 0469 Evidence for grassland and agriculture in the landscape suppressing soybean aphid, *Aphis glycines*, abundance and improving field-scale soybean yields. **Kaitlin Stack Whitney** (whitney3@wisc.edu), Timothy D. Meehan, Christopher Kucharik, Phil Townsend and Claudio Gratton, Univ. of Wisconsin, Madison, WI

8:24 0470 Characterization of a unique genetic strain of gypsy moth, *Lymantria dispar*, across the landscape of northern Minnesota. **Marissa Streifel** (strei154@umn.edu)[1], Patrick Tobin[2] and Brian Aukema[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Washington, Seattle, WA

8:36 0471 Sampling for brown marmorated stink bug, *Halyomorpha halys*, in soybeans: A new visual plant inspection method. **Benjamin L. Aigner** (baigner@vt.edu)[1], D. Ames Herbert[2], Thomas P. Kuhar[1], Jamie Hogue[1], Galen Dively[3], P. Dilip Venugopal[4], William Cissel[5] and Joanne Whalen[5], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]Virginia Polytechnic Institute and State Univ., Suffolk, VA, [3]Univ. of Maryland, College Park, MD, [4]USEPA, Washington, DC, [5]Univ. of Delaware, Newark, DE

8:48 0472 The resurgence of larch casebearer in the Great Lakes region: Are natural enemies still present? **Allastacia Gebauer** (akgebauer@gmail.com) and Brian Aukema, Univ. of Minnesota, St. Paul, MN

9:00 0473 Effectiveness of entomopathogenic nematode-induced systemic resistance against selected pests and pathogens of tobacco. **Julia Ferguson** (jfergu25@utk.edu)[1], Parwinder Grewal[1] and Ruisheng An[2], [1]Univ. of Tennessee, Knoxville, TN, [2]The Ohio State Univ., Wooster, OH

9:12 0474 How insects handle thermal variation: Constant opposed to fluctuating temperatures. **Aleix Valls** (aleix.valls@ndsu.edu), James Kopco and Jason Harmon, North Dakota State Univ., Fargo, ND

9:24 0475 Influence of host plant species and plant nutrition on larval development of cutworms (Lepidoptera: Noctuidae). **Ronald Batallas** (batallas@ualberta.ca) and Maya L. Evenden, Univ. of Alberta, Edmonton, AB, Canada

9:36 0476 Interaction of kudzu, *Pueraria lobata* var. *montana,* with the kudzu bug, *Megacopta cribraria,* as a pest of soybeans. **Joni L. Blount** (jonilb@uga.edu)[1], G. David Buntin[1], Phillip M. Roberts[2] and Wayne Gardner[1], [1]Univ. of Georgia, Griffin, GA, [2]Univ. of Georgia, Tifton, GA

9:48 0477 Differences in fitness traits between E and Z pheromone races of European corn borer, *Ostrinia nubilalis*, on different host plants. **Holly Lynn Walker** (hollylyn83@gmail.com) and Charles Mason, Univ. of Delaware, Newark, DE

10:00 Break

10:12 0478 Influence of partridge pea on arthropods and grain quality in organic field corn. **Lauren Hunt** (lhunt@umd.edu) and Cerruti Hooks, Univ. of Maryland, College Park, MD

10:24 0479 Trickle-up economics: Effects of resource availability on herbivores, enemies and ecological networks. **Moria Robinson** (mrobinson@ucdavis.edu), University of California, Davis, CA

10:36 0480 Phenological shifts in trembling aspen, *Populus tremuloides*, one year after defoliation by the forest tent caterpillar, *Malacosoma disstria*. **Michael Falk** (mfalk4@wisc.edu)[1], Jack Donaldson[2], Michael T. Stevens[3], Kenneth Raffa[1] and Richard L. Lindroth[1], [1]Univ. of Wisconsin, Madison, WI, [2]Living Biography, Provo, UT, [3]Utah Valley Univ., Orem, UT

10:48 0481 Process of disruption: Invasive flowering shrub density shifts bee communities and mutualisms throughout the year. **Michael Minnick** (minnicmj@miamioh.edu) and Thomas Crist, Miami Univ., Oxford, OH

11:00 0482 Sub-cortical interactions between *Monochamus titillator* and *Ips grandicollis* in a laboratory setting: Does arrival time affect survival? **Matthew Ethington** (mwething@uark.edu), Larry D. Galligan and Fred M. Stephen, Univ. of Arkansas, Fayetteville, AR

11:12 0483 Dispersal capacity of European gypsy moth, *Lymantria dispar dispar*, larvae from host vegetation to hardwood log piles. **Rachael Nicoll** (nicol071@umn.edu)[1], Scott W. Myers[2] and Brian Aukema[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - APHIS, Buzzards Bay, MA

11:24 0484 Enhancing arthropod-mediated ecosystem services using plants native to dry sandy soils in Michigan. **Dan Gibson** (gibso124@msu.edu) and Douglas A. Landis, Michigan State Univ., East Lansing, MI

11:36 0485 Differential responses of insect communities to habitat mixing in a dynamic marsh-mangrove ecotone. **Alexander Forde** (fordealex@gmail.com) and Daniel S. Gruner, Univ. of Maryland, College Park, MD

11:48 0486 Landscape-level spatial dynamics of *Halyomorpha halys* (Hemiptera: Pentatomidae) in organic farm systems. **Jakob Goldner** (jgoldner@mix.wvu.edu) and Yong-Lak Park, West Virginia Univ., Morgantown, WV

12:00 0487 Predictable ecological and evolutionary drivers of herbivore induced plant volatiles: A meta-analysis. **Elizabeth Rowen** (erowen@purdue.edu)[1] and Ian Kaplan[2], [1]Pennsylvania State Univ., State College, PA, [2]Purdue Univ., West Lafayette, IN

12:12 0488 Do thermal limits predict wild bee community response to urban warming? **April Hamblin** (alhambli@ncsu.edu), Steven Frank and Elsa Youngsteadt, North Carolina State Univ., Raleigh, NC

10 - Graduate Ten-Minute Paper Competition: P-IE - Ecology B

200 J (Convention Center)

Moderators: K. Clint Allen[1] and Daniel M. Pavuk[2], [1]USDA - ARS, Stoneville, MS, [2]Bowling Green State Univ., Bowling Green, OH

7:55 Introductory Remarks

8:00 0489 Factors associated with post-fire butterfly occupancy and nectar attributes in the Sierra Nevada, California. **David Pavlik** (pavli041@umn.edu)[1], Erica Fleishman[2] and Robert Blair[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of California, Davis, CA

8:12 0490 How individual nutritional intake target influences food sharing and sociality. **Abbie Reade** (abreade@rams.colostate.edu) and Dhruba Naug, Colorado State Univ., Fort Collins, CO

8:24 0491 Crop diversity and sampling method impact observed distributions of potato psyllid, *Bactericera cockerelli*, and the larger insect community. **Matthew Klein** (matthew.klein@oregonstate.edu) and Silvia Rondon, Oregon State Univ., Hermiston, OR

8:36 0492 Distance and direction of movement by selected epigeal arthropods around switchgrass, *Panicum virgatum*. **Caitlin Race** (cirace@email.uark.edu)[1], Timothy J. Kring[1], Robert N. Wiedenmann[1], James Hagler[2] and Scott A. Machtley[2], [1]Univ. of Arkansas, Fayetteville, AR, [2]USDA - ARS, Maricopa, AZ

8:48 0493 Assessing population structure among Colorado potato beetles, *Leptinotarsa decemlineata*, in the Midwest with Genotyping-by-Sequencing. **Michael S. Crossley** (mcrossley3@gmail.com) and Sean Schoville, Univ. of Wisconsin, Madison, WI

9:00 0494 Behavioral ecology and resource use of an invasive pest, *Drosophila suzukii* (Matsumura). **Johanna Elsensohn** (jeelsens@ncsu.edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

9:12 0495 If the frass does not fall, is it important to the forest? **Yi-an Chen** (nynaeve1@uga.edu) and Brian T. Forschler, Univ. of Georgia, Athens, GA

9:24 0496 The roles of physical damage and burial in managing grape berry moth, *Paralobesia viteana*, with tillage. **Jason Matlock** (matlockj@msu.edu) and Matthew Grieshop, Michigan State Univ., East Lansing, MI

9:36 0497 Does agricultural landscape complexity affect soybean aphid suppression in Manitoba? **K. G. L. I. Samaranayake** (ishansamaranayake@yahoo.com) and Alejandro Costamagna, Univ. of Manitoba, Winnipeg, MB, Canada

9:48 0498 Impact of *Solanum carolinense* trichome consumption within tobacco hornworms, *Manduca sexta*. **Alexandra Serpi** (alex.serpi@psu.edu) and Andrew G. Stephenson, Pennsylvania State Univ., University Park, PA

10:00 Break

10:12 0499 Agricultural and ecological implications of interspecific social behavioral plasticity in entomopathogenic nematodes. **Denis Willett** (dwillett@ufl.edu)[1], Hans Alborn[2], Larry Duncan[1] and Lukasz Stelinski[1], [1]Univ. of Florida, Lake Alfred, FL, [2]USDA - ARS, Gainesville, FL

10:24 0500 Comparative study of eastern and western North American populations of *Hippodamia convergens* (Coleoptera: Coccinellidae) for endosymbionts. **Joshua McCord** (jsmc229@g.uky.edu), Jennifer White and John Obrycki, Univ. of Kentucky, Lexington, KY

10:36 0501 The impact of an environmental contaminant on reproduction and development in the invasive Argentine ant, *Linepithema humile*. **Deborah De La Riva** (ddela005@ucr.edu), Michael Jones and John Trumble, Univ. of California, Riverside, CA

10:48 0502 Assessing the value of native and exotic trees across the inner city and suburban forest of Cleveland, OH. **Christopher B. Riley** (riley.595@osu.edu)[1], Daniel A. Herms[2] and Mary Gardiner[2], [1]The Ohio State Univ., Columbus, OH, [2]The Ohio State Univ., Wooster, OH

11:00 0503 Resource partitioning between two species of *Monochamus* pine sawyers in the Ozark National Forest. **Jake Bodart** (jwbodart@email.uark.edu), Larry D. Galligan and Fred M. Stephen, Univ. of Arkansas, Fayetteville, AR

11:12 0504 Direct and indirect trophic interactions of ants, spiders, and soybean pests. **Hannah J. Penn** (hannahjpenn@gmail.com), Kacie J. Athey and James D. Harwood, Univ. of Kentucky, Lexington, KY

11:24 0505 Behavioral and ecological mechanisms behind pattern formation. **Erick Cordeiro** (cordeiro.emg@gmail.com)[1], James Campbell[2], Thomas Phillips[1] and Kimberly A. With[1], [1]Kansas State Univ., Manhattan, KS, [2]USDA - ARS, Manhattan, KS

11:36 0506 Do current restoration practices allow for invertebrate recolonization? A chronosequence of ground dwelling invertebrates on reclaimed oil and gas fields in the Pinedale Anticline. **Megan Wilson** (mwilso39@uwyo.edu) and Timothy Collier, Univ. of Wyoming, Laramie, WY

11:48 0507 Population dynamics of three economically-important *Erythroneura* species present in Californian vineyards. **Cindy Preto** (crpreto@ucdavis.edu), Univ. of California-Davis, Sacramento, CA

12:00 0508 Spatial and temporal dynamics of *Amblypelta lutescens lutescens* Distant (Heteroptera: Coreidae) in avocado crops. **Karel Lindsay** (k.lindsay@uq.edu.au)[1], Michael J. Furlong[1], Myron Zalucki[1] and Ian Newton[2], [1]Univ. of Queensland, Brisbane, Australia, [2]Dept. of Agriculture and Fisheries, Mareeba, Australia

12:12 0509 Urban design: Rain gardens support biodiversity and ecosystem services? **MaLisa Spring** (malisa.spring@gmail.com)[1], Sandra Albro[2], Rob Darner[3], Ahjond Garmestani[4], William Shuster[4] and Mary Gardiner[1], [1]The Ohio State Univ., Wooster, OH, [2]Cleveland Botanical Garden, Cleveland, OH, [3]USGS, Columbus, OH, [4]USEPA, Cincinnati, OH

11 - Graduate Ten-Minute Paper Competition: P-IE - Bees

204 AB (Convention Center)

Moderators: Theresa Pitts-Singer and Rosalind James, USDA - ARS, Logan, UT

7:55 Introductory Remarks

8:00 0510 Populations of foraging honey bees in Midsouth crops. **Adam Whalen** (daw153@msstate.edu)[1], Angus Catchot[1], Jeff Gore[2], Scott Stewart[3], Gus Lorenz[4], Don Cook[2], Fred Musser[1] and Jeffrey W. Harris[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS, [3]Univ. of Tennessee, Jackson, TN, [4]Univ. of Arkansas, Lonoke, AR

8:12 0511 Bumble bee foraging and nest success on a chronosequence of reclaimed Ohio coal mines. **Jessie Wallace** (wallace.677@osu.edu)[1] and Karen Goodell[2], [1]The Ohio State Univ., Columbus, OH, [2]The Ohio State Univ., Newark, OH

8:24 0512 Diverse artificial nest substrates may provide essential habitat for cavity nesting bee groups across a gradient of landscape intensity. **Elias Bloom** (elias.bloom@email.wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

8:36 0513 Does urbanization affect heavy metal exposure in bumble bees? **Scott Prajzner** (prajzner.1@osu.edu) and Mary Gardiner, The Ohio State Univ., Wooster, OH

8:48 0514 Effect of cutting native prairie for hay on bees. **Wayne Ohnesorg** (wohnesorg2@unl.edu)[1], Marion Ellis[2], Robert Wright[2] and Thomas Hunt[3], [1]Univ. of Nebraska, Norfolk, NE, [2]Univ. of Nebraska, Lincoln, NE, [3]Univ. of Nebraska, Concord, NE

9:00 0515 Feeding preferences of a honey bee parasitic mite, *Varroa destructor*. **Samuel Ramsey** (insectious@gmail.com) and Dennis vanEngelsdorp, Univ. of Maryland, College Park, MD

9:12 0516 Honey bee, *Apis mellifera*, free-flight choice experiments using neonicotinoid insecticides. **Catherine Dana** (cdana2@illinois.edu), Univ. of Illinois, Champaign, IL

9:24 0517 Effect of hive placement, surrounding landscape, and percent bloom on honey bee fidelity to cranberry. **Aidee Guzman** (aguzman3@wisc.edu)[1,2], Christelle Guédot[2], Katie Hietala-Henschell[2] and Hannah R. Gaines[2], [1]Univ. of California, Berkeley, CA, [2]Univ. of Wisconsin, Madison, WI

9:36 0518 What's your favorite food? Floral visitation rates by bees in the Pacific Northwest. **Rachel Olsson** (rachel.olsson@email.wsu.edu), Elias Bloom and David Crowder, Washington State Univ., Pullman, WA

9:48 0519 Are different bee species attracted to different floral traits in alfalfa, *Medicago sativa*? **Austin Bauer** (aabauer4@wisc.edu) and Johanne Brunet, Univ. of Wisconsin, Madison, WI

10:00 Break

10:12 0520 Changes in grassland plant-pollinator network structure with fire and grazing. **Ellen Welti** (elwelti@k-state.edu) and Anthony Joern, Kansas State Univ., Manhattan, KS

10:24 0521 Evaluating gene and pollen flow mediated by the alfalfa leafcutting bee, *Megachile rotundata*, in alfalfa seed production. **Natalie Boyle** (nboyle@wsu.edu)[1], Ruth Martin[2], Sandya Kesoju[1], Stephanie Greene[3] and Douglas Walsh[1], [1]Washington State Univ., Prosser, WA, [2]USDA - ARS, Corvallis, OR, [3]USDA - ARS, Fort Collins, CO

10:36 0522 Royal succession and caste-independent reproductive potential in honey bee, *Apis mellifera*, patrilines. **James Withrow** (jmwithro@ncsu.edu) and David Tarpy, North Carolina State Univ., Raleigh, NC

10:48 0523 Wild bee abundance and diversity in Wisconsin vegetable crops. **Kathryn Prince** (kjprince@wisc.edu), Univ. of Wisconsin, Madison, WI

11:00 0524 Impacts of farm management practices on pollinator community and pollination services in the Northern Great Plains. **Subodh Adhikari** (subodh.adhikari@msu.montana.edu), Laura Burkle, Kevin O'Neill, David K. Weaver and Fabian Menalled, Montana State Univ., Bozeman, MT

11:12 0525 Does landscape mediate wild bee health and phylodiversity? **Heather Connelly** (hlc66@cornell.edu)[1], Nolan Amon[1], Bryan N. Danforth[1], Katja Poveda[1] and Gregory M. Loeb[2], [1]Cornell Univ., Ithaca, NY, [2]Cornell Univ., Geneva, NY

11:24 0526 Can bees compensate for a poor nutritional past? **Keziah Katz** (kdkatz@rams.colostate.edu) and Dhruba Naug, Colorado State Univ., Fort Collins, CO

11:36 0527 Do honey bees, *Apis mellifera*, and wild bees (Apoidea) respond differently to pollinator friendly habitat? **Elaine Evans** (evan0155@umn.edu)[1], Matthew Smart[2] and Marla Spivak[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USGS, Jamestown, ND

11:48 0528 Linking bumble bee foraging to resources in Wisconsin landscapes using radio frequency identification (RFID) methods. **Jeremy Hemberger** (hemberger@wisc.edu) and Claudio Gratton, Univ. of Wisconsin, Madison, WI

12:00 0529 Massive bee mortality associated with linden trees: Bee diversity and susceptibility to nectar sugars. **Adriana Argoti** (adriana.argoti@oregonstate.edu) and Sujaya Rao, Oregon State Univ., Corvallis, OR

12:12 0530 Bee visit frequency and time of day effects on cumulative pollen deposition in watermelon. **Jacob Cecala** (jmcecala@gmail.com) and Joan Leong, California State Polytechnic Univ., Pomona, CA

12 - Graduate Ten-Minute Paper Competition: P-IE - Host Plant Resistance

205 A (Convention Center)

Moderators: Robert L. Meagher[1] and Laura Campbell[2], [1]USDA - ARS, Gainesville, FL, [2]Dow AgroSciences, Carbondale, IL

7:55 Introductory Remarks

8:00 0531 Morphological traits conditioning sorghum resistance to the African stem borer, *Busseola fusca*. **Phyllis Muturi** (mutuphy@yahoo.com), Embu Univ. College, Embu, Kenya

8:12 0532 Exploring sunflower resistance to sunflower moth. **D. Sikora** (dsikora1@utk.edu)[1], Jeffrey Bradshaw[1], Gary Brewer[2] and Jarrad Prasifka[3], [1]Univ. of Nebraska, Scottsbluff, NE, [2]Univ. of Nebraska, Lincoln, NE, [3]USDA - ARS, Fargo, ND

8:24 0533 Comparing different assays for Bt resistance detection in western corn rootworm. **Dalton Ludwick** (dclmrd@mail.missouri.edu)[1], Sarah Zukoff[1], Ken Ostlie[2], Bruce D. Potter[3], Lisa Meihls[4], Anthony Zukoff[5], Lee French[6], Mark Ellersieck[1], Wade French[7] and Bruce Hibbard[4], [1]Univ. of Missouri, Columbia, MO, [2]Univ. of Minnesota, St. Paul, MN, [3]Univ. of Minnesota, Lamberton, MN, [4]USDA - ARS, Columbia, MO, [5]Kansas State Univ., Garden City, KS, [6]French Agricultural Research, Lamberton, MN, [7]USDA - ARS, Brookings, SD

8:36 0534 Soybean defense responses to the soybean aphid, *Aphis glycines*. **Kaitlin Chapman** (Karmit.chapman@gmail.com), Tiffany Heng-Moss and Joe Louis, Univ. of Nebraska, Lincoln, NE

8:48 0535 Transgenerational effect of inbreeding and *Manduca sexta* herbivory on defense-related traits in horsenettle, *Solanum carolinense*. **Chad Nihranz** (ctn118@psu.edu) and Andrew G. Stephenson, Pennsylvania State Univ., University Park, PA

9:00 0536 Maize-corn leaf aphid interaction: Role of *Mir1*. **Suresh Varsani** (ssvarsani@gmail.com), Kyle G. Koch, Tiffany Heng-Moss and Joe Louis, Univ. of Nebraska, Lincoln, NE

9:12 0537 Evaluating resistance in selected cranberry varieties towards Sparganothis fruitworm, *Sparganothis sulfureana.* **Erin McMahan** (emcmahan@wisc.edu) and Christelle Guédot, Univ. of Wisconsin, Madison, WI

9:24 0538 Frequency of Vip3Aa20 resistance allele using F1 screen in field populations of *Spodoptera frugiperda* in Brazil. **Renato Horikoshi** (rjhorikoshi@gmail.com), Oderlei Bernardi, Daniel Bernardi, Daniela M. Okuma, Leonardo Miraldo, Fernando Amaral, Sandy Spineli and Celso Omoto, Univ. of São Paulo, Piracicaba, Brazil

9:36 0539 Effect of sweetpotato cultivars on fitness of sweetpotato weevil, *Cylas formicarius elegantulus* (Summer). **Jie Chen** (jchen31@tigers.lsu.edu)[1], Jeffrey A. Davis[1], Michael Stout[1], M. J. Murray[1], Julien M. Beuzelin[2], D. R. LaBonte[1] and Tara Smith[1], [1]Louisiana State Univ., Baton Rouge, LA, [2]Louisiana State Univ., Alexandria, LA

9:48 0540 Integrating plant tolerance into breeding programs for soybean aphid, *Aphis glycines* Matsumura, management. **Lia Marchi-Werle** (lsmarchi1@gmail.com)[1], Hillary Fischer[1], Thomas Hunt[2], Tiffany Heng-Moss[1] and George Graef[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, Concord, NE

10:00 Break

10:12 0541 Screening for corn rootworm resistance to transgenic *Bt* corn in North Dakota. **Veronica Calles Torrez** (veronica.callestorre@ndsu.edu)[1], Janet Knodel[1], Mark A. Boetel[1], Wade French[2] and Billy Fuller[3], [1]North Dakota State Univ., Fargo, ND, [2]USDA - ARS, Brookings, SD, [3]South Dakota State Univ., Brookings, SD

10:24 0542 Presentation withdrawn

10:36 0543 Priming of tomato plants by aboveground herbivores of different feeding guilds against root-knot nematodes. **Dinesh Kafle** (dinesh.kafle@fu-berlin.de), Anne Hänel and Susanne Wurst, Freie Universität Berlin, Berlin, Germany

10:48 0544 Tomato, *Lycopersicon esculentum*, priming in response to caterpillar herbivory. **Anne Jones** (acj152@psu.edu), James H. Tumlinson and Gary Felton, Pennsylvania State Univ., University Park, PA

11:00 0545 Assessing western corn rootworm resistance to Bt corn in the landscape. **Coy St. Clair** (cstclair@iastate.edu)[1], Graham P. Head[2] and Aaron Gassmann[1], [1]Iowa State Univ., Ames, IA, [2]Monsanto Company, St. Louis, MO

11:12 0546 Inheritance and fitness costs associated with field-derived resistance to Cry3Bb1 corn in western corn rootworm, *Diabrotica virgifera virgifera* LeConte. **Aubrey Paolino** (apaolino@iastate.edu) and Aaron J. Gassmann, Iowa State Univ., Ames, IA

11:24 0547 Differential susceptibility of fall armyworm, *Spodoptera frugiperda* Smith, host-strains to selected Bt toxins. **David Ingber** (ingber@udel.edu) and Charles Mason, Univ. of Delaware, Newark, DE

11:36 0548 Understanding unexpected rootworm injury to corn expressing Cry3Bb1 in agro-ecosystems of southwestern Nebraska. **David S. Wangila** (dwangila2@huskers.unl.edu)[1], Blair Siegfried[1,2], Arnubio Valencia-J.[3], Haichuan Wang[1] and Lance Meinke[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL, [3]Universidad de Caldas, Manizales, Colombia

11:48 0549 Evaluation of commercial sorghum hybrids for resistance to *Melanaphis sacchari*. **John Gonzales** (jgonzales@agcenter.lsu.edu)[1], Sebe Brown[1], David L. Kerns[1] and Julien M. Beuzelin[2], [1]Louisiana State Univ., Winnsboro, LA, [2]Louisiana State Univ., Alexandria, LA

12:00 0550 Twins but not identical: Differential plant defense induction by the fall armyworm strains. **Flor E. Acevedo** (fea5007@psu.edu)[1], Michelle Peiffer[1], Robert L. Meagher[2], Dawn Luthe[1] and Gary Felton[1], [1]Pennsylvania State Univ., University Park, PA, [2]USDA - ARS, Gainesville, FL

12:12 0551 Tissue specific expression analysis of CYP3 clan P450 genes and RNAi in *Halyomorpha halys*. **Priyanka Mittapelly** (mittapelly.1@buckeyemail.osu.edu), Raman Bansal and Andrew Michel, The Ohio State Univ., Wooster, OH

13 - Graduate Ten-Minute Paper Competition: P-IE - Biocontrol

205 B (Convention Center)

Moderators: Ted Cottrell[1] and Andrea Joyce[2], [1]USDA - ARS, Byron, GA, [2]Univ. of California, Merced, CA

7:55 Introductory Remarks

8:00 0552 The effect of floral intercropping on beneficial insects in cucumbers. **Nicole F. Quinn** (quinnni2@msu.edu), Daniel Brainard and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

8:12 0553 A food-for-protection mutualism alters the aggressiveness and predatory behavior of two dominant ant species. **Robert Clark** (rclark@wesleyan.edu) and Michael S. Singer, Wesleyan Univ., Middletown, CT

8:24 0554 Grass-feeding gall midges (Diptera: Cecidomyiidae) and their parasitoids in eastern South Dakota. **Manuel Perilla Lopez** (juan.perilla@sdstate.edu), Paul J. Johnson and Arvid Boe, South Dakota State Univ., Brookings, SD

8:36 0555 Next generation sequencing approach to molecular gut content analysis of red imported fire ants, *Solenopsis invicta*. **MacKenzie Kjeldgaard** (mackjeld@gmail.com), Jason Wulff, Gregory Sword and Micky Eubanks, Texas A&M Univ., College Station, TX

8:48 0556 Manipulation of natural enemies of key arthropod pests in Oklahoma vineyards. **Shane McMurry** (shane.mcmurry@okstate.edu) and Eric Rebek, Oklahoma State Univ., Stillwater, OK

9:00 0557 Biological control and intraguild predation by generalist predators in cucurbits: Implications for organic production. **Kacie J. Athey** (kacie.johansen@uky.edu), Jamin Dreyer, Mark A. Williams and James D. Harwood, Univ. of Kentucky, Lexington, KY

9:12 0558 Recruitment of *Diabrotica speciosa* and an entomopathogenic nematode to aboveground application of elicitors: Applications for biocontrol. **Camila Filgueiras** (camilacramer@gmail.com)[1], Denis Willett[2], Martin Pareja[3] and Alcides Moino Jr.[1], [1]Univ. Federal de Lavras, Lavras, Brazil, [2]Univ. of Florida, Lake Alfred, FL, [3]Univ. Estadual de Campinas, Campinas, Brazil

9:24 0559 Identifying predators of *Halyomorpha halys* using molecular gut content analysis. **John Pote** (pote30@gmail.com)[1], Anne Nielsen[1], Dina M. Fonseca[2] and Rafael Valentin[2], [1]Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, [2]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:36 0560 Effects of landscape structure on abundance of cereal leaf beetle, *Oulema melanopus*, and its parasitoid, *Tetrastichus julis*. **Arash Kheirodin** (kheiroda@myumanitoba.ca)[1], Alejandro Costamagna[1] and Héctor A. Cárcamo[2], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

9:48 0561 Damaged goods: How *Cotesia glomerata* responds to hosts parasitized by its competitor, *C. rubecula*. **Dhaval Vyas** (Dhaval.Vyas@colostate.edu)[1], Ryan Paul[1], George Heimpel[2] and Paul Ode[1], [1]Colorado State Univ., Fort Collins, CO, [2]Univ. of Minnesota, St. Paul, MN

10:00 Break

10:12 0562 Dispersal and predation of a Neotropical pioneer tree species, *Zanthoxylum ekmanii*, by a common ground dwelling ant, *Ectatomma ruidum*. **Selina Ruzi** (ruzi2@illinois.edu) and Andrew Suarez, Univ. of Illinois, Champaign, IL

10:24 0563 Optimizing host:parasitoid ratios and photoperiods for more efficient mass rearing of *Tamarixia radiata* (Hymenoptera: Eulophidae), a parasitoid of the citrus greening disease vector *Diaphorina citri* (Hemiptera: Psylloidea). **Xulin Chen** (xulin527@ufl.edu), Monica Triana and Philip A. Stansly, Univ. of Florida, Immokalee, FL

10:36 0564 Cover crops as a tool for cutworm management. **R. W. M. Udari Wanigasekara** (udari_madu@yahoo.com)[1], Alejandro Costamagna[2], Yvonne Lawley[2] and Barbara Sharanowski[2], [1]Univ. of Manitoba, Manitoba, MB, Canada, [2]Univ. of Manitoba, Winnipeg, MB, Canada

10:48 0565 Host range studies with *Scymnus coniferarum*, a potential biological control agent of HWA. **Molly Darr** (mdarr@vt.edu), Scott Salom and Loke T. Kok, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:00 0566 Does *Pterostichus melanarius* (Coleopera: Carabidae) induce fear in slugs? Relevance for biological control. **Anna Busch** (akb226@psu.edu) and John Tooker, Pennsylvania State Univ., University Park, PA

11:12 0567 Impact of switchgrass cultivar and cropping system on natural enemy communities and biological control services. **Marissa Schuh** (schuhmar@msu.edu) and Douglas A. Landis, Michigan State Univ., East Lansing, MI

11:24 0568 Natural enemy and herbivore response to the inclusion of floral resources in intermountain west alfalfa systems. **Makenzie Benander** (mbenande@uwyo.edu) and Randa Jabbour, Univ. of Wyoming, Laramie, WY

11:36 0569 The impact of a squash bug egg parasitoid and its sensitivity to selective insecticides. **James M. Wilson** (jamesmw3@vt.edu), Troy D. Anderson and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:48 0570 Molecular identification of arthropod predators of cucumber beetles. **Molly Dieterich** (dieterich.9@osu.edu)[1], Mary Gardiner[2] and Celeste Welty[1], [1]The Ohio State Univ., Columbus, OH, [2]The Ohio State Univ., Wooster, OH

12:00 0571 Quantifying intraguild predation among native and non-native lady beetles (Coccinellidae) across the midwestern US. **Alice M. Vossbrinck** (vossbrinck.1@osu.edu), Mary Gardiner and Andrew Michel, The Ohio State Univ., Wooster, OH

12:12 0572 One beetle's prey is another beetle's poison: Differential fitness effects of toxic prey among coccinellid species. **Kelly Jackson** (kellyj712@gmail.com), Joshua McCord and Jennifer White, Univ. of Kentucky, Lexington, KY

14 - Undergraduate Ten-Minute Paper Competition: SysEB

205 CD (Convention Center)

Moderators: James Woolley[1] and Floyd Shockley[2], [1]Texas A&M Univ., College Station, TX, [2]Smithsonian Institution National Museum of Natural History, Washington, DC

7:55 Introductory Remarks

8:00 0573 Presentation withdrawn

8:12 0574 Social learning in the thermoregulatory fanning behavior in honey bees, *Apis mellifera* L. **Rachael Kaspar** (raka5016@colorado.edu), Univ. of Colorado, Boulder, CO

8:24 0575 Presentation withdrawn

8:36 0576 Presentation withdrawn

8:48 0577 An examination of ecological rules on phenotypic variation in *Coccinella septempunctata* (Coleoptera: Coccinellidae): A comparison between environmental factors and elytra spot size variation. **Erik Hearn** (zvq594@mocs.utc.edu)[1], Eric O'Neill[1], Yanbing Zheng[2], John Obrycki[2] and Yukie Kajita[1], [1]Univ. of Tennessee, Chattanooga, TN, [2]Univ. of Kentucky, Lexington, KY

9:00 0578 Comparative scale morphology and ultrastructure across insect lineages, with special reference to curculionoids. Steve Davis[1] and **Kyle DeMarr** (kad259@cornell.edu)[2], [1]American Museum of Natural History, New York, NY, [2]Cornell Univ., Ithaca, NY

9:12 0579 Phylogeny and biogeography of the prionine genus *Callipogon* Audinet-Serville (Coleoptera: Cerambycidae) with special emphasis on the origin and conservation of its unique Palearctic member, *Callipogon relictus* Semenov. **Sang Il Kim** (sikim@fas.harvard.edu) and Brian D. Farrell, Harvard Univ., Cambridge, MA

9:24 0580 Review of *Ablautus* Loew, 1866 with the description of new species (Diptera: Asilidae). **Charlotte Herbert** (ceherb11@gmail.com)[1] and Torsten Dikow[2], [1]St. Lawrence Univ., Canton, NY, [2]Smithsonian Institution National Museum of Natural History, Washington, DC

9:36 0581 Phylogeny of *Anax* with special attention to the common green darner, *Anax junius*. **Preston Arnold** (preston.arnold02@gmail.com), Taylor King and Seth M. Bybee, Brigham Young Univ., Provo, UT

9:48 0582 Differential maternal contributions to termite progeny in the face of disease. **Colette Biro** (biro.c@husky.neu.edu), Erin Cole and Rebeca B. Rosengaus, Northeastern Univ., Boston, MA

10:00 0583 The dimensions of generalism: Are armored scale insects (Hemiptera: Diaspididae) generalists across multiple axes? **Shannon Trujillo** (strujillo@sandiego.edu)[1], Hannah Shapiro[1], Daniel Peterson[2], Benjamin B. Normark[2] and Geoffrey Morse[1], [1]Univ. of San Diego, San Diego, CA, [2]Univ. of Massachusetts, Amherst, MA

10:12 Break

10:24 0584 Tropical trees as islands: Diversity accumulation of armored scale insects (Hemiptera: Diaspididae) on trees as a function of forest age. **Hannah Shapiro** (hshapiro@sandiego.edu)[1], Shannon Trujillo[1], Daniel Peterson[2], Benjamin B. Normark[2] and Geoffrey Morse[1], [1]Univ. of San Diego, San Diego, CA, [2]Univ. of Massachusetts, Amherst, MA

10:36 0585 Robbing insects of sex? Testing for a correlation between *Wolbachia* and asexual reproduction in Adelgidae (Sternorrhyncha: Aphidoidea). **Ian Aper** (ian17588@msn.com)[1], Kathryn Weglarz[1], Nathan Havill[2] and Carol D. von Dohlen[1], [1]Utah State Univ., Logan, UT, [2]USDA - Forest Service, Hamden, CT

10:48 0586 To be or not to be: The question of defining genera in the Old World Oraseminae (Hymenoptera: Eucharitidae). **Krissy Dominguez** (cdomi009@ucr.edu), Scott Heacox and John M. Heraty, Univ. of California, Riverside, CA

11:00 0587 The abundance and diversity of cuticular microbes differ on arboreal and terrestrial tropical ants. **Veronica Sinotte** (veronica.sinotte@scranton.edu)[1], Sunshine Van Bael[2,3] and Marc Seid[1], [1]The Univ. of Scranton, Scranton, PA, [2]Smithsonain Tropical Research Institute, Ancon, Panama, [3]Tulane Univ., New Orleans, LA

11:12 0588 Presentation withdrawn

11:24 0589 Investigating the systematics of the *Pseudochalcura gibbosa* (Hymenoptera: Eucharitidae) populations of North America. **Scott Heacox** (sheac001@ucr.edu), Krissy Dominguez and John M. Heraty, Univ. of California, Riverside, CA

11:36 0590 Pygmies of the past: 235 million years of Tetrigidae. **M. Jared Thomas** (thomasmj@illinois.edu) and Sam W. Heads, Univ. of Illinois, Champaign, IL

11:48 0591 Convergent evolution of a dichotomy in wettability on the mouthparts of flies and butterflies. **Kristen Reiter** (kreiter2@kent.edu) and Matthew Lehnert, Kent State Univ. at Stark, North Canton, OH

12:00 0592 Allometry of proboscis architecture of painted lady butterflies, *Vanessa cardui*, in relation to butterfly mass and fluid uptake rates. **Valerie Kramer** (vkramer@kent.edu)[1], Catherine Mulvane[1], Aubrey Brothers[1], Patrick D. Gerard[2] and Matthew Lehnert[1], [1]Kent State Univ. at Stark, North Canton, OH, [2]Clemson Univ., Clemson, SC

12:12 0593 Butterflies don't use a straw to drink: Fluid uptake in butterflies with split mouthparts. **Ashley Lash** (alash3@kent.edu), Kristen Reiter and Matthew Lehnert, Kent State Univ. at Stark, North Canton, OH

15 - Graduate Ten-Minute Paper Competition: MUVE - Mosquitoes, Midges, and Bed Bugs

206 AB (Convention Center)

Moderators: Donald Yee[1] and Sherry Glick[2], [1]Univ. of Southern Mississippi, Hattiesburg, MS, [2]USEPA, Dallas, TX

8:10 Introductory Remarks

8:15 0594 Sampling with a well-defined purpose: A comparison of adult mosquito sampling tactics. **Thuy-Vi Nguyen** (tvnguyen@uga.edu) and Brian T. Forschler, Univ. of Georgia, Athens, GA

8:27 0595 Adult mosquitoes collected by various methods from suburban backyards and dog kennels. **Chris J. Holderman** (chrish2@ufl.edu)[1], Salvador Gezan[1], C. Roxanne Connelly[2] and Phillip E. Kaufman[1], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Florida, Vero Beach, FL

8:39 0596 Discovery of a naturally-occurring ecological trap and implementation for attract-and-kill mosquito control. **Allison Gardner** (amgardn2@illinois.edu), Brian F. Allan and Ephantus J. Muturi, Univ. of Illinois, Champaign, IL

8:51 0597 Teasing apart the behavioral responses of *Culex tarsalis* to fish-associated semiochemicals in wind tunnel bioassays. **Adena Why** (awhy001@ucr.edu) and William E. Walton, Univ. of California, Riverside, CA

9:03 0598 SkitoSnak™: An alternative blood free diet for *Aedes aegypti* mass rearing. **Kristina Gonzales** (gonza720@nmsu.edu), Anthony Clemons, Hitoshi Tsujimoto and Immo Hansen, New Mexico State Univ., Las Cruces, NM

9:15 0599 Polyandry in the dengue vector, *Aedes aegypti*. **Ethan Degner** (ecd77@cornell.edu), Sylvie A. Pitcher and Laura Harrington, Cornell Univ., Ithaca, NY

9:27 0600 The effect of *Mycobacterium ulcerans* exotoxin on host-seeking and oviposition behavior of *Aedes aegypti aegypti* (L.) (Diptera: Culicidae). **Michael Sanders** (mlsanders2507@gmail.com)[1,2], Heather Jordan[2], Craig J. Coates[1] and Jeffery K. Tomberlin[1], [1]Texas A&M Univ., College Station, TX, [2]Mississippi State Univ., Starkville, MS

9:39 0601 Identify *Aedes albopictus* as vector for an indigenous dengue outbreak by sympatric saliva cross-adsorbed western blot. **Tsai-Ying Yen** (farscape@ms38.hinet.net) and Kun-Hsien Tsai, National Taiwan Univ., Taipei, Taiwan

9:51 0602 Development of a novel molecular method for detection of La Crosse virus from vectors and reservoirs. **Cassandra Urquhart** (curquhar@vols.utk.edu)[1], Doris D'Souza[1], Lisa Muller[1], Amy Lambert[2] and Rebecca T. Trout Fryxell[1], [1]Univ. of Tennessee, Knoxville, TN, [2]Centers for Disease Control and Technology, Fort Collins, CO,

10:03 0603 Effects of container size on competition between *Aedes* mosquito larvae. **Peter J. Brabant** (pbrab001@gmail.com), Illinois State Univ., Normal, IL

10:15 Break

10:27 0604 Toll signaling in *Anopheline* mosquitoes. **Victoria Davidson** (victorea@ksu.edu)[1], Simon Blanford[2], Matthew B. Thomas[2] and Kristin Michel[1], [1]Kansas State Univ., Manhattan, KS, [2]Pennsylvania State Univ., University Park, PA

10:39 0605 Impact of increased insulin signaling in the fat body of *Anopheles stephensi* mosquitoes. **Lewis Hun** (Lewisvibulhun@email.arizona.edu) and Michael A. Riehle, Univ. of Arizona, Tucson, AZ

10:51 0606 Flight behavior of *Anopheles gambiae* mosquitoes during arrival and bloodfeeding on human hosts. **Josephine Parker** (josephine.parker@lstmed.ac.uk)[1], Natalia Angarita-Jaimes[2], Matthew Hall[2], Katherine Gleave[1], Jackline Martine[3], Fabian Mashauri[3], Catherine Towers[2], David Towers[2] and Philip McCall[1], [1]Univ. of Liverpool, Liverpool, United Kingdom, [2]Univ. of Warwick, Coventry, United Kingdom, [3]National Institute of Medical Research, Mwanza, Tanzania

11:03 0607 Transmission of the human malaria *Plasmodium falciparum* is maximum at much lower temperatures than previously predicted. **Lillian Moller-Jacobs** (llm233@psu.edu), Shelley Whitehead, Mark Kennedy and Matthew B. Thomas, Pennsylvania State Univ., University Park, PA

11:15 0608 The efficacy of RNAi in the arbovirus vector, *Culicoides sonorensis*. **Mary Mills** (mm02463@ksu.edu)[1], Dana Nayduch[2] and Kristin Michel[1], [1]Kansas State Univ., Manhattan, KS, [2]USDA - ARS, Manhattan, KS

11:27 0609 Estimates of bluetongue virus infection rates in *Culicoides* midge vectors depend on trap attractant and placement.

Emily McDermott (emcde002@ucr.edu)[1], Christie Mayo[2], Alec Gerry[1], Damien Laudier[3], N. James MacLachlan[4] and Bradley Mullens[1], [1]Univ. of California, Riverside, CA, [2]Colorado State Univ., Fort Collins, CO, [3]Laudier Histology, New York, NY, [4]Univ. of California, Davis, CA

11:39 0610 Effect of age and mating status on the mate choice of male bed bugs, *Cimex lectularius*. **Desen Wang** (wds830706@163.com)[1,2], Changlu Wang[1], Narinderpal Singh[1], Richard Cooper[1] and Chen Zha[1], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]South China Agricultural Univ., Guangzhou, China

11:51 0611 Presentation withdrawn

16 - Undergraduate Ten-Minute Paper Competition: MUVE, PBT, and P-IE

207 AB (Convention Center)

Moderators: Ting Li[1] and William A. Donahue[2], [1]Auburn Univ., Auburn, AL, [2]Sierra Research Laboratories, Modesto, CA

8:25 Introductory Remarks

8:30 0612 *Drosophila suzukii* in diapause? **Jessica West** (jeswest@ucdavis.edu)[1], Peter W. Shearer[2], Vaughn Walton[3], Nik G. Wiman[3], Kelly Hamby[4] and Joanna Chiu[1], [1]Univ. of California, Davis, CA, [2]Oregon State Univ., Hood River, OR, [3]Oregon State Univ., Corvallis, OR, [4]Univ. of Maryland, College Park, MD

8:42 0613 Detection of aster yellows phytoplasma in aster leafhoppers (Hemiptera: Cicadellidae) in Michigan. **Katherine Demeuse** (demeusek@msu.edu), Lidia Komondy and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

8:54 0614 Candy-cane stems not so sweet: Ducking goldenrod stems have altered chemical defenses against non-galling herbivores. **Rosalie Sowers** (rosie.sowers@gmail.com), Anjel Helms and John Tooker, Pennsylvania State Univ., University Park, PA

9:06 0615 Presentation withdrawn

9:18 0616 A selective sweet tooth: The effects of various carbohydrates on the dietary selection of the cockroach, *Rhyparobia maderae,* nymphs. **Wesley Tierney** (wmtierney10@yahoo.com) and Randy Cohen, California State Univ., Northridge, CA

9:30 0617 Insect and plant diversity of a restored habitat in Isanti, Minnesota. **Brittany Limanen** (brittany.limanen@wolves.northern.edu), Alyssa Anderson and Jodie Ramsay, Northern State Univ., Aberdeen, SD

9:42 0618 Field trial performance of SmartStax® hybrids on sites with high corn rootworm pressure. **Clayton Carley** (scientist4christ@gmail.com)[1], Kevin Johnson[2] and Dwain M. Rule[3], [1]Univ. of Illinois, Milford, IL, [2]Dow AgroSciences, Danville, IL, [3]Dow AgroSciences, Indianapolis, IN

9:54 0619 The effect of sublethal pesticide exposure on *Musca domestica* (Diptera: Muscidae) flight using a flight mill. **Inbar Aberman** (inbar.aberman@gmail.com)[1], Thomson Paris[2], Barukh Rohde[2], Daniel Fialkovsky[3], Klea Kulla[3], Morgan Hull[2], Seth McNeill[4], Richard Wendell Mankin[5], Philip A. Stansly[6], Christopher J. Geden[5] and Sandra A. Allan[5], [1]Univ. of Lancaster, Lancaster, United Kingdom, [2]Univ. of Florida, Gainesville, FL, [3]City Univ. of New York, New York, NY, [4]Union College, Lincoln, NE, [5]USDA - ARS, Gainesville, FL, [6]Univ. of Florida, Immokalee, FL

10:06 0620 The importance of understanding diet composition and ecological correlates of an insectivorous bird in decline. **Amber Bass** (umbassa@myumanitoba.ca), Barbara Sharanowski and Kevin Fraser, Univ. of Manitoba, Winnipeg, MB, Canada

10:18 0621 Efficiency data on a novel trap for the continuous collection of carrion feeding flies. **James R. Willett** (jrw023@shsu.edu), Michelle L. Lewis, Sibyl R. Bucheli and Natalie K. Lindgren, Sam Houston State Univ., Huntsville, TX

10:30 0622 Characterization and purification of insecticidal bioactive small molecules from fruit. **Stephanie Iverson** (stephanie.iverson@wolves.northern.edu) and Jon Mitchell, Northern State Univ., Aberdeen, SD

17 - Graduate Ten-Minute Paper Competition: MUVE - Diptera

208 AB (Convention Center)

Moderators: D. Wes Watson[1] and Daniel L. Kline[2], [1]North Carolina State Univ., Raleigh, NC, [2]USDA - ARS, Gainesville, FL

8:25 Introductory Remarks

8:30 0623 Life history traits of immature *Blaesoxipha plinthopyga* (Dipera: Sarcophagidae) developing on beef, chicken, and swine liver. **Samantha Casas** (samantha.casas01@utrgv.edu)[1], Christopher Vitek[1] and Jeffery K. Tomberlin[2], [1]Univ. of Texas Rio Grande Valley, Edinburg, TX, [2]Texas A&M Univ., College Station, TX

8:42 0624 Mysteries of the maggot mass microbiome: Microbial communities of Calliphoridae larvae throughout carrion decomposition. **Courtney R. Weatherbee** (weath108@msu.edu)[1], Jennifer L. Pechal[1], Trevor I. Stamper[2] and M. Eric Benbow[1], [1]Michigan State Univ., East Lansing, MI, [2]Purdue Univ., West Lafayette, IN

8:54 0625 Expanding the nutrition ecology framework: Microbes as a mechanism regulating resource acquisition and utilization by primary and secondary consumers. **Le Zheng** (zhengle@tamu.edu)[1], Tawni L. Crippen[2], Melissa Espinoza[1], Alexandra Gordy[1] and Jeffery K. Tomberlin[1], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, College Station, TX

9:06 0626 Ecosystem resilience on carrion with delayed Diptera colonization. **Chong Chin Heo** (chongchin83@tamu.edu) and Jeffery K. Tomberlin, Texas A&M Univ., College Station, TX

9:18 0627 Blind validation of insect age estimates for *Cochliomyia macellaria* (Fabricius) (Diptera: Calliphoridae). **Ashleigh Faris** (ashmfaris@gmail.com), Whitney West, Jeffery K. Tomberlin and Aaron Tarone, Texas A&M Univ., College Station, TX

9:30 0628 Let's talk about sex: Sexual dimorphism in immature development and gene expression in *Chrysomya rufifacies* (Diptera: Calliphoridae). **Meaghan Pimsler** (mlpimsler@gmail.com)[1], Sing-Hoi Sze[1], Shuhua Fu[1], Max Scott[2], Jeffery K. Tomberlin[1] and Aaron Tarone[1], [1]Texas A&M Univ., College Station, TX, [2]North Carolina State Univ., Raleigh, NC

9:42 0629 Impact of larval digestion of different manure types by the black soldier fly, *Hermetia illucens*, (L.) (Diptera: Stratiomyidae) on volatile emissions. **Kelly Beskin** (kelly.beskin@gmail.com), Jeffery K. Tomberlin and Chelsea Holcomb, Texas A&M Univ., College Station, TX

9:54 0630 Olfactory responses of stable fly (Diptera: Muscidae) larvae to volatile organic compounds. **Aaron Gilman** (aarongilman62@gmail.com)[1], Gary Brewer[1], David Taylor[2], Jerry Zhu[2] and Kristina Friesen[2], [1]Univ. of Nebraska, Lincoln, NE, [2]USDA - ARS, Lincoln, NE

10:06 0631 Presentation withdrawn

10:18 Break

10:30 0632 Procurement and persistence of GFP-expressing *Escherichia coli* and *Salmonella typhimurium* in male and female house flies exposed to cattle manure. **Jessica Thomson** (jessiel@ksu.edu)[1], Ludek Zurek[1] and Dana Nayduch[2], [1]Kansas State Univ., Manhattan, KS, [2]USDA - ARS, Manhattan, KS

10:42 0633 Examining house fly, *Musca domestica*, dispersal preferences. **Levi Zahn** (levi.zahn@ucr.edu) and Alec Gerry, Univ. of California, Riverside, CA

10:54 0634 Effects of sugar alcohols on longevity of *Musca domestica* (Diptera: Muscidae). **Michael L. Fisher** (ento4life@gmail.com)[1,2], Steve Denning[1], Wes Watson[1] and Coby Schal[1], [1]North Carolina State Univ., Raleigh, NC, [2]US Navy, Raleigh, NC

11:06 0635 Dividing the pie: Differential dung pat size utilization by sympatric *Haematobia irritans* (Diptera: Muscidae) and *Musca autumnalis* (Diptera: Muscidae). **Fallon Fowler** (fefowler@ncsu.edu)[1] and Bradley Mullens[2], [1]North Carolina State Univ., Raleigh, NC, [2]Univ. of California, Riverside, CA

11:18 0636 Filth fly production and parasitism in heifer rearing pens bedded with straw, hardwood sawdust, and pine shavings. **Jessica Starcevich** (shawnee84@yahoo.com)[1], Roger D. Moon[1], Hugh Chester-Jones[2] and David Ziegler[2], [1]Univ. of Minnesota, St. Paul, MN, [2]Southern Research & Outreach Center, Waseca, MN

11:30 0637 Production of stable flies (Diptera: Muscidae) from two alternative winter housing systems for dairy cows. **Anna Hansen** (hans4863@umn.edu)[1], Roger D. Moon[1], Bradley Heins[2] and Marcia Endres[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Minnesota, Morris, MN

18 - Graduate Ten-Minute Paper Competition: MUVE - Control Methods and Traps

208 C (Convention Center)

Moderators: Rammohan Rao Balusu[1] and Narinderpal Singh[2], [1]Auburn Univ., Auburn, AL, [2]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

7:55 Introductory Remarks

8:00 0638 Laboratory response of the eastern subterranean termite, *Reticulitermes flavipes,* to neighboring populations of the Formosan subterranean termite, *Coptotermes formosanus,* baited with noviflumuron. **Sarah Bernard** (s_bernard@live.com) and Nan-Yao Su, Univ. of Florida, Davie, FL

8:12 0639 The dose-independent lethal time of 20-hydroxyedysone ingested by Formosan subterranean termites. **Lucas Carnohan** (carnohanl@ufl.edu)[1], Nan-Yao Su[1] and Salvador Gezan[2], [1]Univ. of Florida, Davie, FL, [2]Univ. of Florida, Gainesville, FL

8:24 0640 Antimicrobial activity of actinobacteria isolated from the guts of subterranean termites. **Rachel Ann Arango** (rarango@fs.fed.us)[1], Caitlin Carlson[2], Cameron Currie[2], Frederick Green[1] and Kenneth Raffa[2], [1]USDA - Forest Service, Madison, WI, [2]Univ. of Wisconsin, Madison, WI

8:36 0641 Influence of entomopathogenic fungi from forest and urban habitats on founding pairs of *Reticulitermes flavipes* (Rhinotermitidae). **Tamra Lincoln** (trfy9f@mail.missouri.edu) and Richard Houseman, Univ. of Missouri, Columbia, MO

8:48 0642 Transgenic entomopathogenic fungi in the semi-field. **Brian Lovett** (lovettbr@umd.edu)[1], Raymond J. St. Leger[1], Etienne Bilgo[2] and Abdoulaye Diabate[2], [1]Univ. of Maryland, College Park, MD, [2]Centre Muraz, Bobo-Dioulasso, Burkina Faso

9:00 0643 Heritable variation in the sensitivity of *Anopheles gambiae* to DEET. **James Ricci** (jricc001@ucr.edu) and Bradley White, Univ. of California, Riverside, CA

9:12 0644 Using permethrin to reduce mosquito numbers and improve health of nestling Barn Owls. **Caroline Efstathion** (cefstathion@ufl.edu)[1], Nathan D. Burkett-Cadena[2] and Bill Kern[1], [1]Univ. of Florida, Davie, FL, [2]Univ. of Florida, Vero Beach, FL

9:24 0645 Various terpenoids are capable of enhancing multiple synthetic pyrethoids against *Aedes aegypti*. **Edmund Norris** (ejnorris@iastate.edu)[1], Lyric Bartholomay[2] and Joel R. Coats[1], [1]Iowa State Univ., Ames, IA, [2]Univ. of Wisconsin, Madison, WI

9:36 0646 Quantitative analysis of vector behavior following subacute exposure to prallethrin. **Kyndall Dye** (kyndall.dye@uky.edu)[1], Grayson Brown[1], Kenneth F. Haynes[1] and Douglas W. Johnson[2], [1]Univ. of Kentucky, Lexington, KY, [2]Univ. of Kentucky, Princeton, KY

9:48 Break

10:00 0647 Expert-based best management practices for US beekeepers. **Nathalie Steinhauer** (nathalie.steinhauer@gmail.com)[1], Claude Saegerman[2], Karen Rennich[1], Michael Wilson[3] and Dennis vanEngelsdorp[1], [1]Univ. of Maryland, College Park, MD, [2]Univ. of Liège, Liege, Belgium, [3]The Univ. of Tennessee, Knoxville, TN

10:12 0648 Do *Pseudacteon* phorid flies (Diptera: Phoridae) host feed on imported fire ants (Hymenoptera: Formicidae)? **Olufemi Ajayi** (osa0001@auburn.edu) and Henry Fadamiro, Auburn Univ., Auburn, AL

10:24 0649 A leafhopper parasite in love: Flight of the cordgrass "twispar", *Elenchus koebelei* (Strepsiptera: Elenchidae). **Marisano James** (mjajames@ucdavis.edu)[1], John C. Abbott[2] and Kendra K. Abbott[3], [1]Univ. of California, Davis, CA, [2]St. Edward's Univ., Austin, TX, [3]Owner, Abbott Nature, Cedar Park, TX

10:36 0650 Develop safer insecticides against bed bugs and other common urban pests. **Chen Zha** (chen.zha1@rutgers.edu) and Changlu Wang, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

10:48 0651 Insecticide resistance reduces secondary kill in German cockroaches, *Blattella germanica*. **Alexander Ko** (ko.e.alexander@gmail.com), Coby Schal and Jules Silverman, North Carolina State Univ., Raleigh, NC

11:00 0652 Toxicity and repellency of essential oil components on the Turkestan cockroach, *Blatta lateralis* (Blattodea: Blattidae). **Sudip Gaire** (sudipg@nmsu.edu) and Alvaro Romero, New Mexico State Univ., Las Cruces, NM

11:12 0653 Physical factors influencing trap capture of the ham mite, *Tyrophagus putrescentiae* (Schrank) (Acari: Acaridae). **Barbara Amoah** (bamoah@ksu.edu)[1], M. Wes Schilling[2] and Thomas

Phillips[1], [1]Kansas State Univ., Manhattan, KS, [2]Mississippi State Univ., Starkville, MS

11:24 0654 A novel technique for deployment of sulfur dust for ectoparasite control in poultry. **Amy C. Murillo** (alock001@ucr.edu) and Bradley Mullens, Univ. of California, Riverside, CA

11:36 0655 Effect of methoprene impregnated polymer packaging on development of *Tribolium castaneum* and *Trogoderma variabile*. **Deanna Scheff** (dscheff@ksu.edu)[1], Bhadriraju Subramanyam[1], Frank Arthur[2] and Hulya Dogan[1], [1]Kansas State Univ., Manhattan, KS, [2]USDA - ARS, Manhattan, KS

11:48 0656 Timely and effective sealing of Purdue Improved Crop Storage (PICS) bags. **Kabita Kharel** (kkharel@purdue.edu), Dieudonne Baributsa, Scott Williams, Larry Murdock and Linda J. Mason, Purdue Univ., West Lafayette, IN

19 - Graduate Ten-Minute Paper Competition: MUVE - Ticks, Termites, Ants, Behavior, and Field Studies

208 D (Convention Center)

Moderators: Laurel Hansen[1] and Janet Hurley[2], [1]Spokane Falls Community College, Spokane, WA, [2]Texas A&M AgriLife Extension Service, Dallas, TX

8:25 Introductory Remarks

8:30 0657 Species composition and plague prevalence in fleas collected from small mammals in mixed grass prairies: Implications for the maintenance of enzootic plague. **Lauren Paul Maestas** (lptickman@gmail.com) and Hugh Britten, Univ. of South Dakota, Vermillion, SD

8:42 0658 A multiple year investigation of *Ixodes scapularis,* tick-borne pathogens, and plant and animal communities in maple-dominated forests. **Scott Larson** (srlarson3@wisc.edu), Susan Paskewitz, Eric Kruger and Autumn Sabo, Univ. of Wisconsin, Madison, WI

8:54 0659 Risk of exposure to ticks and tick-borne pathogens in Oklahoma State Parks. **Jessica Mitcham** (rmitcha@ostatemail.okstate.edu) and Bruce Noden, Oklahoma State Univ., Stillwater, OK

9:06 0660 Elucidating the pathogen-induced gene expression in tick salivary glands. **Khemraj Budachetri** (khem.bc@eagles.usm.edu), Deepak Kumar, Gary Crispell, Virginia Meyers and Shahid Karim, Univ. of Southern Mississippi, Hattiesburg, MS

9:18 0661 Analysis of the transcriptional pattern of the putative conjugation genes in *Rickettsia bellii* RML 369-C, an endosymbiont of *Dermacentor variabilis*. **Chan Heu** (heuxx012@umn.edu), Timothy Kurtti, Curtis Nelson and Ulrike Munderloh, Univ. of Minnesota, St. Paul, MN

9:30 0662 Evaluation of human attachment by larval *Amblyomma maculatum* (Acari: Ixodidae). **José Portugal III** (jsp281@msstate.edu) and Jerome Goddard, Mississippi State Univ., Mississippi State, MS

9:42 0663 Responses of *Amblyomma maculatum* to odorants to enhance field collection. **Krista Pike** (krista.pike@okstate.edu) and Bruce Noden, Oklahoma State Univ., Stillwater, OK

9:54 0664 "Can you beat DEET?": Efficacy of DEET-free insect repellents on adult and nymphal *Dermacentor variabilis* and *Amblyomma americanum* (Acari: Ixodidae). **Tanner Jenkins** (tanner.jenkins@okstate.edu), W. Wyatt Hoback and Bruce Noden, Oklahoma State Univ., Stillwater, OK

10:06 Break

10:18 0665 Primary elements of age polyethism in workers from the central nest of *Coptotermes formosanus* Shiraki (Isoptera: Rhinotermitidae). **He Du** (hdu@ufl.edu)[1], Thomas Chouvenc[1], Weste Osbrink[2] and Nan-Yao Su[1], [1]Univ. of Florida, Davie, FL, [2]USDA - ARS, Kerrville, TX

10:30 0666 One year census of *Reticulitermes virginicus* and *Reticulitermes malletei* incipient laboratory colonies. **Tae-Young Lee** (ojunim91@uga.edu) and Brian T. Forschler, Univ. of Georgia, Athens, GA

10:42 0667 Colony structure of *Reticulitermes* (Isoptera: Rhinotermitidae) in northwest Arkansas. **Mark Janowiecki** (majanowi@uark.edu)[1], Amber D. Tripodi[2] and Allen L. Szalanski[1], [1]Univ. of Arkansas, Fayetteville, AR, [2]USDA - ARS, Logan, UT

10:54 0668 *Enterococcus cecorum* vector competency of *Alphitobius diaperinus* (Panzer). **B. Lyons** (brandon.lyons@okstate.edu)[1], J. Talley[1], T. Royer[1], A. Wayadande[1] and J. Payne[2], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma State Univ., Muskogee, OK

11:06 0669 Short-range responses of *Triatoma rubida* (Hemiptera: Reduviidae) to heat. **Andres Indacochea** (aindacoc@nmsu.edu) and Alvaro Romero, New Mexico State Univ., Las Cruces, NM

11:18 0670 Body size and thermal ramping rate affect the thermal tolerance of two invasive ants, *Nylanderia fulva* (Mayr) and *Solenopsis invicta* (Buren) (Hymenoptera: Formicidae). **Michael Bentley** (mtbentley@ifas.ufl.edu) and Faith Oi, Univ. of Florida, Gainesville, FL

11:30 0671 A preliminary list of ants at the ports of Georgia. **Benjamin Gochnour** (bmg1110@gmail.com), Universiy of Georgia, Griffin, GA

11:42 0672 Aggression and social plasticity in odorous house ants, *Tapinoma sessile*. **Tim Luttermoser** (tlutterm@purdue.edu) and Grzesiek Buczkowski, Purdue Univ., West Lafayette, IN

11:54 0673 Trail-pheromone sensing in the Asian longhorned beetle, *Anoplophora glabripennis*: A behavioral study. **Fern Graves** (fbg106@psu.edu), Thomas C. Baker and Kelli Hoover, Pennsylvania State Univ., University Park, PA

20 - Graduate Ten-Minute Paper Competition: PBT - Physiology

209 AB (Convention Center)

Moderators: Reed Johnson[1] and Qisheng Song[2], [1]The Ohio State Univ., Wooster, OH, [2]University of Missouri, Columbia, MO

8:25 Introductory Remarks

8:30 0674 Identification and characterization of juvenile hormone affinity chromatography purified proteins. **Joliene Lindholm** (jlindholm@entomology.wisc.edu) and Walter G. Goodman, Univ. of Wisconsin, Madison, WI

8:42 0675 Identification of vitellogenin in *Bactericera cockerelli*. **Freddy Ibanez** (fibanez@neo.tamu.edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX

8:54 0676 The regulation of vitellogenin transcripts in the worker caste of the red imported fire ant, *Solenopsis invicta*. **Chloë Hawkings** (chloe.hawks@tamu.edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX

9:06 0677 Defining defensive secretions of brown marmorated stink bug, *Halyomorpha halys*. **Pallavi Mohekar** (pallavi.mohekar@oregonstate.edu), Nik G. Wiman and Elizabeth Tomasino, Oregon State Univ., Corvallis, OR

9:18 0678 Characterization of a putative laccase from the venom of *Megarhyssa* (Hymenoptera: Ichneumonidae). **Victoria G. Pook** (victoria.pook@uky.edu) and Michael J. Sharkey, Univ. of Kentucky, Lexington, KY

9:30 0679 Comprehensive and functional venomics of social wasps *Vespa crabro flavofasciate* Cameron and *Vespa analis parallela* Andre. **Kyungjae Yoon** (kongbob89@snu.ac.kr)[1], Kyungmun Kim[1], Phuong Nguyen[2], Jong Bok Seo[3], Young Han Park[4], Ki-Gyoung Kim[5], Hong-Yul Seo[5], Young Ho Koh[2] and Si Hyeock Lee[1], [1]Seoul National Univ., Seoul, South Korea, [2]Hallym Univ., Anyang, South Korea, [3]Korea Basic Science Institute, Seoul, South Korea, [4]Hallym Univ. Sacred Heart Hospital, Anyang, South Korea, [5]National Institute of Biological Resources, Incheon, South Korea

9:42 Break

9:54 0680 Host phylogeny and parasitism by *Aphelinus certus*. **Joe Kaser** (kaser008@umn.edu) and George Heimpel, Univ. of Minnesota, St. Paul, MN

10:06 0681 Multiple functions of Na/K-ATPase in dopamine-induced salivation of the Blacklegged tick, *Ixodes scapularis*. **Donghun Kim** (kp5091@ksu.edu) and Yoonseong Park, Kansas State Univ., Manhattan, KS

10:18 0682 Determination of the absolute configuration of female-produced contact sex pheromone components of the longhorned beetle, *Neoclytus acuminatus acuminatus* (F.) (Coleoptera: Cerambycidae). **Gabriel Hughes** (ghughes@purdue.edu)[1], Jan Bello[2], Jocelyn G. Millar[2] and Matthew Ginzel[1], [1]Purdue Univ., West Lafayette, IN, [2]Univ. of California, Riverside, CA

10:30 0683 Using micro-computed tomography to investigate development of respiratory structures in *Manduca sexta*. **Austin Owings** (austin.owings@ndsu.edu), Bryan Helm and Kendra Greenlee, North Dakota State Univ., Fargo, ND

10:42 0684 Dragonfly larva's respiratory jet control using tri-leaflet anal valve. **Chris Roh** (croh@caltech.edu) and Morteza Gharib, California Institute of Technology, Pasadena, CA

10:54 0685 Wing deformations during maneuvering flight of the flower chafer, *Protaetia cuprea*: An overlooked aspect in the ecology and evolution of insect flight. **Yonatan Meresman** (yonatanmeresman@gmail.com) and Gal Ribak, Tel-Aviv Univ., Tel-Aviv, Israel

21 - Graduate Ten-Minute Paper Competition: SysEB - Systematics and Taxonomy

210 AB (Convention Center)

Moderators: István Mikó[1] and David Furth[2], [1]Pennsylvania State Univ., University Park, PA, [2]Smithsonian Institution National Museum of Natural History, Washington, DC

7:55 Introductory Remarks

8:00 0686 Genetic and morphological species delimitation in a Caribbean endemic praying mantis genus, *Callimantis* Stål, 1877. **Riley Tedrow** (ret31@case.edu)[1,2] and Gavin J. Svenson[1], [1]Cleveland Museum of Natural History, Cleveland, OH, [2]Case Western Reserve Univ., Cleveland, OH

8:12 0687 Mud crickets (Orthoptera: Ripipterygidae): Phylogenetic relationships of genera and *Ripipteryx* species groups based on morphology. **Nathalie Baena-Bejarano** (ntbaena@gmail.com)[1], Carlos Sarmiento[2] and Sam Heads[1], [1]Univ. of Illinois, Champaign, IL, [2]Universidad Nacional de Colombia, Bogotá, Colombia

8:24 0688 Progress in reconstructing the higher-level phylogeny of longhorned beetles (Coleoptera: Cerambycidae) using phylogenomic data. **Stephanie Haddad** (stephanyhaddad@gmail.com)[1], Seunggwan Shin[1], Alan Lemmon[2] and Duane D. McKenna[1], [1]Univ. of Memphis, Memphis, TN, [2]Florida State Univ., Tallahassee, FL

8:36 0689 Review of the water scavenger beetle genus *Helobata* Bergroth (Coleoptera: Hydrophilidae: Acidocerinae). **Jennifer Girón** (entiminae@gmail.com) and Andrew Short, Univ. of Kansas, Lawrence, KS

8:48 0690 Phylogenetic revision of the Neotropical weevil genus *Trichodocerus* Chevrolat (Coleoptera: Curculionidae). **Salvatore S. Anzaldo** (sanzaldo@asu.edu), Arizona State Univ., Tempe, AZ

9:00 0691 Resolution of a cryptic species complex in inbred ambrosia beetles using a combination of molecular phylogenetics and careful morphological assessment. **Sedonia Steininger** (m.sedonia@ufl.edu)[1], Jiri Hulcr[2], Richard Stouthamer[3] and Robert Rabaglia[4], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Florida, Gainesville, FL, [3]Univ. of California, Riverside, CA, [4]USDA - Forest Service, Washington, DC

9:12 0692 Taxonomy and systematics of the nightshade feeding flea beetles *Epitrix* and *Acallepitrix* (Coleoptera: Chrysomelidae: Galerucinae: Alticini) in America north of Mexico. **Anthony Deczynski** (adeczyn@g.clemson.edu), Clemson Univ., Clemson, SC

9:24 0693 Evolution and phylogeny of the travertine beetles (Coleoptera: Lutrochidae). **Crystal Maier** (crystal.maier@gmail.com), Field Museum of Natural History, Chicago, IL

9:36 0694 Phylogeny of the cantharophilous rhinoceros beetle tribe Cyclocephalini (Coleoptera: Scarabaeidae: Dynastinae) based on adult morphology. **Matthew Moore** (mrmoore19@ufl.edu)[1], Ronald Cave[2] and Marc Branham[1], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Florida, Ft. Pierce, FL

9:48 0695 Phylogenetic analysis of Amphidorini Leconte: Understanding the evolution of the desert stink beetles (Coleoptera: Tenebrionidae). **M. Andrew Johnston** (ajohnston@asu.edu)[1], Kojun Kanda[2] and Aaron Smith[3], [1]Arizona State Univ., Tempe, AZ, [2]Oregon State Univ., Corvallis, OR, [3]Northern Arizona Univ., Flagstaff, AZ

10:00 Break

10:12 0696 Revision of *Dendrocerus* (Hymenoptera, Megaspilidae): Deciphering an esoteric taxon through an integrative approach. **Kyle Burks** (kyleburks@gmail.com), Pennsylvania State Univ., University Park, PA

10:24 0697 *Conostigmus* spp. (Hymenoptera: Megaspilidae) of the Holarctic. **Carolyn Trietsch** (carolyntrietsch@gmail.com), Pennsylvania State Univ., University Park, PA

10:36 0698 Systematics of the problematic genus *Epyris* (Hymenoptera: Bethylidae): Breaking up a taxonomic wastebasket. **Carly M. Tribull** (ctribull@amnh.org), American Museum of Natural History, New York, NY

10:48 0699 Assessing phylogenetic relationships between emerald moth (Geometridae: Geometrinae) tribes using next-gen sequencing. **David Plotkin** (dplotkin@ufl.edu), Univ. of Florida, Gainesville, FL

11:00 0700 A taxonomic study of the genus *Morophagoides* (Lepidoptera, Tineidae) including shiitake mushroom pest from Japan. **Yohei Osada** (borbocinnara53@hotmail.com)[1], Makoto Sakai[2], Shin-ichi Yoshimatsu[3] and Toshiya Hirowatari[1], [1]Kyushu Univ., Fukuoka, Japan, [2]Kyosei-Kagaku, Ibaraki, Japan, [3]National Institute for Agro-Environmental Sciences, Tsukuba, Japan

11:12 0701 Systematics of *Cernotina* Ross and *Cyrnellus* Banks (Trichoptera, Polycentropodidae). **Lucas Camargos** (camar069@umn.edu) and Ralph W. Holzenthal, Univ. of Minnesota, St. Paul, MN

11:24 0702 The Phylogeny of *Culicoides* (Diptera: Ceratopogonidae) (*Monoculicoides* Khalaf). **Phillip Shults** (phillip.shults@ag.tamu.edu)[1], Art Borkent[2], James Woolley[1] and Edward Vargo[1], [1]Texas A&M Univ., College Station, TX, [2]Royal British Columbia Museum, Salmon Arm, BC, Canada

11:36 0703 How do you solve a problem like *Micropeza* (Diptera: Micropezidae)? **Morgan Jackson** (morgandjackson@gmail.com)[1], Steve Marshall[1] and Jeffrey Skevington[2], [1]Univ. of Guelph, Guelph, ON, Canada, [2]Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, ON, Canada

11:48 0704 Phylogenetic resolution of North American *Rhagoletis* (Diptera: Tephritidae) species groups. **Daniel Hulbert** (hulbertd@msu.edu) and James J. Smith, Michigan State Univ., East Lansing, MI

12:00 0705 A review of the North American Criorhinina (Diptera: Syrphidae). **Kevin Moran** (kevinmoran88@comcast.net), Smithsonian Institution National Museum of Natural History, Washington, DC

12:12 0706 Molecular systematics of the world Thaumaleidae (Diptera). **Robert J. Pivar** (rpivar@vols.utk.edu)[1], John K. Moulton[1] and Bradley J. Sinclair[2], [1]Univ. of Tennessee, Knoxville, TN, [2]Canadian Food Inspection Agency, Ottawa, ON, Canada

22 - Graduate Ten-Minute Paper Competition: PBT - Bees and Pesticides

211 A (Convention Center)

Moderators: Ralf Nauen[1] and Laura C. Lavine[2], [1]Bayer CropScience, Monheim, Germany, [2]Washington State Univ., Pullman, WA

8:10 Introductory Remarks

8:15 0707 Molecular impact of arthropod repellents and toxicants on human health. **Robert Mitchell** (rdmitche@ncsu.edu), R. Michael Roe, Anirudh Dhammi and Ernest Hodgson, North Carolina State Univ., Raleigh, NC

8:27 0708 Spatiotemporal realism in the modeling of honey bee pesticide exposure. **Douglas Sponsler** (sponsler.18@osu.edu)[1], Reed Johnson[1], Chia-Hua Lin[1], Harold Watters[2], Michael Wransky[3] and Rodney Richardson[4], [1]The Ohio State Univ., Wooster, OH, [2]The Ohio State Univ., Bellefontaine, OH, [3]Univ. of Akron, Wooster, OH, [4]The Ohio State Univ., Columbus, OH

8:39 0709 The effects of in-hive miticides on honey bee, *Apis mellifera*, queen retinue response and mandibular pheromones. **Elizabeth Walsh** (walshe@tamu.edu) and Juliana Rangel, Texas A&M Univ., College Station, TX

8:51 0710 Effects of dietary imidacloprid exposure on honey bee, *Apis mellifera,* worker physiology. **Stephanie Parreira** (parreirastephanie@gmail.com) and Ramesh Sagili, Oregon State Univ., Corvallis, OR

9:03 0711 The effects of crop protection pesticides and chemicals on honey bee, *Apis mellifera*, mortality. **Adrian Fisher II** (solifuge9378@tamu.edu)[1], Juliana Rangel[1] and Clint Hoffmann[2], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, College Station, TX

9:15 0712 Herbicide-induced oxidative stress in honey bees: A comparative analysis. **Jennifer R. Williams** (jdub12@vt.edu), Richard D. Fell, Carlyle C. Brewster and Troy D. Anderson, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:27 0713 Presentation withdrawn

9:39 0714 Effects of pastures on early spring pollinator communities around canola, *Brassica napus*, production. **Shaun McCoshum** (mccoshsm@gmail.com) and Kristen Baum, Oklahoma State Univ., Stillwater, OK

9:51 0715 Effects of *Nosema bombi* and Captan on lab-reared colonies of *Bombus vosnesenskii* (Hymenoptera: Apidae). **Houston Judd** (houstonjudd@gmail.com)[1], Ricardo Ramirez[1] and James Strange[2], [1]Utah State Univ., Logan, UT, [2]USDA - ARS, Logan, UT

10:03 Break

10:15 0716 *p*-Cymene enhances toxicity and penetration of thymol in the larvae of *Trichoplusia ni*. **Jun-hyung Tak** (saturnpg7@yahoo.com) and Murray B. Isman, Univ. of British Columbia, Vancouver, BC, Canada

10:27 0717 Timing is everything: Optimizing control strategies for spotted wing drosophila, *Drosophila suzukii.* **Grace Sward** (sward023@umn.edu)[1], Christopher R. Philips[2], William Hutchison[1] and Eric Burkness[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Minnesota, Grand Rapids, MN

10:39 0718 Presentation withdrawn

10:51 0719 Environmentally relevant neonicotinoid concentrations increase mosquito larval tolerance to two widely used larvicides. **Thomas Bilbo** (bilbothomas@gmail.com)[1], Chris Salice[2], Kristina Kohl[1] and Todd Anderson[1], [1]Texas Tech Univ., Lubbock, TX, [2]Towson Univ., Towson, MD

11:03 0720 Aliphatic methyl ketones: Fumigation vs. repellency. **Jean Marcel Deguenon** (jdeguen@ncsu.edu)[1], Jiwei Zhu[1], Anirudh Dhammi[1], Robert Mitchell[1], Daniel Sonenshine[2] and R. Michael Roe[1], [1]North Carolina State Univ., Raleigh, NC, [2]Old Dominion Univ., Norfolk, VA

11:15 0721 Field-evolved resistance to imidacloprid and ethiprole in populations of brown planthopper, *Nilaparvata lugens*, collected from across South and East Asia. **William Garrood** (william.garrood@rothamsted.ac.uk)[1], Christoph Zimmer[1], Martin Williamson[2], Ralf Nauen[3], Chris Bass[1] and Emyr Davies[1], [1]Rothamsted Research, Harpenden, United Kingdom, [2]Rothamsted Research, Hertfordshire, United Kingdom, [3]Bayer CropScience, Monheim, Germany

11:27 0722 Monitoring for soybean aphid resistance to foliar insecticides in Minnesota. **Anthony Hanson** (hans4022@umn.edu)[1], James Menger-Anderson[1], Celia Silverstein[1], Ian MacRae[2] and Robert Koch[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Minnesota, Crookston, MN

11:39 0723 Selection for resistance of soybean aphid to the neonicotinoid insecticide thiamethoxam. **Matheus Ribeiro** (matheusgpmr@gmail.com)[1], Blair Siegfried[2] and Thomas Hunt[3], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL, [3]Univ. of Nebraska, Concord, NE

11:51 0724 Residues of thiamethoxam/mefenoxam in soybean plants and potential effects non-target insects. **Carolina Camargo** (carolinacamargo01@gmail.com)[1], Blair Siegfried[2], Thomas Hunt[3], Loren Giesler[1] and Gary Hein[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL, [3]Univ. of Nebraska, Concord, NE

23 - Graduate Ten-Minute Paper Competition: PBT - Gut, Bt, Microbes, and Immune Response

211 B (Convention Center)

Moderators: Margaret Allen[1] and Ana Vélez[2], [1]USDA - ARS, Stoneville, MS, [2]Univ. of Nebraska, Lincoln, NE

8:25 Introductory Remarks

8:30 0725 Feeding RNAi in the twospotted spider mite, *Tetranychus urticae*. **JuneSun Yoon** (june.yoon@uky.edu) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

8:42 0726 Caterpillar resistance to transgenic cotton: Impact of increased feeding rates. **Anirudh Dhammi** (adhammi@ncsu.edu)[1], R. Michael Roe[1], Dominic Reisig[2] and Ryan E. Kurtz[3], [1]North Carolina State Univ., Raleigh, NC, [2]North Carolina State Univ., Plymouth, NC, [3]Cotton Incorporated, Cary, NC

8:54 0727 Pathogen-specific immune responses from symbionts in a subterranean termite, *Reticulitermes flavipes* (Kollar). **Brittany Peterson** (peter137@purdue.edu) and Michael Scharf, Purdue Univ., West Lafayette, IN

9:06 0728 The *Reticulitermes flavipes* (Kollar) peritrophic matrix: A promising target for termite pest management. **Andres Sandoval-Mojica** (sandova0@purdue.edu) and Michael E. Scharf, Purdue Univ., West Lafayette, IN

9:30 0729 A recombinant bacterium expressing double-stranded RNA specific to integrin β1 subunit enhances Bt toxicity against a polyphagous insect pest, *Spodoptera exigua*. **Eunseong Kim** (tjd9908@naver.com), Yonggyun Kim and Youngjin Park, Andong National Univ., Andong, South Korea

9:42 0730 Resistance to Cry3Bb1 in the western corn rootworm, *Diabrotica virgifera virgifera*: RNA-seq and differential expression. **Leslie Rault** (leslie.rault@huskers.unl.edu)[1], Haichuan Wang[1], Aaron Gassmann[2], Blair Siegfried[3] and Nicholas Miller[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Iowa State Univ., Ames, IA, [3]Univ. of Florida, Gainesville, FL

9:54 Break

10:06 0731 Varying prey nutrient quality affects growth rate and stoichoimetry of riparian spider, *Tetragnatha nitens*. **Steven Merkley** (steven.merkley@ucr.edu), Univ. of California, Riverside, CA

10:18 0732 Feeding and mating initiate juvenile hormone regulation of reproduction in bed bugs. **Hemant Gujar** (hemantgujar@yahoo.com) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

10:30 0733 Environment dominates host factors in shaping mosquito gut microbiota. **Kerri L. Coon** (kerri@uga.edu), Mark R. Brown and Michael R. Strand, Univ. of Georgia, Athens, GA

10:42 0734 *Anopheles* midgut FREP1 mediates *Plasmodium* invasion. **Genwei Zhang** (genweizhang@ou.edu)[1], Guodong Niu[1], Caio Franca[1], Yuemei Dong[2], Xiaohong Wang[1], Noah Butler[3], George Dimopoulos[2] and Jun Li[1], [1]Univ. of Oklahoma, Norman, OK, [2]Johns Hopkins Univ., Baltimore, MD, [3]Univ. of Oklahoma, Oklahoma City, OK

10:54 0735 Mechanisms of transcytosis across the *Spodoptera frugiperda* midgut. **Mariah Kemmerer** (mjkem@iastate.edu) and Bryony Bonning, Iowa State Univ., Ames, IA

11:06 0736 Functional bioassays suggest phage-infected *Hamiltonella defensa* confer resistance to parasitism in the pea aphid by directly killing wasp embryos. **Jayce W. Brandt** (jayce@uga.edu), Kerry M. Oliver and Michael R. Strand, Univ. of Georgia, Athens, GA

11:18 0737 Immune response of the Asian citrus psyllid, *Diaphorina citri*, in response to microbial challenge. **Alex Arp** (aarp@ufl.edu) and Kirsten S. Pelz-Stelinski, Univ. of Florida, Lake Alfred, FL

11:30 0738 Xenobiotic transcription factors initiate the cytochrome P450-mediated insecticide resistance in *Tribolium castaneum*. **Megha Kalsi** (meghakalsi@uky.edu) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

11:42 0739 Developmental effects on immunity: Hormonal and proteinase control in *Manduca sexta*, the tobacco hornworm. Kendra Greenlee and **Kimberly Booth** (kimberly.booth@ndsu.edu), North Dakota State Univ., Fargo, ND

24 - Graduate Ten-Minute Paper Competition: SysEB - Behavior, Coevolution, and Symbiotic Associations

211 C (Convention Center)

Moderators: Jennifer Zaspel[1] and John Wenzel[2], [1]Purdue Univ., West Lafayette, IN, [2]Carnegie Museum of Natural History, Rector, PA

7:55 Introductory Remarks

8:00 0740 The behavioral response by the red imported fire ant *Solenopsis invicta* to recognition chemicals on inanimate objects. **Jason R. Carbaugh** (jcarbaugh@tamu.edu)[1], Robert Renthal[2] and S. Bradleigh Vinson[1], [1]Texas A&M Univ., College Station, TX, [2]Univ. of Texas, San Antonio, TX

8:12 0741 A review of the myrmecophilous South American carabid genus *Homopterus*, with insights into species' ranges and host ant preferences. **Angela Hoover** (ahoover15@email.arizona.edu) and Wendy Moore, Univ. of Arizona, Tucson, AZ

8:24 0742 Malagasy ant, *Pheidole longispinosa* (Forel, 1891), behavior as regionally dominant ant predator in rainforest environment (Hymenoptera: Formicidae). **Timothy Lampasona** (tpl53@cornell.edu), Univ. of Nebraska, Lincoln, NE

8:36 0743 Molecular characterization of the microbiota associated with two genera of ants, *Polyrhachis* spp. and *Camponotus* spp., (Hymenoptera, Formicidae) through next generation sequencing. **Manuela Ramalho** (manutsmk@hotmail.com)[1,2], Odair Bueno[2] and Corrie Moreau[1], [1]Field Museum of Natural History, Chicago, IL, [2]Univ. Estadual Paulista, Rio Claro, Brazil

8:48 0744 Group navigation in the face of obstacles during cooperative transport. **Helen McCreery** (helen.mccreery@colorado.edu)[1] and Radhika Nagpal[2], [1]Univ. of Colorado, Boulder, CO, [2]Harvard Univ., Cambridge, MA

9:00 0745 Reproductive investment strategies in genetically invariant ants, *Vollenhovia emeryi*. **Doug Booher** (dbooher@ucla.edu), Univ. of California, Los Angeles, CA

9:12 0746 Presentation withdrawn

9:24 0747 Nutritional roles of gut symbionts in an herbivorous ant, *Cephalotes varians*. **Yi Hu** (yh332@drexel.edu)[1], Piotr Lukasik[1,2], Jon G. Sanders[3] and Jacob Russell[1], [1]Drexel Univ., Philadelphia, PA, [2]Universitiy of Montana, Missoula, MT, [3]Harvard Univ., Cambridge, MA

9:36 0748 Who makes dinner? Role reversal of co-obligate symbionts in Adelgidae (Sternorrhyncha: Aphidoidea). **Kathryn Weglarz** (kathryn.weglarz@usu.edu)[1], Robert Foottit[2], Nathan Havill[3], John McCutcheon[4] and Carol D. von Dohlen[1], [1]Utah State Univ., Logan, UT, [2]Agriculture and Agri-Food Canada, Ottawa, ON, Canada, [3]USDA - Forest Service, Hamden, CT, [4]Univ. of Montana, Missoula, MT

9:48 0749 HPLC-MS of lichen-derived metabolites in the life stages of *Crambidia cephalica* (Grote and Robinson) (Lepidoptera: Erebidae: Arctiinae: Lithosiini). **Timothy Anderson** (ander472@purdue.edu)[1], David L. Wagner[2], Bruce Cooper[1], Megan McCarty[1] and Jennifer Zaspel[1], [1]Purdue Univ., West Lafayette, IN, [2]Univ. of Connecticut, Storrs, CT

10:00 Break

10:12 0750 Genomics and adaptation in *Wolbachia*, an obligate reproductive parasite in *Trichogramma* wasps. **Amelia Lindsey** (alind005@ucr.edu) and Richard Stouthamer, Univ. of California, Riverside, CA

10:24 0751 Genome of *Rickettsia* endosymbiont suggests candidate mechanisms for fitness benefit to invasive whitefly host. **Bodil Cass** (bcass@email.arizona.edu)[1], James Van Leuven[2] and Martha Hunter[1], [1]Univ. of Arizona, Tucson, AZ, [2]Univ. of Montana, Missoula, MT

10:36 0752 Parasite networks may be key to host manipulation. **Maridel Fredericksen** (maridel.fredericksen@gmail.com)[1], Yizhe Zhang[2], Missy Hazen[1], Danny Chen[2] and David Hughes[1], [1]Pennsylvania State, University Park, PA, [2]Univ. of Notre Dame, Notre Dame, IN

10:48 0753 Describing parentage and relatedness patterns in the horned passalus, *Odontotaenius disjunctus*, through genotyping-by-sequencing. **Jacqueline Dillard** (jdillard2112@gmail.com), Univ. of Kentucky, Lexington, KY

11:00 0754 Comparative genomics of *Cardinium*: Ascertaining genes underlying symbiont-induced reproductive manipulations. **Corinne Stouthamer** (cmstouthamer@gmail.com)[1], Stephan Schmitz-Esser[2], Evelyne Mann[2] and Martha Hunter[1], [1]Univ. of Arizona, Tucson, AZ, [2]Univ. of Veterinary Medicine, Vienna, Austria

11:12 0755 Investigating the divergence times and patterns of Cirrospilini (Hymenoptera: Eulophidae), a group of niche specific parasitoids. **Ryan Perry** (rperr003@ucr.edu), Univ. of California, Riverside, CA

11:24 0756 Host associations and biogeography in the millipede-parasitic genus *Myriophora* (Diptera: Phoridae). **John Hash** (jhash001@ucr.edu)[1], John M. Heraty[1] and Brian V. Brown[2], [1]Univ. of California, Riverside, CA, [2]Natural History Museum, Los Angeles, CA

11:36 0757 Natural enemies and host breadth: A tritrophic analysis of diversification rates in Tortricidae (Lepidoptera). **Mayrolin Garcia** (mzg0043@auburn.edu) and Nate Hardy, Auburn Univ., Auburn, AL

11:48 0758 Colony size of pine sawflies, genus *Neodiprion*, is driven by female oviposition behavior rather than larval aggregative tendency. **John Terbot, II** (jwterb2@uky.edu) and Catherine Linnen, Univ. of Kentucky, Lexington, KY

12:00 0759 History, geography, and host use shape genome-wide patterns of genetic variation in the redheaded pine sawfly, *Neodiprion lecontei*. **Robin Bagley** (robinkbagley@uky.edu)[1], Vitor Sousa[2,3], Matthew Niemiller[4] and Catherine Linnen[1], [1]Univ. of Kentucky, Lexington, KY, [2]Univ. of Bern, Bern, Switzerland, [3]Swiss Institute of Bioinformatics, Lausanne, Switzerland, [4]Univ. of Illinois, Champaign, IL

25 - Graduate Ten-Minute Paper Competition: SysEB - Citizen Science, New Methods, and Physiology

211 D (Convention Center)

Moderators: Katrina Menard[1] and Nathan Lord[2], [1]Sam Noble Oklahoma Museum of Natural History, Norman, OK, [2]Brigham Young Univ., Provo, UT

8:25 Introductory Remarks

8:30 0760 Mid-Atlantic woodland bee diversity: A citizen science survey. **Grace Savoy-Burke** (gsburke@udel.edu)[1], Sam Droege[2] and Deborah A. Delaney[1], [1]Univ. of Delaware, Newark, DE, [2]USGS, Beltsville, MD

8:42 0761 Using an inquiry-based, constructivist learning approach for an introductory Entomology class. **Alyssa McDonough** (mcdonougal@mnstate.edu)[1], James Kopco[2] and Deirdre Prischmann-Voldseth[2], [1]Minnesota State Univ., Moorhead, MN, [2]North Dakota State Univ., Fargo, ND

8:54 0762 Using citizen science data to estimate immature survival of monarchs, *Danaus plexippus*, and inform conservation. **Kelly Nail** (nail@umn.edu), Carl Stenoien and Karen Oberhauser, Univ. of Minnesota, St. Paul, MN

9:06 0763 Berlese vs. Winkler: Sift once, extract twice. **Brittany Owens** (brittanyeowens@gmail.com) and Christopher E. Carlton, Louisiana State Univ., Baton Rouge, LA

9:18 0764 Evaluating trapping methods for estimating populations of American burying beetle, *Nicrophorus americanus*. **Kyle Risser** (kyle.risser@okstate.edu), Oklahoma State Univ., Stillwater, OK

9:30 0765 Characterizing the function of *Methoprene tolerant* and its downstream genes in termites. **Li Tian** (litian617@uky.edu) and Xuguo Zhou, Univ. of Kentucky, Lexington, KY

9:42 0766 Bacteria participate in mosquito defense against oxidative stress. **Jinjin Jiang** (jinjiang@nmsu.edu), New Mexico State Univ., Las Cruces, NM

9:54 0767 Interpopulation variation in male investment and copulatory behavior in a bruchid beetle, *Callosobruchus maculatus*. **William Licht** (william.licht@uky.edu), Univ. of Kentucky, Lexington, KY

10:06 Break

10:18 0768 Phylogenetic basis for understanding genome size evolution in *Drosophila*. **Carl Hjelmen** (cehjelmen09@tamu.edu) and J. Spencer Johnston, Texas A&M Univ., College Station, TX

10:30 0769 Effects of pre-winter conditions on diapause phenologies and mortality rates of host-associated populations of *Rhagoletis pomonella* (Diptera: Tephritidae) in western Washington. **Monte Mattsson** (mattsson@pdx.edu) and Luis Ruedas, Portland State Univ., Portland, OR

10:42 0770 Potential roles of evolutionary history and parental effects in butterfly responses to heavy metals. **Megan Kobiela** (kobie003@umn.edu) and Emilie C. Snell-Rood, Univ. of Minnesota, St. Paul, MN

10:54 0771 Information use exhibits tradeoffs with fecundity in the butterfly *Pieris rapae*. **Sarah Jaumann** (jauma002@umn.edu) and Emilie C. Snell-Rood, Univ. of Minnesota, St. Paul, MN

11:06 0772 If bigger is better why bother with the rest: Worker size variation in bumble bees in response to poor resource conditions. **Michael Rivera** (mdriver3@illinois.edu)[1] and Anna Dornhaus[2], [1]Univ. of Illinois, Champaign, IL, [2]Univ. of Arizona, Tucson, AZ

11:18 0773 First detection of European honey bee, *Apis mellifera*, viruses on wax comb. **Megan Colwell** (colwellm@myumanitoba.ca)[1], Rob Currie[1] and Stephen Pernal[2], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

11:30 0774 Transgenerational immunity and the fitness costs of infection during colony foundation of *Zootermopsis angusticollis*. **Erin Cole** (cole.eri@husky.neu.edu), Northeastern Univ., Boston, MA

11:42 0775 Presentation withdrawn

11:54 0776 Structural variation at the TEP anti-pathogen locus in African malaria mosquitoes. **Eric Smith** (esmit013@ucr.edu) and Bradley White, Univ. of California, Riverside, CA

26 - Graduate Ten-Minute Paper Competition: SysEB - Dispersal, Colonization, and Biogeography

212 AB (Convention Center)

Moderators: John Moeller Leavengood[1] and Ainsley Seago[2], [1]Univ. of Kentucky, Lexington, KY, [2]New South Wales Dept. of Primary Industries, Orange, Australia

8:10 Introductory Remarks

8:15 0777 Emergent wetland pollinators: An unknown story. **Phillip Stephenson** (phillipstephenson@ymail.com), Univ. of Arkansas, Fayetteville, AR

8:27 0778 The evolution and biogeography of top Neotropical predators, *Eciton* spp. **Max E. Winston** (mewinsto@gmail.com)[1], Daniel Kronauer[2] and Corrie Moreau[3], [1]Univ. of Chicago, Chicago, IL, [2]Harvard Univ., Cambridge, MA, [3]Field Museum of Natural History, Chicago, IL

8:39 0779 Social cues mediate thermoregulatory fanning behavior in honey bees, *Apis mellifera* L. **Chelsea N. Cook** (chelsea.cook@colorado.edu), Univ. of Colorado, Boulder, CO

8:51 0780 Measuring the effects of reduced snow cover on alpine arthropods: An Australian perspective. **Rachel Slatyer** (rslatyer@student.unimelb.edu.au)[1], Michael Nash[2] and Ary Hoffmann[1], [1]Univ. of Melbourne, Parkville, Australia, [2]South Australia Research and Development Institute, Urrbrae, Australia

9:03 0781 Social thermal physiology: How superorganismal homeostasis confronts elevational thermal clines (Formicidae: Ecitoninae: *Eciton burchellii parvispinum*). **Kaitlin Baudier** (kmb478@drexel.edu) and Sean O'Donnell, Drexel Univ., Philadelphia, PA

9:15 0782 Preliminary phylogeography of *Synuchus dubius* (Coleoptera: Carabidae) in Arizona's Madrean sky island archipelago. **Alan Yanahan** (yanahan@email.arizona.edu) and Wendy Moore, Univ. of Arizona, Tucson, AZ

9:27 0783 Turning over a new leaf: The temporal variation of Carabidae (Coleoptera) and Gnaphosidae (Araneae) in leaf litter. **Fredericka Hamilton** (fbhamilt@uark.edu) and Ashley Dowling, Univ. of Arkansas, Fayetteville, AR

9:39 0784 Forest disturbance increased ground beetle species diversity. **Kayla I. Perry** (perry.1864@osu.edu)[1], Kimberly Wallin[2,3], John Wenzel[4] and Daniel A. Herms[1], [1]The Ohio State Univ., Wooster, OH, [2]Univ. of Vermont, Burlington, VT [3]USDA - Forest Service, Burlington, VT, [4]Carnegie Museum of Natural History, Rector, PA

9:51 0785 Phylogenetics and biogeography of the tribe Proculini (Coleoptera: Passalidae): The South American radiation of the genus *Veturius*. **Cristian Beza-Beza** (cfbeza@memphis.edu) and Duane D. McKenna, Univ. of Memphis, Memphis, TN

10:03 0786 Biogeography of *Cymatodera* (Cleridae: Tillinae), for richer in North America and for poorer in South America. **Alan Burke** (burkea@ksu.edu) and Gregory Zolnerowich, Kansas State Univ., Manhattan, KS

10:15 Break

10:27 0787 Niche ecology across time in an adaptive radiation of Hawaiian spiders. **Susan Kennedy** (fourjaws@berkeley.edu)[1], Joanne Clavel[2] and Rosemary Gillespie[1], [1]Univ. of California, Berkeley, CA, [2]Univ. of Paris 6, Paris, France

10:39 0788 Biogeographical patterns in the hard-tick genus *Amblyomma* Koch (Acari: Ixodidae). **Matthew Seabolt** (ms09348@georgiasouthern.edu)[1], Lorenza Beati[1], Lance Durden[1] and Hans Klompen[2], [1]Georgia Southern Univ., Statesboro, GA, [2]The Ohio State Univ., Columbus, OH

10:51 0789 Flying to the beat of a different drum: Discordant patterns of butterfly dispersal across the Indo-Australian archipelago. **Andrew Brownjohn** (abrownjohn@gradcenter.cuny.edu) and David J. Lohman, City College of New York, New York, NY

11:03 0790 Environmental temperature gradients contribute to range limits for high-elevation butterflies. **Dale Halbritter** (dhalb001@ufl.edu) and Jaret C. Daniels, Univ. of Florida, Gainesville, FL

11:15 0791 The Buckeye butterflies, genus *Junonia*, from Florida, USA, can be used as a model for studying colonization, establishment, and introgression of invasive insect species. **Melanie Lalonde** (umlalonm@myumanitoba.ca) and Jeffrey Marcus, Univ. of Manitoba, Winnipeg, MB, Canada

11:27 0792 Longitudinal study of community composition of caddisflies (Trichoptera) in a first order stream: Wildcat Creek, Clemson University experimental forest. **Jessica Wimmer** (jessica.wimmer88@gmail.com) and John Morse, Clemson Univ., Clemson, SC

11:39 0793 Exploring understudied fauna using systematics and presence-absence data: What can we learn from North American *Monatractides* (Hydrachnidiae, Torrenticolidae)? **Whitney Nelson** (wanelson@uark.edu)[1], Ray Fisher[1], Joseph O'Neill[1], Danielle Fisher[1], Andrea Radwell[1], Ian Smith[2] and Ashley P. G. Dowling[1], [1]Univ. of Arkansas, Fayetteville, AR, [2]Agriculture and Agri-Food Canada, Ottawa, ON, Canada

11:51 0794 Aquatic macroinvertebrate and microbial community responses to salmon carrion introduction into a headwater stream. **Courtney Larson** (larso126@msu.edu)[1], Courtney R. Weatherbee[1], Jennifer L. Pechal[1], Brandon Gerig[2], Gary Lamberti[2] and M. Eric Benbow[1], [1]Michigan State Univ., East Lansing, MI, [2]Univ. of Notre Dame, Notre Dame, IN

12:03 0795 On the origin of New World Pyrgomorphidae. **Ricardo Marino-Perez** (pselliopus@yahoo.com.mx) and Hojun Song, Texas A&M Univ., College Station, TX

12:15 0796 Phylogenetic systematics and biogeography of two Caribbean centrotine treehopper tribes (Hemiptera: Membracidae) based on nuclear gene sequence and morphological character data. **Brendan Morris** (brenolmorris@gmail.com) and Christopher H. Dietrich, Univ. of Illinois, Champaign, IL

27 - Graduate Ten-Minute Paper Competition: SysEB - Speciation and Evolutionary Morphology

213 AB (Convention Center)

Moderators: Barbara Sharanowski[1] and Richard Brown[2], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Mississippi Entomological Museum, Mississippi State, MS

8:10 Introductory Remarks

8:15 0797 Sequential speciation and the multiplicative origin of community diversity. **Glen Hood** (ghood@nd.edu)[1], Andrew Forbes[2], Thomas Powell[3], Scott Egan[4], Gabriela Hammerlinck[2], James J. Smith[5], Jeffrey Feder[1] and Meredith Doellman[1], [1]Univ. of Notre Dame, Notre Dame, IN, [2]Univ. of Iowa, Iowa City, IA, [3]Univ. of Florida, Gainesville, FL, [4]Rice Univ., Houston, TX, [5]Michigan State Univ., East Lansing, MI

8:27 0798 Characterizing the genomic architecture of divergence along the speciation continuum in the *Rhagoletis pomonella* species complex. **Meredith Doellman** (mdoellma@nd.edu)[1], Scott Egan[2], Glen Hood[1], Thomas Powell[3], Gregory Ragland[4], James J. Smith[5] and Jeffrey Feder[1], [1]Univ. of Notre Dame, Notre Dame, IN, [2]Rice Univ., Houston, TX, [3]Univ. of Florida, Gainesville, FL, [4]Kansas State Univ., Manhattan, KS, [5]Michigan State Univ., East Lansing, MI

8:39 0799 Ecological speciation within the *Peristenus pallipes* (Hymenoptera: Braconidae) complex. **Miles Zhang** (yuanmeng.zhang@gmail.com) and Barbara Sharanowski, Univ. of Manitoba, Winnipeg, MB, Canada

8:51 0800 Speciation patterns of beetles in the highlands of Ecuador. **Sofia Muñoz-Tobar** (smunoz@clemson.edu), Clemson Univ., Clemson, SC

9:03 0801 Unraveling the evolution of the spider flies (Diptera, Acroceridae): Insights from morphology, DNA and fossils. **Jessica Gillung** (jpgillung@ucdavis.edu)[1] and Shaun Winterton[2], [1]Univ. of California, Davis, CA, [2]California Dept. of Food & Agriculture, Sacramento, CA

9:15 0802 Venation predicts the location, but not the color, of forewing pattern elements in jaw moths (Lepidoptera: Micropterigidae). **Sandra Schachat** (schachatsr@si.edu) and Richard Brown, Mississippi Entomological Museum, Mississippi State, MS

9:27 0803 Cross-species amplification and intra and interpopulational polymorphism of microsatellite loci in *Helicoverpa armigera* and *H. zea* (Lepidoptera: Noctuidae) in Brazilian cropping systems. **Natália Leite** (alvesnat@gmail.com)[1], Alberto Correa[1], Alessandro Alves-Pereira[1], Jaqueline Campos[1], Maria Zucchi[2] and Celso Omoto[1], [1]Univ. of São Paulo, Piracicaba, Brazil, [2]Agribusiness Technological Development of São Paulo, Piracicaba, Brazil

9:39 0804 Larval host phylodiversity of *Acronicta* (Lepidoptera: Noctuidae: Acronictinae). **Brigette Zacharczenko** (brigette.zacharczenko@uconn.edu)[1], David L. Wagner[1] and Jadranka Rota[2], [1]Univ. of Connecticut, Storrs, CT, [2]Univ. of Turku, Turku, Finland

9:51 Break

10:03 0805 Morphotypic characterisation of *Sitophilus zeamais* (Coleoptera Curculionidae) in southwest Nigeria. **Felicia Iyiola** (iyiolafelicia@gmail.com)[1], Adebayo Omoloye[1] and James Ojo[2], [1]Univ. of Ibadan, Ibadan, Nigeria, [2]Kwara State Univ., Ilorin, Nigeria

10:15 0806 Mechanical behavior of the rostrum of *Curculio* Linnaeus, 1758 (Coleoptera: Curculionidae). **Michael Andrew Jansen** (entojansen@gmail.com), Arizona State Univ., Tempe, AZ

10:27 0807 Preliminary investigation of the fossorial fore legs of Gryllotalpidae (Orthoptera) diversity driven by soil variation. **Kylee Kleiner** (knk007@shsu.edu), Sam Houston State Univ., Huntsville, TX

10:39 0808 Survey of morphological structures on male scape of *Aphelinus*. **Xanthe Shirley** (xanthe23@tamu.edu) and James Woolley, Texas A&M Univ., College Station, TX

10:51 0809 Systematics of the millipede assassin bugs (Heteroptera: Reduviidae: Ectrichodiinae): Flaunting aposematism and extreme sexual dimorphism. **Michael Forthman** (mfort001@ucr.edu) and Christiane Weirauch, Univ. of California, Riverside, CA

11:03 0810 Cryptic species of brown soft scales, *Coccus hesperidum* (Hemiptera: Coccidae), revealed by molecular analysis. **Jinyeong Choi** (cjy0784@snu.ac.kr) and Seunghwan Lee, Research Institute for Agricultural and Life Sciences, Seoul, South Korea

11:27 0811 Understanding the mimicry complexes of bumble bees, *Bombus* sp., in North America. **Briana Ezray** (bde125@psu.edu) and Heather M. Hines, Pennsylvania State Univ., University Park, PA

11:39 0812 Evolution of convergent adaptations in cryptine ichneumonid wasps: A morphospace approach. **Bernardo Santos** (bsantos@amnh.org), American Museum of Natural History, New York, NY

11:51 0813 Testing for morphometric differentiation between pecan- and water hickory-associated populations of the yellow pecan aphid, *Monelliopsis pecanis* (Hemiptera: Aphididae). **Kyle Harrison** (kharrison@tamu.edu), Raul Medina and Thomas J. DeWitt, Texas A&M Univ., College Station, TX

Joint Symposium: Getting More from Data: Science for Sustainable Solutions

Auditorium Main (Convention Center)

Moderator and Organizer: Paul Fixen, International Plant Nutrition Institute, Brookings, SD

9:30 0814 Opening comments and session objectives. **Sylvie M. Brouder** (sbrouder@purdue.edu), Purdue Univ., West Lafayette, IN

9:40 0815 Data lessons from medicine. **Kay Dickersin** (kdickers@jhsph.edu), US Cochrane Center, Baltimore, MD

10:20 0816 Open science for sustainable solutions. **Bill Michener**, Univ. of New Mexico, Albuquerque, NM

10:50 0817 Data stewardship and harmonization for sustainable solutions. **Cynthia Rosenzweig** (cynthia.rosenzweig@nasa.gov), NASA Goddard Institute for Space Studies, New York, NY

11:20 0818 Panel discussion and Q&A with audience. **Jeffrey J. Volenec** (jvolenec@purdue.edu), Purdue Univ., West Lafayette, IN

11:50 0819 The way forward for the week and beyond. **Paul Fixen** (pfixen@ipni.net), International Plant Nutrition Institute, Brookings, SD

12:00 Adjorn

Joint Symposium: Managing Research Centers for Wildlife and Beneficial Insects

M100 E (Convention Center)

Moderators and Organizers: Thomas Abbott, USDA - ARS, Canal Point, FL

10:15 Introductory Remarks

10:20 0820 A novel integrated cropping system for efficient grain production, improved soil quality and enhanced beneficial arthropod communities. **Robert J. Kremer** (kremerr@missouri.edu)[1], Timothy Reinbott[1], Kristen Sloan Veum[2] and Charles Deichman[3], [1]Univ. of Missouri, Columbia, MO, [2]USDA - ARS, Columbia, MO, [3]Deichman Consulting, Columbia, MO

10:35 0821 The effect of *Senna mexicana chapmanii* density on herbivore biocontrol by parasitoids. **Andrea Salas** (asala035@fiu.edu), Suzanne Koptur and Krishnaswamy Jayachandran, Florida International Univ., Miami, FL

10:50 0822 A virtual field day: The new normal for the 21st Century? **Timothy Reinbott** (reinbottt@missouri.edu) and Kayla Wolf, Univ. of Missouri, Columbia, MO

11:05 0823 Western burrowing owl artificial habitat support at the University of Arizona Maricopa Agricultural Center. **Rick Ward** (rickw@email.arizona.edu)[1], Greg Clark[2] and Michael Wierda[1], [1]Univ. of Arizona, Maricopa, AZ, [2]Wild at Heart, Cave Creek, AZ

11:20 Concluding Remarks

11:30 Adjorn

Calling All New ESA Members!

Join us for our Meet & Greet!

If you are new to ESA this year, please stop by our New Members Meet & Greet Reception.

Mingle with other new members, ESA leaders and staff, and learn about ESA benefits and the Entomology 2015 Annual Meeting. The New Member Meet & Greet takes place on Sunday, November 15 from 2–3:00 PM in the Seasons Room of the Minneapolis Convention Center. Refreshments will be served. You should have received a special invitation to the reception in the mail — bring it and exchange it for a special ESA welcome gift!

MONDAY, NOVEMBER 16, 2015, AFTERNOON

Lunch and Learn: Managing Job Transitions as an Early Professional

209 AB (Convention Center)

Moderators and Organizers: Theresa Cira[1], Ana Velez[2], Mitchell Stamm[2], Robert L. Koch[3], Zach Rystrom[2], Tamra Lincoln[4] and Andrine Shufran[5], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Nebraska, Lincoln, NE, [3]Minnesota Dept. of Agriculture, St. Paul, MN, [4]USDA – ARS, Columbia, MO, [5]Oklahoma State Univ., Stillwater, OK

12:15 PM - 1:15 PM

Student Three-Minute Presentation Competition A

208 C (Convention Center)

Moderators and Organizers: Lee Cohnstaedt[1] and Jana C. Lee[2], [1]USDA - ARS, Manhattan, KS, [2]USDA - ARS, Corvallis, OR

12:30 Introductory Remarks

12:35 0824 Lycopene counters certain negative consequences of paraquat induced oxidative stress. **Cody Champion** (cchampio@nmsu.edu) and Jiannong Xu, New Mexico State Univ., Las Cruces, NM

12:39 0825 Predatory mutualisms: The association between *Melissotarsus* ants and armored scale insects. **Scott Schneider** (scotts@psis.umass.edu) and Benjamin B. Normark, Univ. of Massachusetts, Amherst, MA

12:43 0826 Cotton IPM in the changing Great Plains environment: Interaction of drought stress and early season arthropod pests. **Joe Krauska** (jjkfy6@ksu.edu)[1], Sarah Zukoff[2] and James Nechols[1], [1]Kansas State Univ., Manhattan, KS, [2]Kansas State Univ., Garden City, KS

12:47 0827 Analysis of DNA from *Wolbachia* infected *Folsomia candida* (Collembola: Isotomidae): Evidence for a nucleolytic activity. **Yang Li** (lixx2038@umn.edu) and Ann M. Fallon, Univ. of Minnesota, St. Paul, MN

12:51 0828 Sampling of adult wheat stem sawfly, *Cephus cinctus* Norton, to predict larval infestation. **Christopher McCullough** (ctmccull@cord.edu)[1], Jeffrey Bradshaw[2] and Gary Hein[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, Scottsbluff, NE

12:55 0829 Development of trapping methods to control stinging wasps (Hymenoptera: Vespidae). **Jenny Finitzer** (jennifer.finitzer@email.wsu.edu), Washington State Univ., Pullman, WA

12:59 0830 Assessing the role of onion thrips, *Thrips tabaci*, in bacterial leaf blight of onion. **Ari Grode** (grodeari@msu.edu), Prissana Wiriyajitsomboon, Mary Hausbeck and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

1:03 0831 Evaluation of biouptake of total mercury and methylmercury in terrestrial invertebrates. **Chelsea Standish** (bxn875@vols.utk.edu)[1], Jerome F. Grant[1], Kevin Moulton[1], Teresa Mathews[2] and John Smith[2], [1]Univ. of Tennessee, Knoxville, TN, [2]Oak Ridge National Laboratory, Oak Ridge, TN

1:07 0832 Presentation withdrawn

1:11 0833 Mechanisms of carbohydrate-fueled ecological dominance in a tropical rainforest canopy-foraging ant. **Erica Parra** (erica.parra2@gmail.com) and Terrence P. McGlynn, California State Univ. Dominguez Hills, Carson, CA

1:15 Break

1:20 0834 Comparative efficiency of CO_2 baited drag sampling versus existing collection methods for *Amblyomma americanum* (Acari: Ixodidae). **Tanya Josek** (tanyajosek@gmail.com), Brian F. Allan and Marianne Alleyne, Univ. of Illinois, Champaign, IL

1:24 0835 Comparing the rate of parasitism in the striped cucumber beetle, *Acalymma vittatum*, in organic versus conventional cucurbits in Kentucky. **Amanda Skidmore** (amanda.skidmore@gmail.com), Univ. of Kentucky, Lexington, KY

1:28 0836 Is pan trapping an effective method for estimating hymenopteran diversity in grasslands? **Morgan P. Rondinelli** (morganrondinelli@gmail.com)[1,2], Sam Droege[3], Abigail A.R. Kula[4], David R. Smith[5] and Robert R. Kula[5], [1]Univ. of Michigan, Ann Arbor, MI, [2]Smithsonian Institution National Museum of Natural History, Washington, DC, [3]USGS, Beltsville, MD, [4]Mount St. Mary's Univ., Emmitsburg, MD, [5]USDA - ARS, Washington, DC

1:32 0837 Bumble bees do it better: The importance of wild bees for the pollination of Haskap crops. **S. Frier** (s.d.frier@gmail.com)[1], Christopher Somers[2] and Cory Sheffield[1], [1]Royal Saskatchewan Museum, Regina, SK, Canada, [2]Univ. of Regina, Regina, SK, Canada

1:36 0838 Sub-lethal effects of v-ATPase-A and Snf7 dsRNAs on adult emergence, head capsule width, and dry weight in southern corn rootworm. **Adriano Pereira** (aelias374@yahoo.com.br)[1] and Blair Siegfried[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL

1:40 0839 Herbicide induced effects on oviposition of the rice water weevil, *Lissorhoptrus oryzophilus*. **Emily Kraus** (EKraus@agcenter.lsu.edu) and Michael Stout, Louisiana State Univ., Baton Rouge, LA

1:44 0840 Elucidating the molecular action of tick saliva in the induction of a-galactose in red meat allergy. **Gary Crispell** (gary.crispell@eagles.usm.edu) and Shahid Karim, Univ. of Southern Mississippi, Hattiesburg, MS

1:48 0841 Population characteristics of an introduced bee, *Anthophora plumipes*, in the northeast USA and their successful use of portable adobe nesting blocks. **Lisa Kuder** (lkuder@umd.edu), Univ. of Maryland, College Park, MD

1:52 0842 Sub-lethal effects of an insecticide on a beneficial insect. **Danielle Restuccia** (dmr816@neo.tamu.edu), Texas A&M Univ., College Station, TX

1:56 0843 Transcriptome analysis and validation for potential marker genes of mycorrhizal rice plants in response to feeding with fall armyworm, *Spodoptera frugiperda*. **Lina Bernaola** (lbernaola@agcenter.lsu.edu)[1], Michael Stout[1], Hong Ma[2], Yanbing Chen[2] and Joshua Yuan[2], [1]Louisiana State Univ., Baton Rouge, LA, [2]Texas A&M Univ., College Station, TX

Student Three-Minute Presentation Competition B

208 D (Convention Center)

Moderators and Organizers: Ashley P. G. Dowling[1] and Troy D. Anderson[2], [1]Univ. of Arkansas, Fayetteville, AR, [2]Virginia Polytechnic Institute and State Univ., Blacksburg, VA

12:30 Introductory Remarks

12:35 0844 Trichomes: The first line of defense against herbivores, *Trichoplusia ni*. **Fhallon Ware-Gilmore** (ware-gilmoref@uwa.edu)[1], Michelle Peiffer[2], Ketia Shumaker[1], Dawn Luthe[2] and Gary Felton[2], [1]Univ. of West Alabama, Livingston, AL, [2]Pennsylvania State Univ., University Park, PA

12:39 0845 Antimicrobials: A stomach ache for both people and pentatomids. **Christopher Taylor** (cmjtaylor3@gmail.com) and Galen Dively, Univ. of Maryland, College Park, MD

12:43 0846 Presentation withdrawn

12:47 0847 Phylogenetic patterns in wild bee response to land use. **Tina Harrison** (tinaharrison09@gmail.com), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

12:51 0848 Do human-induced land-use changes affect the sexually selected signal within *Pieris rapae*? **Anne Espeset** (aespeset@nevada.unr.edu), Univ. of Nevada, Reno, NV

12:55 0849 Duration of plant damage by host larvae affects attraction of two parasitoid species, *Microplitis croceipes* and *Cotesia marginiventris,* to cotton: Implications for interspecific competition. **Tolulope Morawo** (tom0002@auburn.edu) and Henry Fadamiro, Auburn Univ., Auburn, AL

12:59 0850 Determining the susceptibility of the southern house mosquito, *Culex quinquefasciatus*, to pesticides that target mosquito larvae. **Nicholas DeLisi** (ndelisi55@gmail.com), Louisiana State Univ., Baton Rouge, LA

1:03 0851 Alternative control methods for spotted wing drosophila, *Drosophila suzukii*. **Haley Butler** (haley.butler@okstate.edu), Oklahoma State Univ., Stillwater, OK

1:07 0852 First record of *Banasa euchlora* (Hemiptera: Pentatomidae) in Minnesota. **Ryan Lumen** (hasti152@d.umn.edu), Univ. of Minnesota, Duluth, MN

1:11 0853 Accurately monitoring an insect population is hard. **John Cambridge** (john.cambridge000@gmail.com) and George C. Hamilton, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

1:15 Break

1:20 0854 The characterization of microbiota changes pre/post larval mosquito treatment in post-Hurricane Sandy tree divot habitat. **Joseph Receveur** (Jpreceve@millersville.edu)[1], Gary Donato[2], Tadhgh Rainey[2], Jennifer L. Pechal[3], M. Eric Benbow[3] and John R. Wallace[1], [1]Millersville Univ., Millersville, PA, [2]Hunterdon County Division of Health Services, Flemington, NJ, [3]Michigan State Univ., East Lansing, MI

1:24 0855 Utilizing the power of the masses to examine invasive insect migration. **Noel Hahn** (nghahn@gmail.com), Cesar Rodriguez-Saona and George C. Hamilton, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

1:28 0856 Plant extract effect on mosquito survivorship: Determining the efficacy of ailanthone to control adult mosquitoes. **Calen Wylie** (cawylie2012@hotmail.com) and John R. Wallace, Millersville Univ., Millersville, PA

1:32 0857 Tolerance as a mechanism of Hessian fly, *Mayetiola destructor*, control. **Kirsten Roe** (roek@purdue.edu)[1], Richard Shukle[1,2], Jeffrey Holland[1] and Brandon Schemerhorn[1], [1]Purdue Univ., West Lafayette, IN, [2]USDA - ARS, West Lafayette, IN

1:36 0858 Solving complex problems (Acrididae: *Melanoplus*: The Puer Group). **Derek Woller** (asilid@gmail.com) and Hojun Song, Texas A&M Univ., College Station, TX

1:40 0859 Dried distillers grains with solubles susceptibility to insect infestation. **Mahsa Fardisi** (mfardisi@purdue.edu), Linda J. Mason and Klein Ileleji, Purdue Univ., West Lafayette, IN

1:44 0860 The spread of the fungus *Aspergillus flavus* by the navel orangeworm, *Amyelois transitella*, via frass. **Daniel Bush** (dsbush2@illinois.edu)[1], May R. Berenbaum[1] and Joel Siegel[2], [1]Univ. of Illinois, Champaign, IL, [2]USDA - ARS, Parlier, CA

1:48 0861 Harlequin bug response to color: Its relation to attract-and-kill systems. **Anthony S. DiMeglio** (tonydimeglio@gmail.com)[1], Donald C Weber[2] and Thomas P. Kuhar[1], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]USDA - ARS, Beltsville, MD

1:52 0862 Early-season flood enhances native biological control agents in Wisconsin cranberry. **Janet Van Zoeren** (vanzoeren@wisc.edu)[1] and Shawn Steffan[2], [1]Univ. of Wisconsin, Madison, WI, [2]USDA - ARS, Madison, WI

Joint Session: Tips from the Experts on the Job Application and Interviewing Process

Marquette Ballroom IV-V (Hilton)

Moderators and Organizers: Emily Fuger[1] and Aaron Daigh[2], [1]ASA, CSSA, and SSSA, Madison, WI, [2]North Dakota State Univ., Fargo, ND

12:30 PM - 2:00 PM

Joint Symposium: Insect Ecology in Organic Crop Management Systems

L100 A (Convention Center)

Moderator and Organizer: Erin Silva, Univ. of Wisconsin, Madison, WI

1:00 Introductory Remarks

1:05 0863 Ecological management for ecosystem services: What can be learned from failure of neonicotinoids. **Juha Helenius** (juha.helenius@helsinki.fi)[1] and Charles Francis[2], [1]Univ. of Helsinki, Helsinki, Finland, [2]Univ. of Nebraska, Lincoln, NE

1:30 0864 Evaluating and augmenting pollinator communities in diversified organic farming systems. **David Crowder** (dcrowder@wsu.edu), Washington State Univ., Pullman, WA

1:55 0865 Is mineral balance beneficial? Gypsum fertilization affects European corn borer development and insect damage to corn. **Ebony Murrell** (egmurrell@gmail.com)[1] and Eileen M. Cullen[2], [1]Pennsylvania State Univ., University Park, PA, [2]California State Polytechnic Univ., Pomona, CA

2:20 0866 The role of plant breeding in insect management in organic systems. **William Tracy** (wftracy@wisc.edu), Univ. of Wisconsin, Madison, WI

2:45 Break

3:00 0867 Arthropods in organic reduced tillage systems. **Mary Barbercheck** (meb34@psu.edu)[1], Ariel Rivers[1], Randa Jabbour[2], Tara Pisani-Gareau[3] and Christina Mullen[1], [1]Pennsylvania State

Univ., University Park, PA, [2]Univ. of Wyoming, Laramie, WY, [3]Boston College, Chestnut Hill, MA

3:25 0868 Biological control buffet in America's salad bowl. **Eric Brennan** (eric.brennan@ars.usda.gov), USDA - ARS, Salinas, CA

3:50 0869 A multi-pronged approach to organic soybean pest management. **Kathleen Delate** (kdelate@iastate.edu), Iowa State Univ., Ames, IA

4:15 Adjorn

Joint Session: Teaching and Extension

Marquette Ballroom IV-V (Hilton)

Moderators and Organizers: Emily Fuger[1] and Aaron Daigh[2], [1]ASA, CSSA, and SSSA, Madison, WI, [2]North Dakota State Univ., Fargo, ND

2:00 PM - 4:00 PM

Organized Meeting: Highlights of Medical, Urban, and Veterinary Entomology in 2015

208 AB (Convention Center)

Moderators and Organizers: Faith Oi[1] and Dini Miller[2], [1]Univ. of Florida, Gainesville, FL, [2]Virginia Polytechnic Institute and State Univ., Blacksburg, VA

2:00 Introductory Remarks

2:05 0870 Highlights of veterinary entomology. **Adalberto Perez de Leon** (beto.perezdeleon@ars.usda.gov), USDA - ARS, Kerrville, TX

2:40 0871 Highlights of urban entomology. **Karen M. Vail** (kvail@utk.edu), Univ. of Tennessee, Knoxville, TN

3:15 0872 Highlights of medical entomology. **Donald Yee** (donald.yee@usm.edu), Univ. of Southern Mississippi, Hattiesburg, MS

3:50 MUVE reception

4:30 MUVE preliminary business meeting

Organized Meeting: Physiology, Biochemistry, and Toxicology (PBT) Networking Section

211 A (Convention Center)

Moderators and Organizers: Qisheng Song[1] and Nannan Liu[2], [1]Univ. of Missouri, Columbia, MO, [2]Auburn Univ., Auburn, AL

2:00 Welcoming Remarks

2:05 0873 Developing new strategies for insect pest management in the genomics era. **Kun Yan Zhu** (kzhu@ksu.edu), Kansas State Univ., Manhattan, KS

2:50 0874 Combining ecology and physiology to understand insect pest responses to global change. **Emily K. Meineke** (ekmeinek@ncsu.edu), North Carolina State Univ., Raleigh, NC

3:02 Break

3:20 Business Meeting

4:05 0875 Bacterial toxins in disease mosquito vector control. **Sarjeet S. Gill** (sarjeet.gill@ucr.edu), Univ. of California, Riverside, CA

4:50 Concluding Remarks

4:55 Reception

Organized Meeting: Plant-Insect Ecosystem (P-IE) Section Networking, Business, and Learning Session on Effective Communication: How to Avoid Pie in Your Face!

200 D (Convention Center)

Moderators and Organizers: Sujaya Rao[1] and Fred Musser[2], [1]Oregon State Univ., Corvallis, OR, [2]Mississippi State Univ., Mississippi State, MS

2:00 Welcoming Remarks

2:05 P-IE business meeting, awards and committee reports

2:55 0876 Learning session: Effective communication: How to avoid pie in your face! **Sujaya Rao** (sujaya@oregonstate.edu), Oregon State Univ., Corvallis, OR

3:00 0877 Handling controversies: Listen, look, change, and commit. **Philip Eppard** (philip.j.eppard@monsanto.com), Monsanto Company, St. Louis, MO

3:30 0878 Seven insights about conversation, relationship, and being remarkable. **Paul Axtell** (paulaxtell@mac.com), Contextual Program Designs, Prior Lake, MN

4:00 0879 How to talk 'newspaper': a live demo and more! **Josephine Marcotty** (marcotty@startribune.com), Minneapolis Star Tribune, Minneapolis, MN

4:30 Panel Discussion

5:00 Networking and Refreshments: P-IE, drinks and more

5:30 Prize drawing for volunteers and members (must be present to win!)

6:00 Conclusion

Organized Meeting: Systematics, Evolution, and Biodiversity (SysEB) Section Meeting

205 CD (Convention Center)

Moderators and Organizers: Hojun Song[1] and M. Alma Solis[2], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Washington, DC

2:00 Introductory Remarks

2:20 SysEB Student Research Travel Award (SRTA) Winners

3:05 NSF Reports

3:35 Committee Reports

4:20 Break

4:30 SysEB Invited Presentation by Dr. Brian Wiegmann

MONDAY, NOVEMBER 16, 2015, EVENING

Student Competition Social Hour with Poster Presenters

Exhibit Hall BC (Convention Center)

Moderators and Organizers: Alvin M. Simmons[1], Catherine Loudon[2] and Jesus F. Esquivel[3], [1]USDA - ARS, Charleston, SC, [2]Univ. of California, Irvine, CA, [3]USDA - ARS, College Station, TX

5:30 PM - 6:30 PM

TUESDAY, NOVEMBER 17, 2015, MORNING

MUVE Section Poster Session A

Exhibit Hall BC (Convention Center)

D3221 Survey of mosquito fauna and updated checklist of the mosquitoes of Oklahoma including new state records, updated distribution of *Aedes albopictus*, and potential vectors of West Nile virus. **Bruce Noden** (bruce.noden@okstate.edu)[1], Lisa Coburn[1], Russell E. Wright[1] and Kristy Bradley[2], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma Dept. of Health, Oklahoma City, OK

D3222 Diversity of *Wolbachia* infections in mosquitoes (Diptera: Culicidae) from the Republic of Korea. Hyung-Woo Lim, Su-Bum Lee, Hyunwoo Kim, Wook Gyo Lee, Jong Yul Roh, Young Ran Ju and **E. Hyun Shin** (mosquitoshin@hanmail.net), Korea National Institute of Health, Chungbuk, South Korea

D3223 Male *Aedes albopictus* inhibit feeding by female *Aedes aegypti*. Ashleigh Stanton, Kathryn Gibbs, John Soghigian and **Todd P. Livdahl** (tlivdahl@clarku.edu), Clark Univ., Worcester, MA

D3224 Membrane feeding to infect immature blacklegged ticks, *Ixodes scapularis*, with tick-borne pathogens. **Jonathan Oliver** (joliver@umn.edu), Geoffrey Lynn, Nicole Burkhardt, Curtis Nelson, Lisa Price, Timothy Kurtti and Ulrike Munderloh, Univ. of Minnesota, St. Paul, MN

D3225 Tick and tick-borne disease surveillance in West Virginia. **Eric J. Dotseth** (Eric.J.Dotseth@wv.gov) and Miguella Mark-Carew, West Virginia Dept. of Health & Human Resources, Charleston, WV

D3226 Blacklegged tick, *Ixodes scapularis*, infestation on small mammals in southeastern Manitoba. **Zach Polk** (polkzc25@gmail.com) and Kateryn Rochon, Univ. of Manitoba, Winnipeg, MB, Canada

D3227 Parasite modification of *Aedes triseriatus* behavior enhances host's survival from predation. **John Soghigian** (jsoghigian@clarku.edu), Linda Valsdottir and Todd P. Livdahl, Clark Univ., Worcester, MA

D3228 Evaluation of mosquito production in a Connecticut cedar swamp. Alicia Bray and **Arlene Velez** (aliciabray@ccsu.edu), Central Connecticut State Univ., New Britain, CT

D3229 Increasing the efficacy of pyrethroid insecticides in suburban mosquito management. **Andrea Skiles** (glennskiles@gmail.com)[1], Kyndall Dye[1], Nicola T. Gallagher[2] and Grayson C. Brown[1], [1]Univ. of Kentucky, Lexington, KY, [2]Syngenta, Greensboro, NC

D3230 CO_2 gating of landing on a heat source by anthropophilic and polyphagous *Anopheles*. **Benjamin DeMasi-Sumner** (bdema001@ucr.edu), Ring T. Cardé and Emerson Lacey, Univ. of California, Riverside, CA

D3231 Trap for the capture and killing of the Chagas disease vector, *R. prolixus*. **Héctor Parra** (hparra@uis.edu.co)[1], Jonny Duque[1], Mayra Pedraza[2] and Marcela Prieto[2], [1]Universidad Industrial de Santander, Bucaramanga, Colombia, [2]Diseñadora Industrial, Bucaramanga, Colombia

D3232 Development of resistance to tick paralysis in sheep following subclinical exposure to virulent *D. andersoni*. Shaun Dergousoff and **Tim Lysyk** (tim.lysyk@agr.gc.ca), Lethbridge Research Centre, Lethbridge, AB, Canada

D3233 Novel interspecies co-habitation of anthropogenic structures leads to host-species expansion in an ectoparasitic hemipteran vector, the swallow bug, *Oeciacus vicarius*. **Warren Booth** (warren-booth@utulsa.edu), Catherine Page and Charles Brown, Univ. of Tulsa, Tulsa, OK

D3234 Use of bed bug traps to capture other cimicids and blood feeding mites found in buildings. Whitney Cranshaw and **Brandon Ewals-Strain** (bewalsstrain@yahoo.com), Colorado State Univ., Fort Collins, CO

D3235 The efficacy of selected commercially available insect repellents for the yellow fever mosquito and the Asian tiger mosquito. **Stacy D. Rodriguez** (stacyr@nmsu.edu)[1], Lisa L. Drake[1], David P. Price[1], John Hammond[2] and Immo Hansen[1], [1]New Mexico State Univ., Las Cruces, NM, [2]Univ. of New Mexico, Albuquerque, NM

D3236 Individual to population-level consequences of photoperiod in *Aedes aegypti* (Diptera: Culicidae). **Katie Costanzo** (costanz4@canisius.edu), Kathryn Jerz and Marissa Verdi, Canisius College, Buffalo, NY

D3237 The behavioral response of *Culex erraticus* to different snake odors. **Lindsey Wells** (lw03325@georgiasouthern.edu) and William Irby, Georgia Southern Univ., Statesboro, GA

D3238 Survey of aquatic mite parasitism of mosquitoes in Maine. **Margret Welch** (margret.welch@maine.edu)[1], Charles Lubelczyk[2], Susan Elias[2] and Joseph Staples[3], [1]Univ. of Southern Maine, Gorham, ME, [2]Maine Medical Center Research Institute, Scarborough, ME, [3]Univ. of Southern Maine, Portland, ME

D3239 Evaluation of mosquito production in compost yards in Connecticut. **Victoria Bartlette** (vhbartlette@my.ccsu.edu) and Alicia Bray, Central Connecticut State Univ., New Britain, CT

PBT Section Poster Session A

Exhibit Hall BC (Convention Center)

D3240 Bioactivation of aryl heterocyclic amine molecules leads to increased potency in certain lepidopteran pests. **Chaoxian Geng** (cgeng@dow.com), Mark Pobanz, Bill Dent III, Yelena Adelfinskaya, Thomas C. Sparks, G. B. Watson, Ted J. Letherer, Cathy Young, Kenneth Beavers, Brian Waldman and Alice Meitl, Dow AgroSciences, Indianapolis, IN

D3241 Identification of carboxylesterase genes from the diamondback moth, *Plutella xylostella* (L.), and RNA interference to evaluate the role in chlopyrifos resistance. **Miao Xie** (xmshelly@163.com)[1], Nana Ran[1], Minsheng You[1] and Qisheng Song[2], [1]Fujian Agriculture and Forestry Univ., Fuzhou, China, [2]Univ. of Missouri, Columbia, MO

D3242 A metatranscriptomic approach aimed at understanding bacterial roles in the termite holobiont. **Brittany Peterson** (peter137@purdue.edu) and Michael Scharf, Purdue Univ., West Lafayette, IN

D3243 Characterization of ATP binding cassette subfamily C transporters in *Reticulitermes flavipes*. **Swapna Priya Rajarapu** (prajarapu@purdue.edu), Jesse Hoteling and Michael Scharf, Purdue Univ., West Lafayette, IN

D3244 Comparative studies on the lethal giant larvae gene in *Ostrinia nubilalis* (Lepidoptera: Pyralidae) and *Diabrotica virgifera virgifera* (Coleoptera: Chrysomelidae). **Anastasia Cooper** (anacooper@ksu.edu), Young Ho Kim and Kun Yan Zhu, Kansas State Univ., Manhattan, KS

D3245 Presentation withdrawn

D3246 cDNA library construction of the Asian ladybird beetle using gateway cloning system. **Yu-Bin Jung** (ybjung89@naver.com), Jung Kyu Kim, Chan-yeong Kang, Jeong Hee Kim, Ji Hyun Min, Il Hyun Byun, Hyun Ju Jang, Min Gyu Cho, Tae-Hee Ryu, Yong-Man Yu and Young-Nam Youn, Chungnam National Univ., Daejeon, South Korea

D3247 PBAN/DH/Pyrokinin signalling system in Animalia. **Russell Jurenka** (rjurenka@iastate.edu), Iowa State Univ., Ames, IA

D3248 Cry1Ac toxin mode of action in heliothines. **Heba Abdelgaffar** (habdelga@utk.edu)[1], Cris Oppert[2], Jessica Monserrate[2] and Juan L. Jurat-Fuentes[1], [1]Univ. of Tennessee, Knoxville, TN, [2]Bayer CropScience, Morrisville, NC

D3249 Discovery of the first Chelicerata pyrokinin receptor from the southern cattle tick, *Rhipicephalus microplus*. Yunlong Yang[1], Ronald Nachman[2] and **Patricia V. Pietrantonio** (p-pietrantonio@tamu.edu)[1], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, College Station, TX

D3250 Application of RNAi to control of tobacco whitefly, *Bemisia tabaci* (Hemiptera: Aleyrodidae), and target gene selection. **Jeong Hee Kim** (wjdgml133@naver.com), Jung-Kyu Kim, Chan-yeong Kang, Yu-Bin Jung, Ji Hyun Min, Il Hyun Byun, Hyun Ju Jang, Min Gyu Cho, Hyoun-Sub Lim, Yong-Man Yu and Young-Nam Youn, Chungnam National Univ., Daejeon, South Korea

D3251 Comparative analyses of selected genes possibly involved in cellular uptake of dsRNA between *Diabrotica verigifera* and *Ostrinia nubilalis*. **Young Ho Kim** (yhkim@ksu.edu) and Kun Yan Zhu, Kansas State Univ., Manhattan, KS

D3252 RNA interference using double stranded RNAs as molecular biopesticide to regulate the invasive insect pest brown marmorated stink bug (BMSB). **Saikat Kumar Ghosh** (Saikat.Ghosh@ars.usda.gov) and Dawn E. Gundersen-Rindal, USDA - ARS, Beltsville, MD

D3253 Peritrophic matrix genes on western corn rootworm, *Diabrotica virgifera virgifera* Le Conte. **Newton Carneiro** (newtonc800@gmail.com)[1], Haichuan Wang[1], Ana Velez[1] and Blair Siegfried[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL

D3254 Genome-wide survey of vacuolar-ATPase genes in the yellow fever mosquito, *Aedes aegypti* (Diptera: Culicidae). **Basak Coskun** (basak@ksu.edu), Moustapha Soumaila Issa, Young Ho Kim and Kun Yan Zhu, Kansas State Univ., Manhattan, KS

D3255 Characterization of bursicon homodimers' role in innate immune responses in *Aedes aegypti*. **Hongwei Zhang** (hzz78@mail.missouri.edu) and Qisheng Song, Univ. of Missouri, Columbia, MO

D3256 Ecdysis triggering hormone, a multifunctional peptide regulating reproduction of *Aedes aegypti*. **Yike Ding** (yding005@ucr.edu) and Michael E. Adams, Univ. of California, Riverside, CA

D3257 Barriers to RNAi response in stink bugs. **Elane Fishilevich** (EFishilevich@dow.com), Meghan Frey, Wendy Lo, Premchand Gandra, Murugesan Rangasamy, Justin Lira and Kenneth Narva, Dow AgroSciences, Indianapolis, IN

D3258 Functional analysis of cadherin as a receptor to Cry1Ac toxin in the polyphagous insect pest, *Helicoverpa armigera*. **Bindiya Sachdev** (bindiya.sachdev@gmail.com)[1], Patricia Pelegrini[2], Saad Moussa[1], S Sivakumar[1], Naresh Arora[1], Diogo Martins-de-Sa[2], Wagner Lucena[2], Sonia Freitas[3], Maria Grossi-de-Sa[2] and Raj Bhatnagar[1], [1]International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi, India, [2]Embrapa-Genetic Resources and Biotechnology, Brasilia-DF, Brazil, [3]Univ. of Brasilia, Brasilia-DF, Brazil

D3259 Airway immunity in the Madagascar hissing cockroach, *Gromphadorhina portentosa*. **Austin Espe** (austin.espe.1@ndsu.edu), Nathan Fisher and Kendra Greenlee, North Dakota State Univ., Fargo, ND

D3260 Variations in thermal history lead to dyssynchronous diapause development. **George Yocum** (george.yocum@ars.usda.gov)[1], Anna Bennett[1], Joseph Rinehart[1], William Kemp[1], Theresa Pitts-Singer[2] and Julia Bowsher[3], [1]USDA - ARS, Fargo, ND, [2]USDA - ARS, Logan, UT, [3]North Dakota State Univ., Fargo, ND

D3261 The fate of oral uptake and injected ammonia as the stable isotope $^{15}NH_4Cl$ on nitrogen metabolism in the American cockroach, *Periplaneta americana* L. **Donald E. Mullins** (mullinsd@vt.edu), Benjamin Gill, Mark Hanigan and Sandra E. Gabbert, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3262 A new "walker" tool for efficient placement of *Diaphorina citri* (Hemiptera: Liviidae) on trees in mating behavior bioassays. **Emily Pregmon** (epregmon@ufl.edu), Richard W. Mankin, Sylvia Lujo, Kayla Norton, Ethan Hartman and Nina Zagvazdina, USDA - ARS, Gainesville, FL

D3263 Disrupting the vibrational mating behavior of *Diaphorina citri*. **Sylvia Lujo** (lujosyv@ufl.edu), Ethan Hartman, Kayla Norton, Nina Zagvazdina, Emily Pregmon and Richard Wendell Mankin, USDA - ARS, Gainesville, FL

D3264 Long term storage of bee semen: A six month assessment of cryopreserved semen quality using motility as an index. **Arun Rajamohan** (arun.rajamohan@ars.usda.gov) and Joseph P. Rinehart, USDA - ARS, Fargo, ND

D3265 Antennal sensilla of the Mexican soybean weevil, *Rhyssomatus nigerrimus* (Coleoptera: Curculionidae). **Elsy Delgado-García** (elsydelgado@gmail.com), Colegio de Postgraduados, Montecillo, Mexico

D3266 Effects of oral ingestion of heat shock protein 70 dsRNA on the thermal tolerance of the sweetpotato whitefly, *Bemisia tabaci*. **Kyeong-Yeoll Lee** (leeky@knu.ac.kr), Jae-Kyoung Shim, Bong-Gi Choi, JInmo Koo and Duck-Oung Jung, Kyungpook National Univ., Daegu, South Korea

D3267 The contribution of fatty acid-derived volatiles to aphid resistance in tomato. **Fiona Goggin** (fgoggin@uark.edu) and Jiamei Li, Univ. of Arkansas, Fayetteville, AR

D3268 Involvement of glycerol-3-phosphate dehydrogenase and glycerol 3-phosphatase in rapid cold hardening of the oriental tobacco budworm, *Helicoverpa assulta*. Dae-weon Lee and **Wook Hyun Cha** (whcha17@gmail.com), Kyungsung Univ., Busan, South Korea

P-IE Section Poster Session A

Exhibit Hall BC (Convention Center)

D3269 Genetic diversity of honey bees in Utah. **Allen L. Szalanski** (aszalan@uark.edu)[1], Amber D. Tripodi[2], Clinton E. Trammel[1] and Danielle Downey[3], [1]Univ. of Arkansas, Fayetteville, AR, [2]USDA - ARS, Logan, UT, [3]Hawaii Dept. of Agriculture, Hilo, HI

D3270 Varroa mite, *Varroa destructor*, management for the small-scale beekeeper: Exploring drone brood removal and other alternative treatment options. **Hannah Whitehead** (whitehead.152@osu.edu), The Ohio State Univ., Columbus, OH

D3271 Bee Health at eXtension.org: a bee line from scientist to society. **Philip Moore** (pmoore17@utk.edu), John Skinner and Michael Wilson, The Univ. of Tennessee, Knoxville, TN

D3272 Effects of heavy metals on the development of *Apis mellifera* larvae. **Ning DI** (ning.di@ucr.edu)[1], Kristen Hladun[1], John T. Trumble[1] and T. X. Liu[2], [1]Univ. of California, Riverside, CA, [2]Northwest A&F Univ., Yangling, Shaanxi, China

D3273 Can foraging on canola increase honey bee, *Apis melifera*, health? **Jackie Lee** (jackie.lee@okstate.edu)[1], Allen Szalanski[2] and Angela Post[1], [1]Oklahoma State Univ., Stillwater, OK, [2]University of Arkansas, Fayetteville, AR

D3274 Survey of native bee communities within several top-tier Louisiana conservation priority ecosystems. **Eric Van Gorder** (eric.van@selu.edu) and Janice L. Bossart, Southeastern Louisiana Univ., Hammond, LA

D3275 Using local ecological knowledge to understand changes in beekeeping and ecosystem services in the Nicoya Peninsula, Costa Rica. **Sara M. Galbraith** (sara.marie.galbraith@gmail.com)[1], Chad Kooistra[2], Troy Hall[2], Héctor Tavárez[1] and Nilsa A. Bosque-Pérez[3], [1]Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica, [2]Oregon State Univ., Corvallis, OR, [3]Univ. of Idaho, Moscow, ID

D3276 Routes of alfalfa leafcutting bee exposure to an insect growth regular under field conditions. **Theresa L. Pitts-Singer** (Theresa.Pitts-Singer@ars.usda.gov)[1] and James D. Barbour[2], [1]USDA - ARS, Logan, UT, [2]Univ. of Idaho, Parma, ID

D3277 Testing the hypothesis of nest site limitation of wild bees using experimental and observational approaches. **Karen Goodell** (goodell.18@osu.edu), The Ohio State Univ., Newark, OH

D3278 Presentation withdrawn

D3279 Variability in use of *Dasiphora fruticosa* (L.) Rydb. as a nectar plant by butterflies: Latitudinal differences in the Rocky Mountains. **Aaron Irber** (ajirber@gmail.com) and Paula Kleintjes Neff, Univ. of Wisconsin, Eau Claire, WI

D3280 Minnesota initiatives to protect insect pollinators. **Rajinder Mann** (rajinder.mann@state.mn.us) and Jamison Scholer, Minnesota Dept. of Agriculture, St. Paul, MN

D3281 Lignocellulose digestion by the higher Attine fungus-gardening ant symbiosis. **Alexandria DeMilto** (ademilto@patriots.uttyler.edu) and Jon Seal, Univ. of Texas, Tyler, TX

D3282 Tawny crazy ants in Hawaii? Evidence of niche shift and global invasion potential of *Nylanderia fulva*. **Sunil Kumar** (sunil.kumar@colostate.edu)[1], Edward G. LeBrun[2], Thomas Stohlgren[1], Jared Stabach[1], Danny McDonald[3], David Oi[4] and John S. LaPolla[5], [1]Colorado State Univ., Fort Collins, CO, [2]Univ. of Texas, Austin, TX, [3]Sam Houston State Univ., Huntsville, TX, [4]USDA - ARS, Gainesville, FL, [5]Towson Univ., Baltimore, MD

D3283 Evaluation of individual and combination insecticide and biopesticide treatments for rapid elimination of imported fire ant colonies for use in the Federal Imported Fire Ant Quarantine. **Jason B. Oliver** (joliver@tnstate.edu)[1], Karla Addesso[1], Anne-Marie Callcott[2], Nadeer Youssef[1] and Paul A. O'Neal[1], [1]Tennessee State Univ., McMinnville, TN, [2]USDA - APHIS, Biloxi, MS

D3284 Homeward navigation in *Pogonomyrmex occidentalis* harvester ants. **Carlyn Winter** (cwinter1991@gmail.com) and Michael Breed, Univ. of Colorado, Boulder, CO

D3285 Attraction of non-target flies (Diptera) to volatile attractants. **Louis Hesler** (Louis.Hesler@ars.usda.gov), USDA - ARS, Brookings, SD

D3286 Potential chemical attractants for corn silk flies. **Sandra A. Allan** (sandy.allan@ars.usda.gov), Rosa Cromartie and Hans Alborn, USDA - ARS, Gainesville, FL

D3287 Silk fly electroantennography, a crucial step for semiochemical investigations. **David Owens** (owensd119@ufl.edu)[1], Gregg Nuessly[1], Paul E. Kendra[2], Dakshina Seal[3], Daniel Hahn[4] and Thomas Colquhoun[4], [1]Univ. of Florida, Belle Glade, FL, [2]USDA - ARS, Miami, FL, [3]Univ. of Florida, Homestead, FL, [4]Univ. of Florida, Gainesville, FL

D3288 Waveform characterization of the redbanded stink bug, *Piezodorus guildinii* (Westwood) (Hemiptera: Heteroptera: Pentatomidae), on soybean plant using the EPG. **Tiago Lucini** (tiago_lucini@hotmail.com)[1], Antônio Panizzi[2] and Elaine Backus[3], [1]Federal Univ. of Paraná, Curitiba, Brazil, [2]National Wheat Research Center, Passo Fundo, Brazil, [3]USDA - ARS, Parlier, CA

D3289 Waveform characterization of the soybean stem feeder, *Edessa meditabunda* (F.) (Hemiptera: Heteroptera: Pentatomidae): Overcoming the challenge of wiring pentatomids for EPG. Tiago Lucini[1] and **Antônio Panizzi** (antonio.panizzi@embrapa.br)[2], [1]Federal Univ. of Paraná, Curitiba, Brazil, [2]National Wheat Research Center, Passo Fundo, Brazil

D3290 A positive preference-performance linkage for lace bug, *Corythucha marmorata*, on drought-stressed *Solidago altissima*. **Maxwell Helmberger** (msh326@cornell.edu)[1,2], Timothy P. Craig[2] and Joanne Itami[2], [1]Cornell Univ., Ithaca, NY, [2]Univ. of Minnesota, Duluth, MN

D3291 Diapause induction in the green lacewing, *Chrysoperla rufilabris*: Influence of photoperiod and temperature. Kewei Chen[1], **James R. Nechols** (jnechols@ksu.edu)[2], John Ruberson[2] and Catherine A. Tauber[3,4], [1]South China Agricultural Univ., Wushan, China, [2]Kansas State Univ., Manhattan, KS, [3]Cornell Univ., Ithaca, NY, [4]Univ. of California, Davis, CA

D3292 A comparative assessment of the response of two species of cucumber beetles to visual and olfactory cues and prospects for mass trapping. **Jaime Pinero** (PineroJ@lincolnu.edu), Lincoln Univ., Jefferson City, MO

D3293 Biological and reproductive performance of *Oebalus insularis* (Heteroptera: Pentatomidae) reared in artificial diets: Subsidy for the multiplication system of *Telenomus podisi* (Hymenoptera: Platygastridae). **Bruno Zachrisson** (bazsalam@gmail.com), IDIAP, Panama, Panama

D3294 Fractions from Eastern redcedar heartwood stimulate oviposition behavior in the ladybird *Coleomegilla maculata*. **Eric Riddick** (eric.riddick@ars.usda.gov)[1], Zhixin Wu[1], Fred Eller[2] and Mark Berhow[2], [1]USDA - ARS, Stoneville, MS, [2]USDA - ARS, Peoria, IL

D3295 Life table determination of optimal temperature range for development and reproduction of *Coleomegilla maculata* (Coleoptera: Coccinellidae). **Juan Morales-Ramos** (juan.moralesramos@ars.usda.gov) and M. Guadalupe Rojas, USDA - ARS, Stoneville, MS

D3296 Reproductive success of sevenspotted lady beetles, *Coccinella septempunctata*, as a function of aphid and plant species. **Todd Ugine** (tau2@cornell.edu) and John Losey, Cornell Univ., Ithaca, NY

D3297 Diversity of coccinellidae in edge habitats associated with corn and soybean agroecosystems. **Daniel M. Pavuk** (dmpavuk@bgnet.bgsu.edu), Bowling Green State Univ., Bowling Green, OH

D3298 Crop management legacies in organic systems affect environmental conditions, but not ground beetle communities. **Ebony G. Murrell** (egmurrell@gmail.com)[1], Christina Mullen[1], Tara Pisani-Gareau[2] and Mary Barbercheck[1], [1]Pennsylvania State Univ., University Park, PA, [2]Boston College, Chestnut Hill, MA

D3299 Ground beetles in sweet corn bordered by native perennial plants and pasture. **Karen Friley** (karen.friley@kysu.edu), John Sedlacek, Denita Brown and E. Slusher, Kentucky State Univ., Frankfort, KY

D3300 Beneficial insects in sweet corn bordered by native perennial plants and pasture in Central Kentucky. John Sedlacek, **Karen Friley** (karen.friley@kysu.edu), E. Slusher and David Key, Kentucky State Univ., Frankfort, KY

D3301 Natural enemy impact on invasive brown marmorated stink bug, *Halyomorpha halys*, eggs in organic agroecosystems: A multistate assessment. **Emily Ogburn** (ecogburn@ncsu.edu)[1], Christine Dieckhoff[2], Rachelyn Dobson[3], Matthew Grieshop[4], Kim A. Hoelmer[2], Clarissa Mathews[5], Jennifer Moore[6], Anne Nielsen[7], Celeste Welty[8] and James F. Walgenbach[9], [1]North Carolina State Univ., Mills River, NC, [2]USDA - ARS, Newark, DE, [3]Univ. of Kentucky, Lexington, KY, [4]Michigan State Univ., East Lansing, MI, [5]USDA - ARS, Kearneysville, WV, [6]The Univ. of Tennessee, Knoxville, TN, [7]Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, [8]The Ohio State Univ., Columbus, OH, [9]North Carolina State Univ., Fletcher, NC

D3302 Cover crop species and termination timing influence Carabidae assemblage in 3-year transition to organic. **Ariel Rivers** (arielrivers@psu.edu), Mary Barbercheck and Christina Mullen, Pennsylvania State Univ., University Park, PA

D3303 Wanted: Dead or alive? Predators' proclivities for carrion prey. **James Hagler** (james.hagler@ars.usda.gov)[1], Christina Moon[2], Freddy Rivers[2] and Scott Machtley[1], [1]USDA - ARS, Maricopa, AZ, [2]South Mountain Community College, Phoenix, AZ

D3304 Long-term variation in natural enemy populations in non-crop field margins in south Georgia. **Melissa D. Thompson** (mdykes@uga.edu)[1], R. J. Ottens[1], John Ruberson[2] and Jason M. Schmidt[1], [1]Univ. of Georgia, Tifton, GA, [2]Kansas State Univ., Manhattan, KS

D3305 Elucidating the predatory community of plum curculio in organic apple production. **Jason M. Schmidt** (jschmid2@uga.edu)[1], Paul Owen-Smith[2], Jemma Flood[2] and Matthew Grieshop[2], [1]Univ. of Georgia, Tifton, GA, [2]Michigan State Univ., East Lansing, MI

D3306 Does greenspace design influence urban vacant lot soil biodiversity and ecosystem functioning? **Nicole Hoekstra** (hoekstra.10@osu.edu) and Mary Gardiner, The Ohio State Univ., Wooster, OH

D3307 How motivation and project structure affect natural resource volunteerism in entomology. **Lesley Tylczak** (latylczak@gmail.com)[1], Robert Venette[2], Marla Spivak[1], Eli Sagor[1] and Terrance Hurley[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - Forest Service, St. Paul, MN

D3308 It's all fun and games: Using gamification to teach entomology. **Marc Fisher** (mlfisher@dow.com) and Kevin Steffey, Dow AgroSciences, Indianapolis, IN

D3309 YouTube and you: Entomology videos on the internet. **Caitlin Stamper** (clstam3@uky.edu) and John Obrycki, Univ. of Kentucky, Lexington, KY

D3310 Using podcasts to promote research and extension. **Erin W. Hodgson** (ewh@iastate.edu), Matt O'Neal and John VanDyk, Iowa State Univ., Ames, IA

D3311 Outreach or reach out: Observations on the "Walnut Alert" experience. **Jerome F. Grant** (jgrant@utk.edu)[1], Frank Hale[2], Alan Windham[2], Gregory J. Wiggins[1] and Paris L. Lambdin[1], [1]Univ. of Tennessee, Knoxville, TN, [2]Univ. of Tennessee, Nashville, TN

D3312 Iowa Monarch Conservation Consortium (IMCC): Stepping up to the front lines of habitat restoration. Teresa Blader[1], Victoria Pocius[1], Keith Bidne[2], **Sue Blodgett** (sblodg@iastate.edu)[1], Steven Bradbury[1], Diane Debinski[1], Robert Hartzler[1], Richard Hellmich[2], Mark Honeyman[1], Laura Jesse[1], Donald R. Lewis[1], John Pleasants[1] and Wendy Wintersteen[1], [1]Iowa State Univ., Ames, IA, [2]USDA - ARS, Ames, IA

D3313 Beyond strengthening the leaf surface: Silicon enhances herbivore-associated plant defense responses. **Flor E. Acevedo** (fea5007@psu.edu), Michelle Peiffer, Dawn Luthe and Gary Felton, Pennsylvania State Univ., University Park, PA

D3314 Chemical correlates of constitutive and inducible resistance against *Spodoptera frugiperda* in four varieties of soybeans. **Srinivas Lanka** (slanka@agcenter.lsu.edu) and Michael Stout, Louisiana State Univ., Baton Rouge, LA

D3315 Beating the bugs in the cranberry bogs: Induced resistance in wild and cultivated cranberry. **Elvira de Lange** (elvira.delange@rutgers.edu)[1], James Polashock[2], Nicholi Vorsa[3] and Cesar Rodriguez-Saona[1], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]USDA - ARS, Chatsworth, NJ, [3]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

D3316 Variable-pressure scanning electron microscopy images of sorghum predict resistance to storage insect pests. **Bonnie Pendleton** (bpendleton@wtamu.edu)[1] and Gary Peterson[2], [1]West Texas A&M Univ., Canyon, TX, [2]Texas A&M, Lubbock, TX

D3317 Synergistic defensive function of raphides and defensive proteins: Raphides intensify the defensive activity of protease and chitinase against insect herbivores through the needle effect. **Kotaro Konno** (konno@affrc.go.jp), Takashi Inoue, Masatoshi Nakamura and Chikara Hirayama, National Institute of Agrobiological Sciences, Tsukuba, Japan

D3318 Effect of spray solution pH on efficacy and residual activity of insecticides against *Drosophila suzukii* (Diptera: Drosophilidae). **Brian Little** (balittle@uga.edu), Bal Gautam and Ashfaq Sial, Univ. of Georgia, Athens, GA

D3319 Cuticular hydrocarbon composition of two invasive ambrosia beetles, *Euwallacea* spp., in the United States of America. **Lori J. Nelson** (lnelson@fs.fed.us)[1], Yigen Chen[2], Tom W. Coleman[3], Daniel Carrillo[4] and Steven Seybold[1], [1]USDA - Forest Service, Davis, CA, [2]Univ. of California, Davis, CA, [3]USDA - Forest Service, San Bernardino, CA, [4]Univ. of Florida, Homestead, FL

D3320 Evaluations of melon germplasm reported to exhibit host plant resistance to sweetpotato whitefly. James McCreight[1], William Wintermantel[1] and **Eric Natwick** (etnatwick@ucanr.edu)[2], [1]USDA - ARS, Salinas, CA, [2]Univ. of California, Holtville, CA

D3321 Effects of foliar apple trichomes on *Galendromus occidentalis* (Nesbitt). **Rebecca Schmidt-Jeffris** (schmidt-jeffris@cornell.edu)[1] and Elizabeth H. Beers[2], [1]Cornell Univ., Geneva, NY, [2]Washington State Univ., Wenatchee, WA

D3322 Bioassays of entomopathogenic fungi against *Melanaphis sacchari*. **Karla Cruz-Aldaco** (aldacokarla@gmail.com)[1], Raul T. Villanueva[2], Gabriela Esparza-Diaz[2], Richard Humber[3] and Sergio Sanchez-Peña[1], [1]Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico, [2]Texas A&M Univ., Weslaco, TX, [3]USDA - ARS, Ithaca, NY

D3323 Sugarcane aphid, *Melanaphis sacchari*, field abundance on resistant and susceptible sorghum hybrids in the Southern High Plains of Texas. **Blayne Reed** (blayne.reed@ag.tamu.edu)[1], Robert P. Porter[2] and Ed Bynum[3], [1]Texas AgriLife Extension, Plainview, TX, [2]Texas Cooperative Extension, Lubbock, TX, [3]Texas A&M AgriLife Extension, Amarillo, TX

D3324 Presentation withdrawn

D3325 Efficacy of different insecticides against aphid, *Lipaphis erysimi* (Kalt.), on *Camelina sativa* (L.) Crantz in Pakistan. Muhammad Arshad[1], Rashad Khan[2], **Muhammad Ullah** (mirfanullah@uos.edu.pk)[1] and Muhammad Afzal[1], [1]Univ. of Sargodha, Sargodha, Pakistan, [2]Univ. of Agriculture Faisalabad, Sargodha, Pakistan

D3326 Observations of the sugarcane aphid, *Melanaphis sacchari*, in the Lower Rio Grande Valley 2014-2015. **Danielle Sekula-Ortiz** (Danielle.Sekula@ag.tamu.edu), Raul T. Villanueva and Gabriela Esparza-Diaz, Texas A&M Univ., Weslaco, TX

D3327 Molecular identification of *Megaselia scalaris* (Loew) as a possible biological control of *Scolecocampa mochisa* and *Sphenophorus incurrens*, sugarcane root pests in Mexico. **Obdulia Segura-León** (sleon@colpos.mx), Colegio de Postgraduados, Texcoco, Mexico

D3328 Presentation withdrawn

D3329 Spread risk factor estimation of sugarcane white leaf disease in the northeast Thailand. **Youichi Kobori** (koboriy@affrc.go.jp)[1] and Yupa Hanboonsong[2], [1]Japan International Research Center for Agricultural Sciences, Ishigaki, Japan, [2]Khon Kaen Univ., Khon Kaen, Thailand

D3330 Evaluation and economic assessment of multiple insecticide strategies for managing pest complexes in sorghum, *Sorghum bicolor* (L.) Moench. **Robert Bowling** (robert.bowling@ag.tamu.edu), Michael Brewer, Levi Russell and Mac Young, Texas A&M Univ., Corpus Christi, TX

D3331 Soybean aphid management in South Dakota with foliar insecticides. **Bradley McManus** (Bradley.McManus@sdstate.edu) and Billy Fuller, South Dakota State Univ., Brookings, SD

D3332 Biocontrol of brown marmorated stink bug. **Victoria Skillman** (skillmav@onid.orst.edu)[1], Adam Cave[2] and Jana C. Lee[2], [1]Oregon State Univ., Corvallis, OR, [2]USDA - ARS, Corvallis, OR

D3333 New sources of soybean resistance against soybean aphid, *Aphis glycines*, biotypes. **Doris Lagos-Kutz** (dlagos@illinois.edu)[1], Curtis B. Hill[2], Glen L. Hartman[3] and Darin Eastburn[1], [1]Univ. of Illinois, Champaign, IL, [2]Agricen Sciences LLC, Pilot Point, TX, [3]National Soybean Research Center, Urbana, IL

D3334 Comparative transcriptomic analyses of soybean aphid, *Aphis glycines*, biotypes feeding on aphid-resistant soybean. Raman Bansal, **Ashley Yates** (yates.229@buckeyemail.osu.edu) and Andrew Michel, The Ohio State Univ., Wooster, OH

D3335 Examination of cross-tolerance to *Rag1* and thiamethoxam treatments in the soybean aphid, *Aphis glycines*. **Carolina Camargo** (carolinacamargo01@gmail.com)[1], Matheus Ribeiro[1], Laramy Enders[1] and Blair Siegfried[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL

D3336 Soybean aphid responses to climate and habitat variability explored using multi-year, ecoinformatics data. **Federica Lacasella** (federicalaca@hotmail.it)[1], Kaitlin Stack-Whitney[1], Krista Hamilton[2], Aditya Singh[1], Phil Townsend[1], Christopher Kucharik[1], Timothy D. Meehan[1] and Claudio Gratton[1], [1]Univ. of Wisconsin, Madison, WI, [2]Wisconsin Dept. of Trade, Agriculture, and Consumer Protection, Madison, WI

D3337 Prevalence of tarnished plant bug, *Lygus lineolaris*, on soybean in the Mississippi Delta. **K. Clint Allen** (clint.allen@ars.usda.gov), Katherine Parys, Nathan Little and Randall Luttrell, USDA - ARS, Stoneville, MS

D3338 Comparison between the releasing of different amounts of pupae and adults of *Trichogramma pretiosum* in lepidopteran eggs control in soybean. Alexandre Pinto[1], **Lucas Cantori** (lucas@occasio.com.br)[2], Abilio de Oliveira[3], Isabelle Padilha[3], Anderson Kobayashi[3], Kenia e Silva[3] and Heraldo de Oliveira[1], [1]BUG- Agentes Biológicos, Piracicaba, Brazil, [2]Ocassio, Piracicaba, Brazil, [3]G. Bio, Ribeirao Preto, Brazil

D3339 Oviposition site preference of *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) in soybean. **Fernanda Pereira** (fernandapolastre@hotmail.com), José Parra, Alexandre Diniz and Cristina Ramos, Univ. of São Paulo, Piracicaba, Brazil

D3340 Agronomic assessment of neonicotinoid insecticidal seed treatments on corn and soybeans. **Keri Carstens** (keri.carstens@pioneer.com), Keith O'Bryan and Meredith Burnison, DuPont Pioneer, Johnston, IA

D3341 Traits, chemistry, and cultural practices: A systems approach for managing corn rootworm. **Sean Evans** (spevan@monsanto.com), Monsanto Company, St. Louis, MO

D3342 Suppression of corn rootworm populations in Illinois: Comparing recent statewide surveys with historical efforts. **Nicholas Tinsley** (tinsley@illinois.edu), Joseph Spencer, Ronald Estes, Alexandra Kaluf, Kelly Estes and Michael Gray, Univ. of Illinois, Champaign, IL

D3343 Nebraska corn growers response to rootworm resistance to Bt corn: Survey to assess awareness, practice change, and information sources. **Robert Wright** (rwright2@unl.edu), Lance Meinke and Douglas Golick, Univ. of Nebraska, Lincoln, NE

D3344 The challenge of managing Bt-resistant western corn rootworm, *Diabrotica virgifera virgifera*, populations: A Minnesota example. **Bruce D. Potter** (bpotter@umn.edu)[1], Ken Ostlie[2] and Travis Vollmer[1], [1]Univ. of Minnesota, Lamberton, MN, [2]Univ. of Minnesota, St. Paul, MN

D3345 Continuous rearing of the western corn rootworm, *Diabrotica virgifera virgifera,* on an artificial diet. **Man Huynh** (mphd32@mail.missouri.edu)[1,2], Lisa Meihls[3], Dalton Ludwick[1], Randall Niedz[4], Stephen L. Lapointe[4], Thomas A. Coudron[3] and Bruce Hibbard[3], [1]Univ. of Missouri, Columbia, MO, [2]Can Tho Univ., Can Tho, Vietnam, [3]USDA - ARS, Columbia, MO, [4]USDA - ARS, Fort Pierce, FL

D3346 Differential gene expression in rotation-resistant and wild-type western corn rootworm beetle, *Diabrotica virgifera virgifera*, digestive tracts. **Chia-Ching Chu** (cchu9@illinois.edu)[1,2], Jorge Zavala[3], Joseph Spencer[1], Matías Curzi[4], Christopher Fields[5], Jenny Drnevich[5], Blair Siegfried[6,7] and Manfredo Seufferheld[1], [1]Univ. of Illinois, Champaign, IL, [2]Univ. of Florida, Lake Alfred, FL, [3]Univ. of Buenos Aires, Buenos Aires, Argentina, [4]DuPont Pioneer, Salto, Argentina, [5]Roy J. Carver Biotechnology Center, Urbana, IL, [6]Univ. of Florida, Gainesville, FL, [7]Univ. of Nebraska, Lincoln, NE

D3347 Field performance of Cry1F and Vip3A Bt traits under varying western bean cutworm pressure. **Westen Archibald** (westen.archibald@gmail.com)[1], Douglas Jones[2], Robert Wright[3] and Julie A. Peterson[1], [1]Univ. of Nebraska, North Platte, NE, [2]Monsanto Company, St. Louis, MO, [3]Univ. of Nebraska, Lincoln, NE

D3348 Selection and characterization of resistance to the Vip3Aa20 protein from *Bacillus thuringiensis* in *Spodoptera frugiperda* (Lepidoptera: Noctuidae). **Oderlei Bernardi** (oderleibernardi@yahoo.com.br)[1], Daniel Bernardi[1], Renato Horikoshi[1], Daniela Okuma[1], Leonardo Miraldo[1], Julio Fatoretto[2], Fernanda Medeiros[2], Tony Burd[3] and Celso Omoto[1], [1]Univ. of São Paulo, Piracicaba, Brazil, [2]Syngenta Proteção de Cultivos Ltda., São Paulo, Brazil, [3]Syngenta Plant Protection, Greensboro, NC

D3349 Control of *Agrotis ipsilon* in seedlings of transgenic Bt maize after treatment of seeds with different products. **Alexandre Pinto** (aspinn@uol.com.br)[1], José dos Reis[2], Leonardo Aziani[2], Guilherme de Souza[2], Antonio Santos[3] and Luiz Marques[4], [1]BUG- Agentes Biológicos, Piracicaba, Brazil, [2]Centro Universitario Moura Lacerda, Ribeirao Preto, Brazil, [3]Dow AgroSciences, Indianapolis, IN, [4]Dow AgroSciences, Mogi Mirim, Brazil

D3350 Ethogram of fall armyworm, *Spodoptera frugiperda*, and corn earworm, *Helicoverpa zea*: Cannibalism/predation behavior. José P. G. F. Silva[1], **Debora Goulart Montezano** (deiagm@gmail.com)[2], Silvana V. Paula-Moraes[3], Edson Baldin[4] and Thomas Hunt[5], [1]Univ. Estadual Paulista, Botucatu, Brazil, [2]Univ. of Nebraska, North Platte, NE, [3]Empresa Brasileira de Pesquisa Agropecuária Cerrados, Planaltina, Brazil, [4]Univ. Estadual Paulista, Botucatu, Brazil, [5]Univ. of Nebraska, Concord, NE

D3351 Impact of pollen contamination on survival and development of corn earworm in different seed blended scenarios of non-Bt and pyramided Bt corn. **Fei Yang** (fyang@agcenter.lsu.edu)[1], David L. Kerns[2], Graham P. Head[3], R. Levy[4], Ying Niu[1] and Fangneng Huang[1], [1]Louisiana State Univ., Baton Rouge, LA, [2]Louisiana State Univ., Winnsboro, LA, [3]Monsanto Company, St. Louis, MO, [4]Louisiana State Univ., Alexandria, LA

D3352 Presentation withdrawn

D3353 True armyworm, rye cover, and no-till: An unfortunate combination in 2015. **Mike W. Dunbar** (dunbar@iastate.edu), Adam Varenhorst, Erin W. Hodgson, Matt O'Neal and Aaron J. Gassmann, Iowa State Univ., Ames, IA

D3354 Preliminary evaluations of the economic threshold for fall armyworm, *Spodoptera frugiperda*, in whorl stage non-Bt field corn. **Glenn Studebaker** (gstudebaker@uaex.edu)[1], Gus Lorenz[2] and Nicholas Seiter[3], [1]Univ. of Arkansas Cooperative Extension Service, Keiser, AR, [2]Univ. of Arkansas, Lonoke, AR, [3]Univ. of Arkansas, Monticello, AR

D3355 Center for Ecology, Evolution and Management of Pesticide Resistance. **Thomas Hunt** (thunt2@unl.edu)[1], Todd Gaines[2] and Philip Westra[2], [1]Univ. of Nebraska, Concord, NE, [2]Colorado State Univ., Fort Collins, CO

D3356 Maize transcriptional responses to insect herbivory. **Saumik Basu** (saumbios@gmail.com), Suresh Varsani and Joe Louis, Univ. of Nebraska, Lincoln, NE

D3357 Preliminary comparison of two transcriptome databases from southern corn rootworm, *Diabrotica undecimpunctata howardi* (Barber), and western corn rootworm, *Diabrotica virgifera virgifera* LeConte. **Haichuan Wang** (hwang4@unl.edu)[1], Adriano Pereira[1] and Blair Siegfried[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL

D3358 Susceptibility of Cry1F-susceptible, -resistant, and -heterozygous fall armyworm to transgenic cotton expressing pyramided Bt genes. Fei Yang[1], **David L. Kerns** (dkerns@agcenter.lsu.edu)[2], Nathaniel Jones[2] and Fangneng Huang[1], [1]Louisiana State Univ., Baton Rouge, LA, [2]Louisiana State Univ., Winnsboro, LA

D3359 Transcriptome analysis of xylem feeding insects reveals low diveristy in detoxifying cytochrome P450 enzymes. **Charles Cowden** (charles.cowden@ars.usda.gov), Steven J. Castle and Joe Hull, USDA - ARS, Maricopa, AZ

D3360 Plasmid DNA associated with crystal protein coding in *Bacillus thuringiensis* CAB565 and CAB566. **You-Kyoung Lee** (dldbrud119@hanmail.net), Na-Young Jin, Jun-Hack Jeon, Yu-Seop Kim, Bo-Ram Lee, Hee Ji Kim, Soo Jeung Ahn, Young-Nam Youn and Yong-Man Yu, Chungnam National Univ., Daejeon, South Korea

D3361 Parasitism and optimization of *Hyposoter didymator* (Hymenoptera: Ichneumonidae) rearing on *Spodoptera littoralis* and *Helicoverpa armigera* (Lepidoptera: Noctuidae). **Dalia Shawer** (dalia_shamel@yahoo.com)[1] and Adel Hatem[2], [1]Kafrelsheikh Univ., Kafr Elsheikh, Egypt, [2]Agricultural Research Center, Giza, Egypt

D3362 Using niche models to understand the occurrence of *Helicoverpa armigera* outbreaks in South America. **Rogério Gonçalves** (rogeriomg20@yahoo.com.br)[1], Daniel Silva[2], Thiago Mastrangelo[3] and Ana Maria L. Azeredo-Espin[4], [1]CBMEG/UNICAMP, Campinas, Brazil, [2]Instituto Federal Goiano, Urutaí, Brazil, [3]Center for Nuclear Energy in Agriculture, Piracicaba, Brazil, [4]State Univ. of Campinas, Campinas, Brazil

D3363 Potential of a commercial NPV formulation to control heliothines in Bt and non-Bt cottons. **Nathan Little** (nathan.little@ars.usda.gov), Randall Luttrell and K. Clint Allen, USDA - ARS, Stoneville, MS

D3364 Evaluating plant and plant oil repellency against the sweetpotato whitefly, *Bemisia tabaci*. **Jesusa C. Legaspi** (Jesusa.Legaspi@ars.usda.gov)[1], Neil Miller[1], Muhammad Haseeb[2], Lambert Kanga[2] and Danielle Wolaver[2], [1]USDA - ARS, Tallahassee, FL, [2]Florida A&M Univ., Tallahassee, FL

D3365 Predation of sentinel bollworm eggs in glanded and glandless cotton. **Jane Breen Pierce** (japierce@nmsu.edu), Patricia E. Monk and John Idowu, New Mexico State Univ., Las Cruces, NM

D3366 Effects of *Lygus lineolaris* nymph feeding on anatomy of cotton squares in relation to EPG-monitored feeding. **Eeva Sharma** (eevasharma@mail.fresnostate.edu)[1], John Bushoven[1], Elaine Backus[2] and Felix Cervantes[3], [1]California State Univ., Fresno, CA, [2]USDA - ARS, Parlier, CA, [3]Univ. of California, Parlier, CA

D3367 Telling the story of pink bollworm eradication through a museum exhibit. **Michelle Walters** (michelle.l.walters@aphis.usda.gov)[1], Andrea Walton[1], Timothy Walters[2], Sangmi Lee[3], Soon Flynn[3], John Claus[1] and Guolei Tang[1], [1]USDA - APHIS, Phoenix, AZ, [2]Arizona Museum of Natural History, Mesa, AZ, [3]Arizona State Univ., Tempe, AZ

D3368 Conditional mutualism in a plant-virus-vector interaction is facilitated by drought stress. Thomas S. Davis, Nilsa A. Bosque-Pérez and **Sanford D. Eigenbrode** (sanforde@uidaho.edu), Univ. of Idaho, Moscow, ID

D3369 Landscape, climatic factors and the abundance of cereal aphids in the Pacific Northwest, USA. **S. Ebrahim Sadeghi** (ebrahims@uidaho.edu)[1], Thomas Davis[1], Ying Wu[1], Bahman Shafii[1], Stephen Fricke[2], John Abatzoglou[1] and Sanford Eigenbrode[1], [1]Univ. of Idaho, Moscow, ID, [2]Univ. of Illinois, Champaign, IL

D3370 Host composition effects on bird cherry-oat aphid, *Rhopalosiphum padi* L., behavior and reproduction. **Dayna Collett** (dayna.collett@okstate.edu) and Kris Giles, Oklahoma State Univ., Stillwater, OK

D3371 Predicting lady beetle and green lacewing abundance in winter canola and wheat agroecosystems. **Casi N. Jessie** (casi.jessie@okstate.edu)[1], Kris Giles[1], Timothy J. Kring[2] and Brian McCornack[3], [1]Oklahoma State Univ., Stillwater, OK, [2]Univ. of Arkansas, Fayetteville, AR, [3]Kansas State Univ., Manhattan, KS

D3372 Stink bugs (Hemiptera: Heteroptera: Pentatomidae) of Minnesota wheat: Species composition, abundance and phenology. **Walter Rich** (richx082@umn.edu)[1], Tiffany Pahs[2] and Robert Koch[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Minnesota Dept. of Agriculture, St. Paul, MN

D3373 What's eating those flea beetles? A molecular approach applied to sustainable management in canola. Barbara Sharanowski, **Ana Dal Molin** (adalmolin@tamu.edu) and Leanne Peixoto, Univ. of Manitoba, Winnipeg, MB, Canada

D3374 Ovipositional preference of wheat stem sawflies, *Cephus cinctus*. **Nuha Altilmisani** (nuha.altilmisani@hotmail.com), Frank B. Peairs and Paul Ode, Colorado State Univ., Fort Collins, CO

D3375 Effect of Thimet against wheat stem sawfly, *Cephus cinctus*. **John Miller** (jhmiller@montana.edu), Amber Ferda, Julie Prewett, Brian Thompson and Gadi V.P. Reddy, Montana State Univ., Conrad, MT

D3376 Identify, understand and communicate the influence of different parameters in production of the biofuel crop, *Miscanthus* x *giganteus*. **Godshen Pallipparambil** (grpallip@ncsu.edu)[1], S. Raghu[2] and Robert N. Wiedenmann[3], [1]NSF Center for Integrated Pest Management, Raleigh, NC, [2]CSIRO EcoSystem Sciences, Brisbane, Australia, [3]Univ. of Arkansas, Fayetteville, AR

D3377 Integrated pest management for developing countries in Africa and Asia. **Amer Fayad** (afayad@vt.edu) and Rangaswamy R. Muniappan, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3378 New lead to control brown planthopper, *Nilaparvata lugens,* in transgenic rice. **Leonardo Magalhaes** (leonardo.magalhaes@bayer.com)[1], Alberto Bressan[1], Duane Lehtinen[1], Daniela Portz[2], Sonum Sharma[3], Amit Awasthi[3], Eveline Bossier[4], Steven Muylaert[4], Jeroen Van Rie[4] and Razvan Dumitru[1], [1]Bayer CropScience, Morrisville, NC, [2]Bayer CropScience, Monheim, Germany, [3]Bayer CropScience, India, [4]Bayer CropScience, Ghent, Belgium

D3379 Screen for rice leaffolder resistant rice genotypes in Taiwan. **Wen-Po Chuang** (wenpo@ntu.edu.tw)[1] and Chung-Ta Liao[2], [1]National Taiwan Univ., Taipei, Taiwan, [2]Taichung District Agricultural Research and Extension Station, Changhua County, Taiwan

D3380 Updating polo software for arthropod bioassays. **Efren Olguin** (efrenrangel7@gmail.com)[1] and Moneen Jones[2], [1]Harmony Search Software, Colonia del Valle, Mexico, [2]Univ. of Missouri, Portageville, MO

D3381 Measurements of tarnished plant bug, *Lygus lineolaris*, susceptibility to insecticides in the Mississippi Delta. **Randall Luttrell** (randy.luttrell@ars.usda.gov), Maribel Portilla, Katherine Parys, Nathan Little and K. Clint Allen, USDA - ARS, Stoneville, MS

D3382 Baseline susceptibility of *Lygus lineolaris* (Palisot de Beauvois) to Novaluron. **Katherine Parys** (katherine.parys@ars.usda.gov), Gordon Snodgrass, Randall Luttrell, K. Clint Allen and Nathan Little, USDA - ARS, Stoneville, MS

D3383 Susceptibility of tarnished plant bug (Hemiptera: Miridae) adults and larvae to selected reduced-risk insecticides and development of three diagnostic doses. Moneen Jones[1], **Jessica Duckworth** (duckworthjl@missouri.edu)[1] and K. E. M. Hendricks[2], [1]Univ. of Missouri, Portageville, MO, [2]Univ. of Florida, Immokalee, FL

D3384 The impact of organic insecticides on natural enemies of brown marmorated stink bug. **Ashley Colavecchio** (amcola@udel.edu)[1], Kim A. Hoelmer[2], Christine Dieckhoff[2] and Kathleen Tatman[2], [1]Univ. of Delaware, Newark, DE, [2]USDA - ARS, Newark, DE

D3385 Lethal and sublethal effects of newer insecticides on *Chrysoperla johnsoni* and *Chrysoperla carnea* (Neuroptera: Chrysopidae). Kaushalya G. Amarasekare and **Peter W. Shearer** (peter.shearer@oregonstate.edu), Oregon State Univ., Hood River, OR

D3386 *Isoclast™* Active: A novel solution to manage key sap-feeding insects on commodity and specialty crops globally. **Sunil Tewari** (stewari@dow.com)[1] and Melissa Siebert[2], [1]Dow AgroSciences, Fowler, IN, [2]Dow AgroSciences, Greenville, MS

D3387 Fastac™ CS: Formulation innovation for alpha-cypermethrin by BASF. **H. Alejandro Arevalo** (Alejandro.Arevalo@BASF.com), Mitchell Blair, Christa Ellers-Kirk, Daniel O'Byrne, Siddharth Tiwari, Richard Tyler, Rianna Guethling and Rebecca Willis, BASF Corporation, Research Triangle Park, NC

D3388 Endophytic lifestyle of an insect pathogen causes isolate-specific differences in the development of the host plant but not in its herbivores. **Helena Brochero** (embrochero@unal.edu.co)[1,2], Michael Rostas[3], Travis Glare[2], Maya Raad[2] and Aimee McKinnon[2], [1]Universidad Nacional de Colombia, Bogotá, Colombia, [2]Bio-Protection Research Centre, Lincoln, New Zealand, [3]Lincoln Univ., Canterbury, New Zealand

D3389 An endoparasitic egg hunt: Does habitat complexity mediate attack by *Trissolcus japonicus* (Hymenoptera: Platygastridae) on non-target stink bugs? **Paul Botch** (botchpau@msu.edu) and Ernest Delfosse, Michigan State Univ., East Lansing, MI

D3390 Natural levels of parasitism on tarnished plant bug adults from wild hosts in the Mississippi delta. Maribel Portilla, Randall Luttrell, Katherine Parys, K. Clint Allen, **Omaththage P. Perera** (op.perera@ars.usda.gov) and Nathan Little, USDA - ARS, Stoneville, MS

D3392 How did the oakworm get its stripes? **Evan Lampert** (Evan.lampert@ung.edu), Univ. of North Georgia, Oakwood, GA

D3391 Neonicotinoid seed treatments reduce beneficial predator and pollinator populations in cultivated sunflowers. **Mike Bredeson** (mmbredeson@jacks.sdstate.edu)[1,2] and Jonathan Lundgren[2], [1]South Dakota State Univ., Brookings, SD, [2]USDA - ARS, Brookings, SD

SysEB Section Poster Session A

Exhibit Hall BC (Convention Center)

D3393 Developing least disruptive management methods for rangeland grasshopper ecosystems: Trial year 2014. Andrea Walton[1,2], Chelsey Tellez[2], Larry E. Jech[1], Chris Reuter[3], Lonnie R. Black[3], R. Nelson Foster[1], Nico Franz[2] and **Sangmi Lee** (slee281@asu.edu)[2], [1]USDA - APHIS, Phoenix, AZ, [2]Arizona State Univ., Tempe, AZ, [3]USDA - ARS, Phoenix, AZ

D3394 Behavioral interactions between the velvety tree ant, *Liometopum occidentale* (Hymenoptera: Formicidae), and phorid flies (Diptera: Phoridae). **Luigi Vigil** (luigivigil@gmail.com) and Cheryl Hogue, California State Univ., Northridge, CA

D3395 Preliminary cladistic analysis for the Scotaenini (Hymenoptera: Tiphiidae, Thynninae) genera. **Cíntia Justino** (cintiaelju@gmail.com)[1,2] and Fernando Noll[2], [1]Carnegie Museum of Natural History, Pittsburgh, PA, [2]UNESP, São José do Rio Preto, Brazil

D3396 The Pselaphinae (Coleoptera: Staphylinidae) of Louisiana. **Brittany Owens** (brittanyeowens@gmail.com) and Christopher E. Carlton, Louisiana State Univ., Baton Rouge, LA

D3397 Crowd sourcing explained: BugGuide as a model for extension diagnostics. **Laura Jesse** (ljesse@iastate.edu), John VanDyk and Daren Mueller, Iowa State Univ., Ames, IA

D3398 Pantropical Carabidae: Studies of the genus *Plochionus* Dejean 1821, the tent-caterpillar hunters. **Beulah Garner** (b.garner@nhm.ac.uk)[1] and Terry Erwin[2], [1]Natural History Museum, London, United Kingdom, [2]Smithsonian Institution National Museum of Natural History, Washington, DC

D3399 A key to genera of neotropical Tingidae. **Alex Knudson** (alexander.knudson.2@ndsu.edu)[1] and Adam Wallner[2], [1]Univ. of North Dakota, Fargo, ND, [2]USDA - APHIS, Miami, FL

D3400 Beyond Plinko® keys: Illustrated identification tools for known world Dryophthorinae immatures with the first description of the preimaginal stages of 3 genera. **Maria Lourdes Chamorro** (lourdes.chamorro@ars.usda.gov), USDA - ARS, Washington, DC

D3401 The state of BugGuide: Past, present, and future. **John VanDyk** (jvandyk@iastate.edu), Laura Jesse and Sue Blodgett, Iowa State Univ., Ames, IA

D3402 Systematics of Eustylini and Geonemini (Curculionidae: Entiminae). **Guanyang Zhang** (gyz151@gmail.com) and Nico Franz, Arizona State Univ., Tempe, AZ

D3403 Immature stages of *Compsobata univitta* (Diptera: Micropezidae: Calobatinae). **Jeffrey K. Barnes** (jbarnes@uark.edu), Univ. of Arkansas, Fayetteville, AR

D3404 Comparison of morphometric indices in male and female imagos of *Calliptamus barbarus* (Orthoptera: Calliptaminae) in the region of Jijel, Algeria. **Rouibah Moad** (rouibahm@yahoo.com), University of Jijel, Jijel, Algeria

D3405 Phylogenetic relationship among frog-biting midges (Corethrellidae). **Ivonne Meuche** (imeuche@purdue.edu), Jennifer Zaspel and Ximena Bernal, Purdue Univ., West Lafayette, IN

D3406 Guantanamo blues: Taking a closer look at *Cyclargus* (Lepidoptera: Lycaenidae) from Cuba. Deborah Matthews[1], **Jacqueline Miller** (jmiller@flmnh.ufl.edu)[1], Andrew Warren[1], James Toomey[1], Roger Portell[1], Terry Lott[1] and Nick Grishin[2], [1]Florida Museum of Natural History, Gainesville, FL, [2]Univ. of Texas Southwestern Medical Center, Dallas, TX

D3407 Building a weevil (Coleoptera: Curculionidae) phenotype ontology from the bottom up. **Nico Franz** (nico.franz@asu.edu)[1], Salvatore S. Anzaldo[1], Michael Andrew Jansen[1], Matthew L. Gimmel[2], M. Andrew Johnston[1] and Guanyang Zhang[1], [1]Arizona State Univ., Tempe, AZ, [2]Santa Barbara Museum of Natural History, Santa Barbara, CA

D3408 First detection of European honey bee, *Apis mellifera*, viruses in the bee louse, *Braula coeca*, and comparison to viruses in *Varroa destructor* mites. **Megan Colwell** (colwellm@myumanitoba.ca)[1], Rob Currie[1] and Stephen Pernal[2], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

Virtual Posters

Exhibit Hall BC (Convention Center)

VP0022 Biological activity of essential oil of sage plant leaves, *Salvia officinalis* L., against the black cutworm *Agrotis ipsilon* (Hubn.). **Aziza Sharaby** (sharaby_aziza@yahoo.com)[1] and Asma EL-Nujiban[2], [1]National Research Center, Cairo, Egypt, [2]Qassim Univ., Qassim, Saudi Arabia

VP0023 Synergistic effect of garlic oil and *Bacillus thuringiensis* toward *Spodoptera exigua*. **Ninfa M. Rosas-Garcia** (nrosas@ipn.mx)[1], Johana Perez-Gomez[2], Maribel Mireles-Matinez[1], Alma Paz-González[1], Jesús M. Villegas-Mendoza[1] and Gildardo Rivera[1], [1]Centro de Biotecnología Genómica-Instituto Politécnico Nacional, Reynosa, Mexico, [2]Universidad Autónoma de Tamaulipas, Reynosa, Mexico

VP0024 Efficacy of ethyl formate and phosphine, applied alone and in combination, on imported pineapple to control citrus mealybug, *Planococcus citri*. **Jeong Oh Yang** (joyang12@korea.kr)[1], Dong-Hoon Cho[1], Byung-Ho Lee[2], Min-Goo Park[1] and BongSu Kim[2], [1]Animal and Plant Quarantine Agency, Suwon, South Korea, [2]Dongbu Farm Hannong, Nonsan, South Korea

VP0025 Could neonicotinoid stake dips interfere with biological control of the cassava mealybug, *Phenacoccus manihoti*, in Thailand? **Sirilak Lankaew** (sirilak.lk@gmail.com)[1], Phanuwat Moonjuntha[1], Prapit Wongtiem[1] and Kris Wyckhuys[2], [1]Rayong Field Crops Research Center, Rayong, Thailand, [2]International Center for Tropical Agriculture, Hanoi, Vietnam

VP0026 Pyrethroid insecticide resistance *kdr* gene in the house fly, *Musca domestica* (Diptera: Muscidae), in the United Arab Emirates. **Mohammad Ali Al-Deeb** (m_aldeeb@uaeu.ac.ae), United Arab Emirates Univ., Al-Ain, United Arab Emirates

VP0027 Characterize cantharidin-biosynthetic enzymes in *Epicauta chinensis* and identify the inhibitory effects of cantharidin on the PxPSPs in *Plutella xylostella*. **Yalin Zhang** (yalinzh@nwsuaf.edu.cn), Northwest A&F Univ., Yangling, China

VP0028 Biological activity of *Citrus monstruosa* on the medfly, *Ceratitis capitata* Wiedemann (Diptera: Tephritidae). Giorgia Sarais[1],

Giacomo Petretto[2], Carla Lai[1], Francesco Loy[3], Paolo Solari[3], Roberto Crnjar[3] and **Carla Masala** (cmasala@unica.it)[3], [1]Univ. of Cagliari, Cagliari, Italy, [2]Univ. of Sassari, Sassari, Italy, [3]Univ. of Cagliari, Monserrato, Italy

VP0029 Identifying the insect culprit behind a regional cassava disease pandemic. **Chi Tran** (chitran.ctt54@gmail.com)[1], Nami Minato[2], Vi Le[1], Hoat Trinh[1] and Kris Wyckhuys[2], [1]Plant Protection Research Institute, Hanoi, Vietnam, [2]International Center for Tropical Agriculture, Hanoi, Vietnam

VP0030 The role of the foregut in digestion of the cricket, *Teleogryllus commodus* Walker, and the locust, *Chortoicetes terminifera* Walker. Shang Zhou[1], James Woodman[2] and **Paul D. Cooper** (paul.cooper@anu.edu.au)[1], [1]The Australian National Univ., Canberra, Australia, [2]Australian Government Dept. of Agriculture, Canberra, Australia

VP0031 Interspecific differences in Haller's organ in two species of Saudi Arabian ticks detected with scanning electron microscopy. **Souad Alsaqabi** (dr-alsaqabi@hotmail.com), Qassim Univ., Qassim, Saudi Arabia

VP0032 A new look at insect hormones. **Karel Sláma** (slama@entu.cas.cz), Czech Academy of Sciences, Ceske Budejovice, Czech Republic

VP0033 Morphological markers in embryonic development of *Drosophila suzukii* (Diptera: Drosophilidae): Prerequisites for cryopreservation. Silvia Landi, Elisabetta Gargani, Francesco Paoli, **Sauro Simoni** (sauro.simoni@entecra.it) and Pio Roversi, Research Center for Agrobiology and Pedology, Florence, Italy

VP0034 CryomiRs: Characterization of a cold-associated family of microRNAs in *E. solidaginis* and *E. scudderiana*. Pierre Lyons[1], Nicolas Crapoulet[2], Kenneth Storey[3] and **Pier Jr Morin** (pier.morin@umoncton.ca)[1], [1]Univ. de Moncton, Moncton, NB, Canada, [2]Atlantic Cancer Research Institute, Moncton, NB, Canada, [3]Carleton Univ., Ottawa, ON, Canada

VP0035 Soil fertilization modulates development and reproduction of the invasive cassava mealybug, *Phenacoccus manihoti*. **Dang Hoa Tran** (trandanghoa@huaf.edu.vn)[1], Thi Giang Nguyen[1], Huu Tinh Hoang[1], Trong Nghia Hoang[1], Khac Phuc Le[1], Ignazio Graziosi[2] and Kris Wyckhuys[2], [1]Hue Univ. of Agriculture and Forestry, Hue, Vietnam, [2]International Center for Tropical Agriculture, Hanoi, Vietnam

VP0036 Larval interactions in a guild of butterflies feeding in seedpods of a perennial legume. **Rafael Obregón** (rafaobregonr@gmail.com), Juan Fernández Haeger and Diego Jordano, Univ. of Córdoba, Córdoba, Spain

Program Symposium: Applying a Systems Approach - Emergent Outcomes of Multidimensional Interactions in Agroecosystems

Auditorium 1 (Convention Center)

Moderators and Organizers: Randa Jabbour[1] and Mary Barbercheck[2], [1]Univ. of Wyoming, Laramie, WY, [2]Pennsylvania State Univ., University Park, PA

8:00 Introductory Remarks

8:05 0880 Promoting biodiversity and functional agroecosystems at local and landscape scales. **David Crowder** (dcrowder@wsu.edu), Washington State Univ., Pullman, WA

8:30 0881 A slug in the system: Unintended effects of neonicotinoid seed treatments in no-till corn and soybeans. **Margaret Douglas** (mrd276@psu.edu) and John Tooker, Pennsylvania State Univ., University Park, PA

8:55 0882 Disrupting the network? Assessing the impacts of pesticide seed treatments on multi-trophic interactions in the soil system. **Lesley Atwood** (lesley.atwood@wildcats.unh.edu)[1], Richard Smith[1], David A. Mortensen[2] and Roger Koide[3], [1]Univ. of New Hampshire, Durham, NH, [2]Pennsylvania State Univ., University Park, PA, [3]Brigham Young Univ., Provo, UT

9:20 0883 Premier Presentation: Development of a system approach to multi-pest management: Application of a Bayesian decision theory approach to the joint management of *Cephus cinctus* Norton (Hymenoptera: Cephidae) and *Bromus tectorum* L. **Fabian Menalled** (menalled@montana.edu)[1], Ilai Keren[2], David K. Weaver[1] and James Robison-Cox[1], [1]Montana State Univ., Bozeman, MT, [2]Washington Dept. of Fish and Wildlife, Olympia, WA

9:45 Break

10:00 0884 Quantitative approaches to agroecosystem multifunctionality assessment. **Denise Finney** (dmf272@psu.edu), Pennsylvania State Univ., University Park, PA

10:25 0885 A systems model for extension: Integrating farmer participatory learning, on-farm research and extension outputs. **Charlie White** (cmw29@psu.edu)[1], Tianna DuPont[2], Dave Hartman[3] and Mena Hautau[4], [1]Pennsylvania State Univ., University Park, PA, [2]Pennsylvania State Extension, Nazareth, PA, [3]Pennsylvania State Extension, Bloomsburg, PA, [4]Pennsylvania State Extension, Leesport, PA

10:50 0886 Farmer-student engagement facilitates systems-level assessment: The case of genetically-modified sugarbeets in Wyoming. **Randa Jabbour** (rjabbour@uwyo.edu), Univ. of Wyoming, Laramie, WY

11:15 0887 Agroecology as an academic platform to improve science capacity and sustainability in agriculture. **Alexis Racelis** (racelisae@utpa.edu)[1], Danika Brown[1], Daniel Plas[1], Tim Sears[1], Kenneth R. Summy[1], Angela Chapman[1], Carlo R. Moreno[1], Mike Morris[2] and Robert Maggiani[2], [1]Univ. of Texas Rio Grande Valley, Edinburg, TX, [2]National Center for Appropriate Technology, Edinburg, TX

11:40 Concluding Remarks

Joint Symposium: Bugs and Dirt: Four Letter Words That Go Together

M100 D (Convention Center)

Moderators and Organizers: Randall Southard[1], Edwin Lewis[1], Daniel Hirmas[2] and Rufus Isaacs[3], [1]Univ. of California, Davis, CA, [2]Univ. of Kansas, Lawrence, KS, [3]Michigan State Univ., East Lansing, MI

7:55 Introductory Remarks

8:00 0888 Soil ecology and soil health. **Howard Ferris** (hferris@ucdavis.edu), Univ. of California, Davis, CA

8:30 0889 The wondrous habits of ground-nesting bees: Ubiquitous, diverse, but inscrutable. **James H. Cane** (jim.cane@ars.usda.gov), USDA - ARS, Logan, UT

9:00 0890 Mason bees: The union between pollination and soils. **Dave Hunter**, Crown Bees, Wooinville, WA

9:30 0891 The effect of soil disturbance on a ground nesting bee. **Katharina Ullman** (katharina@xerces.org), Xerces Society for Invertebrate Conservation, Portland, OR

10:00 Break

10:15 0892 Observations on subsurface behaviors and mixing patterns of ants. **Alan Halfen** (afhalfen@ku.edu) and Stephen Hasiotis, Univ. of Kansas, Lawrence, KS

10:45 0893 Making a mountain out of an anthill: Ancient hymenopteran influence on calcrete outcrop expression, Neogene Ogallala Formation, western Kansas, USA. **Brian Platt** (bfplatt@olemiss.edu)[1], Jon Smith[2], Greg Ludvigson[2] and Joseph Thomasson[3], [1]Univ. of Mississippi, Univ., MS, [2]Kansas Geological Survey, Lawrence, KS, [3]Fort Hays State Univ., Hays, KS

11:15 0894 Plasticity of soil-dwelling ant nest architecture and effects on soil properties in environments of contrasting soil texture. **Kim Drager** (kdrager2@illinois.edu) and Andrew Suarez, Univ. of Illinois, Champaign, IL

11:30 Discussion

12:00 Adjorn

MUVE Section Symposium: 30 Years of Hunting the Tiger. *Aedes albopictus* in America: Current Perspectives and Future Challenges

206 AB (Convention Center)

Moderator and Organizer: Donald A. Yee, Univ. of Southern Mississippi, Hattiesburg, MS

8:00 Introductory Remarks

8:05 0895 The response of *Aedes aegypti* to *Aedes albopictus* invasion: Insights from landscape ecology and population genetics. **Kristen Hopperstad** (kahopper@ncsu.edu) and Michael Reiskind, North Carolina State Univ., Raleigh, NC

8:25 0896 Satyrization and satyrization-resistance as contributors to the distribution and abundance of *Aedes albopictus* and *Aedes aegypti* in Florida. **L. Phil Lounibos** (lounibos@ufl.edu), Irka E. Bargielowski and María Cristina Carrasquilla, Univ. of Florida, Vero Beach, FL

8:45 0897 Escaping competitive exclusion from *Aedes albopictus:* Back to the future to explore the time-space continuum. **Paul T. Leisnham** (leisnham@umd.edu)[1], Shannon L. LaDeau[2], Megan Saunders[1] and Dawn Biehler[3], [1]Univ. of Maryland, College Park, MD, [2]Cary Institute of Ecosystem Studies, Millbrook, NY, [3]Univ. of Maryland Baltimore County, Catonsville, MD

9:05 0898 The evolution and molecular physiology of diapause in North American *Aedes albopictus*. **Peter Armbruster** (paa9@georgetown.edu), Georgetown Univ., Washington, DC

9:25 0899 *Aedes albopictus* range maps, challenges and ways forward. **Moritz Kraemer** (moritz.kraemer@zoo.ox.ac.uk), Univ. of Oxford, Oxford, United Kingdom

9:45 0900 The role of *Aedes albopictus* in chikungunya virus transmission. **Stephen Higgs** (shiggs@bri.ksu.edu), Kansas State Univ., Manhattan, KS

10:05 Intermission

10:20 0901 How nutrients and nutrient stoichiometry can lead to a deeper understanding of the success of *Aedes albopictus*. **Donald Yee** (donald.yee@usm.edu), Univ. of Southern Mississippi, Hattiesburg, MS

10:40 0902 The impact of pesticides on midgut microbiota of *Aedes albopictus*. **Ephantus J. Muturi** (emuturi2@illinois.edu), Univ. of Illinois, Champaign, IL

11:00 0903 Premier Presentation: Field trials of autocidal approaches to suppress *Aedes albopictus*. **Stephen Dobson** (sdobson@uky.edu), Univ. of Kentucky, Lexington, KY

11:20 0904 Effective larval and adult control measures against *Aedes albopictus*. **Ary Farajii** (ary@slcmad.org), Salt Lake City Mosquito Abatement District, Salt Lake City, UT

11:40 0905 Density effects on *Aedes albopictus*: Unintended consequences of mosquito control? **Steven Juliano** (sajulian@ilstu.edu)[1], Kristina McIntire[1], Alex Moss[1], Bruce Noden[2], Joseph E. Fader[3] and Paul A. O'Neal[4], [1]Illinois State Univ., Normal, IL, [2]Oklahoma State Univ., Stillwater, OK, [3]Duke Univ. Marine Lab, Beaufort, NC, [4]Tennessee State Univ., McMinnville, TN

PBT Section Symposium: Insect Resistance to Traits and Weed Resistance to Herbicides: Learnings, Opportunities and Partnerships for Sustainable Management Programs

211 A (Convention Center)

Moderators and Organizers: Murugesan Rangasamy, Nandi Nagaraj and Robert Masters, Dow AgroSciences, Indianapolis, IN

8:00 Introductory Remarks

8:05 0906 The science, logistics, and realities of implementing effective insecticide resistance management to GM crops. **Scott Stewart**, Univ. of Tennessee, Knoxville, TN

8:25 0907 Herbicide resistance: A threat to global crop production systems. **David Shaw** (dshaw@research.msstate.edu), Mississippi State Univ., Mississippi State, MS

8:45 0908 Supporting resistance management through cooperative research: A commodity checkoff's perspective. Robert L. Nichols and **Ryan E. Kurtz** (rkurtz@cottoninc.com), Cotton Incorporated, Cary, NC

9:05 0909 A diversity of tactics is essential for effective herbicide-resistant weed management. **Micheal D. Owen** (mdowen@iastate.edu), Iowa State Univ., Ames, IA

9:25 Break

9:35 0910 Resistance management for GM crops: Industry principles, policies, and programs. **Nicholas Storer** (nstorer@dow.com), Dow AgroSciences, Indianapolis, IN

9:55 0911 Industry perspectives on herbicide resistance monitoring and mitigation. **Mark Peterson** (mapeterson@dow.com), Dow AgroSciences, Indianapolis, IN

10:15 0912 The evolution of lepidopteran IRM to GM corn: Interactions between research, industry and government. **Thomas Hunt** (thunt2@unl.edu)[1], Richard Hellmich[2], Thomas Sappington[2] and Silvana V. Paula-Moraes[3], [1]Univ. of Nebraska, Concord, NE, [2]USDA - ARS, Ames, IA, [3]Empresa Brasileira de Pesquisa Agropecuária Cerrados, Planaltina, Brazil

10:35 0913 Rationale for community-based approaches to herbicide resistance management. **Jill Schroeder** (jill.schroeder@ars.usda.gov), USDA - ARS, Washington, DC

10:55 Discussion

11:15 Concluding Remarks

PBT Section Symposium: Partnering for Health: Genetic, Behavioral and Environmental Synergies in Insect Immunity

204 AB (Convention Center)

Moderators and Organizers: Michael Simone-Finstrom[1,2], Margarita López-Uribe[2] and Marla Spivak[3], [1]Univ. of Pennsylvania, Philadelphia, PA, [2]North Carolina State Univ., Raleigh, NC, [3]Univ. of Minnesota, St. Paul, MN

8:00 Welcoming Remarks

8:00 0914 Moms know best: Pathogen-induced maternal effects in *Manduca sexta*. **Rebeca B. Rosengaus** (r.rosengaus@neu.edu), Steve Vollmer and Wendy Smith, Northeastern Univ., Boston, MA

8:20 0915 Immunity and other forms of defense against fungal pathogens in pea aphids. **Nicole Gerardo** (nicole.gerardo@emory.edu), Emory Univ., Atlanta, GA

8:40 0916 Pathogen adaptations to individual and social host defenses in ants. **Sylvia Cremer** (sylvia.cremer@ist.ac.at), Institute of Science and Technology Austria, Klosterneuburg, Austria

9:00 Break

9:15 0917 Microbial interactions and honey bee immunity. **Jay Evans** (jay.evans@ars.usda.gov), USDA - ARS, Beltsville, MD

9:35 0918 Symbionts as modulators of virulence and defense in insect-parasite interactions. Michael R. Strand and **Kavita Bitra** (bitrakavita@gmail.com), Univ. of Georgia, Athens, GA

9:55 0919 Premier Presentation: Immune system responses to a drop in food supply: Not a global decline, but a shift in immune system strategy. **Shelley A. Adamo** (sadamo@dal.ca), Dalhousie Univ., Halifax, NS, Canada

10:15 Intermission

10:30 0920 The evolutionary consequences of sociality for immunity. **Margarita M. López-Uribe** (mmlopezu@ncsu.edu), Steven Frank, Robert R. Dunn and David Tarpy, North Carolina State Univ., Raleigh, NC

10:45 0921 The gene expression behind genotype-by-genotype specificity in a bumble bee-trypanosome host-parasite system. **Seth M. Barribeau** (barribeaus14@ecu.edu), East Carolina Univ., Greenville, NC

11:00 0922 Finding the clean genes: The search for loci underpinning hygienic behaviour in the honey bee. **Brock Harpur** (harpur@yorku.ca) and Amro Zayed, York Univ., Toronto, ON, Canada

11:15 Break

11:25 0923 Antimicrobial compounds from plants to the hive: Benefits of a propolis envelope to honey bee immunity and colony health. **Renata Borba** (rsborba@umn.edu) and Marla Spivak, Univ. of Minnesota, St. Paul, MN

11:40 SP0924 Activating honey bee immunity with a larval vaccine against *Nosema ceranae*. Matthew Endler[1], Zachary Y. Huang[2] and **James C. Nieh** (jnieh@ucsd.edu)[1], [1]Univ. of California, San Diego, CA, [2]Michigan State Univ., East Lansing, MI

P-IE Section Symposium: Are We Stressed Enough Yet? Interdisciplinary Partnerships to Evaluate the Consequences of Plant Abiotic and Biotic Stresses

200 F (Convention Center)

Moderators and Organizers: Punya Nachappa[1] and Adrianna Szczepaniec[2], [1]Indiana Univ.-Purdue Univ., Fort Wayne, IN, [2]South Dakota State Univ., Brookings, SD

8:00 Introductory Remarks

8:20 0925 Abiotic and biotic stresses and the susceptibility of plants to a vector-borne pathogen. **Debbie Finke** (finked@Missouri.edu), Univ. of Missouri, Columbia, MO

8:40 0926 Climate change effects on tree-insect interactions. **Mary A. Jamieson** (maryajamieson@gmail.com)[1], Richard L. Lindroth[2], Kenneth Raffa[2] and Peter Reich[3], [1]Oakland Univ., Rochester, MI, [2]Univ. of Wisconsin, Madison, WI, [3]Univ. of Minnesota, St. Paul, MN

9:00 0927 Drought-stress exacerbates the interactions between spider mites and neonicotinoid-treated corn. **Ricardo Ramirez** (ricardo.ramirez@usu.edu), Utah State Univ., Logan, UT

9:20 SP0928 Influence of oxylipin metabolism in plants on insect resistance and drought tolerance. Fiona L. Goggin[1] and **Argelia Lorence** (alorence@astate.edu)[2], [1]Univ. of Arkansas, Fayetteville, AR, [2]Arkansas State Univ., Jonesboro, AR

SD0929 Host-environment mismatches associated with forest trees injured by spruce beetles, *Dendroctonus rufipennis*, and aspen leaf miners, *Phyllocnistis populiella*, in Alaska. **John E. Lundquist** (jlundquist@fs.fed.us)[1] and Robin Reich[2], [1]USDA - Forest Service, Anchorage, AK, [2]Colorado State Univ., Fort Collins, CO

SD0930 Presentation withdrawn

SD0931 Influence of El Niño southern oscillation on historical outbreaks of the southern pine beetle, *Dendroctonus frontalis* Zimmermann, in the southern United States. **Rabiu Olatinwo** (rolatinwo@lsu.edu)[1,2] and Stacy R. Blomquist[1], [1]USDA - Forest Service, Pineville, LA, [2]Louisiana State University, Baton Rouge, LA

9:32 Break

9:42 0932 Interactions among wheat curl mites, wheat streak mosaic and water use efficiency. Jacob Price and **Charles Rush** (crush@ag.tamu.edu), Texas AgriLife Research Center, Amarillo, TX

10:02 0933 Novel perspectives on how drought stress affects plant-herbivore interactions. **Warren Sconiers** (vnugos2386@gmail.com)[1] and Micky Eubanks[2], [1]North Carolina State Univ., Raleigh, NC, [2]Texas A&M Univ., College Station, TX

10:22 0934 Severe drought stress and the nutrient landscape available to generalist herbivores. **Paul Lenhart** (palenhart@gmail.com), Spencer T. Behmer and Micky Eubanks, Texas A&M Univ., College Station, TX

10:42 0935 Urban warming and herbivory lead to declines in street tree function. **Emily K. Meineke** (emily.meineke@gmail.com), Elsa Youngsteadt, Robert R. Dunn and Steven Frank, North Carolina State Univ., Raleigh, NC

11:02 SP0936 Impact of temperature on defensive chemistry of the invasive weed *Echium plantagineum* and implications for its biological control under climatic warming. **Paul A. Weston** (pweston@csu.edu.au)[1], Dominik Skoneczny[1], Leslie A. Weston[1] and Geoffrey Gurr[2], [1]Charles Sturt Univ., Wagga Wagga, Australia, [2]Charles Sturt Univ., Orange, Australia

11:14 Concluding Remarks

P-IE Section Symposium: Effects of Global Climate Change on Species Interactions and Biological Control

208 AB (Convention Center)

Moderators and Organizers: Sanford D. Eigenbrode[1] and David Crowder[2], [1]Univ. of Idaho, Moscow, ID, [2]Washington State Univ., Pullman, WA

8:00 0937 Differential response to climate change among arthropods is altering the structure of arctic communities. **Amanda Koltz** (amanda.koltz@duke.edu)[1], Niels Schmidt[2] and Toke Hoye[2], [1]Duke Univ., Durham, NC, [2]Aarhus Univ., Denmark, NA, Denmark

8:20 0938 Insect community composition and network dynamics along a climate warming-induced plant range shift gradient. **Olga Kostenko** (o.kostenko@nioo.knaw.nl), Stijn Schreven, Freddy ten Hooven, Jeff Harvey and Wim H. van der Putten, Netherlands Institute of Ecology, Wageningen, Netherlands

8:40 0939 Climate change and interaction diversity. **Lee A. Dyer** (nolaclimber@gmail.com), Univ. of Nevada, Reno, NV

9:00 0940 Climate-smart push–pull: Resilient, adaptable conservation agriculture for the future. **Charles Midega** (cmidega@mbita.icipe.org)[1], Zeyaur Khan[1], Toby Bruce[2] and John Pickett[2], [1]International Centre of Insect Physiology and Ecology, Nairobi, Kenya, [2]Rothamsted Research, Harpenden, Hertfordshire, United Kingdom

9:20 0941 Comparing individual and combined effects of night warming and light pollution on top down control of pea aphids. **Colleen Miller** (colleen.rose.miller1@gmail.com) and Brandon Barton, Univ. of Wisconsin, Madison, WI

9:40 0942 Experimental warming has different effects on top-down control of aphids in conventional and organic alfalfa fields. **Brandon Barton** (btbarton@wisc.edu) and Ebony G. Murrell, Univ. of Wisconsin, Madison, WI

10:00 Break

10:20 0943 In the heat of the night: How warming at night can affect an aphid and its predator. **Jason P. Harmon** (jason.harmon@ndsu.edu), North Dakota State Univ., Fargo, ND

10:40 0944 Warm springs result in phenological mismatch and reduced parasitism of the cereal leaf beetle: Implications for biological control in western North America. **Edward W. Evans** (ted.evans@usu.edu)[1] and Sanford Eigenbrode[2], [1]Utah State Univ., Logan, UT, [2]Univ. of Idaho, Moscow, ID

11:00 0945 Effects of climate change on food-web diversity, species interactions, and biological control. **Sarina Macfadyen** (sarina.macfadyen@csiro.au), CSIRO, Canberra, Australia

11:20 0946 Does like replace like? Phenotypic plasticity and responses of tritrophic old field communities to climate change. **Adam Rosenblatt** (adam.rosenblatt@yale.edu), Yale University, New Haven, CT

11:40 0947 Can forests take the heat? Managing pests and ecosystem services in a changing climate. **Steven Frank** (sdfrank@ncsu.edu), Emily K. Meineke, Adam Dale and Elsa Youngsteadt, North Carolina State Univ., Raleigh, NC

P-IE Section Symposium: The Larry L. Larson Symposium: Pest Shifting and Invasive Species: The Need for New Technology to Manage New Insect Pests

200 D (Convention Center)

Moderators and Organizers: Luis E. Gomez[1] and Melissa Siebert[2], [1]Dow AgroSciences, Indianapolis, IN, [2]Dow AgroSciences, Greenville, MS

8:15 Introductory Remarks

8:30 0948 Can new technology help us become better 19th century farmers? **James Cranney, Jr.** (jcranney@CalCitrusQuality.org), California Citrus Quality Council, Auburn, CA

9:00 0949 Regulatory challenges presented by emerging pest issues and label expansions. Jamey Thomas, Dave Ouimette, Nick Simmons and **Michael Shaw** (mcshaw@dow.com), Dow AgroSciences, Indianapolis, IN

9:30 0950 Pheromone-based decision support tools and management tactics for the invasive brown marmorated stink bug (Hemiptera: Pentatomidae) in specialty crops. **Tracy C. Leskey** (tracy.leskey@ars.usda.gov)[1], Brent Short[1], William R. Morrison[1], Doo-Hyung Lee[2], J. Christopher Bergh[3], John P. Cullum[3], Donald C Weber[4] and Ashot Khrimian[4], [1]USDA - ARS, Kearneysville, WV, [2]Gachon Univ., Gyeonggi-do, South Korea, [3]Virginia Polytechnic Institute and State Univ., Winchester, VA, [4]USDA - ARS, Beltsville, MD

10:00 Break

10:15 0951 Sugarcane aphid, *Melanaphis sacchari*: A new invasive pest of sorghum in the U.S. **David L. Kerns** (dkerns@agcenter.lsu.edu), Louisiana State Univ., Winnsboro, LA

10:45 0952 Molecular aspects of flupyradifurone action on sucking pest insects. **Ralf Nauen** (ralf.nauen@bayer.com)[1], Amanda Beaudoin[2], Michael Beck[1], Matthias Haas[1], Peter Jeschke[1] and Georg S. Raupach[1], [1]Bayer CropScience, Monheim, Germany, [2]Bayer CropScience, Research Triangle Park, NC

11:15 Concluding Remarks

Member Symposium: Partnerships for Developing Synergistic Solutions Addressing an Invasive Soybean Pest: A Six-Year Study of the Kudzu Bug, *Megacopta cribraria*

212 AB (Convention Center)

Moderators and Organizers: Peter Nelson, Steven Reyna and Alejandro Del Pozo, North Carolina State Univ., Raleigh, NC

8:00 Welcoming Remarks

8:05 0953 Diet of the bean plataspid, *Megacopta cribraria*, in north central Alabama. **David Johnson** (djohnso2@samford.edu)[1] and Riley Lovejoy[2], [1]Samford Univ., Birmingham, AL, [2]Univ. of Alabama, Tuscaloosa, AL

8:25 0954 Pest status and management of the kudzu bug, *Megacopta cribraria*, in Georgia crops. **G. David Buntin** (gbuntin@uga.edu)[1], Phillip M. Roberts[2], Alton Sparks[2], John All[3], Michael Toews[2], Joni L. Blount[1] and Wayne Gardner[1], [1]Univ. of Georgia, Griffin, GA, [2]Univ. of Georgia, Tifton, GA, [3]Univ. of Georgia, Athens, GA

8:45 0955 Classical biological control of *Megacopta cribraria* and the worldwide connections required. **Walker Jones** (walker.jones@ars.usda.gov)[1] and Keiji Takasu[2], [1]USDA - ARS, Stoneville, MS, [2]Kyushu Univ., Fukuoka, Japan

9:05 0956 Commodity involvement in addressing emerging production issues: The kudzu bug in soybean. **Richard Joost** (RJoost@smithbucklin.com), United Soybean Board, Chesterfield, MO

9:25 Intermission: Poster session and refreshments

SD0957 *Megacopta cribraria* in soybean agro ecosystem. **Joni L. Blount** (jonilb@uga.edu)[1], David Buntin[1], Phillip M. Roberts[2] and Michael Toews[2], [1]Univ. of Georgia, Griffin, GA, [2]Univ. of Georgia, Tifton, GA

SD0958 Welcome to the neighborhood: Tennessee's response to the new kid on the block. **Kadie Britt** (kbritt5@vols.utk.edu)[1], Jerome F. Grant[1], Scott Stewart[2], Gregory J. Wiggins[1] and Steve D. Powell[3], [1]Univ. of Tennessee, Knoxville, TN, [2]Univ. of Tennessee, Jackson, TN, [3]Tennessee Dept. of Agriculture, Nashville, TN

SD0959 Antibiosis in soybean breeding lines to the invasive kudzu bug, *Megacopta cribraria* (Hemiptera: Plataspidae). **Bradley Fritz** (bjfritz@ncsu.edu)[1], Clyde E. Sorenson[1], Thomas Carter[2] and Dominic Reisig[3], [1]North Carolina State Univ., Raleigh, NC, [2]USDA - ARS, Raleigh, NC, [3]North Carolina State Univ., Plymouth, NC

SD0960 Development of gene silencing for control of kudzu bug in soybeans. **Lucas Hietala** (lhietal1@vols.utk.edu), Jerreme J. Jackson, Margaret Staton, Rahul Banerjee, C. Neal Stewart and Juan L. Jurat-Fuentes, Univ. of Tennessee, Knoxville, TN

SD0961 Molecular analysis of internal composition of *Megacopta cribraria*. **Riley Lovejoy** (rztunnell@crimson.ua.edu)[1] and David Johnson[2], [1]Univ. of Alabama, Tuscaloosa, AL, [2]Samford Univ., Birmingham, AL

SD0962 Kuzdu bug bacterial packets important in larval development. **Robert Mitchell** (rdmitche@ncsu.edu) and R. Michael Roe, North Carolina State Univ., Raleigh, NC

SD0963 Fitness consequences of host plant choice on kudzu bug, *Megacopta cribraria* (F.), development and dispersal. **James Murphy** (jtmurph@uga.edu)[1], Patricia Moore[2], Michael Toews[3] and Alexander Erwin[4], [1]Clemson Univ., Clemson, SC, [2]Univ. of Georgia, Athens, GA, [3]Univ. of Georgia, Tifton, GA, [4]Univ. of Georgia, Gainesville, GA

SD0964 Assessment of a cross-vane trap as a tool for sampling the invasive *Megacopta cribraria* in soybean. **Francesca Stubbins** (sstubbi@clemson.edu), Clemson Univ., Blackville, SC

SD0965 Kudzu bug distribution in Virginia, overwintering occurrence, and egg parasitoid survey. **Rebecca Whalen** (wrebec9@vt.edu)[1], D. Ames Herbert[2] and Sean Malone[2], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]Virginia Polytechnic Institute and State Univ., Suffolk, VA

9:55 0966 *Megacopta cribraria* discovery in North America initiates a population genetic study across two hemispheres. **Tracie M. Jenkins** (jenkinst@uga.edu), Univ. of Georgia, Athens, GA

10:15 0967 Impact of kudzu bug (Hemiptera: Plataspidae) feeding on soybean yield and implications for management. **Nicholas Seiter** (nseiter@uaex.edu)[1], Alejandro Del Pozo[2], Jeremy K. Greene[3], Francis Reay-Jones[4], Phillip M. Roberts[5] and Dominic Reisig[6], [1]Univ. of Arkansas, Monticello, AR, [2]North Carolina State Univ., Raleigh, NC, [3]Clemson Univ., Blackville, SC, [4]Clemson Univ., Florence, SC, [5]Univ. of Georgia, Tifton, GA, [6]North Carolina State Univ., Plymouth, NC

10:35 0968 Preliminary studies of host plant resistance in soybeans against *Megacopta cribraria* (Hemiptera: Plataspidae). **Sriyanka Lahiri** (slahiri@ncsu.edu)[1], Bradley Fritz[1], Thomas Carter[2] and Dominic Reisig[3], [1]North Carolina State Univ., Raleigh, NC, [2]USDA - ARS, Raleigh, NC, [3]North Carolina State Univ., Plymouth, NC

10:55 0969 Ecology of two native egg parasitoids of the kudzu bug, *Megacopta cribraria,* in Japan. **Keiji Takasu** (takasu@brs.kyushu-u.ac.jp), Kyushu Univ., Fukuoka, Japan

11:15 Concluding Remarks

Member Symposium: Preparing for the Future - What Every Student Should Know About Getting a Job or Finding a Career

200 A (Convention Center)

Moderators and Organizers: Janet Hurley[1] and Robert Davis[2], [1]Texas A&M AgriLife Extension Service, Dallas, TX, [2]BASF Corporation, Pflugerville, TX

8:00 0970 Introductions, goal of the session, the benefits of unpaid work to help make you a better candidate and employee. **Janet Hurley** (ja-hurley@tamu.edu), Texas A&M AgriLife Extension Service, Dallas, TX

8:20 0971 Your transcript as your resume: Classes to consider outside of entomology. Allison Taisey[1] and **Jim Fredericks** (jfredericks@pestworld.org)[2], [1]Cornell Univ., Southborough, MA, [2]National Pest Management Association, Fairfax, VA

8:40 0972 Career development survival guide: Keys to success from the interview forward. **Mike Culy** (mculy@dow.com), Dow AgroSciences, Indianapolis, IN

9:00 0973 Outstanding ways to stand out: Certification and other signs of professionalism. **Chris Stelzig** (cstelzig@entsoc.org), Entomological Society of America, Annapolis, MD

9:20 Break

9:40 0974 A career in public health entomology: It's not just vector management. **Mustapha Debboun** (mdebboun@hcphes.org), Harris County Public Health & Environmental Services, Houston, TX

10:00 0975 A career in the military as an entomologist - environmental health specialist. **Donald Teig** (donald.teig.1@us.af.mil), US Air Force, JBSA-Randolph, TX

10:20 0976 Urban pest management: It's not your father's pest control. **Mark D. Sheperdigian** (shep@rosepestsolutions.com), Rose Pest Solutions, Troy, MI

10:40 0977 Working in the field: Applied entomology in the agricultural fields of Texas. **Blayne Reed** (blayne.reed@ag.tamu.edu), Texas AgriLife Extension, Plainview, TX

11:00 0978 Opportunities available and preparation for careers in industry. **Robert Davis** (robert.davis@basf.com), BASF Corporation, Pflugerville, TX

11:20 0979 Entomology in industry: What's my job today and how do I keep up? **John Greenplate** (john.t.greenplate@monsanto.com), Monsanto Company, Chesterfield, MO

11:40 Panel Discussion

12:00 Lunch and Learn - Round table discussions with speakers

Member Symposium: Stored-Product Entomology: Partnerships Across and Within Disciplines

200 B (Convention Center)

Moderators and Organizers: Brent Elliott[1] and Zhaorigetu Chen[2], [1]Canadian Grain Commission, Winnipeg, MB, Canada, [2]Kansas State Univ., Manhattan, KS

8:00 Welcoming Remarks

8:05 0980 Methodology for evaluating long term efficacy of the IGR methoprene on different stored grains. **Frank Arthur** (frank.arthur@ars.usda.gov), USDA - ARS, Manhattan, KS

8:23 0981 DLD gene duplication in the strong phosphine resistant population of the red flour beetle, *Tribolium castaneum*. **Zhaorigetu Chen** (jorigtoo@ksu.edu)[1], Hongbo Jiang[1], David Schlipalius[2], Yoonseong Park[1] and Thomas Phillips[1], [1]Kansas State Univ., Manhattan, KS, [2]Agri-Science Queensland, Brisbane, Australia

8:41 0982 Assessment of post-harvest losses in four major crops: An emerging partnership to mitigate post-harvest losses in Ethiopia. **Rizana M. Mahroof** (rmahroof@scsu.edu)[1], Subramanyam Bhadriraju[2], Kingsly Ambrose[2], Venkat Reddy[2] and Dirk E. Maier[2], [1]South Carolina State Univ., Orangeburg, SC, [2]Kansas State Univ., Manhattan, KS

8:59 0983 Reducing post-harvest losses: Impact of a novel tool, ZeroFly® storage bags. **Oana Baban** (otr@vestergaard.com) and Georgina Bingham Zivanovic, Vestergaard, Lausanne, Switzerland

9:17 0984 Potential of nitric oxide fumigation for post-harvest pest control. **Yong-Biao Liu** (YongBiao.Liu@ars.usda.gov), USDA - ARS, Salinas, CA

9:35 0985 The efficacy of Profume® gas fumigant to control phosphine-resistant grain insects infesting stored wheat. **George Opit** (george.opit@okstate.edu)[1], Ellen Thoms[2] and Thomas Phillips[3], [1]Oklahoma State Univ., Stillwater, OK, [2]Dow AgroSciences, Gainesville, FL, [3]Kansas State Univ., Manhattan, KS

9:53 0986 Comparison of toxicity between ethanedinitrile and methyl bromide to five stored product insects. **Swaminathan Thalavaisundaram** (swaminathan.thalavaisundaram@boc.com)[1], Yong-Lin Ren[2] and Pavel Jakoubek[3], [1]Crop Science & Fumigation, North Ryde, Australia, [2]Murdoch Univ., Murdoch, Australia, [3]Lucebni Zavody Draslovka, Kolin IV, Czech Republic

10:11 Break

10:26 0987 Update on stored-product fumigation research at ARS. **Spencer Walse** (spencer.walse@ars.usda.gov), USDA - ARS, Parlier, CA

10:44 0988 Phosphine resistance in stored-product insects pests in California. **Sandipa G. Gautam** (sandipa.gautam@okstate.edu) and George Opit, Oklahoma State Univ., Stillwater, OK

11:02 0989 Integrated pest management in rice mills: Monitoring red flour beetles. **Tanja McKay** (tmckay@astate.edu), Arkansas State Univ., State Univ., AR

11:20 0990 Partnering with industry and researchers: How we can help each other. **Chelle Hartzer** (CHartzer@indfumco.com), The Industrial Fumigant Company, Lenexa, KS

11:38 0991 Pesticide tolerance in diapausing larvae of khapra beetle, *Trogoderma granarium* Everts (Coleoptera: Dermestidae). **Mukti N. Ghimire** (mukti@ksu.edu)[1,2], Scott W. Myers[2], Frank Arthur[3] and Thomas Phillips[1], [1]Kansas State Univ., Manhattan, KS, [2]USDA - APHIS, Buzzards Bay, MA, [3]USDA - ARS, Manhattan, KS

Joint Symposium: Characterizing and Controlling Insects and Bacteria Associated with Manure-Impacted Environments

M101 C (Convention Center)

Moderators and Organizers: Kimberly Cook[1], Daniel Miller[2] and Christopher J. Geden[3], [1]USDA - ARS, Bowling Green, KY, [2]USDA - ARS, Lincoln, NE, [3]USDA - ARS, Gainesville, FL

8:00 Introductory Remarks

8:05 0992 Manure, maggots, microbes. Oh my! A closer look at house fly acquisition, harboring and dissemination of bacteria. **Dana Nayduch** (dana.nayduch@ars.usda.gov), USDA - ARS, Manhattan, KS

8:25 0993 Management of manure-breeding flies. **Christopher J. Geden** (chris.geden@ars.usda.gov), USDA - ARS, Gainesville, FL

8:45 0994 Environmental parameters associated with stable fly (Diptera: Muscidae) development at hay bale feeders. **Kristina Friesen** (kristina.friesen@ars.usda.gov), USDA - ARS, Lincoln, NE

9:05 0995 An alternative management strategy for manure-impacted environments. **Jeffrey Bradshaw** (jbradshaw2@unl.edu)[1], Gary Brewer[2], Junwei Zhu[3] and David Boxler[4], [1]Univ. of Nebraska, Scottsbluff, NE, [2]Univ. of Nebraska, Lincoln, NE, [3]USDA - ARS, Lincoln, NE, [4]Univ. of Nebraska, North Platte, NE

9:25 0996 Flies as carriers of animal/human pathogens associated with manure. **Ludek Zurek** (lzurek@ksu.edu), Kansas State Univ., Manhattan, KS

9:45 Break

9:55 0997 Dissemination of *Escherichia coli* O157:H7 from a cattle feedlot: Effect of proximity on contamination of leafy greens, bioaerosols, and pest flies. **Elaine Berry** (elaine.berry@ars.usda.gov)[1], James Wells[1], Lisa Durso[2], James Bono[1], Kristina Friesen[2], Trevor Suslow[3] and Patricia Millner[4], [1]USDA - ARS, Clay Center, NE, [2]USDA - ARS, Lincoln, NE, [3]Univ. of California, Davis, CA, [4]USDA - ARS, Beltsville, MD

10:15 0998 Flies as carriers of pathogens associated with manure. **Astri Wayadande** (a.wayadande@okstate.edu), Oklahoma State Univ., Stillwater, OK

10:35 0999 Manure-borne PEDv (porcine epidemic diarrhea virus) survival in soil. **Daniel Miller** (dan.miller@ars.usda.gov)[1], Amy Schmidt[2] and John Loy[2], [1]USDA - ARS, Lincoln, NE, [2]Univ. of Nebraska, Lincoln, NE

10:55 1000 Microbial ecology of stored swine manure and reduction of emissions using condensed tannins. **Terence Whitehead** (terry.whitehead@ars.usda.gov), USDA - ARS, Peoria, IL

11:15 1001 Pathogen and antibiotic resistant bacterial colonization of a newly established broiler house. **John Brooks** (john.brooks@ars.usda.gov), Michael McLaughlin, Ardeshir Adel and Dana Miles, USDA - ARS, Mississippi State, MS

11:35 Adjorn

Joint Symposium: Partnering to Understand Complexity: Biogeochemical Cycles in Agricultural Systems

103 A (Convention Center)

Moderators and Organizers: Ana Wingeyer[1], Martha Mamo[2] and Jeffrey Bradshaw[3], [1]Instituto Nacional de Tecnología Agropecuaria, Paraná, Brazil, [2]Univ. of Nebraska, Lincoln, NE, [3]Univ. of Nebraska, Scottsbluff, NE

8:00 Introductory Remarks

8:15 1002 Nitrogen use efficiency and cycling in pastures managed with reduced nitrogen inputs. **John Guretzky** (jguretzky2@unl.edu)[1], Walter Schacht[1], Terry Klopfenstein[1] and Ana Wingeyer[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Instituto Nacional de Tecnología Agropecuaria, Paraná, Brazil

8:35 1003 Dung decomposition as a function of cattle diet. **Brad Schick** (bschick2@unl.edu), Univ. of Nebraska, Lincoln, NE

8:55 1004 Is it working? A look at the changing nutrient practices in the southern Willamette Valley's Groundwater Management Area. **Susanna Pearlstein**[1], Jana Compton[1], Audrey Eldridge[2] and Alan Henning[3], [1]USEPA, Corvallis, OR, [2]Oregon Dept. of Environmental Quality, Medford, OR, [3]USEPA, Eugene, OR

9:15 1005 Southern Willamette Valley Groundwater Management Area. **Susanna Pearlstein**[1], Audrey Eldridge[2] and Jana Compton[1], [1]USEPA, Corvallis, OR, [2]Oregon Dept. of Environmental Quality, Medford, OR

9:35 Break

9:50 1006 Grazing management effect on micro- and macro-scale fate of carbon and nitrogen in rangelands. **Ana Wingeyer** (wingeyer.ana@inta.gob.ar)[1], Martha Mamo[2], Jeffrey Bradshaw[3], Walter Schacht[2], Jerry Volesky[4], Richard Ferguson[2], Haishun Yang[2], Kent Eskridge[2], Sean D. Whipple[3] and Karla H. Jenkins[3], [1]Instituto Nacional de Tecnología Agropecuaria, Paraná, Brazil, [2]Univ. of Nebraska, Lincoln, NE, [3]Univ. of Nebraska, Scottsbluff, NE, [4]Univ. of Nebraska, North Platte, NE

10:10 1007 Fate of nutrient inputs from dung pats. **Kenneth Evans**[1], Ana Wingeyer[2], Martha Mamo[1], Walter Schacht[1], Pamela Sutton[1] and Kent Eskridge[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Instituto Nacional de Tecnología Agropecuaria, Paraná, Brazil

10:30 1008 Influence of cattle grazing practices on dung beetle communities. **Patrick Wagner** (pwagner@huskers.unl.edu), Univ. of Nebraska, Lincoln, NE

10:50 1009 Using model simulation to quantify the role of dung beetle in Dung C and N decomposition. **Haishun Yang** (hyang2@unl.edu)[1], Martha Mamo[1], Ana Wingeyer[2], Walter Schacht[1], Jeffrey Bradshaw[3], Kenneth Evans[1] and Kent Eskridge[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Instituto Nacional de Tecnología Agropecuaria, Paraná, Brazil, [3]Univ. of Nebraska, Scottsbluff, NE

11:10 Discussion

12:00 Adjorn

Joint Symopsium: Agroecosystems Research: Integrated Cropping Systems That Promote Ecosystem Services

101 H (Convention Center)

Moderators and Organizers: Diane L. Rowland[1], Russ Gesch[2], Chengci Chen[3], and Marisol Berti[4], [1]Univ. of Florida, Gainesville, FL, [2]USDA - ARS, Morris, MN, [3]Montana State Univ., Bozeman, MT, [4]North Dakota State Univ., Fargo, ND

9:25 Introductory Remarks

9:30 1010 Diversity of global approaches to agroecology to enhance sustainability and ecosystem services provision for cropping systems. **Alexander Wezel** (wezel@isara.fr), ISARA, Lyon, France

10:00 1011 Bumble bee colony performance increases with local or landscape resource availability, but not both. **Brian Spiesman** (bspiesman@wisc.edu)[1], Claudio Gratton[1] and Rufus Isaacs[2], [1]Univ. of Wisconsin, Madison, WI, [2]Michigan State Univ., East Lansing, MI

10:20 1012 Agronomic management strategies in Texas: Securing soil and improving the efficiency of water use. **Cristine Morgan** (cmorgan@ag.tamu.edu)[1], Jourdan Bell[2], Paul DeLaune[3], Xuejun Dong[4], Katie Lewis[5] and Jamie Foster[6], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M AgriLife Extension, Amarillo, TX, [3]Texas A&M AgriLife Research & Extension, Vernon, TX, [4]Texas A&M AgriLife Research & Extension, Uvalde, TX, [5]Texas A&M AgriLife Research, Lubbock, TX, [6]Texas A&M AgriLife Research, Corpus Christi, TX

10:40 1013 Conservation biological control of wheat stem sawfly: Applying agroecology to enhance integrated pest management. **David K. Weaver** (weaver@montana.edu)[1], Scott Meers[2], Brian L. Beres[3], Micaela Buteler[4], Megan L. Hofland[1], Justin B. Runyon[5], Dayane Reis[1] and Perry R. Miller[1], [1]Montana State Univ., Bozeman, MT, [2]Alberta Agriculture and Rural Development, Brooks, AB, Canada, [3]Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, [4]CONICET, Mendoza, Argentina, [5]USDA - Forest Service, Bozeman, MT

11:00 1014 Diverse cropping systems that promote beneficial insects. **Jonathan G. Lundgren** (jonathan.lundgren@ars.usda.gov), USDA - ARS, Brookings, SD

11:20 1015 Cover crops and livestock integration. **Nicolas DiLorenzo** (ndilorenzo@ufl.edu)[1], Jose Carlos Batista Dubeux[1], Sheena George[2], Ann Blount[1], Cheryl Mackowiak[2], David L. Wright[2], James Marios[2] and G. Cliff Lamb[1], [1]Univ. of Florida, Marianna, FL, [2]Univ. of Florida, Quincy, FL

11:40 1016 Expanding disciplinary and international research training in global agroecosystems. **Diane L. Rowland** (dlrowland@ufl.edu)[1], Debolina Chakraborty[1], Jerry Bennett[1], George Hochmuth[1], Wes Wood[2], Heather Enloe[1], Odemari Mbuya[3], Jose Carlos Batista Dubeux[4], Kelly Racette[3], Tarik Eluri[3], Peter Kettlewell[5], Mario Lira[6], Nicola Randall[5], Alexander Wezel[7] and David Ramirez[8], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Florida, Milton, FL, [3]Florida A&M Univ., Tallahassee, FL, [4]Univ. of Florida, Marianna, FL, [5]Harper Adams Univ., Newport, United Kingdom, [6]Univ. Federal Rural de Pernambuco, Recife, Brazil, [7]ISARA, Lyon, France, [8]International Potato Institute, Lima, Peru

12:00 Adjorn

Joint Symposium: Turfgrass Insect Management: New and Emerging Issues

101 B (Convention Center)

Moderators and Organizers: Kelly Kopp[1] and Benjamin McGraw[2], [1]Utah State Univ., Logan, UT, [2]Pennsylvania State Univ., University Park, PA

9:55 Introductory Remarks

10:00 1017 Can wetting agents improve the post-application persistence of entomopathogenic nematodes in turfgrass? **Benjamin McGraw** (bam53@psu.edu), Pennsylvania State Univ., University Park, PA

10:15 1018 Kill billbug: Improving a predictive model to time management in the intermountain west. **Ricardo Ramirez** (ricardo.ramirez@usu.edu), Utah State Univ., logan, UT

10:30 1019 Weevil trak delivers a decision-tool for the regional management of annual bluegrass weevil in golf course turf. **Daniel Peck** (dcpeck@grass-systems-entomology.com)[1], Mark Coffelt[2] and Mike Agnew[2], [1]Grass Systems Entomology LLC, Geneva, NY, [2]Syngenta Crop Protection, Greensboro, NC

10:45 1020 Old pest, new environment: The annual bluegrass weevil invades North Carolina. **Terri Billeisen** (tlhoctor@ncsu.edu) and Rick Brandenburg, North Carolina State Univ., Raleigh, NC

11:00 Break

11:10 1021 Chemical mediation of hunting billbug, *Sphenophorus venatus*, host-finding and mating behavior: Implications for management in the transition zone. **Alexandra Duffy** (duffy14@purdue.edu), Matthew David Ginzel and Douglas Richmond, Purdue Univ., West Lafayette, IN

11:25 1022 How low can they go? Annual bluegrass weevil oviposition and development in golf course putting greens. **Benjamin Czyzewski** and Benjamin McGraw, Pennsylvania State Univ., University Park, PA

11:40 1023 Forecasting turfgrass pest pressure under future climate change. **Matthew J. Petersen** (mpetersen13@gmail.com), Roanoke College, Salem, VA

11:55 1024 Fungicides affect Japanese beetle (Coleoptera: Scarabaeidae) egg hatch, larval survival and detoxification enzymes. **R. Chris Williamson** (rcwilliamson@wisc.edu)[1], Glen R. Obear[1], David W. Held[2], Patrick J. Liesch[1] and Adekunle Adesanya[2], [1]Univ. of Wisconsin, Madison, WI, [2]Auburn Univ., Auburn, AL

12:10 Discussion

12:15 Adjorn

Ten-Minute Papers, MUVE Section: Ticks

208 CD (Convention Center)

Moderators: Glen Scoles[1] and Jennifer Henke[2], [1]USDA - ARS, Pullman, WA, [2]Coachella Valley Mosquito and Vector Control District, Indio, CA

8:00 Introductory Remarks

8:05 1025 Geographic distribution of tick species and pathogen prevalence in tick vector populations in Washington state. **Elizabeth Dykstra** (Elizabeth.Dykstra@doh.wa.gov), Washington State Dept. of Health, Olympia, WA

8:17 1026 Geographic distribution and abundance of *Dermacentor andersoni* and *Dermacentor variabilis* in Western Canada. **Shaun Dergousoff** (shaun.dergousoff@agr.gc.ca)[1], Neil Chilton[2], Kateryn Rochon[3] and Tim Lysyk[1], [1]Lethbridge Research Centre, Lethbridge, AB, Canada, [2]Univ. of Saskatchewan, Saskatoon, SK, Canada, [3]Univ. of Manitoba, Winnipeg, MB, Canada

8:29 1027 Ten years of blacklegged ticks, *Ixodes scapularis*, in Manitoba, Canada. **Kateryn Rochon** (kateryn.rochon@umanitoba.ca)[1], L. Robbin Lindsay[2] and Terry Galloway[1], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Public Health Agency of Canada, Winnipeg, MB, Canada

8:41 1028 Identification of an odorant-binding-protein-like sequence in *Amblyomma americanum* (Acari: Ixodidae). **Robert Renthal** (robert.renthal@utsa.edu)[1], Leena Manghnani[1], Lígia Borges[2] and Adalberto Pérez de León[3], [1]Univ. of Texas, San Antonio, TX, [2]Univ. Federal de Goias, Goiânia, Brazil, [3]USDA - ARS, Kerrville, TX

8:53 1029 Invasive eastern red cedar provides habitat for *A. americanum* to invade new areas of Oklahoma. **Bruce Noden** (bruce.noden@okstate.edu) and Trisha Dubie, Oklahoma State Univ., Stillwater, OK

9:05 1030 Presentation withdrawn

9:17 1031 Acquisition and transmission of *Theileria parva* from persistently infected carriers. **Glen Scoles** (scoles@vetmed.wsu.edu)[1] and Cassandra Olds[2], [1]USDA - ARS, Pullman, WA, [2]Washington State Univ., Pullman, WA

Ten-Minute Papers, MUVE Section: Bed Bugs

208 CD (Convention Center)

Moderators: Molly L. Stedfast[1] and Chow-Yang Lee[2], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]Universiti Sains Malaysia, Penang, Malaysia

9:35 Introductory Remarks

9:37 1032 It's about instilling confidence: Results from the "*Let's Beat the Bug*!" campaign. **Stephen Kells** (kells002@umn.edu) and Amelia Shindelar, Univ. of Minnesota, St. Paul, MN

9:49 1033 Capturing the ABCs of bed bug, *Cimex lectularius*, management in California's low-income multi-unit housing situations: A summary of survey responses. **Andrew Sutherland** (amsutherland@ucanr.edu)[1], Dong-Hwan Choe[2] and Vernard R. Lewis[3], [1]Univ. of California Cooperative Extension, Alameda, CA, [2]Univ. of California, Riverside, CA, [3]Univ. of California-Berkeley, Richmond, CA

10:01 1034 Sentinel bed bugs, *Cimex lectularius*, for laboratory and field evaluations. **Molly L. Stedfast** (msted14@vt.edu) and Dini Miller, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

10:13 1035 Factors affecting insecticide efficacy against the bed bug. **Jennifer Gordon** (jgord13@gmail.com), Michael F. Potter and Kenneth F. Haynes, Univ. of Kentucky, Lexington, KY

10:25 1036 Effects of binary mixtures of diatomaceous earth dust and botanical insecticides in bed bug management. **Yasmin Akhtar** (yasmin.akhtar@ubc.ca) and Murray B. Isman, Univ. of British Columbia, Vancouver, BC, Canada

10:37 Break

10:47 1037 Rapid and pervasive mitochondrial heteroplasmy with recombination in the bed bug, *Cimex lectularius*. Grant Robison[1], Zachary DeVries[2], Ondrej Balvin[3], Edward Vargo[4], Coby Schal[2] and **Warren Booth** (warren-booth@utulsa.edu)[1], [1]Univ. of Tulsa, Tulsa, OK, [2]North Carolina State Univ., Raleigh, NC, [3]Czech Univ. of Life Sciences, Prague, Czech Republic, [4]Texas A&M Univ., College Station, TX

10:59 1038 Sublethal exposure to insecticide affects multiple bed bug, *Cimex lectularius*, behaviors. **Sydney Crawley** (sydney19@gmail.com), Michael F. Potter and Kenneth F. Haynes, Univ. of Kentucky, Lexington, KY

11:11 1039 Chemical identification of two compounds in bed bug, *Cimex lectularius*, fecal extracts which elicit off-host aggregation. **Leonard Ver Vers** (lververs@nalco.com)[1], Joelle Olson[2,3], Roger D. Moon[2] and Stephen A. Kells[2], [1]Nalco: An Ecolab Company, Naperville, IL, [2]Univ. of Minnesota, St. Paul, MN, [3]Ecolab, Eagan, MN

11:23 1040 Differences in climbing ability between bed bug, *Cimex lectularius*, and the tropical bed bug, *Cimex hemipterus* (Hemiptera: Cimicidae). Daeyun Kim and **Chow-Yang Lee** (chowyang@usm.my), Universiti Sains Malaysia, Penang, Malaysia

11:35 1041 Permethrin uptake characteristics for bed bugs exposed to *Active*Guard® Mattress Liner fabric. **Sabrina Hymel** (hyme0003@umn.edu) and Stephen Kells, Univ. of Minnesota, St. Paul, MN

11:47 1042 Ultralow oxygen treatment for bed bug control. **Yong-Biao Liu** (yongbiao.liu@ars.usda.gov)[1] and Kenneth F. Haynes[2], [1]USDA - ARS, Salinas, CA, [2]Univ. of Kentucky, Lexington, KY

Ten-Minute Papers, PBT Section: Toxicology

211 B (Convention Center)

Moderators: Blair Siegfried[1] and Nannan Liu[2], [1]Univ. of Florida, Gainesville, FL, [2]Auburn Univ., Auburn, AL

8:30 Introductory Remarks

8:32 1043 Independent action between two modes of action, DvSnf7 RNA and Cry3Bb1 protein, in southern corn rootworm, *Diabrotica undecimpunctata howardi*, and Colorado potato beetle, *Leptinotarsa decemlineata.* Jianguo Tan, Geoffrey Mueller, Pamela Bachman, Joshua Uffman, Steven Levine and **Peter Jensen** (Peter.d.jensen@monsanto.com), Monsanto Company, St. Louis, MO

8:44 1044 Characterization of the effect of two insecticides commonly used for the control of ACP on the parasitoid *Tamarixia radiata* Waterston (Hymenoptera: Eulophidae). **Anuar Morales-Rodriguez** (am434@cornell.edu)[1], Matthew Daugherty[1], Gregory S. Simmons[2] and Joseph G. Morse[1], [1]Univ. of California, Riverside, CA, [2]Center for Plant Health Science and Technology (CPHST), Salinas, CA

8:56 1045 New hydrophobic bait formulation extends the utility of pest ant toxic baits. **Lekhnath Kafle** (kafle@chunghsi.com.tw)[1], Nancy Lee[1], Chi-Wei Chen[1] and Robert Vander Meer[2], [1]Chung Hsi Chemical Plant, Taipei City, Taiwan, [2]USDA - ARS, Gainesville, FL

9:08 1046 Honey bees, *Apis mellifera*, and nanotechnology based pesticide formulations. **Louisa Hooven** (louisa.hooven@oregonstate.edu), Ramesh Sagili, Jino Son and Stacey Harper, Oregon State Univ., Corvallis, OR

9:20 1047 An attempt to identify genetic variation in salivary protein sequences of the green rice leafhopper, *Nephotettix cincticeps*, that is associated with virulency against resistant rice varieties. **Makoto Hattori** (hatto@affrc.go.jp)[1], Yukiko Matsumoto[1], Masahiro Hirae[2] and Yasumori Tamura[1], [1]National Institute of Agrobiological Sciences, Tsukuba, Japan, [2]NARO Agricultural Research Center, Tsukuba, Japan

9:32 1048 Evaluation of the rainfast of Isoclast™ under laboratory simulated rain setting. **Mary Kubiszak-Rushton** (mkubiszak@dow.com)[1], Luis E. Gomez[1] and Imre Mezei[2], [1]Dow AgroSciences, Indianapolis, IN, [2]Dow AgroSciences, Budapest, Hungary

9:44 1049 Systematic review and meta-analysis of aerosol insecticide efficacy in the control of stored product insects. **Moustapha Soumaila Issa** (msoumai@k-state.edu)[1], James Campbell[2], Kun Yan Zhu[1], Frank Arthur[2], Bhadriraju Subramanyam[1] and Nora Bello[1], [1]Kansas State Univ., Manhattan, KS, [2]USDA - ARS, Manhattan, KS

9:56 1050 Effect of insect growth regulators lufenuron, pyriproxyfen, and methoxyfenozoid for the control of *Trogoderma granarium* Everts (Coleoptera: Dermestidae). **Mansoor ul Hasan** (mansoorsahi2000@yahoo.com)[1], Qurban Ali[1], Muhammad Sagheer[1] and Shahzad Saleem[2], [1]Univ. of Agriculture, Faisalabad, Pakistan, [2]COMSATS Institute of Information Technology, Sahiwal, Pakistan

10:08 1051 *Sabadilla* alkaloids versus pyrethroids: A comparison study of toxicity and characterization of insecticidal modes of action. **Lacey Jenson** (ljenson@vt.edu) and Troy D. Anderson, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

10:20 1052 Efficiency of certain bioinsecticides against *Bemisia tabaci* (Genn.) and its immature stages. **A. E. El-Sheikh** (dranwar.elsheikh@gmail.com) and M. R. El-Assar, Minufiya Univ., Giza, Egypt

10:32 1053 Benzoylurea selection in *Plutella xylostella* confers strong resistance and fitness costs linked to a mutation in chitinsynthase 1. **Denise Steinbach** (denise.steinbach@bayer.com)[1,2] and Ralf Nauen[2], [1]Martin Luther Univ. of Halle-Wittenberg, Halle, Germany, [2]Bayer CropScience, Monheim, Germany

Ten-Minute Papers, P-IE Section: Applied Ecology

200 H (Convention Center)

Moderators: Kristina Prescott[1] and Mirian M. Hay-Roe[2], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - ARS, Gainesville, FL

8:00 Introductory Remarks

8:02 1054 Ecological implications of arsenic hyperaccumulation. **Benjamin Jaffe** (jaffebd@gmail.com)[1], David Smith[2] and Michael Ketterer[3], [1]Northern Arizona Univ., Flagstaff, AZ, [2]Denison Univ., Granville, OH, [3]Metrpolitan State University, Denver, CO

8:14 1055 Impact of the invasive mirid *Nesidiocoris tenuis* on whitefly populations. **Raul T. Villanueva** (rtvillanueva@ag.tamu.edu)[1], Lizbeth Hernadez-Landa[2] and Gabriela Esparza-Díaz[1], [1]Texas A&M Univ., Weslaco, TX, [2]Universidad Veracruzana, Xalapa, Veracruz, Mexico

8:26 1056 Phylogenetic analysis of *Deladenus* (Tylenchida: Neotylenchidae) nematodes parasitizing *Sirex* (Hymenoptera: Siricidae) woodwasps in North America and Europe. **E. Erin Morris** (morri639@msu.edu)[1], György Csóka[2], Juan Pajares[3] and Ann E. Hajek[4], [1]Michigan State Univ., East Lansing, MI, [2]Forest Research Institute, Mátrafüred, Hungary, [3]Univ. of Valladolid, Palencia, Spain, [4]Cornell Univ., Ithaca, NY

8:38 1057 Account of an invasion: Emerging pests and diseases impacting cassava fields in Southeast Asia. **Ignazio Graziosi** (i.graziosi@hotmail.it)[1], Nami Minato[1], Eilsabeth Alvarez[2], Dung Ngo[3], Hoat Trinh[4], Tin Aye[1], Juan Pardo[2], Prapit Wongtiem[5] and Kris Wyckhuys[1], [1]International Center for Tropical Agriculture, Hanoi, Vietnam, [2]International Center for Tropical Agriculture, Cali, Colombia, [3]Plant Protection Dept., Hanoi, Vietnam, [4]Plant Protection Research Institute, Hanoi, Vietnam, [5]Rayong Field Crops Research Center, Rayong, Thailand

8:50 1058 Cover crops: Controlling pests at multiple trophic levels. **Peter Coffey** (peterlcoffey@gmail.com), Cerruti Hooks and Guihua Chen, Univ. of Maryland, College Park, MD

9:02 1059 The effects of urban warming on predators of street tree pests. **Anna Holmquist** (ajholmqu@ncsu.edu), Emily K. Meineke and Steven Frank, North Carolina State Univ., Raleigh, NC

9:14 1060 Regulation of outbreaking populations of winter moth, *Operophtera brumata*, by density dependent dispersal. **Adam Pepi** (apepi@umass.edu), Hannah Broadley and Joseph Elkinton, Univ. of Massachusetts, Amherst, MA

9:38 1061 Parasitism and predation rates on sentinel egg masses of the invasive brown marmorated stink bug, *Halyomorpha halys*, in vegetable crops in Maryland. **Mary Cornelius** (mary.cornelius@ars.usda.gov)[1], Christine Dieckhoff[2] and Kim A. Hoelmer[2], [1]USDA - ARS, Beltsville, MD, [2]USDA - ARS, Newark, DE

9:50 1062 Screen-house based rearing experiments demonstrate innate host shift potential in the cashew mirid, *Helopeltis schoutedeni* Reuter (Heteroptera: Miridae). **Idongesit Mokwunye** (idychumok@yahoo.com)[1], Fombong Ayuka[2], Frank Ewete[3] and Baldwyn Torto[2], [1]Cocoa Research Institute of Nigeria, Ibadan, Nigeria, [2]International Centre of Insect Physiology and Ecology, Nairobi, Kenya, [3]Univ. of Ibadan, Ibadan, Nigeria

10:02 Break

10:24 1063 Effects of rainfall manipulations and grasshopper density on grasshopper populations in the northern Great Plains. **David Branson** (dave.branson@ars.usda.gov), USDA - ARS, Sidney, MT

10:36 1064 Management of flea beetles in the Canadian Prairies. **Alejandro Costamagna** (ale.costamagna@umanitoba.ca)[1], Héctor A. Cárcamo[2], Jennifer Otani[3] and John Gavloski[4], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, [3]Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, [4]Manitoba Agriculture, Food and Rural Initiatives, Carman, MB, Canada

10:48 1065 Intraguild predation, cannibalism and the coexistence of aphidophagous coccinellids in maize and soybean. **Kristina Prescott** (presc030@umn.edu) and David A. Andow, Univ. of Minnesota, St. Paul, MN

11:00 1066 Geospatial analysis of *Melanaphis sacchari* in South Texas. **Gabriela Esparza-Diaz** (gesparzadiaz@ag.tamu.edu) and Raul T. Villanueva, Texas A&M Univ., Weslaco, TX

11:12 1067 Characterizing spatial distribution and host crop association of neonicotinoid resistant *Frankliniella fusca* (Thysanoptera: Thripidae). **Anders Huseth** (ashuseth@ncsu.edu), Thomas Chappell and George G. Kennedy, North Carolina State Univ., Raleigh, NC

11:24 1068 Effects of cyanogenic plants on fitness in two host strains of the fall armyworm, *Spodoptera frugiperda*. **Mirian M. Hay-Roe** (Mirian.Hay-Roe@ars.usda.gov), Robert L. Meagher and Rodney N. Nagoshi, USDA - ARS, Gainesville, FL

11:36 1069 Effects of insect herbivory on herbicidal control of water hyacinth, *Eichhornia crassipes*. **Philip Tipping** (philip.tipping@ars.usda.gov)[1], Lyn Gettys[2] and Carey Minteer[1], [1]USDA - ARS, Fort Lauderdale, FL, [2]Univ. of Florida, Davie, FL,

11:48 1070 Seasonal dynamics of *Bagrada hilaris* on non-cultivated hosts in the Salinas Valley of California. **Ian M. Grettenberger** (iangrett@gmail.com)[1], Jhalendra Rijal[1], Richard Smith[2], Shimat V. Joseph[2] and Larry D. Godfrey[1], [1]Univ. of California, Davis, CA, [2]Univ. of California Cooperative Extension, Salinas, CA,

Ten-Minute Papers, P-IE Section: Forest Entomology

200 J (Convention Center)

Moderators: Louela Castrillo[1] and John Formby[2], [1]Cornell Univ., Ithaca, NY, [2]Mississippi State Univ., Mississippi State, MS

8:00 Introductory Remarks

8:02 1071 Factors influencing the spread of emerald ash borer in urban forests: A case study in Syracuse, New York. **Michael Jones** (mijone01@syr.edu) and Melissa K. Fierke, State Univ. of New York College of Environmental Science and Forestry, Syracuse, NY

8:14 1072 Effect of tree condition on performance of emerald ash borer, *Agrilus planipennis*. **Chris J.K. MacQuarrie** (cmacquar@nrcan.gc.ca), Natural Resources Canada, Sault Ste. Marie, ON, Canada

8:26 1073 Forest responses to emerald ash borer, *Agrilus planipennis*, induced ash mortality. **Wendy S. Klooster Bethel** (bethel.75@osu.edu)[1], Daniel A. Herms[2], Kathleen S. Knight[3], Catherine P. Herms[2], Deborah G. McCullough[4], Annemarie Smith[2], Kamal Gandhi[5], Diane Hartzler[2] and John Cardina[2], [1]The Ohio State Univ., Columbus, OH, [2]The Ohio State Univ., Wooster, OH, [3]USDA - Forest Service, Delaware, OH, [4]Michigan State Univ., East Lansing, MI, [5]Univ. of Georgia, Athens, GA

8:38 1074 Incidence of infestation and larval success of emerald ash borer, *Agrilus planipennis*, on white fringetree, *Chionanthus virginicus*, Chinese fringetree, *Chionanthus retusus*, and devilwood, *Osmanthus americanus*. **Don Cipollini** (don.cipollini@wright.edu) and Chad M. Rigsby, Wright State Univ., Dayton, OH

8:50 1075 Introduced parasitoids of emerald ash borer in Tennessee: Promising or perplexing? **Gregory J. Wiggins** (wiggybug@utk.edu), Jerome F. Grant and Paris L. Lambdin, Univ. of Tennessee, Knoxville, TN

9:02 1076 Reproductive biology and diapause patterns of *Oobius agrili*, an egg parasitoid of the emerald ash borer, *Agrilus planipennis*. **Jackie Hoban** (jhoban@udel.edu)[1], Jian Duan[2] and Judith A. Hough-Goldstein[1], [1]Univ. of Delaware, Newark, DE, [2]USDA - ARS, Newark, DE

9:14 1077 The influence of host density on dispersal of the emerald ash borer parasitoid, *Tetrastichus planipennisi*. **Juli Gould** (juli.r.gould@aphis.usda.gov)[1], Melissa K. Fierke[2], Gericke Cook[3] and Michael Jones[2], [1]USDA - APHIS, Buzzards Bay, MA, [2]State Univ. of New York College of Environmental Science and Forestry, Syracuse, NY, [3]USDA - APHIS, Fort Collins, CO

9:26 1078 Population dynamics of eastern spruce budworm, *Choristoneura fumiferana*, early in the outbreak cycle. **Deepa Pureswaran** (deepa.pureswaran@nrcan.gc.ca)[1], Louis De Grandpre[1], Fidele Bognounou[1] and Daniel Kneeshaw[2], [1]Canadian Forest Service, Quebec City, QC, Canada, [2]Univ. du Québec, Montréal, QC, Canada

9:38 1079 Presentation withdrawn

9:50 1080 Assessing regional variation in tamarack mortality from eastern larch beetle in the Great Lakes Region, USA. **Susan J. Crocker** (scrocker@fs.fed.us)[1], Greg Liknes[1], Fraser R. McKee[2], Jana Albers[3] and Brian Aukema[2], [1]USDA - Forest Service, St. Paul, MN, [2]Univ. of Minnesota, St. Paul, MN, [3]Minnesota Dept. of Natural Resources, Grand Rapids, MN

10:02 Break

10:12 1081 New and well known pests of California eucalypts. **Gevork Arakelian** (garakelian@acwm.lacounty.gov), Los Angeles County Department of Agricultural Commissioner/Weights & Measures, South Gate, CA

10:24 1082 Elucidating interactions between abiotic and biotic factors affecting southern pine health. **Kamal Gandhi** (kjgandhi@uga.edu)[1], Brittany Barnes[1], David R. Coyle[1], Christiane Helbig[2], Kier Klepzig[3], Frank Koch[4], Larry Morris[1], John T. Nowak[3], Bill Otrosina[5] and Bill Smith[6], [1]Univ. of Georgia, Athens, GA, [2]Technische Universität Dresden, Tharandt, Germany, [3]USDA - Forest Service, Asheville, NC, [4]USDA - Forest Service, Research Triangle Park, NC, [5]USDA - Forest Service, Athens, GA, [6]USDA - Forest Service, Raleigh, GA

10:36 1083 Trunk and canopy volatile organic compound profiles of black and Manchurian ash implicated in stress-mediated ovipositional preferences of emerald ash borer. **Chad M. Rigsby** (rigsby.7@wright.edu)[1], Nathaniel McCartney[2], Daniel A. Herms[3], Don Cipollini[1] and James H. Tumlinson[2], [1]Wright State Univ., Dayton, OH, [2]Pennsylvania State Univ., University Park, PA, [3]The Ohio State Univ., Wooster, OH

10:48 1084 A national risk asssessment for goldspotted oak borer (Coleoptera: Buprestidae). **Robert Venette** (rvenette@fs.fed.us)[1], Tom W. Coleman[2] and Steven Seybold[3], [1]USDA - Forest Service, St. Paul, MN, [2]USDA - Forest Service, San Bernardino, CA, [3]USDA - Forest Service, Davis, CA

11:00 1085 Pine mortality associated with severe drought and bark beetles (Scolytinae) in southern California. **Tom W. Coleman** (twcoleman@fs.fed.us), USDA - Forest Service, San Bernardino, CA

11:12 1086 Comparative morphometric and chemical analyses of phenotypes of two invasive ambrosia beetles, *Euwallacea* spp., in the United States of America. **Yigen Chen** (ygchen2007@gmail.com)[1], Tom W. Coleman[2], Lori J. Nelson[3], Paul L. Dallara[1] and Steven Seybold[3], [1]Univ. of California, Davis, CA, [2]USDA - Forest Service, San Bernardino, CA, [3]USDA - Forest Service, Davis, CA

11:24 1087 Attraction of the ambrosia beetle, *Euwallacea* nr. *fornicatus*. **Miriam Cooperband** (miriam.f.cooperband@aphis.usda.gov)[1], Allard Cossé[2], Richard Stouthamer[3], Tappey H. Jones[4] and Daniel Carrillo[5], [1]USDA - APHIS, Buzzards Bay, MA, [2]USDA - ARS, Peoria, IL, [3]Univ. of California, Riverside, CA, [4]Virginia Military Institute, Lexington, VA, [5]Univ. of Florida, Homestead, FL

11:36 1088 Attack of the clones: The invasion potential of the redbay ambrosia beetle, *Xyleborus glabratus*, in North America. **John Formby** (jpf9@msstate.edu)[1], Natraj Krishnan[1], Anthony I. Cognato[2] and John Riggins[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Michigan State Univ., East Lansing, MI

11:48 1089 Competition between biological control fungi and fungal symbionts of ambrosia beetles, *Xylosandrus crassiusculus* and *X. germanus*: Mycelial interactions and impact on beetle brood production. **Louela Castrillo** (lac48@cornell.edu)[1], Michael Griggs[2] and John Vandenberg[2], [1]Cornell Univ., Ithaca, NY, [2]USDA - ARS, Ithaca, NY

Ten-Minute Papers, P-IE Section: Host Plant and Insect Resistance

200 C (Convention Center)

Moderators: Boris Castro[1] and J.P. Michaud[2], [1]Dow AgroSciences, Indianapolis, IN, [2]Kansas State Univ., Hays, KS

8:00 Introductory Remarks

8:02 1090 Effects of IPM up-front on the durability of a Bt pyramid and remediation of resistance in *Diabrotica virgifera*. **Jeannette Martinez** (jeannettecmartinez@gmail.com) and Michael Caprio, Mississippi State Univ., Mississippi State, MS

8:14 1091 Contribution of plant elicitor peptides to defenses against herbivores. **Fiona L. Goggin** (fgoggin@uark.edu)[1], Ashley Humphreys[1], Min Woo Lee[1], Argelia Lorence[2] and Alisa Huffaker[3], [1]Univ. of Arkansas, Fayetteville, AR, [2]Arkansas State Univ., Jonesboro, AR, [3]Univ. of California, San Diego, CA

8:26 1092 Antibiosis to aphids in sorghum: Cross-resistance to greenbugs and sugarcane aphids in a parental line derived from PI 550610. **J.P. Michaud** (jpmi@ksu.edu)[1] and Mohamed Bayoumy[2], [1]Kansas State Univ., Hays, KS, [2]Mansoura Univ., Mansoura, Egypt

8:38 1093 Evaluation of the efficacy of Dow AgroSciences' dual *Bt* technology in soybeans (Conkesta™) to manage a complex of lepidopteran pests in Brazil. **Boris Castro** (bacastro@dow.com)[1], Luiz Marques[2], Antonio Santos[1], Cristiane Manzoni[3], Jaedino Rosseto[4] and Oscar Silva[5], [1]Dow AgroSciences, Indianapolis, IN, [2]Dow AgroSciences, Mogi Mirim, Brazil, [3]Dow AgroSciences, São Paulo, Brazil, [4]Dow AgroSciences, Uberlândia, Brazil, [5]Dow AgroSciences, Rio Verde-GO, Brazil

8:50 1094 Comparison of options for management of Cry3Bb1-resistant western corn rootworm. **Ram B. Shrestha** (shrestrb@iastate.edu), Mike W. Dunbar and Aaron J. Gassmann, Iowa State Univ., Ames, IA

9:02 1095 New binary-toxin against western corn rootworm from a non-*Bacillus thuringiensis* bacterium: Similarity in mode of action? **Amit Sethi** (amit.sethi@pioneer.com)[1], Claudia Pérez-Ortega[2], Mark Nelson[2], Tim Nowatzki[1], Nasser Yalpani[1], Lu Liu[3], Gusui Wu[1], J. Lindsey Flexner[2] and Laura S. Higgins[1], [1]DuPont Pioneer, Johnston, IA, [2]DuPont Pioneer, Wilmington, DE, [3]DuPont Pioneer, Hayward, CA

9:14 1096 Antibiosis of soybean genotypes to the silverleaf whitefly, *Bemisia tabaci* biotype B. **Edson Baldin** (elbaldin@fca.unesp.br) and Patrícia Cruz, São Paulo State Univ., Botucatu, Brazil

9:26 1097 "Target the pest, not the rest": Novel *Bt galleriae* with Cry8Da protein (grubGONE!®, beetleGONE!® & boreGONE!®) provides selective control of *Popillia japonica, Agrilus planipennis, Hypera brunipennis* and others while preserving beneficial insects. **Kurt Schwartau** (kurtschwartau@phyllom.com), David Matthews and John Libs, Phyllom BioProducts Corp., Oakland, CA

9:38 1098 Thrips-mediated impacts from Bt rice on ecological fitness of non-target predator, *Orius tantilus* (Hemiptera: Anthocoridae). **Zunnu Akhtar** (zunnuraen@gmail.com), Univ. of Agriculture, Faisalabad, Pakistan

9:50 Break

10:00 1099 Assessing novel plant resistance traits against *Xylella fastidiosa* through vector transmission studies and epidemic

models. **Adam Zeilinger** (arz@berkeley.edu)[1], Fabien Labroussaa[1], Bruce Kirkpatrick[2] and Rodrigo P. P. Almeida[1], [1]Univ. of California, Berkeley, CA, [2]Univ. of California, Davis, CA

10:12 1100 Monitoring for insecticide resistance in Michigan populations of spotted wing drosophila, *Drosophila suzukii*. **Steven VanTimmeren** (vantimm2@msu.edu), Rufus Isaacs, David Mota-Sanchez and John C. Wise, Michigan State Univ., East Lansing, MI

10:24 1101 Dose investigations for Conkesta™ Bt soybean and IRM implications for South America. **Desmi Chandrasena** (dichandrasena@dow.com)[1], Maria Cometti[2], Nicholas Storer[1], Boris Castro[1] and Antonio Santos[1], [1]Dow AgroSciences, Indianapolis, IN, [2]Dow AgroSciences, Colon, Argentina

10:36 1102 Evaluation of natural fall armyworm, *Spodoptera frugiperda* (J. E. Smith), resistance in the germplasm of UF field corn breeding program. **Robert Beiriger** (papilio@ufl.edu) and Gregg Nuessly, Univ. of Florida, Belle Glade, FL

10:48 1103 Cry34/35Ab1 artificial diet bioassay for western corn rootworm: A historical data review. **Miles Lepping** (mdlepping@dow.com)[1], Nicholas Storer[1], Dwain M. Rule[1], Elizabeth Owens[2], Clinton Pilcher[2] and Stephen D. Thompson[2], [1]Dow AgroSciences, Indianapolis, IN, [2]DuPont Pioneer, Johnston, IA

11:00 1104 Update on resistance monitoring for Cry34/35Ab1. **Laura S. Higgins** (laura.higgins@pioneer.com)[1], J. Lindsey Flexner[2], Clinton Pilcher[1], Amit Sethi[1], Andre Crespo[1], Stephen D. Thompson[1], Nicholas Storer[3] and Miles Lepping[3], [1]DuPont Pioneer, Johnston, IA, [2]DuPont, Wilmington, DE, [3]Dow AgroSciences, Indianapolis, IN

11:12 1105 Effects of temporal variation in selection pressure on resistance evolution to Bt toxins: Implications for resistance management. **Haridas Chirakkal** (hchirakkal2@unl.edu)[1], Lance Meinke[1], Blair Siegfried[2] and Brigitte Tenhumberg[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Florida, Gainesville, FL

11:24 1106 Improving Bt resistance risk assessment and management through genomic monitoring. **Megan Fritz** (mlfritz@ncsu.edu) and Fred Gould, North Carolina State Univ., Raleigh, NC

Ten-Minute Papers, P-IE Section: IPM - Field Crops 1

200 I (Convention Center)

Moderators: Patricia Prasifka[1] and Andre Crespo[2], [1]Dow AgroSciences, West Fargo, ND, [2]DuPont Pioneer, Johnston, IA

8:00 Introductory Remarks

8:02 1107 Injury to rice by the tadpole shrimp, *Triops longicaudatus*, in California. **Luis Espino** (laespino@ucanr.edu), Univ. of California Cooperative Extension, Colusa, CA

8:14 1108 Rice water weevil density-yield relationships in rice treated with chlorantraniliprole and thiamethoxam. **Srinivas Lanka** (slanka@agcenter.lsu.edu) and Michael Stout, Louisiana State Univ., Baton Rouge, LA

8:26 1109 Interactions between *Metopolophium festucae cerealium* and Barley yellow dwarf virus (BYDV-PAV). **S. Ebrahim Sadeghi** (ebrahims@uidaho.edu), Jenna Bjur, Nilsa A. Bosque-Pérez, Lana Unger and Sanford Eigenbrode, Univ. of Idaho, Moscow, ID

8:38 1110 External application of OPDA enhances the resistance of wheat plants to Hessian fly, *Mayetiola destructor*, infestation under heat stress. **Lieceng Zhu** (lzhu@uncfsu.edu), Fayetteville State Univ., Fayetteville, NC

8:50 1111 Effect of wheat curl mite infestation and wheat streak mosaic virus inoculation timing on disease severity in winter wheat. Everlyne Wosula, **Anthony J. McMechan** (justin.mcmechan@gmail.com), Stephen Wegulo and Gary Hein, Univ. of Nebraska, Lincoln, NE

9:02 1112 Monitoring of the orange wheat blossom midge, *Sitodiplosis mosellana* Géhin (Diptera: Cecidomyiidae), and its parasitoid, *Macroglenes penetrans* Kirby (Hymenoptera: Pteromalidae), in northwest Montana. **Erik Echegaray** (erik.echegaray@montana.edu) and Robert Stougaard, Montana State Univ., Kalispell, MT

9:14 1113 Efficacy of Transform® insecticide in wheat and alfalfa. **Patricia Prasifka** (plprasifka@dow.com)[1], Kevin Johnson[2], Jesse M. Richardson[3], Harvey A. Yoshida[4] and Melissa Siebert[5], [1]Dow AgroSciences, West Fargo, ND, [2]Dow AgroSciences, Danville, IL, [3]Dow AgroSciences, Hesperia, CA, [4]Dow AgroSciences, Richland, WA, [5]Dow AgroSciences, Greenville, MS

9:26 1114 Discovery of corn rootworm specific insecticidal protein from non-*Bacillus* bacterial species. **Lu Liu** (lu.liu@pioneer.com)[1], Ute Schellenberger[1], Jarred Oral[1], Barbara Rosen[1], Genhai Zhu[1], Jun-zhi Wei[1], Mark McDonald[1], David Cerf[1], Weiping Xie[1], Scott Diehn[2], Virginia Crane[2], Gary Sandahl[2], Joe Zhao[2], Amit Sethi[2], Tim Nowatzki[2], Mark Nelson[3], Albert Lu[2] and Gusui Wu[2], [1]DuPont Pioneer, Hayward, CA, [2]DuPont Pioneer, Johnston, IA, [3]DuPont Pioneer, Wilmington, DE

9:38 1115 Syngenta's RNA-based biocontrol applied to soil is effective for corn rootworm control. **Pascale Feldmann** (pascale.feldmann@syngenta.com) and Geert Plaetinck, Syngenta, Zwijnaarde, Belgium

9:50 1116 Discovery of midgut genes for the RNA interference control of corn rootworm. **Xu Hu** (xu.hu@pioneer.com)[1], Nina Richtman[1], Lisa Procyk[1], Jian-Zhou Zhao[1], Meghan Oneal[1], Joe Steimel[1], Xiping Niu[1], Bliss Kernodle[1], Virginia Crane[1], Jeff Robson[1], Gary Sandahl[1], Julie Ritland[1], Timothy M. Nowatzki[1], Tim Mabry[2], James Presnail[3] and Albert Lu[1], [1]DuPont Pioneer, Johnston, IA, [2]DuPont Pioneer, Ivesdale, IL, [3]Evogene Inc., St. Louis, MO

10:02 Break

10:12 1117 Fall armyworm defoliation in maize hybrids with variable leaf feeding resistance and their Bt isolines. **Herb Eichenseer** (Herb.Eichenseer@Pioneer.com), DuPont Pioneer, Johnston, IA

10:24 1118 Neonicotinoids alter the transcriptome of corn exposed to spider mite herbivory. **Jason Wulff** (jason.wulff@ag.tamu.edu)[1], Adrianna Szczepaniec[2], Cecilia Tamborindeguy[1], Ricardo Ramirez[3] and Micky Eubanks[1], [1]Texas A&M Univ., College Station, TX, [2]South Dakota State Univ., Brookings, SD, [3]Utah State Univ., Logan, UT

10:36 1119 Simulating natural enemy abundance and biocontrol in Bt maize. **Christopher Brown** (christopher.r.brown@monsanto.com) and Robert K. D. Peterson, Montana State Univ., Bozeman, MT

10:48 1120 Targeting the "root" of the problem: Enhanced bifenthrin formulations for soil insect control. **Caleigh Irwin** (cirwin@vivecrop.com), Danielle Norton, Hung Pham, Jordan Dinglasan and Darren Anderson, Vive Crop Protection, Toronto, ON, Canada

11:00 1121 Evaluation of reduced risk insecticides for management of wireworms (Coleoptera: Elateridae) on spring wheat. **Frank Antwi** (frank.antwi@montana.edu)[1], Gadi VP. Reddy[2], John Miller[1], Stefan T. Jaronski[3], Bob Vernon[4] and Kevin Wanner[5], [1]Montana State Univ., Conrad, MT, [2]Univ. of Guam, Mangilao, Guam, [3]USDA - ARS, Sidney, MT, [4]Agriculture and Agri-Food Canada, Agassiz, BC, Canada, [5]Montana State Univ., Bozeman, MT

11:12 1122 Western corn rootworm (Coleoptera: Chrysomelidae) emergence on corn hybrids expressing Cry34Ab1/Cry35Ab1 and Cry3Bb1 at variable infestation rates. **Laura Campbell** (lacampbell@dow.com)[1], Patricia Prasifka[2], Nicholas Storer[3], Dwain M. Rule[3], Steve P. Nolting[3] and William H. Hendrix[3], [1]Dow AgroSciences, Carbondale, IL, [2]Dow AgroSciences, West Fargo, ND, [3]Dow AgroSciences, Indianapolis, IN

11:24 1123 Survival of corn earworm on Bt maize and cross-pollinated refuge ears from seed blends. **Andre Crespo** (andre.crespo@pioneer.com)[1], Analiza P. Alves[1], J. Lindsey Flexner[2], Bonnie Hong[1], Yiwei Wang[1], Angus Catchot[3], Don Cook[4] and David Buntin[5], [1]DuPont Pioneer, Johnston, IA, [2]DuPont Pioneer, Wilmington, DE, [3]Mississippi State Univ., Mississippi State, MS, [4]Mississippi State Univ., Stoneville, MS, [5]Univ. of Georgia, Griffin, GA

11:36 1124 Dow AgroSciences corn trait strategy overview. **Dwain M. Rule** (ddrule@dow.com), Kent Davies, Nicholas Storer and Miles Lepping, Dow AgroSciences, Indianapolis, IN

Ten-Minute Papers, P-IE Section: IPM - Fruit and Nut Trees

200 G (Convention Center)

Moderators: Arthur Agnello[1] and Joel Siegel[2], [1]Cornell Univ., Geneva, NY, [2]USDA - ARS, Parlier, CA

8:00 Introductory Remarks

8:02 1125 Influence of temperature, humidity and photoperiod on western cherry fruit fly, *Rhagoletis indifferens*, diapause. **Lisa Neven** (Lisa.Neven@ars.usda.gov), USDA - ARS, Wapato, WA

8:14 1126 Release and establishment of *Fopius arisanus* against oriental fruit fly, *Bactrocera dorsalis*, attacking mango in Senegal. **Roger Vargas** (roger.vargas@ars.usda.gov)[1], Luc Leblanc[2] and Kemo Badji[3], [1]USDA - ARS, Hilo, HI, [2]Univ. of Hawai'i, Honolulu, HI, [3]Crop Protection Directorate, Dakar, Senegal

8:26 1127 Navel orangeworm, *Amyelois transitella*, insecticide application efficacy and control. **Joel Siegel** (joel.siegel@ars.usda.gov)[1] and Matt Strmiska[2], [1]USDA - ARS, Parlier, CA, [2]Qualified Applicator Specialists, Fresno, CA

8:38 1128 Aerosol mating disruption for the navel orangeworm, *Amyelois transitella*: Characterization and optimization. **Charles Burks** (charles.burks@ars.usda.gov), USDA - ARS, Parlier, CA

8:50 1129 Deployment of organic insecticides and parasitoids for sustainable management of Asian citrus psyllid, *Diaphorina citri*. **Jawwad Qureshi** (jawwadq@ufl.edu) and Philip A. Stansly, Univ. of Florida, Immokalee, FL

9:02 1130 Feeding, transport and survival of Asian citrus psyllid, *Diaphorina citri*, adults. **Roger Duncan Selby** (roger.selby@ucr.edu) and Richard Stouthamer, Univ. of California, Riverside, CA

9:14 1131 Around the clock field videography of the Asian citrus psyllid in southern California: Natural enemy and ally interactions. **Erica Kistner** (ekistner@ucr.edu) and Mark S. Hoddle, Univ. of California, Riverside, CA

9:26 1132 Productivity of HLB-infected citrus trees is enhanced by Asian citrus psyllid control and foliar nutrition. **James Tansey** (jtansey@ufl.edu)[1], Pilar Vanaclocha[1], Moneen Jones[2], Cesar Monzo[1,3] and Philip A. Stansly[1], [1]Univ. of Florida, Immokalee, FL, [2]Univ. of Missouri, Portageville, MO, [3]IVIA, Valencia, Spain

9:38 1133 Abundance of mite species on citrus trees treated with conventional or organic insecticides applied for control of the Asian citrus psyllid, *Diaphorina citri* (Hemiptera: Psyllidae). **Yijing Cen** (cenyj@scau.edu.cn)[1,2], Xulin Chen[2], Jawwad Qureshi[2] and Philip A. Stansly[2], [1]South China Agricultural Univ., Guangzhou, China, [2]Univ. of Florida, Immokalee, FL

9:50 1134 Temperature associated cuticular melanization in the Asian citrus psyllid, *Diaphorina citri kuwayama* (Hemiptera:Lividae), and its role in *Candidatus liberibacter asiaticus* transmission. **Torrence Gill** (gilltorrence@hotmail.com), Monique Coy and Kirsten Pelz-Stelinski, Univ. of Florida, Lake Alfred, FL

10:02 Break

10:12 1135 Closer™ SC: A novel insecticide for the control of sap-feeding insects in citrus and vegetables in Florida. **Alejandro Calixto** (AACalixto@dow.com)[1], Melissa Siebert[2], Luis E. Gomez[3] and Jamey Thomas[3], [1]Dow AgroSciences, Wesley Chapel, FL, [2]Dow AgroSciences, Greenville, MS, [3]Dow AgroSciences, Indianapolis, IN

10:24 1136 Ambrosia beetle, *Xylosandrus germanus*, infestations and management trials in high-density apple orchards. **Arthur Agnello** (ama4@cornell.edu)[1], Deborah Breth[2] and John Vandenberg[3], [1]Cornell Univ., Geneva, NY, [2]Cornell Cooperative Extension, Albion, NY, [3]USDA - ARS, Ithaca, NY

10:36 1137 Impacts of and mitigation strategies for the tawny crazy ant, *Nylanderia fulva*, on pecan orchards in southeast Texas. **Bill Ree** (w-ree@tamu.edu)[1], Danny McDonald[2] and Paul Nester[3], [1]Texas A&M AgriLife Extension Service, Bryan, TX, [2]Sam Houston State Univ., Huntsville, TX, [3]Texas A&M AgriLife Extension Service, Houston, TX

10:48 1138 Overview of the cocoa pod borer, *Conopomorpha cramerella* (Lepidoptera, Gracillariidae), a major pest for the cocoa industry. **Jerome Niogret** (niogret.ecology.consulting@gmail.com)[1], Smilja Lambert[2], Hussin Bin Purung[3], Keith Ingram[4], Charles Stuhl[5], Nancy D. Epsky[6], Paul E. Kendra[6] and Hans Alborn[5], [1]Niogret Ecology Consulting LLC, Miami, FL, [2]Mars Inc, Cairns, Australia, [3]Mars Inc, Tarengge, Indonesia, [4]Mars Inc, Gainesville, FL, [5]USDA - ARS, Gainesville, FL, [6]USDA - ARS, Miami, FL

11:00 1139 Flight periodicity and host preference of the walnut twig beetle, *Pityophthorus juglandis* (Coleoptera: Scolytidae), in the native habitat in New Mexico. **Andrew Graves** (adgraves@fs.fed.us)[1], Corwin Parker[2] and Steven Seybold[3], [1]USDA - Forest Service, Alburquerque, NM, [2]Univ. of California, Davis, CA, [3]USDA - Forest Service, Davis, CA

11:12 1140 Early-season monitoring of leaffooted bug in almond and pistachio produced in California's San Joaquin and Sacramento Valleys. **Kris Tollerup** (ketollerup@ucanr.edu)[1] and Bradley Higbee[2], [1]Univ. of California, Parlier, CA, [2]Paramount Farming Co, Shafter, CA

11:24 1141 Long-line trapping of codling moth: A novel approach to increasing the utility of insect captures in monitoring traps. **James Miller** (miller20@msu.edu)[1], Christopher Adams[1], Larry Gut[1], Peter S. McGhee[1], Paul A. Weston[2] and Jeffrey Schenker[1], [1]Michigan State Univ., East Lansing, MI, [2]Charles Sturt Univ., Wagga Wagga, Australia

11:36 1142 Interpreting catch of codling moth, *Cydia pomonella*, in sex pheromone baited monitoring traps. **Christopher Adams** (adamsch@msu.edu), Larry Gut and James R. Miller, Michigan State Univ., East Lansing, MI

11:48 1143 Assessing the global risk of establishment of codling moth, *Cydia pomonella*, using CLIMEX and MaxEnt niche models. **Sunil Kumar** (sunil.kumar@colostate.edu)[1], Lisa Neven[2], Hongyu Zhu[3] and Runzhi Zhang[3], [1]Colorado State Univ., Fort Collins, CO, [2]USDA - ARS, Wapato, WA, [3]Chinese Academy of Sciences, Beijing, China

Ten-Minute Papers, SysEB Section: Genomic Data in Systematics and Evolution

210 AB (Convention Center)

Moderators: Duane D. McKenna[1] and Rebecca B. Simmons[2], [1]Univ. of Memphis, Memphis, TN, [2]Univ. of North Dakota, Grand Forks, ND

8:00 Welcoming Remarks

8:02 1144 Does *wingless* display non-neutral evolution in aposematic and mimetic tiger moths? (Lepidoptera: Erebidae: Arctiinae). **Rebecca B. Simmons** (rebecca.simmons@email.und.edu)[1], Susan J. Weller[2] and Jennifer Zaspel[3], [1]Univ. of North Dakota, Grand Forks, ND, [2]Univ. of Minnesota, Minneapolis, MN, [3]Purdue Univ., West Lafayette, IN

8:14 1145 Exploring the evolutionary history of assassin flies (Diptera: Asilidae) through phylogenomic data. **Mauren Turcatel** (turcatelm@si.edu)[1], Torsten Dikow[1] and Rebecca Dikow[2], [1]Smithsonian Institution National Museum of Natural History, Washington, DC, [2]Smithsonian Institute for Biodiversity Genomics, Washington, DC

8:26 1146 Applying next generation sequencing technology to estimate biodiversity: A new tool to accurately, rapidly and efficiently address an old problem. Eric G Chapman[1], **Michael J. Sharkey** (msharkey@uky.edu)[1] and Matthieu Leray[2], [1]Univ. of Kentucky, Lexington, KY, [2]Smithsonian Institution National Museum of Natural History, Washington, DC

8:38 1147 Differential gene expression in host races of *Rhagoletis pomonella* flies in diapause using RNAseq. **Peter Meyers** (pmeyers2@nd.edu)[1], Gregory Ragland[2] and Jeffrey Feder[1], [1]Univ. of Notre Dame, Notre Dame, IN, [2]Kansas State Univ., Manhattan, KS

8:50 1148 The Colorado potato beetle, *L. decemlineata*, genome yields insight into the role of transposable elements in pest evolution. **Kristian Brevik** (kristian.a.brevik@gmail.com)[1], Ania Muszewska[2], Sean Schoville[3] and Yolanda Chen[1], [1]Univ. of Vermont, Burlington, VT, [2]Polish Academy of Sciences, Warszawa, Poland, [3]Univ. of Wisconsin, Madison, WI

9:02 1149 Towards resolution of "the largest outstanding problem in the higher classification of Coleoptera": Anchored phylogenomics and the 1K Weevils Project. **Seunggwan Shin** (sshin4@memphis.edu)[1], Alex Aitken[1], Alan Lemmon[2], Emily Lemmon[2] and Duane D. McKenna[1], [1]Univ. of Memphis, Memphis, TN, [2]Florida State Univ., Tallahassee, FL

9:14 1150 Completion of the i5K genome project of the Colorado potato beetle, *Leptinotarsa decemlineata*. **Sean Schoville** (sean.schoville@wisc.edu)[1], Yolanda Chen[2] and Stephen Richards[3], [1]Univ. of Wisconsin, Madison, WI, [2]Univ. of Vermont, Burlington, VT, [3]Baylor Univ., Houston, TX

9:26 1151 Phylogenomics reveals convergence of breeding and feeding habits among the pygmy borers (Scolytinae: Cryphalini). **Andrew Johnson** (ajj@ufl.edu)[1], Jiri Hulcr[1] and Duane D. McKenna[2], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Memphis, Memphis, TN

9:38 1152 The Asian longhorned beetle, *Anoplophora glabripennis* (Cerambycidae: Lamiinae), genome reveals functional and evolutionary insights at the beetle-plant interface. **Duane D. McKenna** (dmckenna@memphis.edu)[1] and Stephen Richards[2], [1]Univ. of Memphis, Memphis, TN, [2]Baylor Univ., Houston, TX

9:50 Concluding Remarks

Ten-Minute Papers, SysEB Section: Phylogenetics

211 D (Convention Center)

Moderators: James Robertson[1] and Traci L. Grzymala[2], [1]Univ. of Arizona, Tucson, AZ, [2]Univ. of California, Berkeley, CA

8:00 Welcoming Remarks

8:02 1153 Comparative mtDNA phylogenetics of Southern Appalachian litter beetles across different forest types. **Shelley Myers** (smyers2@clemson.edu) and Michael Caterino, Clemson Univ., Clemson, SC

8:14 1154 Phylogeny of the Neotropical leaf beetle tribe Dorynotini Monrós and Viana, 1949 (Coleoptera: Chrysomelidae: Cassidinae). **Marianna V. P. Simões** (marianna_simoes1@ku.edu), Univ. of Kansas, Lawrence, KS

8:26 1155 Phylogenetic and taxonomic approaches to understanding the evolution of ant parasitoids in the genus *Orasema* (Hymenoptera: Eucharitidae). **John M. Heraty** (john.heraty@ucr.edu), Jason Mottern and Roger A. Burks, Univ. of California, Riverside, CA

8:38 1156 Adaptive radiation of Batesian mimetic butterflies across a tropical archipelago. **David J. Lohman** (dlohman@ccny.cuny.edu)[1,2], Chia-Hsuan Wei[3], Dylan Scott[1,2], Djunijanti Peggie[4], Krushnamegh Kunte[5], Tenzing Doleck[1,2], Elva Yang[2], Susan Tsang[1,2], Chris Müller[6], Andrew Brownjohn[2] and Shen-Horn Yen[3], [1]Graduate Center-CUNY, New York, NY, [2]City College of New York-CUNY, New York, NY, [3]National Sun Yat-Sen Univ., Kaohsiung, Taiwan, [4]Research Centre for Biology-LIPI, Cibinong-Bogor, Indonesia, [5]National Center for Biological Sciences, Bengaluru, India, [6]Australian Museum, Sydney, Australia

8:50 1157 Molecular phylogeny of the subgenus *Oxypodera* (Coleoptera: Staphylinidae: Aleocharinae: *Atheta*). **Vladimir Gusarov** (vladimir.gusarov@nhm.uio.no), Univ. of Oslo, Oslo, Norway

9:02 1158 Phylogeny of some Culicidae mosquitoes based on mitochondrial DNA sequences. **Navneet Rai** (navneetkaur507@rocketmail.com), Punjabi University, Patiala, India

9:14 1159 Exploring the phylogenetic placement of the firefly genus *Robopus* Motschulsky (Coleoptera: Lampyridae). **Oliver Keller** (okeller1977@gmail.com) and Marc Branham, Univ. of Florida, Gainesville, FL

9:26 Break

9:38 1160 A multiple gene phylogeny reveals polyphyly among eastern North American *Aphaenogaster* species (Hymenoptera: Formicidae). **Bernice DeMarco** (demarc10@msu.edu) and Anthony I. Cognato, Michigan State Univ., East Lansing, MI

9:50 1161 The 1000 Curculionidae Phylogeny and Evolution Project: New frontiers in morphological phylogenetics of weevils. **Dave Clarke** (djclarke@memphis.edu)[1], Adriana E. Marvaldi[2], Rolf Oberprieler[3] and Duane D. McKenna[1], [1]Univ. of Memphis, Memphis, TN, [2]Universidad Nacional de La Plata, Buenos Aires, Argentina, [3]CSIRO, Canberra, Australia

10:02 1162 Understanding the most recent and rapid radiation in Orthoptera based on a molecular phylogeny of grasshoppers (Orthoptera: Acridoidea). **Hojun Song** (hsong@tamu.edu), Texas A&M Univ., College Station, TX

10:14 1163 Deciphering the evolution of *Oocyclus* tropical waterfall beetles using Bayesian total evidence phylogenetics.

Emmanuel Toussaint (emmanuel.touss1@gmail.com) and Andrew Short, Univ. of Kansas, Lawrence, KS

10:26 1164 Sexual dimorphism and diversification: Morphological phylogeny of the puppet beetles (Coleoptera, Aderidae). **Traci L. Grzymala** (mala@berkeley.edu), Univ. of California, Berkeley, CA

10:38 1165 Comprehensive phylogeny of the superfamily Cleroidea (Coleoptera: Polyphaga). **Matthew L. Gimmel** (phalacrid@gmail.com)[1], Milada Bocakova[2], Nicole L. Gunter[3] and Richard A. B. Leschen[4], [1]Santa Barbara Museum of Natural History, Santa Barbara, CA, [2]Palacky Univ., Olomouc, Czech Republic, [3]CSIRO, Canberra, Australia, [4]Landcare Research, Auckland, New Zealand

10:50 1166 A molecular phylogeny of Neotropical *Parapanteles* wasps (Braconidae: Microgastrinae) reveals polyphyly and simplifies host use patterns. **Kyle Parks** (kparks4@illinois.edu) and James Whitfield, Univ. of Illinois, Champaign, IL

11:02 1167 Phylogenetic utility of morphology in an explosive adaptive radiation of beetles (Carabidae: Paussinae: *Paussus*). **James Robertson** (erotylid@gmail.com) and Wendy Moore, Univ. of Arizona, Tucson, AZ

11:14 1168 Phylogeny of the burrowing water beetles (Coleoptera: Noteridae) as inferred from molecular sequence data. **Stephen Baca** (s953b810@ku.edu) and Andrew Short, Univ. of Kansas, Lawrence, KS

11:26 1169 An introduction to Polynesian *Carposina* (Lepidoptera: Carposinidae): Host jumps and diversification on islands. **Matthew J. Medeiros** (matt.j.medeiros@gmail.com) and Peter T. Oboyski, Univ. of California, Berkeley, CA

11:38 Concluding Remarks

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TUESDAY, NOVEMBER 17, 2015, AFTERNOON

Organized Meeting: IOBC NRS Annual Meeting

211 D (Convention Center)

Moderators and Organizers: Cesar Rodriguez-Saona, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

12:00 IOBC/NRS Member & Business Meeting

12:30 Presentation of Professional and Graduate Student Awards

12:45 Distinguished Scientist Awardee Presentation

1:15 Outstanding PhD Student Awardee Presentation

1:45 Concluding Remarks and Presentation

Lunch and Learn: Preparing for the Future - What Every Student Should Know About Getting a Job or Finding a Career

200 A (Convention Center)

Moderators and Organizers: Janet Hurley[1] and Robert Davis[2], [1]Texas A&M AgriLife Extension Service, Dallas, TX, [2]BASF Corporation, Pflugerville, TX

12:00 PM - 1:15 PM

Lunch and Learn: Science Policy: Fellows, Funding, and the Federal Future of Entomology

207 AB (Convention Center)

Moderators and Organizers: Karen Mowrer and Alison Thompson, Lewis-Burke Associates, Washington, DC

12:15 PM - 1:15 PM

Joint Session: Novel Approaches on Site-Specific Integrated Pest Management

M100 F (Convention Center)

Moderators and Organizers: Brenda Ortiz[1] and John Shanahan[2], [1]Auburn Univ., Auburn, AL, [2]DuPont Pioneer, Des Moines, IA

1:00 Introductory Remarks

1:05 1170 Spatial pattern analysis of *Heterodera glycines* population densities in experimental settings to soybean variety evaluations in the United States. **Oscar Perez-Hernandez** (oscar.perezhernandez@sdstate.edu)[1] and Loren Giesler[2], [1]South Dakota State Univ., Brookings, SD, [2]Univ. of Nebraska, Lincoln, NE

1:20 1171 Zone management approaches in IPM of tarnished plant bug in midsouth cotton. **Tina Teague** (tteague@astate.edu) and Keith Morris, Arkansas State Univ., Jonesboro, AR

1:35 1172 The population ecology of image pixels: A geostatistical abstraction. **Jeffrey Willers** (jeffrey.willers@ars.usda.gov) and Ardeshir Adeli, USDA - ARS, Mississippi State, MS

1:50 1173 The view from above: Unmanned aerial systems and remote scouting for insects. **Ian MacRae** (imacrae@umn.edu)[1], Robert Koch[2], Tavvs Alves[2] and Tim Baker[1], [1]Univ. of Minnesota, Crookston, MN, [2]Univ. of Minnesota, St. Paul, MN

2:05 Break

2:20 1174 Image-based field monitoring of sugar beet Cercospora leaf spot using robust template matching and pattern recognition. **Rong Zhou**[1], Shun'ichi Kaneko[2], Fumio Tanaka[3], Miyuki Kayamori[3] and Motoshige Shimizu[3], [1]Utah State Univ., Logan, UT, [2]Hokkaido Univ., Sapporo, Japan, [3]Hokkaido Research Organization, Naganuma, Japan

2:35 1175 Development and evaluation of a laser-guided air-assisted sprayer in nursery production. **Robin Rosetta** (robin.rosetta@oregonstate.edu)[1], Heping Zhu[2], Michael E. Reding[2], Randall H. Zondag[3], Christopher Ranger[2], Luis A. Cañas[4], Amy Fulcher[5], Charles Krause[2], Yue Shen[4], Hui Liu[4], Yu Chen[4], Erdal Ozkan[6], Richard C. Derksen[2], James Locke[7] and Stanley Ernst[6], [1]Oregon State Univ., Aurora, OR, [2]USDA - ARS, Wooster, OH, [3]The Ohio State Univ., Painesville, OH, [4]The Ohio State Univ., Wooster, OH, [5]Univ. of Tennessee, Knoxville, TN, [6]The Ohio State Univ., Columbus, OH, [7]USDA - ARS, Toledo, OH

2:50 1176 Looking ahead to automated integrated weed management: Challenges and opportunities. **Stephen Young** (sly27@cornell.edu)[1], Santosh Pitla[2], Frits van Evert[3], John Schueller[4] and Francis Pierce[5], [1]Northeastern IPM Center, Cornell Univ., Ithaca, NY, [2]Univ. of Nebraska, Lincoln, NE, [3]Wageningen Univ. & Research Center, Wageningen, Netherlands, [4]Univ. of Florida, Gainesville, FL, [5]Washington State Univ., Pullman, WA

3:05 Adjorn

Joint Symposium: Management and Biological Control of Weeds in Agroecosystems

M101 A (Convention Center)

Moderators and Organizers: Anil Shrestha[1] and Linda Buergi[2], [1]California State Univ., Fresno, CA, [2]Oregon State Univ., Corvallis, OR

1:00 Introductory Remarks

1:05 1177 Classical biological control of invasive plants: Limits and possibilities. **Linda Buergi** (buergil@onid.oregonstate.edu), Oregon State Univ., Corvallis, OR

1:20 1178 Biological control of yellow starthistle in western rangelands: Implications for grazing. **Mark Schwarzländer** (markschw@uidaho.edu), Univ. of Idaho, Moscow, ID

1:35 1179 Biological control of mile-a-minute weed: Effects of abiotic environmental conditions. **Judith A. Hough-Goldstein** (jhough@udel.edu)[1], Ellen Lake[2] and Scott Berg[1], [1]Univ. of Delaware, Newark, DE, [2]USDA - ARS, Fort Lauderdale, FL

1:50 1180 Integrating targeted sheep grazing in organic systems: Impacts on weed and ground beetle communities. **Fabian Menalled** (menalled@montana.edu), Sean McKenzie, Hayes Goosey, Kevin O'Neill, Subodh Adhikari and Nar Ranabhat, Montana State Univ., Bozeman, MT

2:10 1181 Evaluation of contrasting weed management systems using multiple performance criteria. **Matt Liebman** (mliebman@iastate.edu)[1], Natalie Hunt[2], Jason Hill[2], Ann Johanns[1], Huong Nguyen[1] and Matthew Woods[1], [1]Iowa State Univ., Ames, IA, [2]Univ. of Minnesota, St. Paul, MN

2:30 Break

2:40 1182 Pollinator assemblages on dandelions and white clover in urban and suburban lawns. **Jonathan Larson** (jonathan.larson@unl.edu)[1] and Daniel Potter[2], [1]Univ. of Nebraska, Omaha, NE, [2]Univ. of Kentucky, Lexington, KY

2:55 1183 Potential influences of agricultural pesticide use on biological control of non-agricultural weeds with insects. **Patrick J. Moran** (patrick.moran@ars.usda.gov), USDA - ARS, Albany, CA

3:10 1184 Certified crop advisor perceptions of giant ragweed distribution, herbicide-resistance, and management in the Corn Belt. **Emilie Regnier** (regnier.1@osu.edu)[1], Steven Kent Harrison[1], Mark Loux[1], Christopher Holloman[1], Ramarao Venkatesh Venkatesh[1], Florian Diekmann[1], Robin Taylor[2] and Robert Ford[1], [1]The Ohio State Univ., Columbus, OH, [2]Texas A&M AgriLife Research & Extension Service, Temple, TX

3:25 1185 Cover crop diversity and management for weed control in organic agro-ecosystems. **Amanda Buchanan** (alynn@msu.edu)[1], Guihua Chen[2] and Cerruti Hooks[2], [1]Michigan State Univ., East Lansing, MI, [2]Univ. of Maryland, College Park, MD

3:40 1186 Evolutionary stability of biological weed control. **Linda Buergi** (buergil@onid.oregonstate.edu), Oregon State Univ., Corvallis, OR

3:55 Concluding Remarks

4:00 Adjorn

Joint Interactive Workshop: Writing Manuscripts for Publication

Minneapolis Ballroom B (Hilton)

Moderator and Organizer: Emily Fuger, ASA, CSSA, and SSSA, Madison, WI

1:30 PM - 3:00 PM

Student Debates

Auditorium Main (Convention Center)

Moderators and Organizers: Rebecca Schmidt-Jeffris[1], Kyndall Dye[2] and Alix Whitener[3], [1]Cornell Univ., Geneva, NY, [2]Univ. of Kentucky, Lexington, KY, [3]Washington State Univ., Wenatchee, WA

1:30 1187 Molecular biology and entomology: Partnering for solutions. **Rebecca Schmidt-Jeffris** (schmidt-jeffris@cornell.edu), Cornell Univ., Geneva, NY

1:40 1188 Unbiased Introduction, Topic 1: What is the single best genetically-engineered technology for arthropod pest control? **Priyanka Mittapelly** (mittapelly.1@buckeyemail.osu.edu), The Ohio State Univ., Wooster, OH

1:45 1189 Team 1, University of California - Davis: Sterile Insect Technique (faculty advisor: Michael Parrella). **Daniel Klittich** (dsklittich@ucdavis.edu)[1], **Margaret Scampavia** (mrscampavia@ucdavis.edu)[2] and **Ralph Washington**[1], [1]Univ. of California, Davis, CA, [2]Univ. of California, Oakland, CA

1:52 Cross Examination by Team 2 for Topic 1

1:55 1190 Team 2, Auburn University: RNAi (faculty advisor: David Held). **Matthew Burrows**[1], **Olufunmilayo Ajayi** (oea0001@auburn.edu)[1], **R. Murphey Coy** (rmc0023@tigermail.auburn.edu)[2] and **Adrian Pekarkic**[1], [1]Auburn Univ., Auburn, AL, [2]Univ. of Kentucky, Lexington, KY

2:02 Cross Examination by Team 1 for Topic 1

2:05 First Rebuttal by Team 2 for Topic 1

2:08 First Rebuttal by Team 1 for Topic 1

2:11 Second Rebuttal by Team 2 for Topic 1

2:14 Second Rebuttal by Team 1 for Topic 1

2:17 Questions from Judges and Audience for Topic 1

2:27 Break

2:37 1191 Unbiased Introduction, Topic 2: With the development of tools like RNAi, in the future we may be capable of eradicating species. If we can eradicate a species, should we? **Ashley Yates** (yates.229@buckeyemail.osu.edu), The Ohio State Univ., Wooster, OH

2:42 1192 Pro Team, Louisiana State University (advisor: Kristin Healy). **Emily Kraus** (ekraus@agcenter.lsu.edu), **Lina Bernaola** (lbernaola@agcenter.lsu.edu), **Nicholas DeLisi** (ndelisi55@gmail.com), **Zinan Wang** (zwang67@tigers.lsu.edu) and **Blake E. Wilson** (bwils26@lsu.edu), Louisiana State Univ., Baton Rouge, LA

2:49 Cross Examination by Con Team for Topic 2

2:52 1193 Con Team, North Carolina State University (advisor: Fred Gould). **Sophia Webster** (shwebste@ncsu.edu)[1], **Jen Baltzegar**[2], **Johanna Elsensohn** (jeelsens@ncsu.edu) and **Gabriel Zillnik**, North Carolina State Univ., Raleigh, NC

2:59 Cross Examination by Pro Team for Topic 2

3:02 First Rebuttal by Con Team for Topic 2

3:05 First Rebuttal by Pro Team for Topic 2

3:08 Second Rebuttal by Con Team for Topic 2

3:11 Second Rebuttal by Pro Team for Topic 2

3:14 Questions from Judges and Audience for Topic 2

3:24 Break

3:34 1194 Unbiased Introduction, Topic 3: What is the single best tool for managing pesticide resistance? **Jenny Finitzer** (jennifer.finitzer@email.wsu.edu), Washington State Univ., Pullman, WA

3:39 1195 Team 1, Florida A&M University: Pesticide-Free Refuges (advisor: Raymond Hix). **Tavia Gordon** (taviagordon@yahoo.com), **Whitley Stewart**, **Edidiong Inyang**, **Xavier Price** and **Eric Turner**, Florida A&M Univ., Tallahassee, FL

3:46 Cross Examination by Team 2 for Topic 3

3:49 1196 Team 2, University of Nebraska: Pesticide Rotation (advisor: Joe Louis). **Carolina Camargo** (carolinacamargo01@gmail.com)[1], **Melina Florez-Cuadros** (melinaflorezcuadros@yahoo.com)[1], **Christopher McCullogh**[1], **Wayne Ohnesorg** (wohnesorg2@unl.edu)[2], **Camila F. Oliveira-Hofman** (coliveirahofman@gmail.com)[1], **Travis J. Prochaska** (Travis.Prochaska@gmail.com)[1] and **Matheus Riberio**[1], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, Pierce, NE

3:56 Cross Examination by Team 1 for Topic 3

3:59 First Rebuttal by Team 2 for Topic 3

4:02 First Rebuttal by Team 1 for Topic 3

4:05 Second Rebuttal by Team 2 for Topic 3

4:08 Second Rebuttal by Team 1 for Topic 3

4:11 Questions from Judges and Audience for Topic 3

4:14 Concluding Remarks

Program Symposium: How Can Ecosystem Services Support Resilient and Multifunctional Agriculture Systems to Meet the Challenges of the 21st Century?

Auditorium 1 (Convention Center)

Moderators and Organizers: Katharina Ullmann[1,2] and Timothy Bowles[1], [1]Univ. of California, Davis, CA, [2]The Xerces Society for Invertebrate Conservation, Portland, OR

1:30 Welcoming Remarks

1:35 1197 Can managing ecosystem services give a win-win for biodiversity and food production? **David Kleijn** (david.kleijn@wur.nl), Wageningen Univ., Wageningen, Netherlands

2:00 1198 Interactions between pollination and pest control services in agroecosystems. **Ola Lundin** (olalundin@ucdavis.edu), Univ. of California, Davis, CA

2:25 1199 Tradeoffs and synergies in California pest and nutrient management. **Amanda Hodson** (akhodson@ucdavis.edu), Univ. of Califonia, Davis, CA

2:50 Break

3:00 1200 Crop rotation, plant nutrition, and changing sensitivity in cotton to *Lygus* herbivory. **Jay Rosenheim** (jarosenheim@ucdavis.edu), Univ. of California, Davis, CA

3:25 1201 Crop diversity effects on pollination and natural pest control services: Is ecological evidence enough to promote food security? **Amber Sciligo** (amber.sciligo@berkeley.edu), Univ. of California, Berkeley, CA

3:50 1202 Enhancing agroecosystem performance and resilience through increased diversification of landscapes and cropping systems. **Matt Liebman** (mliebman@iastate.edu), Iowa State Univ., Ames, IA

4:15 Break

4:25 1203 Knowledge networks for managing ecosystem services in agroecosystems. **Kelly Garbach** (kgarbach@luc.edu), Loyola Univ., Chicago, IL

4:50 1204 Accounting for nature: Incorporating ecosystem services into societal decision-making. **Stephen Polasky** (polasky@umn.edu), Univ. of Minnesota, St. Paul, MN

5:15 Panel Discussion

PBT Section Symposium: Water and Ion Homeostasis-Role of Aquaporins and Other Channel Proteins

211 A (Convention Center)

Moderators and Organizers: Jeff Fabrick[1], Joshua Benoit[2] and Immo Hansen[3], [1]USDA -ARS, Maricopa, AZ, [2]Univ. of Cincinnati, Cincinnati, OH, [3]New Mexico State Univ., Las Cruces, NM

1:30 Introductory Remarks

1:33 1205 Salt and water balance in insects: Molecular mechanisms and potential biomedical targets. **Klaus W. Beyenbach** (kwb1@cornell.edu), Univ. of Osnabrueck, Osnabrueck, Germany

1:53 1206 How do insect tubules achieve the highest transport rates in biology? **Julian Dow** (julian.dow@glasgow.ac.uk)[1], Kenneth Halberg[2], Pablo Cabrero[1], Anthony Dornan[1], Selim Therhzaz[1] and Shireen Davies[1], [1]Univ. of Glasgow, Glasgow, United Kingdom, [2]The August Krogh Centre, Univ. of Copenhagen, Copenhagen, Denmark

2:13 1207 The molecular evolution of arthropod aquaporins. **Roderick Finn** (nigel.finn@uib.no)[1,2], François Chauvigné[2,3], Jon Stavang[1], Xavier Belles[4] and Joan Cerdà[3], [1]Univ. of Bergen, Bergen, Norway, [2]Institute of Marine Research, Bergen, Norway, [3]Consejo Superior de Investigaciones Científicas, Barcelona, Spain, [4]Institute of Evolutionary Biology, Barcelona, Spain

2:33 1208 Physiology of aquaporins in lepidopteran caterpillars. **Masaaki Azuma** (azuma@muses.tottori-u.ac.jp), Tottori Univ., Tottori, Japan

2:53 1209 Water relations in plant sap-feeding insects: From molecular function to pest control target. **Angela E. Douglas** (aes326@cornell.edu), Cornell Univ., Ithaca, NY

3:13 1210 Functional aquaporins from the agricultural pests *Lygus hesperus* and *Bemisia tabaci*. **Jeff Fabrick** (jeff.fabrick@ars.usda.gov), USDA - ARS, Maricopa, AZ

3:28 1211 Aquaporins in the antarctic midge, an extremophile that relies on dehydration for cold survival. **Shin Goto** (shingoto@sci.osaka-cu.ac.jp), Osaka City Univ., Osaka, Japan

3:48 Break

3:58 1212 Presentation withdrawn

4:18 1213 Functional analysis of aquaporins in the bed bug, *Cimex lectualrius*. **Jason Rasgon** (jlr54@psu.edu), Pennsylvania State Univ., University Park, PA

4:38 1214 Tsetse flies require specific aquaporins during nursing to ensure hydration of intrauterine progeny. **Joshua Benoit** (benoitja@ucmail.uc.edu), Univ. of Cincinnati, Cincinnati, OH

4:53 1215 Aquaporins and aquaglyceroporins of the yellow fever mosquito, *Aedes aegypti*. **Immo Hansen** (immoh@nmsu.edu), New Mexico State Univ., Las Cruces, NM

5:08 1216 Molecular, biochemical, and physiological evidence for a functional transition in the 'kidneys' of adult female mosquitoes during the processing of blood meals. **Peter Piermarini** (piermarini.1@osu.edu), Brian Cassone and Carlos Esquivel, The Ohio State Univ., Wooster, OH

5:28 Concluding Remarks

P-IE Section Symposium: Ecology and Management of Migratory Moth Pests: Uniting Disciplines to Provide Solutions

211 B (Convention Center)

Moderators and Organizers: Jason Chapman[1], John Westbrook[2] and William Hutchison[3], [1]Rothamsted Research, Harpenden, United Kingdom, [2]USDA - ARS, College Station, TX, [3]Univ. of Minnesota, St. Paul, MN

1:30 Welcoming Remarks

1:35 1217 Simulation of generational migrations of fall armyworm, *Spodoptera frugiperda*, moths. **John Westbrook** (john.westbrook@ars.usda.gov)[1], Siddarta Jairam[1], Rodney N. Nagoshi[2], Robert L. Meagher[2] and Shelby J. Fleischer[3], [1]USDA - ARS, College Station, TX, [2]USDA - ARS, Gainesville, FL, [3]Pennsylvania State Univ., University Park, PA

1:55 1218 Using ecological techniques to manage overwintering populations of the fall armyworm. **Robert L. Meagher** (rob.meagher@ars.usda.gov)[1], Rodney N. Nagoshi[1], Shelby J. Fleischer[2] and John Westbrook[3], [1]USDA - ARS, Gainesville, FL, [2]Pennsylvania State Univ., University Park, PA, [3]USDA - ARS, College Station, TX

2:15 1219 The effect of disease on the migration of the fall armyworm, *Spodoptera frugiperda*. **Aislinn Pearson** (aislinn.pearson@rothamsted.ac.uk)[1], Jason Chapman[2], Robert Graham[3] and Kenneth Wilson[4], [1]Rothamsted Research, Harpenden, United Kingdom, [2]Univ. of Exeter, Penryn, United Kingdom, [3]Harper Adams Univ., Newport, United Kingdom, [4]Lancaster Univ., Lancaster, United Kingdom

2:35 1220 Host-microbe interactions in field populations of the migratory pest African armyworm, *Spodoptera exempta*. **Robert Graham** (rgraham@harper-adams.ac.uk)[1], David Grzywacz[2], Wilfred Mushobozi[3] and Kenneth Wilson[4], [1]Harper Adams Univ., Newport, United Kingdom, [2]Univ. of Greenwich, Chatham Maritime, United Kingdom, [3]EcoAgriConsultancy Services Ltd, Arusha, Tanzania, [4]Lancaster Univ., Lancaster, United Kingdom

2:55 1221 Pest outbreaks as an emergent property of managing density-dependent risks and rewards through facultative migratory decisions. **Thomas W. Sappington** (Tom.Sappington@ars.usda.gov)[1], Yunxia Cheng[2], Yonghong Xiao[2], Lei Zhang[2], Xingfu Jiang[2] and Lizhi Luo[2], [1]USDA - ARS, Ames, IA, [2]Chinese Academy of Agricultural Sciences, Beijing, China

3:15 Break

3:33 1222 The effect of climate change on the Great Plains low level jet and the potential impact on insect migration patterns. **Peter Snyder** (pksnyder@umn.edu), Univ. of Minnesota, St. Paul, MN

3:53 1223 The influence of flight behaviour on the migration pathways of pest moths. **Jason Chapman** (jason.chapman@rothamsted.ac.uk), Univ. of Exeter, Penryn, United Kingdom

4:13 1224 The presence of both migrant and resident populations present a significant challenge for effective pest management: The case of the western bean cutworm. **Jeremy McNeil** (jmcneil2@uwo.ca)[1], Joanna Konopka[1] and Jocelyn L. Smith[2], [1]Univ. of Western Ontario, London, ON, Canada, [2]Univ. of Guelph, Ridgetown, ON, Canada

4:33 1225 Premier Presentation: A genomics approach to studying migration in high-flying moth pests. **Christopher Jones** (christopher.jones@rothamsted.ac.uk)[1], Jason Lim[1], Chris Bass[1] and Jason Chapman[2], [1]Rothamsted Research, Harpenden, United Kingdom, [2]Univ. of Exeter, Penryn, United Kingdom

4:53 1226 Premier Presentation: A bat's perspective on the autumn movements of migratory noctuid moths. **Jennifer Krauel** (jkrauel@vols.utk.edu)[1], John Westbrook[2] and Gary McCracken[1], [1]Univ. of Tennessee, Knoxville, TN, [2]USDA - ARS, College Station, TX

5:13 SP1227 Provenance assignment of insect samples with stable isotope markers. **Peter Holder** (peter.holder@lincoln.ac.nz)[1], Karen Armstrong[1], R. Van Hale[2], M.A. Millet[3] and Russell Frew[2], [1]Lincoln Univ., Christchurch, New Zealand, [2]Otago Univ., Dunedin, New Zealand, [3]Victoria Univ., Wellington, New Zealand

5:25 Discussion

P-IE Section Symposium: Insect-Mediated Ecosystem Services: Enhancing Interactions with our Beneficial Partners (IOBC-NRS Symposium)

211 D (Convention Center)

Moderators and Organizers: Cesar Rodriguez-Saona[1] and Mary M. Gardiner[2], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]The Ohio State Univ., Wooster, OH

2:00 Welcoming Remarks

2:05 1228 Conserving and enhancing wild bees for crop pollination: The importance of species identity and community composition. **Daniel Cariveau** (dancariveau@gmail.com) and Rachael Winfree, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

2:25 1229 Arthropod biodiversity and ecosystem services are decoupled across New York City green spaces. **Amy Savage** (myrmecophilesavage@gmail.com), Elsa Youngsteadt, Rob R. Dunn and Steven Frank, North Carolina State Univ., Raleigh, NC

2:45 1230 How important are microbes in the bee diet? **Hannah R. Gaines** (hgaines@wisc.edu)[1], Bryan N. Danforth[2], Yoshito Chikaraishi[3], Claudio Gratton[1] and Shawn Steffan[4], [1]Univ. of Wisconsin, Madison, WI, [2]Cornell Univ., Ithaca, NY, [3]Japan Agency for Marine-Earth Science & Technology, Yokosuka, Japan, [4]USDA - ARS, Madison, WI

3:05 1231 Designing vacant land to enhance biodiversity and ecosystem services in Cleveland, Ohio. **Mary Gardiner** (gardiner.29@osu.edu), The Ohio State Univ., Wooster, OH

3:25 1232 Implications of small and large scale land conversion for bee communities and pollination. **Rufus Isaacs** (isaacsr@msu.edu), Michigan State Univ., East Lansing, MI

3:45 Break

4:00 1233 Dynamic resource landscapes: How landscape-scale spatial and temporal variation in resource availability affects predatory insects and biocontrol. **Claudio Gratton** (cgratton@wisc.edu), Tania Kim and Brian Spiesman, Univ. of Wisconsin, Madison, WI

4:20 1234 Managing agricultural landscapes for insect-mediated ecosystem services. **Douglas A. Landis** (landisd@msu.edu), Michigan State Univ., East Lansing, MI

4:40 1235 Decoding carnivore roles in crop protection. **Shawn Steffan** (steffan@entomology.wisc.edu), USDA - ARS, Madison, WI

5:00 1236 Insect biodiversity and the suppression of human pathogens. **William E. Snyder** (wesnyder@wsu.edu), Matthew Jones and Amanda Jean Meadows, Washington State Univ., Pullman, WA

5:20 Concluding Remarks

P-IE Section Symposium: Getting Down and Dirty: The Role of Brown Food Webs in Providing Ecosystem Services

200 C (Convention Center)

Moderators and Organizers: Kelton Welch[1] and Matthew Jones[2], [1]USDA - ARS, Brookings, SD, [2]Washington State Univ., Pullman, WA

1:30 Introductory Remarks

1:35 1237 A natural approach to human-pathogen suppression: Can coprophage biodiversity fill in the GAPS? **Matthew Jones** (matthew.s.jones@wsu.edu) and William E. Snyder, Washington State Univ., Pullman, WA

1:55 1238 Mechanisms and trade-offs in dung beetle-mediated parasite regulation. **Elizabeth Nichols** (liznichols@gmail.com), Swarthmore College, Swarthmore, PA

2:15 1239 The effect of chemical disturbances on multiple functions provided by dung invertebrates. **Paul Manning** (paul.manning@zoo.ox.ac.uk)[1], Sarah Beynon[2], Eleanor Slade[1] and Owen Lewis[1], [1]Univ. of Oxford, Oxford, United Kingdom, [2]Dr. Beynon's Bug Farm, St. Davids, United Kingdom

2:35 1240 Mite-insect interaction in the soil and possible implementation. **Chuleui Jung** (cjung@andong.ac.kr), Eunsun Keum and Jiwon Kim, Andong National Univ., Andong, South Korea

2:55 1241 Characterizing ecological networks of soil arthropods in maize agro-ecosystems. **Kelton Welch** (kelton.welch@ars.usda.gov) and Jonathan Lundgren, USDA - ARS, Brookings, SD

3:15 Break

3:30 1242 Soil food web and ecosystem services in organic and transitioning farming systems. **Harit K. Bal** (bal.9@osu.edu)[1], Khandakar Rafiq Islam[2], Edward McCoy[1], Subbu Kumarappan[3], Parwinder S. Grewal[1] and Alan Sundermeier[4], [1]The Ohio State Univ., Wooster, OH, [2]The Ohio State Univ., Piketon, OH, [3]Agricultural Technical Institute, Wooster, OH, [4]The Ohio State Univ., Bowling Green, OH

3:50 1243 Soil macrofauna as drivers of soil-based ecosystem services in hillside agroecosystems of Central America. **Steven Fonte** (stevenfonte@gmail.com)[1], Johan Six[2], Edmundo Barrios[3], Laurent Rousseau[4] and Patrick Lavelle[5], [1]Colorado State Univ., Fort Collins, CO, [2]Swiss Federal Institute of Technology, Zürich, Switzerland, [3]World Agroforestry Centre, Nairobi, Kenya, [4]Univ. du Québec, Montreal, QC, Canada, [5]Pierre and Marie Curie Univ., Paris, France

4:10 1244 How biogeochemistry shapes the carbon cycle: A brown food web perspective. **Michael Kaspari** (mkaspari@ou.edu), Univ. of Oklahoma, Norman, OK

4:30 1245 Mycorrhiza effects on semiarid grassland community structure and species in the northern Great Plains. **Kurt Reinhart** (kurt.reinhart@ars.usda.gov), USDA - ARS, Miles City, MT

4:50 1246 Insect-microbe interactions in the rhizosphere and their consequences for plant defense and carbon cycling. **Kyle Wickings** (kgw37@cornell.edu) and Huijie Gan, Cornell Univ., Geneva, NY

5:10 Concluding Remarks

P-IE Section Symposium: Rootworm Management: Status of GM Traits, Insecticides, and Potential New Tools

208 AB (Convention Center)

Moderators and Organizers: Bruce Hibbard[1], Elisa Bernklau[2] and Joseph Spencer[3], [1]USDA - ARS, Columbia, MO, [2]Colorado State Univ., Fort Collins, CO, [3]Univ. of Illinois, Champaign, IL

12:00 Welcoming Remarks

1:30 1247 Resistance and cross-resistance to Bt maize by populations of western corn rootworm from Iowa. **Aaron Gassmann** (aaronjg@iastate.edu), Eric H. Clifton, John Doudna, Mike W. Dunbar, Amanda Hoffmann, David A. Ingber, Siva Jakka, Ryan S. Keweshan, Kenneth E. Masloski, Aubrey Paolino, Jennifer L. Petzold-Maxwell, Ram B. Shrestha and Coy St. Clair, Iowa State Univ., Ames, IA

1:50 1248 A retrospective look at western corn rootworm resistance to Bt corn in Nebraska: Insights into observed patterns. **Lance Meinke** (lmeinke1@unl.edu)[1], David S. Wangila[1], Thomas Hunt[2], Robert Wright[1], Douglas Golick[1], Julie A. Peterson[3] and Greg Kruger[3], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, Concord, NE, [3]Univ. of Nebraska, North Platte, NE

2:10 1249 Selecting corn hybrids in the transgenic era. **Joseph Lauer** (jglauer@wisc.edu), Univ. of Wisconsin, Madison, WI

2:30 1250 U.S. EPA's response to western corn rootworm Bt resistance: Too little too late? **Michael Gray** (megray@illinois.edu), Univ. of Illinois, Champaign, IL

2:50 1251 Efficacy of plant and diet based assays for Bt resistance detection in western corn rootworm populations. **Lisa Meihls** (lisa.meihls@ars.usda.gov)[1], Thomas A. Coudron[1], Dalton Ludwick[2], Elisa Bernklau[3], Man Huynh[2] and Bruce Hibbard[1], [1]USDA - ARS, Columbia, MO, [2]Univ. of Missouri, Columbia, MO, [3]Colorado State Univ., Fort Collins, CO

3:10 Break

3:25 1252 New resistance and new technologies: Implications for future rootworm management strategies. **Blair Siegfried** (bsiegfried1@unl.edu)[1], Adriano Pereira[2], Ana Velez[2] and Kenneth Narva[3], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Nebraska, Lincoln, NE, [3]Dow AgroSciences, Indianapolis, IN

3:50 1253 Bt resistance in rotation-resistant western corn rootworm populations. **Joseph Spencer** (spencer1@illinois.edu), Michael Gray, Nicholas Tinsley, Ronald Estes, Alexandra McMillan and Sarah Hughson, Univ. of Illinois, Champaign, IL

4:10 1254 Rootworm chemical ecology and applications. **Elisa Bernklau** (bernklau@lamar.colostate.edu), Colorado State Univ., Fort Collins, CO

4:30 1256 Genomic-level investigations of rootworm biology and adaptation. **Brad S. Coates** (brad.coates@ars.usda.gov), USDA - ARS, Ames, IA

4:50 1257 SmartStax PRO: The next generation in corn rootworm management technology. **Sean Evans** (spevan@monsanto.com)[1], Dwain M. Rule[2], Thomas Clark[3], Ronald Flannagan[3], Graham P. Head[1] and Nicholas Storer[2], [1]Monsanto Company, St. Louis, MO, [2]Dow AgroSciences, Indianapolis, IN, [3]Monsanto Company, Chesterfield, MO

SysEB Section Symposium: Evolution of Castes in Social Organisms: Behavior, Development and Regulating Mechanisms

213 AB (Convention Center)

Moderators and Organizers: Li Tian and Qian "Karen" Sun, Univ. of Kentucky, Lexington, KY

1:30 Welcoming Remarks

1:35 1258 Recent omic insights into symbiont-mediated caste regulation in the termite *Reticulitermes flavipes*. **Michael Scharf** (msharf@purdue.edu), Purdue Univ., West Lafayette, IN

1:55 1259 Premier Presentation: The pre-adult social environment has lasting impacts on adult behavior and health in the honey bee, *Apis mellifera*. **Clare Rittschof** (clare.rittschof@gmail.com)[1,2], Chelsey Coombs[1], Maryann Frazier[2], Christina M. Grozinger[2] and Gene E. Robinson[1], [1]Univ. of Illinois, Champaign, IL, [2]Pennsylvania State Univ., University Park, PA

2:15 1260 The road to sociality: Genetic and physiological toolkits underpinning diapause and caste determination in bumble bee queens. **Etya Amsalem** (eua6@psu.edu), Pennsylvania State Univ., University Park, PA

2:35 SP1261 Brain amines, aggression, reproducion and the emergence of social behavior in the bee *Megalopta*. **Adam Smith** (adam_smith@gwu.edu)[1] and Marc Seid[2], [1]George Washington Univ., Washington, DC, [2]The Univ. of Scranton, Scranton, PA

2:47 1262 The molecular basis of an effective defense in aphid soldiers. **Sarah P. Lawson** (sarah.lawson@unh.edu), Univ. of New Hampshire, Durham, NH

3:07 SP1263 Fire ant ecology: The state of the art. **Joshua R. King** (joshua.king@ucf.edu)[1] and Walter R. Tschinkel[2], [1]Univ. of Central Florida, Orlando, FL, [2]Florida State Univ., Tallahassee, FL

3:19 Break

3:29 1264 Premier Presentation: Division of labor from 50,000 evolutionary feet. **Patrick Abbot** (patrick.abbot@vanderbilt.edu), Vanderbilt Univ., Nashville, TN

3:49 1265 From foundation to death: Differential caste investment during the life of a termite colony. **Thomas Chouvenc** (tomchouv@ufl.edu) and Nan-Yao Su, Univ. of Florida, Davie, FL

4:09 1266 Eusociality in parasitic flatworms: Trematodes form soldier and reproductive castes. **Ryan Hechinger** (rhechinger@ucsd.edu), Univ. of California, San Diego, CA

4:29 1267 Personalities and behavioral syndromes: Sub-caste variation in honey bee behavior. **Alexander Walton** (awalton@iastate.edu), Iowa State Univ., Ames, IA

4:49 1268 The social regulation of worker-reproductive transition in the eastern subterranean termite. **Qian Sun** (qian.sun@uky.edu), Univ. of Kentucky, Lexington, KY

5:09 SP1269 Habitat bottlenecks to the establishment of fire ant, *Solenopsis invicta,* populations. **Walter R. Tschinkel** (tschinkel@bio.fsu.edu)[1] and Joshua R. King[2], [1]Florida State Univ., Tallahassee, FL, [2]Univ. of Central Florida, Orlando, FL

Member Symposium: Entomology - Partnering with Small Liberal Arts Colleges

212 AB (Convention Center)

Moderators and Organizers: Kirk J. Larsen[1], Carrie Hall[2] and Daniel Howard[2], [1]Luther College, Decorah, IA, [2]Univ. of New Hampshire, Durham, NH

1:30 Introductory Remarks

1:35 1270 Igniting sparks: Engaging students in adventures with insects. **Sherilyn G. F. Smith** (smithsg@lemoyne.edu), Le Moyne College, Syracuse, NY

1:50 1271 Science as process in the introductory classroom: Using insects as teaching models. **Carrie Hall** (carrie.hall@augie.edu), Augustana College, Sioux Falls, SD

2:05 1272 Sand paper and mealworms: Doesn't everyone use this combination in their entomology class? **Kirk J. Larsen** (larsenkj@luther.edu), Luther College, Decorah, IA

2:20 1273 Engaging undergraduate students in insect biology through forensic entomology. **David B. Rivers** (drivers@loyola.edu), Loyola Univ., Baltimore, MD

2:35 1274 It's not over when it's over: Stimulating curiosity and engagement with insects beyond the introductory classroom through citizen science. **Derek Rosenberger** (rose0675@umn.edu), Univ. of Minnesota, St. Paul, MN

2:50 1275 There and back again: Fostering undergraduate research in insect biology within a study abroad framework. **Daniel Howard**, Univ. of New Hampshire, Durham, NH

3:05 Break

3:15 1276 Standing out in a crowd of entomologists: How a liberal arts education gives students the edge. **Valerie S. Banschbach** (banschbach@roanoke.edu), Abagail Davis and Tyler Quigley, Roanoke College, Salem, VA

3:30 1277 How to be an entomologist at a small/middle-sized liberal arts school. **Brian G. Scholtens** (scholtensb@cofc.edu), College of Charleston, Charleston, SC

3:45 1278 Getting a job at a liberal arts college. **Emily Mohl** (mohl@stolaf.edu), St. Olaf College, Northfield, MN

4:00 1279 Preparing students for the shocking transition into graduate school. **Gene Kritsky** (cdarwin@aol.com)[1] and Margaret Lehnert[2], [1]Mount St. Joseph Univ., Cincinnati, OH, [2]Kent State Univ. at Stark, North Canton, OH

4:15 1280 Is entomology on the MCAT? Encouraging less-than enthusiastic biology majors to become excited about insects. **D. Bryan Bishop** (bishop@cord.edu), Concordia College, Moorhead, MN

4:30 1281 Connecting across campus through cultural entomology. **Tierney R. Brosius** (tierneybrosius@augustana.edu), Connie Ghinazzi and Jacob Torres, Augustana College, Rock Island, IL

SD1282 How Broward College and the University of Florida became BFF's and how your institutions can do it too! **David Serrano** (dserrano@broward.edu)[1] and Kimberly Moore[2], [1]Broward College, Davie, FL, [2]Univ. of Florida, Ft. Lauderdale, FL

SD1283 Ant communities of cornfields in polyculture versus monoculture farms of the Roanoke Valley of Virginia. **Abagail Davis** (aedavis@mail.roanoke.edu) and Valerie Banschbach, Roanoke College, Salem, VA

4:45 Concluding Remarks and Poster Session

Board Certified Entomologist's (BCE) Member Symposium: State of the Art Insect Monitoring Approaches

206 AB (Convention Center)

Moderators and Organizers: Laura S. Higgins[1] and Shripat Kamble[2], [1]DuPont Pioneer, Johnston, IA, [2]Univ. of Nebraska, Lincoln, NE

1:30 1284 Board certification? Yes! **Laura S. Higgins** (laura.higgins@pioneer.com), DuPont Pioneer, Johnston, IA

1:45 1285 Bed bug monitoring techniques. **Susan C. Jones** (jones.1800@osu.edu), The Ohio State Univ., Columbus, OH

2:15 1286 Ant monitoring systems. **Laurel Hansen** (laurel.hansen@sfcc.spokane.edu), Spokane Falls Community College, Spokane, WA

2:45 1287 Termite monitoring systems. **Vernard Lewis** (urbanpests@berkeley.edu), Univ. of California, Berkeley, CA

3:15 Break

3:30 1288 Insect monitoring techniques for stored-products in storage, processing and marketing. **Thomas Phillips** (twp1@ksu.edu), Kansas State Univ., Manhattan, KS

4:00 1289 Using drones before drones were cool: Perspectives on monitoring using drone technology. **Elson J. Shields** (es28@cornell.edu), Cornell Univ., Ithaca, NY

4:30 1290 Citizen science challenges and opportunities: Lessons learned from the Buckeye Lady Beetle Blitz and Pollination Investigators programs. Mary Gardiner and **Chelsea Smith** (smith7231@osu.edu), The Ohio State Univ., Wooster, OH

5:00 Symposium Sponsor Presentation - Dr. Ron Harrison

5:30 BCE Reception sponsored by Rollins in 207 AB

Member Symposium: Orthopteroids: A Nexus of Synergy Between Scientific Disciplines and Innovative Partnerships

204 AB (Convention Center)

Moderator and Organizer: Derek Woller, Texas A&M Univ., College Station, TX

1:30 Welcoming Remarks

1:35 1292 The phylogeography of an intriguing group of xerophile grasshoppers (Acrididae: Melanoplus: The Puer Group). **Derek Woller** (asilid@gmail.com) and Hojun Song, Texas A&M Univ., College Station, TX

1:45 1293 The utility of female genitalia characters in Mantodea. **Sydney Brannoch** (skp72@case.edu) and Gavin J. Svenson, Cleveland Museum of Natural History, Cleveland, OH

2:05 1294 From Proteobacteria to Phasmatodea: Partnering with the 1KITE project to time a horizontal gene transfer event. **Matan Shelomi** (mshelomi@ice.mpg.de) and Yannick Pauchet, Max Planck Institute for Chemical Ecology, Jena, Germany

2:25 1295 What's happening in hoppers: Explorations of the acridid alimentary canal. **Tyler Raszick** (tjraszick@gmail.com), Gabrielle Corso, Gregory Sword and Hojun Song, Texas A&M Univ., College Station, TX

2:45 1296 Phylogenetic roots of the Grylloblattodea and implications for past environmental change. **Sean Schoville** (sean.schoville@gmail.com), Univ. of Wisconsin, Madison, WI

3:05 1297 Adaptations for tube living produces a silly (but fast) backwards gait in Embioptera. **Janice S. Edgerly** (jedgerlyrooks@scu.edu)[1], Thomas Libby[2] and Robert J. Full[2], [1]Santa Clara Univ., Santa Clara, CA, [2]Univ. of California, Berkeley, CA

3:25 Break

3:40 1298 Manipulation of cockroaches: Why and how. **S. Bradleigh Vinson** (bvinson@tamu.edu) and Hong Liang, Texas A&M Univ., College Station, TX

4:00 1299 The evolution of flight in stick insects (Phasmatodea). **Yu Zeng** (dreavoniz@berkeley.edu) and Robert Dudley, Univ. of California, Berkeley, CA

4:20 1300 The evolutionary ecology of sexual cannibalism in praying mantids. **William Brown** (william.brown@fredonia.edu), State Univ. of New York, Fredonia, NY

4:40 1301 The curious case of the post oak grasshopper. **Spencer T. Behmer** (s-behmer@tamu.edu), Texas A&M Univ., College Station, TX

5:00 1302 Following the cues: Flies, crickets, phonotaxis, and technology. **Andrew C. Mason** (amason@utsc.utoronto.ca), Univ. of Toronto, Scarborough, ON, Canada

Member Symposium: Games, Comics, and Social Media: Outreach Education in Entomology

200 B (Convention Center)

Moderators and Organizers: Carly M. Tribull[1] and Morgan Jackson[2], [1]American Museum of Natural History, New York, NY, [2]Univ. of Guelph, Guelph, ON, Canada

1:30 Welcoming Remarks

1:32 1303 Webcomics and phylogenetics: Creating visual tutorials for our favorite systematic methods. **Carly M. Tribull** (ctribull@amnh.org), American Museum of Natural History, New York, NY

1:52 1304 SUPERBUGS: Entomological themes in superhero comics. **Ainsley E. Seago** (ainsley.seago@csiro.au), CSIRO, Canberra, Australia

2:12 1305 From box plots to boxed plots: Science communication with comics. **Maki Naro** (maki.naro@gmail.com), Illustrator of Fortune, New York, NY

2:32 1306 Translating a thesis into a comic book: Why and how scientists should communicate complex ideas to the general public. **Veronica Berns** (vmberns@gmail.com), Univ. of Wisconsin, Madison, WI

2:52 1307 Speech-bubble scholarship: Interpreting original research in comic book form. **Alexandra Westrich** (awestrich@fieldmuseum.org), Field Museum of Natural History, Chicago, IL

3:12 SP1308 The Invasive Mosquito Project: Crowdsourcing and citizen science for a public health objective. **Lee Cohnstaedt** (lee.cohnstaedt@ars.usda.gov), USDA - ARS, Manhattan, KS

3:24 1309 Draw bugs to know bugs: Using illustration and comics to teach entomology. **Emilie Bess** (bessm@evergreen.edu), The Evergreen State College, Olympia, WA, and Springstar Inc., Woodinville, WA

3:44 1310 There's an app for that: Finding your social media niche. **Morgan Jackson** (morgandjackson@gmail.com), Univ. of Guelph, Guelph, ON, Canada

3:59 1311 UCR's entomology outreach program: An integrative approach to community engagement. **Amelia Lindsey** (alind005@ucr.edu), Univ. of California, Riverside, CA

4:14 1312 What's bugging you? Ask an entomologist: Scicomm through blogging. **Joe Ballenger** (joe.ballenger@ars.usda.gov)[1] and Nancy Miorelli[2], [1]USDA - ARS, Stoneville, MS, [2]Univ. of Georgia, Athens, GA

4:29 1313 Using Facebook as a tool to communicate science and entomology, and why you should be involved. **Jake E. Bova** (jbova86@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:44 1314 I don't always promote entomology on social media… but when I do… it's with memes. **Miles Zhang** (yuanmeng.zhang@gmail.com)[1], Meredith Miller[2] and Nancy Miorelli[3], [1]Univ. of Manitoba, Winnipeg, MB, Canada, [2]Univ. of Guelph, Guelph, ON, Canada, [3]Univ. of Georgia, Athens, GA

4:59 1315 Social media and six-legged science: Lessons from tumblr's 'buggirl'. **Andrea Haberkern** (andrea.haberkern.526@my.csun.edu), California State Univ., Northridge, CA

5:14 1316 The future of outreach: How millennials are changing science communication. **Derek Hennen** (derhennen@gmail.com), Univ. of Arkansas, Fayetteville, AR

5:29 Concluding Remarks

Member Symposium: The Bee-Soil Interface: Exploring the Role of Soils in Wild Bee Nesting and Success

200 D (Convention Center)

Moderators and Organizers: Alexandra Harmon-Threatt, Univ. of Illinois, Champaign, IL

1:30 1317 Ground-nesting by bees: A review of our limited understanding of a common and diverse habit. **James H. Cane** (Jim.Cane@ars.usda.gov), USDA - ARS, Logan, UT

1:50 1318 Factors associated with nesting: Are we measuring the right things? **Hillary Sardinas** (hsardinas@berkeley.edu) and Claire Kremen, Univ. of California, Berkeley, CA

2:10 1319 Soil, flower, and nest microbiomes in ground nesting bees. **Quinn McFrederick** (quinn.mcfrederick@ucr.edu), Univ. of California, Riverside, CA

2:30 1320 Where the wild bees are: The effects of prairie management on soil characteristics and bee nesting. **Brittany Buckles** (bbuckls2@illinois.edu) and Alexandra Harmon-Threatt, Univ. of Illinois, Champaign, IL

2:50 1321 Presentation withdrawn

3:10 Break

3:20 1322 Farming practices affect nest site selection and productivity of native soil-nesting bees. **Margaret Scampavia** (mrscampavia@ucdavis.edu)[1], Neal M. Williams[2] and Edwin Lewis[2], [1]Univ. of California, Oakland, CA, [2]Univ. of California, Davis, CA

3:40 1323 Soil-borne pollutants and their impact on bee health and pollination ecology. **Kristen Hladun** (kristen.hladun@email.ucr.edu) and John T. Trumble, Univ. of California, Riverside, CA

4:00 1324 Manipulating soil temperatures to influence brood emergence in the alkali bee. **Amber Vinchesi** (amber.vinchesi@oregonstate.edu)[1] and Douglas Walsh[2], [1]Oregon State Univ., Hermiston, OR, [2]Washington State Univ., Prosser, WA

4:20 1325 Assessing the soil legacy of insecticides: Are we creating ecological traps for ground-nesting bees? **Nicholas Anderson** (nlndrsn2@illinois.edu) and Alexandra Harmon-Threatt, Univ. of Illinois, Champaign, IL

4:40 1326 Extreme nesting substrates of the bee group *Anthophora (Heliophila)*: Volcanic ash and sandstone. **Michael Orr** (michael.christopher.orr@gmail.com)[1], Hilary Erenler[2] and Terry Griswold[3], [1]Utah State Univ., Logan, UT, [2]Univ. of Northhampton, Northhampton, United Kingdom, [3]USDA - ARS, Logan, UT

5:00 SP1327 Fire's effect on bee phenology, plant phenology, interactions and seed set. **Alexandra Harmon-Threatt** (aht@illinois.edu)[1] and Raelene Crandall[2], [1]Univ. of Illinois, Champaign, IL, [2]Washington Univ., St. Louis, MO

Late Breaking Symposium: A Nexus of Agriculture – Honey bee health and commodity crop production: Collision course or road to cooperation?

200 E (Convention Center)

Moderators and Organizers: Caydee Savinelli[1], Jay P. Overmyer[1], Iain Kelly[2] and Dick Rogers[2], [1]Syngenta, Greensboro, NC, [2]Bayer CropScience, Research Triangle Park, NC

1:30 Introductory Remarks

1:35 1328 Integrated apiculture: Moving from bee health reaction to adapting apicultural practice to the landscape and environment for sustainability. **Dick Rogers** (dick.rogers@bayer.com), Bayer CropScience, Research Triangle Park, NC

1:57 1329 Exposure of honey bees to seed treatment insecticides during corn planting in Ohio. **Reed Johnson** (johnson.5005@osu.edu)[1], Chia-Hua Lin[1] and Harold Watters[2], [1]The Ohio State Univ., Wooster, OH, [2]The Ohio State Univ., Bellefontaine, OH

2:19 1330 Mitigating seed treatment dust released from pneumatic planters using deflectors and Bayer fluency agent.

Jay Overmyer (jay.overmyer@syngenta.com)[1], Fred Rice[1], David Fischer[2] and Nick Jones[3], [1]Syngenta Crop Protection, Greensboro, NC, [2]Bayer CropScience, Research Triangle Park, NC, [3]Syngenta, Jealotts Hill, United Kingdom

2:41 1331 The final piece to the puzzle: Field studies assessing bee exposure to neonic seed treatments. **Cynthia Scott-Dupree** (cscottdu@uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada

3:03 1332 Linking pesticide exposure and bee health: Fact and fiction from a mid-southern perspective. Scott Stewart[1] and **Gus Lorenz** (glorenz@uaex.edu)[2], [1]Univ. of Tennessee, Jackson, TN, [2]Univ. of Arkansas, Lonoke, AR

3:25 Break

3:35 1333 Assessment of chronic sublethal effects of imidacloprid on honey bee colony health. **Galen Dively** (galen@umd.edu), Univ. of Maryland, College Park, MD

3:57 1334 Managed pollinator protection plans. Steven Dwinell and **Jeanette Klopchin** (jeanette.klopchin@freshfromflorida.com), Florida Dept. of Agriculture and Consumer Services, Tallahassee, FL

4:19 1335 Changes on the landscape and how to establish the best possible honey bee foraging habitat. **Pete Berthelsen** (pberthelsen@pheasantsforever.org), Pheasants Forever, Elba, NE

4:41 1336 What is happening in Europe with honey bees? **Helen Thompson** (helen.thompson@syngenta.com), Syngenta, Jealotts Hill, United Kingdom

5:03 1337 Estimated impact of neonicotinoid insecticides on pest management practices and costs for U.S. corn, soybean, wheat, cotton and sorghum farmers. **Paul D. Mitchell** (pdmitchell@wisc.edu), Univ. of Wisconsin, Madison, WI

5:25 Concluding Remarks

Member Symposium: Ecological Engineering to Improve Microbial Control Agents

200 F (Convention Center)

Moderators and Organizers: Surendra Dara[1] and Robert W. Behle[2], [1]Univ. of California, San Luis Obispo, CA, [2]USDA - ARS, Peoria, IL

1:30 1338 Biopesticide environments for *Metarhizium* microsclerotia from fermentation through application. **Robert W. Behle** (robert.behle@ars.usda.gov)[1], Mark A. Jackson[1] and Douglas S. Richmond[2], [1]USDA - ARS, Peoria, IL, [2]Purdue Univ., West Lafayette, IN

1:50 1339 Entomopathogenic nematodes boost plant immunity: A novel approach to plant protection. **Julia Ferguson** (jfergu25@vols.utk.edu), Ruisheng An and Parwinder S. Grewal, Univ. of Tennessee, Knoxville, Knoxville, TN

2:10 1340 Effects of agricultural management on *Beauveria* and *Metarhizium*. **Mary Barbercheck** (meb34@psu.edu) and Puneet Randhawa, Pennsylvania State Univ., University Park, PA

2:30 1341 Plant-insect cues that assist in beneficial nematode host searching. **Jared Gregory-Ali** (alijared@msu.edu), Michigan State Univ., East Lansing, MI

2:50 1342 What's happening to *Metarhizium* F52 microsclerotia formulated in hydromulch in the environment? **Tarryn Goble** (tazgoble@gmail.edu)[1], Ann E. Hajek[1], Mark A. Jackson[2] and Sana Gardescu[1], [1]Cornell Univ., Ithaca, NY, [2]USDA - ARS, Peoria, IL

3:10 1343 Manipulating the environment to enhance microbial control in orchard systems. **David Shapiro-Ilan** (david.shapiro@ars.usda.gov), USDA - ARS, Byron, GA

3:30 1344 Creating the ideal habitat for pest control with entomopathogenic nematodes: An example from nurseries. **Anne Nielsen** (nielsen@aesop.rutgers.edu)[1] and Edwin Lewis[2], [1]Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, [2]Univ. of California, Davis, CA

3:50 SP1345 Engineering of belowground trophic cascades to the benefit of agriculture. **Ivan Hiltpold** (i.hiltpold@uws.edu.au), Univ. of Western Sydney, Penrith, Australia

Member Symposium: Insects in the City: Urban Ecology and Human Influence on Insect Populations

200 A (Convention Center)

Moderators and Organizers: David Lowenstein[1] and Scott Prajzner[2], [1]Univ. of Illinois, Chicago, IL, [2]The Ohio State Univ., Wooster, OH

2:30 1346 Floral enrichment of turf lawns and its potential benefit for pollinator communities. **Ian Lane** (lanex173@umn.edu), Eric Watkins and Marla Spivak, Univ. of Minnesota, St. Paul, MN

2:50 1347 Socioeconomic impacts on patterns of urban bees, wasps, and their parasites. **Scott MacIvor** (jsmacivor@gmail.com) and Laurence Packer, York Univ., Toronto, ON, Canada

3:10 1348 Pesticide use in suburbs: An inspector's observations in the field. **Caitlin E. Burkman** (burkmanc@michigan.gov), Michigan Dept. of Agriculture & Rural Development, Lansing, MI

3:30 1349 Does urbanization homogenize insect communities? **Michael McKinney** (mmckinne@utk.edu), Univ. of Tennessee, Knoxville, TN

3:50 Break

4:00 1350 The impact of night-time lighting on invertebrates: From individuals to communities. **Thomas Davies** (thomas.davies@exeter.ac.uk), Jonathan Bennie and Kevin Gaston, Univ. of Exeter, Cornwall, United Kingdom

4:20 1351 Insects and urban warming: Does latitude matter? **Elsa Youngsteadt** (ekyoungs@ncsu.edu), Robert R. Dunn, Andrew F. Ernst and Steven Frank, North Carolina State Univ., Raleigh, NC

4:40 1352 Distinct urban spatial structure in a specialized plant-herbivore-parasitoid community. **Amanda Nelson** (amanda-nelson@uiowa.edu), Univ. of Iowa, Iowa City, IA

Organized Meeting: Partnering to Develop Solutions Against the Infamous Invasive Pest Spotted Wing Drosophila

200 G (Convention Center)

Moderators and Organizers: Christelle Guédot[1] and Ash Ahmad[2], [1]Univ. of Wisconsin, Madison, WI, [2]Univ. of Georgia, Athens, GA

1:30 Welcoming Remarks

1:35 1353 Uncovering the basics of SWD, recent research in its biology and ecology. **Jana C. Lee** (jana.lee@ars.usda.gov), USDA - ARS, Corvallis, OR

1:55 1354 *Drosophila suzukii* population dynamics: Implications for management. **Vaughn Walton** (vaughn.walton@oregonstate.edu)[1], Nik G. Wiman[1], Daniel Dalton[1], Gianfranco Anfora[2], Hannah Burrack[3], Joanna Chiu[4], Kent M. Daane[5], Rufus Isaacs[6], Alberto Grassi[7], Betsey Miller[1], Samantha L. Tochen[1], Xin-geng Wang[5] and Claudio Loriatti[7], [1]Oregon State Univ., Corvallis, OR, [2]IASMA Research and Innovation Center, San Michele, Italy, [3]North Carolina State Univ., Raleigh, NC, [4]Univ. of California, Davis, CA, [5]Univ. of California, Berkeley, CA, [6]Michigan State Univ., East Lansing, MI, [7]Edmund Mach Foundation, San Michele, Italy

2:15 1355 How wild hosts and landscape factors affect SWD populations. **Emma Pelton** (pelton@wisc.edu)[1], Rufus Isaacs[2], Steven VanTimmeren[2], Annie Blanton[3], William Hutchison[3], Claudio Gratton[1] and Christelle Guédot[1], [1]Univ. of Wisconsin, Madison, WI, [2]Michigan State Univ., East Lansing, MI, [3]Univ. of Minnesota, St. Paul, MN

2:35 1356 Performance of various traps and baits for monitoring *Drosophila suzukii* in berry crops. **Oscar Liburd** (oeliburd@ufl.edu), Lindsy Iglesias and Teresia Nyoike, Univ. of Florida, Gainesville, FL

2:55 1357 Progress towards developing behavior-based control strategies for spotted wing drosophila. **Cesar Rodriguez-Saona** (crodriguez@aesop.rutgers.edu)[1,2], Tracy C. Leskey[3], Aijun Zhang[4], Anne Nielsen[5] and Caryn Michel[5], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, [3]USDA - ARS, Kearneysville, WV, [4]USDA - ARS, Beltsville, MD, [5]Rutgers, The State Univ. of New Jersey, Bridgeton, NJ

3:15 Break

3:30 1358 Preliminary development of an insecticide based attract-and-kill tactic for spotted wind drosophila. **Matthew Grieshop** (grieshop@msu.edu), Juan Huang, Danielle Kirkpatrick, Larry Gut and Rufus Isaacs, Michigan State Univ., East Lansing, MI

3:50 1359 Seasonal dispersal and exclusion of spotted wing drosophila. **Donn Johnson** (dtjohnso@uark.edu) and Barbara Lewis, Univ. of Arkansas, Fayetteville, AR

4:10 1360 Fate of spotted wing drosophila larvae in harvested fruit. **Hannah Burrack** (hannah_burrack@ncsu.edu), North Carolina State Univ., Raleigh, NC

4:30 1361 Residue declines and post-harvest mitigation of pesticide residues to meet export MRL restrictions in highbush blueberry. **Rufus Isaacs** (isaacsr@msu.edu), Steven Van Timmeren and John C. Wise, Michigan State Univ., East Lansing, MI

4:50 Concluding Remarks

Ten-Minute Papers, MUVE Section: Mosquitoes, Biology, Ecology, and Control

208 CD (Convention Center)

Moderators: Chris J. Holderman and Michael Bentley, Univ. of Florida, Gainesville, FL

1:15 Introductory Remarks

1:17 1362 Comprehensive sampling, genomic characterization and pilot metagenomics in Anopheline vector populations across an ecological transect in Guinea Conakry and Mali. **Michelle Riehle** (mriehle@umn.edu)[1], Eugeni Belda[2], Raymond Kone[3], Abdoul Beavogui[3], Becky Emerson[1], Boubacar Coulibaly[4], Mamadou Coulibaly[4], Oumou Niare[4], Sekou F. Traore[4] and Ken Vernick[2], [1]Univ. of Minnesota, St. Paul, MN, [2]Institut Pasteur, Paris, France, [3]Centre de Formation et de Recherche en Santé Rurale de Mafèrinyah, Conakry, Guinea, [4]Univ. of Bamako, Bamako, Mali

1:29 1363 MicroRNA-275 targets $Ca2^{+}$-ATPase to control Notch in the mosquito gut. **Bo Zhao** (bzhao002@ucr.edu), Keira Lucas, Tusar T. Saha, Sourav Roy, Jisu Ha, Vladimir A. Kokoza and Alexander S. Raikhel, Univ. of California, Riverside, CA

1:41 1364 Mosquito gut ecosystem: An ecological genomics perspective. **Jiannong Xu** (jxu@nmsu.edu), New Mexico State Univ., Las Cruces, NM

1:53 1365 Population dynamics of *Armigeres subalbatus* (Diptera: Culicidae) across a temperate altitudinal gradient. **Luis Chaves** (lchaves@nagasaki-u.ac.jp), Nozomi Imanishi and Tomonori Hoshi, Nagasaki Univ., Nagasaki, Japan

2:05 1366 Larval habitat age and prior exploitation affect female life history in the mosquito *Aedes triseriatus*. **Katie Westby** (kwestby@wustl.edu)[1] and Steven Juliano[2], [1]Washington Univ. in St. Louis, Eureka, MO, [2]Illinois State Univ., Normal, IL

2:17 1367 Location of a source of carbon dioxide by female *Anopheles coluzzii* in a wind tunnel under conditions of laminar airflow and still air. **Emerson Lacey** (eslacey@ucr.edu) and Ring T. Cardé, Univ. of California, Riverside, CA

2:29 1368 Evidence for detection and response to far field sound in *Aedes aegypti* mosquitoes using behavior and neurophysiological tools. **Gil Menda** (gm234@cornell.edu)[1], Eyal Nitzany[1,2], Ron Hoy[1], Ron Miles[3] and Laura Harrington[1], [1]Cornell Univ., Ithaca, NY, [2]Brain and Mind Research Institute, New York, NY, [3]Binghamton Univ., Ithaca, NY

2:41 1369 Seminal influences: Male mosquitoes and their contribution to female biology, behavior and disease transmission. **Laura Harrington** (lch27@cornell.edu), Cornell Univ., Ithaca, NY

2:53 1370 Monitoring *Culex* mosquito resistance to pyrethroids: Within-population variation in response informs modifications of the time-response CDC Bottle Bioassay. **Mary A. Sorensen** (marys@placermosquito.org) and Jessica Stevenson, Placer Mosquito & Vector Control District, Roseville, CA

3:05 1371 Evaluation of insecticide resistance and biochemical mechanisms in *Anopheles stephensi* from Punjab, Pakistan. **Muhammad Oneeb** (muhammad.oneeb@uvas.edu.pk), Huma Naeem, Azhar Maqbool and Muhammad Zubair Shabbir, Univ. of Veterinary and Animal Sciences, Lahore, Pakistan

3:17 1372 Novel management tools to easily monitor and to attract and kill adult mosquito vectors of disease. Teun Dekker[1], Leonard Mboera[2], Elison Mwebembezi[2], Woodbridge Foster[3], Babak Ebrahimi[3], Rodrigo Oliveira da Silva[4], William Urrutia[4], Carmem Bernardi[4], Kim Spencer[4], Leandro Ernesto Jost Mafra[5], Rafael Borges[6], Katherine Villagran[4], Emerson Christie[4], Jonathan Rico[4], **Kavita Sharma** (kavitasharma03@gmail.com)[4], Eamonn Keogh[7] and Agenor Mafra-Neto[4], [1]Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, [2]NIMR, Dar-es-Salaam, Tanzania, [3]The Ohio State Univ., Columbus, OH, [4]ISCA Technologies, Riverside, CA, [5]ISCA Tecnologias Ltda, Vacaria, Brazil, [6]ISCA Tecnologias Ltda, Ijui, Brazil, [7]Univ. of California, Riverside, CA

3:29 1373 Environmental influences on mosquito foraging can affect the evolution of behavioral resistance. **Chris Stone** (chrism.stone@gmail.com)[1], Nakul Chitnis[2] and Kevin Gross[1], [1]North Carolina State Univ., Raleigh, NC, [2]Swiss Tropical and Public Health Institute, Basel, Switzerland

Ten-Minute Papers, MUVE Section: Mosquitoes, Disease Transmission, and Public Health

208 CD (Convention Center)

Moderators: Rebecca T. Trout[1] and Thuy-Vi Nguyen[2], [1]Univ. of Tennessee, Knoxville, TN, [2]Univ. of Georgia, Athens, GA

3:45 Introductory Remarks

3:50 1374 Developing K-12 educational curricula based on insect vectors of disease: Biodiversity, disease cycles, climate change. **Leonard E. Munstermann** (leonard.munstermann@yale.edu) and Laura Fawcett, Yale Univ., New Haven, CT

4:02 1375 Biological and integrated vector management for the control of dengue vectors in Punjab, Pakistan. **Nusrat Jahan** (dr.nusratjahan@gcu.edu.pk), Government College Univ., Lahore, Punjab, Pakistan

4:14 1376 The elderly mosquito and its role in transmitting dengue in the southwestern United States. **Michael A. Riehle** (mriehle@ag.arizona.edu), Teresa K Joy, Pablo Reyes Castro, Steven Haenchen, Yves Carriere, Kathleen R. Walker and Kacey Ernst, Univ. of Arizona, Tucson, AZ

4:26 1377 Local adaptation of dengue virus to *Aedes aegypti* populations from different temperature regimes. **Andrea Gloria-Soria** (andrea.gloria-soria@yale.edu), Paul Turner and Jeffrey Powell, Yale Univ., New Haven, CT

4:38 1378 Seasonal and spatial activity of La Crosse virus in mosquitoes and humans. **Eric J. Dotseth** (eric.j.dotseth@wv.gov)[1], Anthony Alsobrook[2], Eric Lowe[3], Wyatt Payne[4] and Clara Stephens[2], [1]West Virginia Dept. of Health & Human Resources, Charleston, WV, [2]Marshall Univ., Huntington, WV, [3]Fairmont State Univ., Fairmont, WV, [4]Bridgemont Community & Technical College, Montgomery, WV

4:50 1379 Transcription profiling of defensin in response to chikungunya virus in *Aedes aegypti*. **Liming Zhao** (lmzhao@ufl.edu), Univ. of Florida, Vero Beach, FL

5:02 1380 Targeting mosquito FREP1 to block malaria transmission with fungal metabolites. Guodong Niu, Bin Wang, Genwei Zhang, Jarrod King, Robert Cichewicz and **Jun Li** (junli@ou.edu), Univ. of Oklahoma, Norman, OK

5:14 1381 Outdoor feeding of malaria vectors on Bioko Island, Equatorial Guinea, continues to increase in response to indoor-based vector control. **Zachary Popkin-Hall** (zpopkinh@tamu.edu)[1], Sharmila Pathikonda[1], Godwin Fuseini[2], Abrahan Matias[3], Hans J Overgaard[4], Vani Kulkarni[1], Vamsi Reddy[1], Christopher Schwabe[2], Immo Kleinschmidt[5] and Michel A. Slotman[1], [1]Texas A&M Univ., College Station, TX, [2]Medical Care Development International, Silver Spring, MD, [3]Medical Care Development International, Malabo, Equatorial Guinea, [4]The Norwegian Univ. of Life Sciences, Ås, Norway, [5]London School of Hygiene and Tropical Medicine, London, United Kingdom

5:26 1382 Artemisinin-resistant *Plasmodium falciparum* Cambodian clinical isolates infect diverse vectors of Southeast Asia and Africa. **Brandyce St. Laurent** (brandyce.stlaurent@nih.gov) and Rick Fairhurst, National Institutes of Health, Rockville, MD

Ten-Minute Papers, PBT Section: Chemical Ecology, Behavior Physiology and Biotic Interaction

205 A (Convention Center)

Moderators: Jeffrey J. Stuart[1] and Kun Yan Zhu[2], [1]Purdue Univ., West Lafayette, IN, [2]Kansas State Univ., Manhattan, KS

1:30 Introductory Remarks

1:32 1383 Limited impacts of industrial corn and soy production on honey bee colony health. **Frank Rinkevich** (fdr5@LSU.edu)[1], Joseph Margotta[1], Robert G. Danka[2], James A. Ottea[1] and Kristen Healy[1], [1]Louisiana State Univ., Baton Rouge, LA, [2]USDA - ARS, Baton Rouge, LA

1:44 1384 Exploring the physiological role of inward rectifying potassium channels in arthropod disease vectors. **Daniel R. Swale** (dswale@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

1:56 1385 Effects of ozone exposure in cockroaches and bed bugs at the organismal and suborganismal levels. **Ameya D. Gondhalekar** (ameyag@purdue.edu), James Feston, Mahsa Fardisi, Yanlin Tian, Xin Yi Cui, Michael E. Scharf and Linda J. Mason, Purdue Univ., West Lafayette, IN

2:08 1386 TA/TYR regulates division of labor at both larval and adult stages. **Ying Wang** (ying.wang.6@asu.edu) and Robert E. Page Jr., Arizona State Univ., Tempe, AZ

2:20 1387 *Wolbachia* infection in a natural parasitoid wasp population. **Saskya van Nouhuys** (saskya@cornell.edu) and Anne Duplouy, Univ. of Helsinki, Helsinki, Finland

2:32 1388 Isolation and identification of the sex pheromone of *Hypsipyla grandella* Zeller. **Juan Cibrian** (jcibrian@colpos.mx)[1] and Jose Manuel Pineda-Rios[2], [1]Colegio de Postgraduados, Texcoco, Mexico, [2]Colegio de Postgraduados, Montecillo, Mexico

2:44 Break

2:54 1389 RNA virus discovery in stink bugs. **Yuting Chen** (yutingc@iastate.edu), Sijun Liu and Bryony Bonning, Iowa State Univ., Ames, IA

3:06 1390 Are fire ant venom alkaloid and cuticular hydrocarbon patterns useful taxonomic characters? **Robert Vander Meer** (bob.vandermeer@ars.usda.gov) and Sanford Porter, USDA - ARS, Gainesville, FL

3:18 1391 The wing-beat kinematics and power output associated with circular motion in an insect flight-mill. **Gal Ribak** (gribak@post.tau.ac.il)[1], Shay Barkan[2] and Victoria Soroker[2], [1]Tel-Aviv Univ., Tel-Aviv, Israel, [2]Agricultural Research Organisation, The Volcani Center, Bet-Dagan, Israel

3:30 1392 Anti-termite action of wood extracts from different parts of termite resistant plants. **Muhammad Qureshi** (qureshienv@yahoo.com), Government College Univ., Lahore, Pakistan

3:42 1393 Integration of repellency effect of Neem insecticide with bio-pheromone trap of *Beauveria bassiana* to control *Rhynchophorus ferrugineus*. **Jamal Hajjar** (jamalnoura@yahoo.com) and Aziz Ajlan, King Faisal Univ., Hofuf, Saudi Arabia

3:54 1394 Identification and expression analysis of carboxylesterases and cytochrome P450 gene families in red palm weevil, *Rhynchophorus ferrugineus* (Olivier). **Binu Antony** (binuantony1@yahoo.co.in), Mehmoud Abdelazim and Saleh A. Aldosari, King Saud Univ., Riyadh, Saudi Arabia

4:06 1395 Palm weevil (Curculionidae: Coleoptera) diversity in Indonesia: A morphometric approach based on pronotal typologies. **Abdulrahman Aldawood** (aldawood@ksu.edu.sa), Sukirno Sukirno, Muhammad Tufail and Khawaja Ghulam Rasool, King Saud Univ., Riyadh, Saudi Arabia

Ten-Minute Papers, P-IE Section: Biological Control

200 J (Convention Center)

Moderators: Dakshina Seal, Univ. of Florida, Homestead, FL

1:30 Introductory Remarks

1:32 1396 The effect of neighbor identity on biocontrol agent, *Galerucella* spp., choice in visitation, oviposition, and feeding on purple loosestrife, *Lythrum salicaria*. **Gina Quiram** (quira012@umn.edu)[1] and Alyssa Hakes[2], [1]Univ. of Minnesota, St. Paul, MN, [2]Lawrence Univ., Appleton, WI

1:44 1397 Biological control in high tunnel agriculture: An effective pest management tool? **Laura Ingwell** (laura.ingwell@gmail.com), Rick Foster and Ian Kaplan, Purdue Univ., West Lafayette, IN

1:56 1398 Evaluating the efficacy of non-crop flowering plants for conservation biocontrol in an organic field cropping system. **T. Aurora Toennisson** (tatoenni@ncsu.edu)[1], Hannah Burrack[1] and Joana Klein[2], [1]North Carolina State Univ., Raleigh, NC, [2]Univ. Federal do Rio Grande do Sul, Porto Alegre, Brazil

2:08 1399 Assessing the relative influence of field and landscape factors on the stability of biological control of the alfalfa weevil. **Tatyana Rand** (tatyana.rand@ars.usda.gov), USDA - ARS, Sidney, MT

2:20 1400 Classical biological control in Montana for wheat midge, *Sitodiplosis mosellana* (Diptera: Cecidomyiidae), using *Macroglenes penetrans* (Hymenoptera: Pteromalidae). **Gadi V. P. Reddy** (reddy@montana.edu), Brian Thompson and Daniel Picard, Montana State Univ., Conrad, MT

2:32 1401 Effect of temperature on biological control of confused flour beetle, *Tribolium confusum* (Coleoptera: Tenebrionidae). **Brian Thompson** (brian.thompson@montana.edu), Gadi V. P. Reddy and Daniel Picard, Montana State Univ., Conrad, MT

2:44 1402 Are parasitoids limiting the efficacy of the biological control agent, *Neomusotima conspurcatalis* (Lepidoptera: Crambidae), on *Lygodium microphyllum*, old world climbing fern? **Ellen Lake** (ellen.lake@ars.usda.gov)[1], Michael Gates[2], Melissa Smith[1], Alexander Chapman[1] and Philip Tipping[1], [1]USDA - ARS, Fort Lauderdale, FL, [2]USDA - ARS, Washington, DC

2:56 1403 Predicting parasitoid accumulation in biological control agents of the invasive weed, Brazilian pepper. **Gregory S. Wheeler** (greg.wheeler@ars.usda.gov)[1] and Fernando Mc Kay[2], [1]USDA - ARS, Ft Lauderdale, FL, [2]FuEDEI, Buenos Aires, Argentina

3:08 1404 Green eggs and cam: Video-observed host-acceptance behavior by *Trissolcus japonicus* (Hymenoptera: Platygastridae) in multiple-species host-specificity tests for potential classical biological control of the brown marmorated stink bug. **Paul Botch** (botchpau@msu.edu) and Ernest Delfosse, Michigan State Univ., East Lansing, MI

3:20 1405 Brown marmorated stink bug predation by native natural enemies: A game of do-or-die in the laboratory and take-it-or-leave-it smorgasbord in organic vegetable production. **Clarissa Mathews** (cmathews@shepherd.edu)[1,2], William R. Morrison[3] and Tracy C. Leskey[3], [1]Redbud Farm LLC, Inwood, WV, [2]Shepherd Univ., Shepherdstown, WV, [3]USDA - ARS, Kearneysville, WV

3:32 Break

3:42 1406 Progress of monitoring and biological control research of the brown marmorated stink bug, *Halyomorpha halys,* in southern California. **Jesus R. Lara** (jlara007@ucr.edu)[1], Mark S. Hoddle[1] and Charles H. Pickett[2], [1]Univ. of California, Riverside, CA, [2]California Dept. of Food and Agriculture, Sacramento, CA

3:54 1407 The novel use of an introduced biological control agent, *Megamelus scutellaris* (Hemiptera: Delphacidae), as host for a native parasitoid. **Carey Minteer** (carey.minteer@ars.usda.gov) and Philip Tipping, USDA - ARS, Fort Lauderdale, FL

4:06 1408 Presentation withdrawn

4:18 1409 Biological control of *Alitropus typus* (Isopodes: Flabellifera) in Pakistan. **Naveeda Qureshi** (naveedaqresh@gmail.com) and Muhammad Afzal, Quaid-i-Azam Univ., Islamabad, Pakistan

4:30 1410 Development of a biocontrol program for managing American serpentine leafminer, *Liriomyza trifolii* (Burgess). **Dakshina Seal** (dseal3@ufl.edu), Shashan Devkota, M. Razzak and C. Sabines, Univ. of Florida, Homestead, FL

4:42 1411 Evaluation of native New York entomopathogenic nematodes for biocontrol of plum curculio, *Conotrachelus nenuphar*, in apple orchards. **Tessa Lessord** (tgl27@cornell.edu)[1], Arthur Agnello[1], Elson J. Shields[2] and Kyle Wickings[1], [1]Cornell Univ., Geneva, NY, [2]Cornell Univ., Ithaca, NY

4:54 1412 Comparative control of soybean aphid by three parasitoid wasps. **Jonathan Dregni** (dreg0005@umn.edu), Univ. of Minnesota, St Paul, MN

5:06 1413 Neighboring plants influence damage from a biocontrol insect on an unintended host. **Alyssa Hakes** (alyssa.s.hakes@lawrence.edu), Lawrence Univ., Appleton, WI

5:18 1414 Rapid evolution in a biological control organism: Effects on demography and behavior. **Linda Buergi** (buergil@onid.oregonstate.edu) and Peter McEvoy, Oregon State Univ., Corvallis, OR

Ten-Minute Papers, P-IE Section: IPM - Field Crops 3

200 I (Convention Center)

Moderators: Julien Beuzelin[1] and Michael Toews[2], [1]Louisiana State Univ., Baton Rouge, LA, [2]Univ. of Georgia, Tifton, GA

1:30 Introductory Remarks

1:32 1415 Taxonomy for farmers: Developing mobile tools for in field identification of pests to facilitate IPM. **Barbara Sharanowski** (barb.sharanowski@gmail.com), Ana Dal Molin, Amber Bass, Leanne Peixoto and Kale McKay, Univ. of Manitoba, Winnipeg, MB, Canada

1:44 1416 Real-time risk estimates of potato virus Y in seed potatoes based on aphid (Homoptera: Aphididae) flight data. **Nathan Russart** (russ0228@umn.edu) and Ian MacRae, Univ. of Minnesota, Crookston, MN

1:56 1417 Syngenta's RNA-based biocontrol for Colorado potato beetle has equivalent field efficacy compared to commercial chemical pesticides. **Geert Plaetinck** (geert.plaetinck@syngenta.com)[1] and Jason Vincent[2], [1]Syngenta, Zwijnaarde, Belgium, [2]Syngenta, Bracknell, United Kingdom

2:08 1418 Zebra chip disease development in potato in relation to vector density and time of infection. **Mahnaz Rashidi** (mrashidi@uidaho.edu)[1], Xi Liang[1], Christopher Rogers[1], Erik Wenninger[2], Nora Olsen[2], Alexander Karasev[3], Phillip Wharton[1] and Arash Rashed[1], [1]Univ. of Idaho, Aberdeen, ID, [2]Univ. of Idaho, Kimberly, ID, [3]Univ. of Idaho, Moscow, ID

2:20 1419 Con- and heterospecific influences on potato colonization by three species of aphids. **Andrei Alyokhin** (andrei.alyokhin@umit.maine.edu)[1] and Aaron Buzza[2], [1]Univ. of Maine, Orono, ME, [2]Univ. of Maine, Presque Isle, ME

2:32 1420 Threecornered alfalfa hopper (Hemiptera: Membracidae) pest potential during reproductive stages of soybean. **Julien M. Beuzelin** (jbeuzelin@agcenter.lsu.edu)[1] and David L. Kerns[2], [1]Louisiana State Univ., Alexandria, LA, [2]Louisiana State Univ., Winnsboro, LA

2:44 1421 Comparison of selection rates of soybean podworm (Lepidoptera: Noctuidae) to key insecticides using mixture versus rotation strategies. **Moneen Jones** (jonesmon@missouri.edu)[1], Jessica Duckworth[1] and K. E. M. Hendricks[2], [1]Univ. of Missouri, Portageville, MO, [2]Univ. of Florida, Immokalee, FL

2:56 1422 Management of the main lepidopteran pests in Argentina with Dow AgroSciences' dual *Bt* technology in soybeans (Conkesta™). **Antonio Santos** (acsantos1@dow.com)[1], Boris Castro[1] and Maria Cometti[2], [1]Dow AgroSciences, Indianapolis, IN, [2]Dow AgroSciences, Colon, Argentina

3:08 1423 Impact of stink bug populations on soybean post harvest aid application. **Jeffrey A. Davis** (jeffdavis@agcenter.lsu.edu), M. J. Murray and Arthur Richter, Louisiana State Univ., Baton Rouge, LA

3:20 1424 Attract & kill: Using sorghum, sunflowers and pheromone lures for organic management of brown marmorated stink bug. **Taliaferro Trope** (talia84@vt.edu)[1], Douglas G. Pfeiffer[1], J. Christopher Bergh[2] and Thomas P. Kuhar[1], [1]Virginia Polytechnic Institute and State Univ., Blacksburg, VA, [2]Virginia Polytechnic Institute and State Univ., Winchester, VA

3:32 Break

3:42 1425 Presentation withdrawn

3:54 1426 Distribution and managment of kudzu bug in commercial soybean. **Michael Toews** (mtoews@uga.edu)[1], Phillip M. Roberts[1], Dominic Reisig[2], Francis Reay-Jones[3], Jeremy K. Greene[4] and Ian Knight[1], [1]Univ. of Georgia, Tifton, GA, [2]North Carolina State Univ., Plymouth, NC, [3]Clemson Univ., Florence, SC, [4]Clemson Univ., Blackville, SC

4:06 1427 Evaluation of soybean genotypes for resistance to the invasive kudzu bug, *Megacopta cribraria*, in South Carolina. **Francis Reay-Jones** (freayjo@clemson.edu)[1], Jeremy Greene[2] and Ben Fallen[1], [1]Clemson Univ., Florence, SC, [2]Clemson Univ., Blackville, SC

4:18 1428 Effect of planting date on insect and bird damage among grain sorghum hybrids. **Xinzhi Ni** (xinzhi.ni@ars.usda.gov)[1], Karen Harris-Shultz[1], Joseph Knoll[1], Michael Toews[2] and G. David Buntin[3], [1]USDA - ARS, Tifton, GA, [2]Univ. of Georgia, Tifton, GA, [3]Univ. of Georgia, Griffin, GA

4:30 1429 A population genomic analysis of resistance breaking biotypes in soybean aphid, *Aphis glycines* (Hemiptera). Andrew Michel and **Jacob Wenger** (wenger.93@osu.edu), The Ohio State Univ., Wooster, OH

4:42 1430 Management of soybean aphid, *Aphis glycines*, with Transform® insecticide. **Kevin Johnson** (kdjohnson@dow.com)[1], Dave Ruen[2], Patricia Prasifka[3] and Melissa Siebert[4], [1]Dow AgroSciences, Danville, IL, [2]Dow AgroSciences, Lanesboro, MN, [3]Dow AgroSciences, West Fargo, ND, [4]Dow AgroSciences, Greenville, MS

4:54 1431 Do floral resources of bioenergy crops improve sugar status of natural enemies of soybean aphid? **Milan Plećaš** (mdplecas@umn.edu)[1], Julie A. Peterson[2], James O. Eckberg[1], Gregg A. Johnson[1] and George E. Heimpel[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Nebraska, North Platte, NE

5:06 1432 The global risk of the invasive soybean aphid, *Aphis glycines.* **Rebecca Hallett** (rhallett@uoguelph.ca)[1], Ross Weiss[2], Owen Olfert[2] and Darren Kriticos[3], [1]Univ. of Guelph, Guelph, ON, Canada, [2]Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, [3]CSIRO, Canberra, Australia

5:18 1433 Gentic characterization of aphid resistance in soybean. **Dechun Wang** (wangdech@msu.edu), Wenyan Du, Jiazheng Yuan, Shichen Zhang, Carmille Bales, Zhongnan Zhang and Guorong Zhang, Michigan State Univ., East Lansing, MI

Ten-Minute Papers, P-IE Section: IPM - Horticultural and Vegetable Crops

200 H (Convention Center)

Moderator: Michelle Samuel-Foo, Univ. of Florida, Gainesville, FL

1:30 Introductory Remarks

1:32 1434 Preliminary studies of the movement biology of *Drosophila suzukii* morphs. **Mark Asplen** (mark.asplen@metrostate.edu), Metropolitan State Univ., St. Paul, MN

1:44 1435 Tolerance of immature stages of *Drosophila suzukii* to high temperature extremes. **Daniel Dalton** (daniel.dalton@oregonstate.edu), Vaughn Walton, Riki York and Nik G. Wiman, Oregon State Univ., Corvallis, OR

1:56 1436 Spatial variation in host utilization by *Drosophila suzukii* in blackberry. **Lauren M. Diepenbrock** (laurendiepenbrock@gmail.com) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

2:08 1437 Exirel™, A novel management tool for the invasive spotted wing drosophila, *Drosophila suzukii*. **Juan Manuel Alvarez** (Juan.M.Alvarez@dupont.com)[1], Hector E. Portillo[1], Jean-Luc Rison[2], David De Scals[3], Diego Rengifo[4] and Pierre Rougier[5], [1]DuPont Crop Protection, Newark, DE, [2]DuPont, Nambsheim, France, [3]DuPont Iberica S.L., Murcia, Spain, [4]DuPont Iberica S.L., Barcelona, Spain, [5]DuPont de Nemours S.A.S, Défense 9, France

2:20 1438 Effect of temperature on acute toxicity of insecticides to spotted wing drosophila. **Bal Gautam** (bkgautam@uga.edu), Brian Little and Ashfaq Sial, Univ. of Georgia, Athens, GA

2:32 1439 Successes in attracting and repelling *Drosophila suzukii*: prospects for improved monitoring and management. **Justin Renkema** (renkemaj@uoguelph.ca)[1], Andrew Frewin[2], Rose Buitenhuis[3] and Rebecca Hallett[2], [1]Univ. of Florida, Wimauma, FL, [2]Univ. of Guelph, Guelph, ON, Canada, [3]Vineland Research and Innovation Centre, Lincoln, ON, Canada

2:44 1440 Issues surrounding management of spotted wing drosophila in southeastern United States. **Ashfaq Sial** (ashsial@uga.edu)[1], Bal Gautam[1], Brian Little[1], Renee Holland[2], William Lovett[2], James Jacobs[3] and Glen Rains[4], [1]Univ. of Georgia, Athens, GA, [2]Univ. of Georgia, Alma, GA, [3]Univ. of Georgia, Blackshear, GA, [4]Univ. of Georgia, Tifton, GA

2:56 1441 Potential deterrent for *Drosophila suzukii*, isolated from a plant pathogen, *Botrytis cinerea*. **Dong H. Cha** (dhc288@gmail.com), Stephen P. Hesler, Gabrielle Brind'Amour, Sara Villani, Kerik Cox, Anna Wallingford and Gregory M. Loeb, Cornell Univ., Geneva, NY

3:08 Break

3:18 1442 Comparative efficacy of new insecticide formulations against tomato leafminer, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae). **Tamer A. Mashtoly** (tamer_emam@agr.asu.edu.eg) and Nesreen Helal, Ain Shams Univ., Cairo, Egypt

3:30 1443 Biopesticides for management of sweetpotato whitefly, *Bemisia tabaci*, on greenhouse tomatoes. **Michelle Samuel-Foo** (mfoo@ufl.edu)[1], Hugh A. Smith[2] and Rajagopalbabu Srinivasan[3], [1]Univ. of Florida, Gainesville, FL, [2]Univ. of Florida, Wimauma, FL, [3]Univ. of Georgia, Tifton, GA

3:42 1444 A dynamic economic threshold for corn earworm, *Helicoverpa zea*, in sweet corn. **Rick Foster** (rfoster@purdue.edu), Purdue Univ., W. Layfayette, IN

3:54 1445 Mulch-based sustainable pest management strategies for green onions. **Marisol Quintanilla-Tornel** (marisolq@hawaii.edu) and Koon-Hui Wang, Univ. of Hawai'i, Honolulu, HI

4:06 1446 The leek moth invasion: A monitoring program detailing the current and potential distribution of leek moth within Vermont and New York. Victor Izzo[1], **Scott Lewins** (slewins@smcvt.edu)[2] and Masanori Seto[3], [1]Univ. of Vermont, Burlington, VT, [2]St. Michael's College, Colchester, VT, [3]Cornell Univ., Geneva, NY

4:18 1447 Whiteflies versus watermelon: Attacks versus resistance. **Alvin M. Simmons** (alvin.simmons@ars.usda.gov) and Amnon Levi, USDA - ARS, Charleston, SC

4:30 1448 Arthropod pest management on organic strawberries in Florida. **Elena Rhodes** (erhodes@ufl.edu), Oscar Liburd and Carlene Chase, Univ. of Florida, Gainesville, FL

4:42 1449 Effect of insecticide mode of action on thrips species composition in Florida strawberry. **Hugh A. Smith** (hughasmith@ufl.edu), Jeffrey Cluever and Curtis Nagle, Univ. of Florida, Wimauma, FL

4:54 1450 How different strawberry varieties and miticides affect TSSM and predatory mite populations. **Janine Razze** (jrazze@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

Ten-Minute Papers, SysEB Section: Arthropod-Symbiont Interaction

211 C (Convention Center)

Moderators: Guanyang Zhang[1] and Jiri Hulcr[2], [1]Arizona State Univ., Tempe, AZ, [2]Univ. of Florida, Gainesville, FL

1:30 Welcoming Remarks

1:32 1451 *Blochmannia* influences head width and melanization in the carpenter ant, *Camponotus floridanus*. **Samantha Freedman** (samanthanfreedman@gmail.com) and Marc Seid, The Univ. of Scranton, Scranton, PA

1:44 1452 Stability and instability of host-symbiont combinations among higher fungus-gardening ants. **Jon Seal** (trachymyrmex@gmail.com), Univ. of Texas, Tyler, TX

1:56 1453 Disease ecology of the symbiosis of a lower fungus-farming ant and its coevolved parasite. **Katrin Kellner** (antkatrina@gmail.com)[1,2], Melissa Kardish[1], Jon Seal[2], Timothy A. Linksvayer[3] and Ulrich G. Mueller[1], [1]Univ. of Texas, Austin, TX, [2]Univ. of Texas, Tyler, TX, [3]Univ. of Pennsylvania, Philadelphia, PA

2:08 1454 Can't live together, can't live apart: Symbionts of pea aphids vary strongly in their propensities to co-inhabit. **Jacob Russell** (jar337@drexel.edu)[1], Andrew H. Smith[1] and Kerry M. Oliver[2], [1]Drexel Univ., Philadelphia, PA, [2]Univ. of Georgia, Athens, GA

2:20 1455 Presentation withdrawn

2:32 1456 Diversity and evolution of bacterial symbionts in weevils (Coleoptera: Curculionoidea). **Guanyang Zhang** (gyz151@gmail.com) and Nico Franz, Arizona State Univ., Tempe, AZ

2:44 1457 The potential role of *Wolbachia* as an incompatibility factor between cherry infesting *Rhagoletis* fruit fly species. **Hannes Schuler** (hschuler@nd.edu)[1], Meredith Doellman[1], Glen Hood[1], Mary Glover[1], Wee Yee[2], Juan Rull[3], Martin Aluja[3], Scott Egan[4] and Jeffrey Feder[1], [1]Univ. of Notre Dame, Notre Dame, IN, [2]USDA - ARS, Wapato, WA, [3]Instituto de Ecología, Xalapa, Mexico, [4]Rice Univ., Houston, TX

2:56 1458 RNA-barcoding: Rapid and reliable characterization of fungal symbiont communities in insects. **Jiri Hulcr** (hulcr@ufl.edu)[1], Craig Bateman[1] and Katherine Smith[1,2], [1]Univ. of Florida, Gainesville, FL, [2]USDA - Forest Service, Gainesville, FL

3:08 Concluding Remarks

Women in Science "Breaking the Bias Habit" Workshop/ Reception

102 A-F (Convention Center)

Moderators and Organizers: Samira Daroub, Univ. of Florida, Belle Glade, FL

2:00 Introductory Remarks

2:05 1459 Breaking the bias habit to promote gender equity. **Jennifer Sheridan** (sheridan@engr.wisc.edu), Women in Science & Engineering Leadership Institute, Madison, WI

3:40 Reception, cash bar, and networking

5:00 Adjorn

TUESDAY, NOVEMBER 17, 2015, EVENING

Social Hour with Poster Presenters

Exhibit Hall BC (Convention Center)

Moderators and Organizers: Sue Blodgett[1] and Melody A. Keena[2], [1]Iowa State Univ., Ames, IA, [2]USDA - Forest Service, Hamden, CT

5:30 PM - 6:30 PM

Organized Meeting: Korean Young Entomologists (KYE)

205 B (Convention Center)

Moderators and Organizers: Ikju Park[1] and Donghun Kim[2], [1]Univ. of Idaho, Moscow, ID, [2]Kansas State Univ., Manhattan, KS

6:00 Welcoming Remarks

6:05 Introductory Remarks

6:10 1460 Soil microarthropod biodiversity study and contribution to soil ecosystem service. **Chuleui Jung** (cjung@andong.ac.kr), Jiwon Kim and Eunsun Keum, Andong National Univ., Andong, South Korea

6:25 1461 Development of biological control tactics against alydid bean bug: A research update. **Un Taek Lim** (utlim@andong.ac.kr), Md. Abdul Alim and Bishwo Prasad Mainali, Andong National Univ., Andong, South Korea

6:40 1462 The use of attractants for urban pest management. **Dong-Hwan Choe** (donghwan.choe@ucr.edu), Univ. of California, Riverside, CA

6:55 1463 Ways to manage or improve collection. **Sangmi Lee** (slee281@asu.edu), Arizona State Univ., Tempe, AZ

7:10 1464 Population phenology of yellow tea thrips, *Scirtothrips dorsalis*, and spatial distribution pattern of the damaged citrus orchards in Jeju island. **Rokyeon Hwang** (hry99@korea.kr) and Jawwook Hyun, Rural Development Administration, Seoguipo, South Korea

7:25 Break

7:35 Introductory remarks for student competition

7:38 1465 Transcriptome of the lone star tick, *Amblyomma americanum*, revealing the molecular interaction between the vector and the pathogen *Ehrlichia chaffeensis*. **Donghun Kim** (kp5091@k-state.edu) and Yoonseong Park, Kansas State Univ., Manhattan, KS

7:50 1466 Forecasting the effects of global warming: Phenological changes of Hemiptera in two cases. **Hyoseok Lee** (blueorange23@snu.ac.kr), Jong Kook Jung and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

8:02 1467 The potential role of olfactory and visual cues associated with the host recognition of *Mogulones borraginis*. **Ikju Park** (park0563@vandals.uidaho.edu) and Mark Schwarzländer, Univ. of Idaho, Moscow, ID

8:14 Concluding Remarks

Organized Meeting: Overseas Chinese Entomologists Association (OCEA): Opportunity, Challenge, Collaboration and Achievement

200 C (Convention Center)

Moderators and Organizers: Xiao-Qiang Yu[1], Fangneng Huang[2] and Junwei Zhu[3], [1]Univ. of Missouri, Kansas City, MO, [2]Louisiana State Univ., Baton Rouge, LA, [3]USDA - ARS, Lincoln, NE

6:00 1468 OCEA Welcome Remarks. **Xiao-Qiang Yu** (yux@umkc.edu), Univ. of Missouri, Kansas City, MO

6:20 1469 Introduction of Chinese entomologist symposium in 2016 International Congress of Entomology. Le Kang[1] and **Nannan Liu** (liunann@auburn.edu)[2], [1]Chinese Academy of Sciences, Beijing, China, [2]Auburn Univ., Auburn, AL

6:40 1470 From sex determination to sex regulation. **Yong Ping Huang** (yphuang@sibs.ac.cn), Shanghai Institutes for Biological Science, Chinese Academy of Sciences, Shanghai, China

7:10 1471 The functions of *Cotesia vestalis* teratocyte. **Xuexin Chen** (xxchen@zju.edu.cn), Zhejiang Univ., Hangzhou, China

7:40 1472 OCEA highlights of the year 2015. **Fangneng Huang** (fhuang@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

8:10 1473 Molecular mechanisms of the brown planthopper resurgence induced by pesticides. **Jin-Cai Wu** (Jc.wu@public.yz.js.cn), Yangzhou Univ., Yangzhou, China

8:40 1474 Bt rice in China: Ecological risk assessment. **Gongyin Ye** (chu@zju.edu.cn), Zhejiang Univ., Hangzhou, China

9:10 1475 OCEA financial report. **Junwei Zhu** (Jerry.Zhu@ars.usda.gov), USDA - ARS, Lincoln, NE

9:20 1476 Election of OCEA officer and concluding remarks. **Xiao-Qiang Yu** (yux@umkc.edu), Univ. of Missouri, Kansas City, MO

Organized Meeting: Heteropterist Symposium

210 AB (Convention Center)

Moderators and Organizers: Katrina L. Menard[1] and Michael Forthman[2], [1]Sam Noble Oklahoma Museum of Natural History, Norman, OK, [2]Univ. of California, Riverside, CA

7:00 1477 Presentation withdrawn

7:15 1478 Exposing the ambush bugs: Defining species boundaries among a continuum of morphological features and color patterns. **Paul Masonick** (pmasonick@gmail.com), Univ. of California, Riverside, CA

7:30 1479 Preliminary results on the Tingidae of Costa Rica. **Alex Knudson** (alexander.knudson.2@ndsu.edu), Univ. of North Dakota, Fargo, ND

7:45 1480 Across-species mating in squash bugs: Causes and consequences. **Christine W. Miller** (cwmiller@ufl.edu), Univ. of Florida, Gainesville, FL

8:00 1481 Remarkably preserved fossil assassin bugs and their impact on reduviid classification. **Daniel Swanson** (drswans2@illinois.edu), Univ. of Illinois, Champaign, IL

8:15 1482 Revisionary studies on the genus *Piezosternum* Amyot & Serville, 1843 (Heteroptera: Tessaratomidae), preliminary results. **Mariom Carvajal** (mariom.carvajal@gmail.com), David Rider and Eduardo Faúndez, North Dakota State Univ., Fargo, ND

8:30 1483 Preliminary studies on the Gondwandian relationships among heteropterans. **Eduardo Faúndez** (ed.faundez@gmail.com) and David Rider, North Dakota State Univ., Fargo, ND

8:45 1484 Feeding behavior of pentatomids and coreids. **Paula Mitchell** (mitchellp@winthrop.edu), Winthrop Univ., Rock Hill, SC

9:00 1485 Response to the increasing threat posed by stink bugs in Minnesota agriculture. **Robert Koch** (koch0125@umn.edu), University of Minnesota, Saint Paul, MN

Organized Meeting: North American Dipterists Society (NADS) Meeting

213 AB (Convention Center)

Moderator and Organizer: Torsten Dikow, Smithsonian Institution National Museum of Natural History, Washington, DC

7:00 Welcoming Remarks

7:20 SP1486 Flies over Beringia: Genetic, taxonomic and ecological diversity of Diptera in a glacial refugium. **Terry Wheeler** (terry.wheeler@mcgill.ca), McGill Univ., Sainte Anne-de-Bellevue, QC, Canada

7:32 1487 A review of the 8th Int. Symposium on Syrphidae. **Kevin Moran** (kevinmoran88@comcast.net), Smithsonian Institution National Museum of Natural History, Washington, DC

7:52 1488 Collecting flies for genomic research: Workflow at Smithsonian NMNH and Biorepository. **Torsten Dikow** (dikowt@si.edu), Smithsonian Institution National Museum of Natural History, Washington, DC

8:12 SP1489 This *transformer* is not like the others: Distinct features of a sex determination gene in a blow fly with a distinct sex determination mechanism. **Aaron Tarone** (amtarone@ag.tamu.edu)[1], Meaghan Pimsler[1], Anne Andere[2], Corbin D. Jones[3], Max Scott[4], Jeffery K. Tomberlin[1], Sing-Hoi Sze[1] and Christine Picard[2], [1]Texas A&M Univ., College Station, TX, [2]Indiana Univ. - Purdue Univ., Indianapolis, IN, [3]Univ. of North Carolina, Chapel Hill, NC, [4]North Carolina State Univ., Raleigh, NC

8:24 Concluding Remarks

Organized Meeting: Society of Overseas Nepalese Entomologists Meeting

209 AB (Convention Center)

Moderators and Organizers: Roshan Manandhar[1,2], Deepak Shrestha[3] and Sudan Gyawaly[4], [1]Society of Overseas Nepalese Entomologists (SONE), Jefferson City, MO, [2]Lincoln Univ., Jefferson City, MO, [3]Univ. of Idaho, Moscow, ID, [4]Society of Overseas Nepalese Entomologists (SONE), VA

7:00 Welcoming Remarks

7:10 General Meeting

8:30 Student Award Ceremony

8:50 Concluding Remarks

Organized Meeting: The Coleopterists Society Annual Meeting

208 AB (Convention Center)

Moderator and Organizer: Christopher E. Carlton, Louisiana State Univ., Baton Rouge, LA

7:30 Welcoming Remarks

7:35 1490 Darkling beetle biodiversity: An evolutionary journey through time and morphospace. **Aaron Smith** (aaron.smith@nau.edu), Northern Arizona Univ., Flagstaff, AZ

8:15 Break

8:25 Business Meeting

9:25 Concluding Remarks

WEDNESDAY, NOVEMBER 18, 2015, MORNING

MUVE Section Poster Session B

Exhibit Hall BC (Convention Center)

D3409 Improvements to iFly®: Proof of concept internal visual key system for species identification. **Trevor I. Stamper** (stampert@purdue.edu), Purdue Univ., West Lafayette, IN

D3410 The effects of La Crosse virus infection on DEET response in *Aedes albopictus* and *Aedes triseriatus*. **Kevin Chan** (kchan90@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3411 Subterranean termite management using Termidor® SC (fipronil 0.06%) and an additive in Lake Charles, Louisiana. **Dennis R. Ring** (dring@agctr.lsu.edu)[1] and Robert Davis[2], [1]Louisiana State Univ., Baton Rouge, LA, [2]BASF Corporation, Pflugerville, TX

D3412 Spatial distribution of mortality of *Coptotermes formosanus* Shiraki (Isoptera: Rhinotermitidae) exposed to chitin synthesis inhibitor or metabolic inhibitor in extended foraging arenas. **Garima Kakkar** (garimaiari@ufl.edu)[1] and Nan-Yao Su[2], [1]Fort Lauderdale Research & Education Center, Davie, FL, [2]Univ. of Florida, Davie, FL

D3413 Assessment of insecticide susceptibility levels in field strains of German cockroaches, *Blattella germanica* (L.), collected from public housing. **Mahsa Fardisi** (mfardisi@purdue.edu), Ameya D. Gondhalekar and Michael E. Scharf, Purdue Univ., West Lafayette, IN

D3414 Efficacy of selected pesticides against *Tyrophagus putrescentiae*: Influence of surface, dose, and residual activity. **Salehe Abbar** (abbar@k-state.edu)[1], M. Wes Schilling[2] and Thomas Phillips[1], [1]Kansas State Univ., Manhattan, KS, [2]Mississippi State Univ., Starkville, MS

D3415 Design, use and evaluation of an online IPM risk calculator for public schools. Blake Bennett, Michael Merchant and **Janet Hurley** (ja-hurley@tamu.edu), Texas A&M AgriLife Extension Service, Dallas, TX

D3416 Reducing the nuisance of the red imported fire ant, *Solenopsis invicta*, in the Waverly Acres Airpark Community. **Paul Nester** (p-nester@tamu.edu)[1] and Reginald Lepley[2], [1]Texas A&M AgriLife Extension Service, Houston, TX, [2]Texas A&M AgriLife Extension Service, Huntsville, TX

D3417 Replication of transinfected *Wolbachia* in horn fly, *Haematobia irritans irritans* (L.) (Diptera: Muscidae), cell cultures. **Timothy Kurtti** (kurtt001@umn.edu)[1], Peter J. James[2] and Ulrike Munderloh[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Univ. of Queensland, Dutton Park, Australia

D3418 Insect pests of animals: USDA S1060 Project Extension website. **Alec Gerry** (alec.gerry@ucr.edu), Univ. of California, Riverside, CA

D3419 Phenology and ecology of tick species parasitic on cattle and wildlife in Oklahoma. **Trisha Dubie** (trishd@okstate.edu), Bruce Noden and Justin L. Talley, Oklahoma State Univ., Stillwater, OK

D3420 Microbiome discoveries in pathogen infected ticks. **Rebecca T. Trout Fryxell** (RFryxell@utk.edu) and Jennifer DeBruyn, Univ. of Tennessee, Knoxville, TN

D3421 Developmental rates of *Chrysomya megacephala* larvae (Diptera: Calliphoridae) reared on different tissues and temperatures. Fábio Rezende, Maicon Grella, Marcela Alonso, Patrícia J. Thyssen and **Aricio Linhares** (aricio@unicamp.br), UNICAMP, Campinas, Brazil

D3422 Survey of dog owners to help determine risks of tick (Acari: Ixodidae) infestation and tick-borne disease in Washington State. Nougesha Poulin and **Elizabeth Dykstra** (elizabeth.dykstra@doh.wa.gov), Washington State Dept. of Health, Olympia, WA

D3423 Status of nilgai antelope as a host of cattle fever tick, *Boophilus microplus*, and babesiosis. **Donald B. Thomas** (donald.thomas@ars.usda.gov)[1], Pia Olafson[2] and Roberta Duhaime[3], [1]USDA - ARS, Edinburg, TX, [2]USDA - ARS, Kerrville, TX, [3]USDA - APHIS, Austin, TX

D3424 Preference of flesh flies (Diptera: Sarcophagidae) for bacteria associated with stages of human decomposition. **Keli King** (klk020@SHSU.edu), Sam Houston State Univ., Huntsville, TX

PBT Section Poster Session B

Exhibit Hall BC (Convention Center)

D3425 Pest organism development on host plant and artificial diet. **Kristine Sturtz** (kristine.sturtz@pioneer.com), Katie Helbing and Chad Boeckman, DuPont Pioneer, Johnston, IA

D3426 Effect of nutrition on the lipid content of *Tenebrio molitor* (Coleoptera: Tenebrionidae) larvae. **M. Guadalupe Rojas** (guadalupe.rojas@ars.usda.gov) and Juan Morales-Ramos, USDA - ARS, Stoneville, MS

D3427 Life history, reproductive biology, and larval development of *Ontsira mellipes* (Hymenoptera: Braconidae) on a newly associated host species, the invasive Asian longhorned beetle (Coleoptera: Cerambycidae). **Julian Golec** (juliang@udel.edu)[1], Ellen M. Aparicio[2], Jian Duan[2] and Judith A. Hough-Goldstein[1], [1]Univ. of Delaware, Newark, DE, [2]USDA - ARS, Newark, DE

D3428 *Tuta absoluta* (Lepidoptera: Gelechiidae) rearing in artificial diet. **Johanna Bajonero Cuervo** (johabajonero@gmail.com) and José Postali Parra, Univ. of São Paulo, Piracicaba, Brazil

D3429 Identification of odorant binding proteins and chemosensory proteins in red palm weevil, *Rhynchophorus ferrugineus* (Olivier). Binu Antony, Mehmoud Abdelazim and **Saleh A. Aldosari** (aldosari95@hotmail.com), King Saud Univ., Riyadh, Saudi Arabia

D3430 Efficacy of essential oil of *Piper aduncum* against nymphs and adults of *Diaphorina citri*. **Haroldo Xavier Linhares Volpe** (haroldo@fundecitrus.com.br)[1], Murilo Fazolin[2], Rafael Brandão Garcia[1], José Carlos Barbosa[3] and Marcelo Pedreira Miranda[1], [1]Fundo de Defesa da Citricultura, Araraquara, Brazil, [2]Embrapa Acre, Rio Branco, Brazil, [3]Univ. Estadual Paulista, Jaboticabal, Brazil

D3431 Optimization of spray volume for *Diaphorina citri* Kuwayama (Hemiptera: Liviidae) control in sweet orange groves. **Marcelo Pedreira Miranda** (mpmiranda@fundecitrus.com.br), Diego Antonio Scardelato and Marcelo Silva Scapin, Fundo de Defesa da Citricultura, Araraquara, Brazil

D3432 Toxicities of two ant derived fatty amines to corn earworm and sugarcane aphid. **Jian Chen** (jian.chen@ars.usda.gov)[1], Tahir Rashid[2], Xinzhi Ni[3], Maribel Portilla[1] and Randall Luttrell[1], [1]USDA - ARS, Stoneville, MS, [2]Alcorn State Univ., Mound Bayou, MS, [3]USDA - ARS, Tifton, GA

D3433 Susceptibility of the fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae), to Bt toxins and conventional pesticides

in Mexico. **Rebeca Gutierrez** (gutie131@msu.edu)[1], David Mota-Sanchez[1], Mark E. Whalon[1], Carlos A. Blanco[2] and J. Concepcion Rodriguez[3], [1]Michigan State Univ., East Lansing, MI, [2]USDA - APHIS, Riverdale, MD, [3]Colegio de Postgraduados, Texcoco, Mexico

D3434 Presentation withdrawn

D3435 Insecticide-resistance management for various insect life histories: Is a mixture strategy always the best choice? **Masaaki Sudo** (sudomasaaki@affrc.go.jp)[1], Daisuke Takahashi[1,2], Yoshito Suzuki[3], David A. Andow[4] and Takehiko Yamanaka[1], [1]National Institute for Agro-Environmental Sciences, Tsukuba, Japan, [2]Umeå Univ., Umeå, Sweden, [3]NARO, Tsukuba, Japan, [4]Univ. of Minnesota, St. Paul, MN

D3436 The Pesticide Risk Mitigation Engine (ipmprime.com): A user-friendly online tool for field-specific risk assessment and mitigation. **Thomas A. Green** (ipmworks@ipminstitute.org)[1], Chuck Benbrook[2], Karen Benbrook[3], Timothy Brown[4], Susan Kegley[4], Pierre Mineau[5], Daniel Skolnik[1] and Patrick Shannon-Hughes[1], [1]IPM Institute of North America, Madison, WI, [2]Washington State Univ., Enterprise, OR, [3]BCS Ecologic Inc., Enterprise, OR, [4]Pesticide Research Institute, Berkeley, CA, [5]Pierre Mineau Consulting, Salt Spring Island, BC, Canada

D3437 Evaluation of chlorine dioxide gas for managing stored-product insects. **Beibei Li** (libeibei@ksu.edu), Xinyi E and Bhadriraju Subramanyam, Kansas State Univ., Manhattan, KS

D3438 Functional characterization of *Aedes aegypti* alkaline phosphatase Alp1 involved in the toxicity of Cry toxins from *Bacillus thuringiensis* subspp. *israelensis* and *jegathesan*. **Jianwu Chen** (jwchen97@yahoo.com), Karlygash G. Aimanova and Sarjeet S. Gill, Univ. of California, Riverside, CA

D3439 Obliquebanded leafroller (Lepidoptera: Tortricidae) resistance to insecticides in Michigan apple and cherry production. **Abdulwahab Hafez** (hafezabd@msu.edu), John C. Wise, David Mota-Sanchez and Larry Gut, Michigan State Univ., East Lansing, MI

D3440 A glass vial bioassay technique for monitoring lambda-cyhalothrin resistance in soybean aphid. **James Menger-Anderson** (jamesmengeranderson@gmail.com), Anthony Hanson and Robert Koch, Univ. of Minnesota, St. Paul, MN

D3441 Modification of a Bt toxin for toxicity against soybean aphid, *Aphis glycines* Matsumura. **Biviana Flores escobar** (biviana@iastate.edu), Benjamin Deist, Nanasaheb Chougule, Maria Fernandez Luna and Bryony Bonning, Iowa State Univ., Ames, IA

D3442 Leap™: A novel biorational pesticide with two-way plant protection. **Russell Eldridge** (russell.eldridge@valentbiosciences.com)[1], Bala Devisetty[1], Craig Campbell[2], Gregory Clarke[2], Fred Marmor[2] and Rick Hopkins[2], [1]Valent BioSciences Corporation, Libertyville, IL, [2]Valent-USA, Walnut Creek, CA

D3443 Control effects of *Frankliniella occidentalis* due to high and low volume of insecticides in paprika cultivation. Na-Young Jin, You-Kyoung Lee, Yu-Seop Kim, Jun-Hack Jeon, Bo-Ram Lee, Hee Ji Kim, Soo Jeung Ahn, Young-Nam Youn and **Yong-Man Yu** (ymyu@cnu.ac.kr), Chungnam National Univ., Daejeon, South Korea

D3444 Modification of a Bt toxin to target Asian citrus psyllid, *Diaphorina citri* (Hemiptera). **Maria Fernandez-Luna** (tfdzluna@iastate.edu)[1], Michael B. Blackburn[2], David Hall[3], Biviana Flores Escobar[1] and Bryony Bonning[1], [1]Iowa State Univ., Ames, IA, [2]USDA - ARS, Beltsville, MD, [3]USDA - ARS, Ft. Pierce, FL

P-IE Section Poster Session B

Exhibit Hall BC (Convention Center)

D3445 Aphid killing bacteria: How do they work and how can we utilize them? **Deepa Paliwal** (d.paliwal@pgr.reading.ac.uk)[1], Lin Field[2], Ralf Nauen[3], Carol Wagstaff[1], Tim Mauchline[2], Chris Bass[2] and Robert Jackson[1], [1]Univ. of Reading, Reading, United Kingdom, [2]Rothamsted Research, Harpenden, United Kingdom, [3]Bayer CropScience, Mondheim, Germany

D3446 Dose-responses of the citrus leaf miner to several insecticides commonly applied in Florida. **James Tansey** (jtansey@ufl.edu)[1], Moneen Jones[2], Pilar Vanaclocha[1] and Philip A. Stansly[1], [1]Univ. of Florida, Immokalee, FL, [2]Univ. of Missouri, Portageville, MO

D3447 Spatial point pattern analysis of *Candidatus Liberibactor asiaticus* diagnostics from Asian citrus psyllid, *Diaphorina citri* Kuwayama, samples: Potential for predicting infected citrus host locations. **David W. Bartels** (david.w.bartels@aphis.usda.gov)[1] and Gericke Cook[2], [1]USDA - APHIS, Edinburg, TX, [2]USDA - APHIS, Fort Collins, CO

D3448 Biological factors contributing to *Candidatus Liberibacter asiaticus* infection densities in field Asian citrus psyllid, *Diaphorina citri* Kuwayama, populations. **Chia-Ching Chu** (cchu9@ufl.edu), Torrence Gill and Kirsten Pelz-Stelinski, Univ. of Florida, Lake Alfred, FL

D3449 Advances in *Tamarixia radiata* mass rearing to control the HLB vector, *Diaphorina citri*. **José Parra** (jrpparra@usp.br), Alexandre Diniz, Jaci Vieira and Gustavo Alves, Univ. of São Paulo, Piracicaba, Brazil

D3450 Investigation of volatiles from citrus plants with potential for use in integrated management of *Diaphorina citri* Kuwayama (Hemiptera: Liviidae). **André Gustavo Corrêa Signoretti** (andresignoretti@fundecitrus.com.br)[1], Weliton Dias Silva[2], José Mauricio Bento[2] and Rodrigo Magnani[1], [1]Fundo de Defesa da Citricultura, Araraquara, Brazil, [2]Univ. of São Paulo, Piracicaba, Brazil

D3451 Survival of *Diaphorina citri* on *Murraya exotica* foliage exposed to different levels of light. Kelvin Ruiz-Medina[1], Ricardo Goenaga[2] and **David A. Jenkins** (David.Jenkins@ars.usda.gov)[2], [1]Univ. of Puerto Rico, Mayaguez, PR, [2]USDA - ARS, Mayaguez, PR

D3452 Screening organic pesticides for control of Asian citrus psyllid, *Diaphorina citri*, in California. **James A. Bethke** (jabethke@ucanr.edu)[1], Marianne Whitehead[1], Joseph C. Morse[2], Frank Byrne[2], Elizabeth E. Grafton-Cardwell[2], Kris Godfrey[3], Mark S. Hoddle[2] and Lea Corkidi[1], [1]Univ. of California Cooperative Extension, San Diego, CA, [2]Univ. of California, Riverside, CA, [3]Univ. of California, Davis, CA

D3453 Semi-field testing of insecticides against Asian citrus psyllid in citrus. **Nastaran Tofangsazi** (nastaran.tofangsazi@ucr.edu)[1], Anuar Rodriguez[1], Elizabeth Grafton-Cardwell[2] and Joseph C. Morse[1], [1]Univ. of California, Riverside, CA, [2]Univ. of California, Exeter, CA

D3454 Evaluating the biological control of Asian citrus psyllid in the Lower Rio Grande Valley of Texas. Daniel Flores[1], Jose Renteria[1], Rupert Santos[1], Mayra Rangel[2], Gilbert Salazar[1], Nicholas Soto[2], Abel Villarreal III[3], Osiel Hurtado[3], Ariel Miranda[4], Jose Urbalejo[5], Sergio Sanchez[5], **Christopher Vitek** (vitekc@utpa.edu)[2] and Matt A. Ciomperlik[1], [1]USDA - APHIS, Edinburg, TX, [2]Univ. of Texas Rio Grande Valley, Edinburg, TX, [3]Texas Citrus Pest and Disease Management Corporation, Edinburg, TX, [4]USDA - APHIS, Reynosa, Mexico, [5]USDA - APHIS, Tijuana, Mexico

D3455 Advancing IPM for Midwest apple production using the Pesticide Risk Mitigation Engine (ipmPRiME.com). **Peter Werts** (pwerts@ipminstitute.org), Thomas Bernard and Thomas A. Green, IPM Institute of North America, Madison, WI

D3456 Fluctuations over time of phytoplasma diseases incidence in grapevines and in leafhoppers in Quebec and Ontario vineyards. Chrystel Olivier[1], Julien Saguez[2], Jacques Lasnier[3], Tim Dumonceaux[4] and **Charles Vincent** (Charles.Vincent@agr.gc.ca)[2], [1]Agriculture and Agri-Food Canada, London, ON, Canada, [2]Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada, [3]Ag-Cord Inc., Granby, QC, Canada, [4]Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

D3457 Can crape myrtle banker plants be used to manage aphids feeding on pecan foliage? **Ted Cottrell** (ted.cottrell@ars.usda.gov) and Emily Kemp, USDA - ARS, Byron, GA

D3458 Blackmargined aphid, *Monellia caryella*, control in pecan in far west Texas. **Salvador Vitanza** (svitanza@ag.tamu.edu)[1] and Mark Muegge[2], [1]Texas A&M Univ. AgriLife Extension Service, El Paso, TX, [2]Texas A&M Univ., Fort Stockton, TX

D3459 Development of a more cost effective mass trapping program for managing tephritid fruit flies on mango in Haiti. **Fractyl Mertilus** (fractyl007@yahoo.fr), Timothy D. Schowalter and Dennis R. Ring, Louisiana State Univ., Baton Rouge, LA

D3460 Development of an economic threshold for *Frankliniella bispinosa* in Southern highbush blueberries grown in North-central Florida. **Tamika Garrick** (tgarrick09@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

D3461 Mechanisms of host plant resistance in selected cranberry varieties towards Sparganothis fruitworm, *Sparganothis sulfureana.* **Erin McMahan** (emcmahan@wisc.edu) and Christelle Guédot, Univ. of Wisconsin, Madison, WI

D3462 Stylet penetration pattern and feeding activities of *Metcalfa pruinosa* (Say) (Hemiptera: Flatidae) on *Hibiscus syriacus* L. (Malvaceae). **Bo Yoon Seo** (seoby@korea.kr)[1], Jin Kyo Jung[2], Chang-Gyu Park[1] and Yong-Lak Park[3], [1]National Academy of Agricultural Science, Wanju-gun, South Korea, [2]National Institute of Crop Science, Suwon, South Korea, [3]West Virginia Univ., Morgantown, WV

D3463 Efficacy of post-harvest soil applied insecticide for management of cowpea curculio, *Chalcodermus aeneus,* in southern pea. **Alton N. Sparks, Jr.** (asparks@uga.edu) and David Riley, Univ. of Georgia, Tifton, GA

D3464 Evaluation of three isolates of *Beauveria bassiana* for control of *Megacopta cribraria* (Heteroptera: Plataspidae). **Maribel Portilla** (maribel.portilla@ars.usda.gov)[1], Walker A. Jones[1], Omaththage P. Perera[1], Jeremy Greene[2], Randall Luttrell[1] and Nicholas Seiter[3], [1]USDA - ARS, Stoneville, MS, [2]Clemson Univ., Blackville, SC, [3]Univ. of Arkansas, Monticello, AR

D3465 Evaluation of trap crops for their attractiveness to the key caterpillar pest complex and the harlequin bug in cole crops. **Roshan Manandhar** (manandharr@lincolnu.edu) and Jaime Pinero, Lincoln Univ., Jefferson City, MO

D3466 Thermal budgeting for cabbage butterfly, *Pieris brassicae*, under controlled conditions in Kashmir Valley. **Barkat Hussain** (bari123@vt.edu)[1] and Douglas G. Pfeiffer[2], [1]Sher-e-Kashmir Univ. of Agricultural Sciences and Technology of Kashmir, Shalimar, India, [2]Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3467 Estimating defoliation from remotely sensed imagery obtained from an unmanned aerial system. **Tim Baker** (baker854@crk.umn.edu)[1], Ian MacRae[1], Robert Koch[2] and Nathan Russart[1], [1]Univ. of Minnesota, Crookston, MN, [2]Univ. of Minnesota, St. Paul, MN

D3468 Evaluating aerial imagery for early season pest management in cucurbits. **James Jasinski** (jasinski.4@osu.edu)[1] and John Schoenhals[2], [1]The Ohio State Univ., Urbana, OH, [2]The Ohio State Univ., Columbus, OH

D3469 Developing innovative tactics for pest management in asparagus. **Amanda Buchanan** (alynn@msu.edu), Jason Schmidt, Adam Ingrao, Matthew Grieshop and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

D3470 Damage caused by the mite *Tetranychus urticae* (Trombidiformes: Tetranychidae) on three varieties of strawberry. **Sandra González-Domínguez** (sandraggd86@gmail.com), Ma. Teresa Santillán-Galicia, Víctor González-Hernández, Héctor González-Hernández and Javier Suárez-Espinosa, Colegio de Postgraduados, Texcoco, Mexico

D3471 Tentative controls of *Pseudococcus maritinus* (Ehrhorn) infestation on *Poliomintha longiflora* A. Gray. **Francoise Favi** (ffavi@vsu.edu), Virginia State Univ., Petersburg, VA

D3472 Biological control and pupation habits of spotted wing drosophila in the field. J. Megan Woltz[1] and **Jana C. Lee** (jana.lee@ars.usda.gov)[2], [1]Oregon State Univ., Corvallis, OR, [2]USDA - ARS, Corvallis, OR

D3473 Oviposition behavior of spotted wing drosophila, *Drosophila suzukii*, in the presence of aversive odors. **Anna Wallingford** (akw52@cornell.edu) and Gregory M. Loeb, Cornell Univ., Geneva, NY

D3474 Monitoring and management of the spotted wing drosophila, *Drosophila suzukii* (Diptera: Drosophilidae), in Florida. **Muhammad Haseeb** (Muhammad.Haseeb@famu.edu), Dasia Harmon and Lambert Kanga, Florida A&M Univ., Tallahassee, FL

D3475 Thrips species associated with tospovirus infected tomato fields and their abundance and distribution. **Dakshina Seal** (dseal3@ufl.edu), M. Razzak and C. Sabines, Univ. of Florida, Homestead, FL

D3476 Maintenance of non-crop plants in pepper crops is not sufficient to favor soil-borne entomopathogenic fungi. **Andre Perez** (alageperez@gmail.com)[1], Madelaine Venzon[2], Elem Martins[1], Simon Elliot[1] and Camila Moreira[1], [1]Univ. Federal de Viçosa, Viçosa, Brazil, [2]Agriculture and Livestock Research Enterprise of Minas Gerais, Viçosa, Brazil

D3477 Assessing the abundance of American serpentine leafminer, *Liriomyza trifolii*, on five vegetable crops grown in south Florida. **Shashan Devkota** (devkotasashan@ufl.edu)[1], Dakshina Seal[1], Oscar Liburd[2], J. Scott Ferguson[3] and Christine Waddill[1], [1]Univ. of Florida, Homestead, FL, [2]Univ. of Florida, Gainesville, FL, [3]Atlantic Turf & Ornamental Consulting, Vero Beach, FL

D3478 New insect pest, *Aphanisticus congener* (Coleoptera: Buprestidae) of turfgrass in Korea. Dong Woon Lee, **Jin Hee Shin** (wildstorm87@naver.com) and Faisal Kabir, Kyungpook National Univ., Sangju, South Korea

D3479 Differential gene expression in the gray lawn leafhopper, *Exitianus exitiosus* (Uhl.), after acquisition of *Spiroplasma kunkelii*. **Sharon Andreason** (sharon.andreason@okstate.edu) and Astri Wayadande, Oklahoma State Univ., Stillwater, OK

D3480 Degree of foregut colonization by multiple strains of *Xylella fastidiosa* in the blue-green sharpshooter, *Graphocephala atropunctata* (Signoret), an efficient vector. Holly Shugart[1], **Elaine Backus** (elaine.backus@ars.usda.gov)[2], Michael Rogers[1] and Steven Lee[2], [1]Univ. of Florida, Lake Alfred, FL, [2]USDA - ARS, Parlier, CA

D3481 Haplotypes of potato psyllid (Hemiptera: Triozidae), and *Candidatus Liberibacter solanacearum* from biogeographic Sierra Madre Oriental province of Mexico. **Gabriela Esparza-Diaz** (gesparzadiaz@ag.tamu.edu)[1], Raul Villanueva[1], Li Paetzold[2], Sergio Sanchez-Peña[3], Charles Rush[4] and D. Henne[5], [1]Texas A&M Univ., Weslaco, TX, [2]Texas AgriLife Research, Bushland, TX, [3]Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico, [4]Texas A&M Univ., Amarillo, TX, [5]Monsanto Company, Kihei, HI

D3482 Role of matrimony vine, *Lycium* spp., in population dynamics of potato psyllid, *Bactericera cockerelli*, in the Pacific Northwest. **Jenita Thinakaran** (jenitathinakaran@gmail.com), Joseph Munyaneza, William Rodney Cooper and David Horton, USDA - ARS, Wapato, WA

D3483 Use of EPG to examine effect of cyantraniliprole on probing behavior of potato psyllid, *Bactericera cockerelli.* Tariq Mustafa[1,2], **Joseph Munyaneza** (joseph.munyaneza@ars.usda.gov)[2] and Juan Manuel Alvarez[3], [1]Washington State Univ., Pullman, WA, [2]USDA - ARS, Wapato, WA, [3]DuPont Crop Protection, Newark, DE

D3484 How destructive is brown marmorated stink bug, *Halyomorpha halys*, in herbaceous plants? **Stanton Gill** (sgill@umd.edu)[1], Brian Kunkel[2], Karen Rane[3], Deborah Smith-Fiola[4], Virginia Rosenkranz[5] and Suzanne Klick[6], [1]Univ. of Maryland, Ellicott City, MD, [2]Univ. of Delaware, Newark, DE, [3]Univ. of Maryland, College Park, MD, [4]IPM Consultant, MD, [5]Univ. of Maryland, Salisbury, MD, [6]Central Maryland Research and Education Center, Ellicott City, MD

D3485 Biological control of mile-a-minute vine in North Carolina using the weevil *Rhinoncomimus latipes* Korotyaev. **Kathleen Kidd** (kathleen.kidd@ncagr.gov), North Carolina Dept. of Agriculture & Consumer Services, NC

D3486 Effects of host plant diversity on phloem feeding insects. **Kai Zhang** (zhangkai686@gmail.com)[1], Sean Prager[1], Tong-Xian Liu[2], John T. Trumble[1] and Ning Di[1], [1]Univ. of California, Riverside, CA, [2]Northwest A&F Univ., Yangling, China

D3487 *Anastatus furnissi* (Hymenoptera: Eupelmidae) as a parasitoid of the bog buckmoth (Lepidoptera: Saturniidae), a rare inhabitant of New York peatlands. **Karen Sime** (karen.sime@oswego.edu) and C. Hellquist, State Univ. of New York, Oswego, NY

D3488 Mid-winter chipping to destroy egg masses of the spotted lanternfly, *Lycorma delicatula* (Hemiptera: Fulgoridae). **Miriam Cooperband** (Miriam.F.Cooperband@aphis.usda.gov)[1], Ron Mack[1] and Sven-Erik Spichiger[2], [1]USDA - APHIS, Buzzards Bay, MA, [2]Pennsylvania Dept. of Agriculture, Harrisburg, PA

D3489 Out cold: Diapause patterns of *Oobius agrili* (Hymenoptera: Encyritidae) populations. **E. Erin Morris** (morri639@msu.edu)[1], Leah S. Bauer[2], Deborah L. Miller[2] and Therese Poland[2], [1]Michigan State Univ., East Lansing, MI, [2]USDA - Forest Service, East Lansing, MI

D3490 Lighting up emerald ash borer attraction to traps. **James B. Wieferich** (wiefer10@msu.edu), Deborah G. McCullough and Jeremy Lowell, Michigan State Univ., East Lansing, MI

D3491 Buprestid community structure, coarse woody debris and overstory species in four Michigan cover types. **Kyle Redilla** (redillak@msu.edu) and Deborah G. McCullough, Michigan State Univ., East Lansing, MI

D3492 Do females prefer purple-purple? Male and female emerald ash borer attraction to two double-decker trap color schemes. **Deborah McCullough** (mccullo6@msu.edu)[1], Therese Poland[2] and James B. Wieferich[1], [1]Michigan State Univ., East Lansing, MI, [2]USDA - Forest Service, Lansing, MI

D3493 Effects of paclobutrazol on four ash species and interactions with two systemic neonicotinoids applied for emerald ash borer control. **Andrew R. Tluczek** (tluczek@msu.edu)[1], Deborah G. McCullough[1], Sara R. Tanis[1] and Phillip A. Lewis[2], [1]Michigan State Univ., East Lansing, MI, [2]USDA - APHIS, Buzzards Bay, MA

D3494 Presentation withdrawn

D3495 Unexpectedly high survival of white ash in core areas of the emerald ash borer invasion. **Molly Robinett** (robine18@msu.edu), Deborah McCullough and Alyssa Wethington, Michigan State Univ., East Lansing, MI

D3496 Community composition of cerambycids captured in conifer and hardwood sites in Michigan forests. **Sara Tanis** (tanissar@msu.edu), Deborah McCullough and Kyle Redilla, Michigan State Univ., East Lansing, MI

D3497 Environmental effects of using systemic insecticide to control emerald ash borer. **Rasha Alakeel** (rkma@rams.colostate.edu) and Whitney Cranshaw, Colorado State Univ., Fort Collins, CO

D3498 Evaluation of potentially attractive compounds for wood-boring beetle management. **Alicia Bray** (brayalic@gmail.com)[1], Karla Addesso[2], Jason B. Oliver[2] and Paul A. O'Neal[2], [1]Central Connecticut State Univ., New Britain, CT, [2]Tennessee State Univ., McMinnville, TN

D3499 Presentation of visual decoy beetles and pheromone lures to emerald ash borers on small branch traps. **Michael Domingue** (mjd29@psu.edu)[1], Peter J. Silk[2], Krista Ryall[3] and Thomas C. Baker[1], [1]Pennsylvania State Univ., University Park, PA, [2]Natural Resources Canada, Fredericton, NB, Canada, [3]Natural Resources Canada, Canadian Forest Service, Sault Ste. Marie, ON, Canada

D3500 Metallic wood-boring beetles (Coleoptera: Buprestidae) collected at Virginia ports of entry. **Eric R. Day** (idlab@vt.edu), Virginia Polytechnic Institute and State University, Blacksburg, VA

D3501 The southern pine beetle moves north: First report of *Dendroctonus frontalis* in southern New England. **Claire E. Rutledge** (Claire.Rutledge@ct.gov) and Adriana Arango Velez, The Connecticut Agricultural Experiment Station, New Haven, CT

D3502 Bark beetle (Scolytinae) attacks on Jeffrey pine, *Pinus jeffreyi*, and coulter pine, *Pinus coulteri*, following prescribed fire and wildfire in southern California. **Adrian Poloni** (adrian_poloni@live.com)[1], Danny Cluck[2] and Tom W. Coleman[3], [1]Univ. of California Davis, CA, [2]USDA - Forest Service, Susanville, CA, [3]USDA - Forest Service, San Bernardino, CA

D3503 Casting the widest net: Evaluation of lures to assess diversity and identify presence of invasive and nuisance species of Scolytidae in Rock Island State Park, Rock Island, Tennessee. **Paul A. O'Neal** (paoneal@blomand.net)[1], Karla Addesso[1] and William Sutton[2], [1]Tennessee State Univ., McMinnville, TN, [2]Tennessee State Univ., Nashville, TN

D3504 Impact of silviculture and bark beetles on loblolly pine resin flow. **Sander Olivia Denham** (sodenham@gmail.com)[1], David R. Coyle[2], Kimberly Novick[3] and Bronson Bullock[2], [1]North Carolina State Univ., Raleigh, NC, [2]Univ. of Georgia, Athens, GA, [3]Univ. of Indiana, Bloomington, IN

D3505 A meta-analysis of forest insect trapping techniques with a focus on Coleoptera. **Richard A. Redak** (richard.redak@ucr.edu)[1] and Jeremy D. Allison[2], [1]Univ. of California, Riverside, CA, [2]Natural Resources Canada, Sault Ste. Marie, ON, Canada

D3506 Public benefit of biological control of insect herbivores in California urban forests. **Timothy Paine** (timothy.paine@ucr.edu)[1], Jocelyn G. Millar[1], Lawrence M. Hanks[2], Juli Gould[3] and Kent M. Daane[4], [1]Univ. of California, Riverside, CA, [2]Univ. of Illinois, Champaign, IL, [3]USDA - APHIS, Buzzards Bay, MA, [4]Univ. of California, Berkeley, CA

D3507 Evaluation of wood-boring beetles in a Connecticut nature preserve. **Shawn Mullen** (shawnryanmullen@gmail.com) and Alicia Bray, Central Connecticut State Univ., New Britain, CT

D3508 Trapping strategies for monitoring seasonal flight activity of *Cnestus mutilatus* in Tennessee. **William Klingeman** (wklingem@utk.edu)[1], Alicia Bray[2] and Jason B. Oliver[3], [1]Univ. of Tennessee, Knoxville, TN, [2]Central Connecticut State Univ., New Britain, CT, [3]Tennessee State Univ., McMinnville, TN

D3509 Effects of temperature on neonate *Lymantria* survival with and without food. **Melody A. Keena** (mkeena@fs.fed.us)[1] and Juan Shi[2], [1]USDA - Forest Service, Hamden, CT, [2]Beijing Forestry Univ., Beijing, China

D3510 Adaptation and evolutionary stasis across the North American range of gypsy moth, *Lymantria dispar*. **Dylan Parry** (dparry@esf.edu)[1], Kristine Grayson[2], Marissa Streifel[3], Brian Aukema[3], Patrick Tobin[4] and Derek Johnson[5], [1]State Univ. of New York, Syracuse, NY, [2]Univ. of Richmond, Richmond, VA, [3]Univ. of Minnesota, St. Paul, MN, [4]Univ. of Washington, Seattle, WA, [5]Virginia Commonwealth Univ., Richmond, VA

D3511 Dispersal capacity to hardwood log piles of European gypsy moth, *Lymantria dispar dispar*, larvae. **Rachael Nicoll** (nicol071@umn.edu)[1], Scott W. Myers[2] and Brian Aukema[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - APHIS, Buzzards Bay, MA

D3512 Five-day getaway: How far can a walnut twig beetle fly? **Aubree Wilke** (wilke137@umn.edu)[1], Andrea Hefty[1], Robert Venette[2], Steven Seybold[3] and Brian Aukema[1], [1]Univ. of Minnesota, St. Paul, MN, [2]USDA - Forest Service, St. Paul, MN, [3]USDA - Forest Service, Davis, CA

D3513 Spread and management of *Eriococcus lagerstroemiae* Kuwana (Hemiptera: Eriococcidae) on crape myrtle. **Erfan Vafaie** (erfanv@tamu.edu)[1], Michael Merchant[2], Mengmeng Gu[3], Evan Anderson[4], Yan Chen[5], John D. Hopkins[6] and Jim Robbins[6], [1]Texas A&M Agrilife Extension Service, Overton, TX, [2]Texas A&M AgriLife Extension Service, Dallas, TX, [3]Texas A&M Univ., College Station, TX, [4]Sam Houston State Univ., Huntsville, TX, [5]Louisiana State Univ., Hammond, LA, [6]Univ. of Arkansas, Little Rock, AR

D3514 Winter kill: Implications of the one-two punch of the polar vortex and siberian express on hemlock woolly adelgid in the south. **Greg Wiggins** (wiggybug@utk.edu)[1], Jerome F. Grant[1], J. Patrick Parkman[1], R. Jesse Webster[2], Elizabeth P. Benton[1], J. Rusty Rhea[3] and Paris L. Lambdin[1], [1]Univ. of Tennessee, Knoxville, TN, [2]National Park Service, Gatlinburg, TN, [3]USDA - Forest Service, Asheville, NC

D3515 First releases of western US silver flies (Diptera: Chamaemyiidae) for biological control of hemlock woolly adelgid in the East. **Darrell W. Ross** (darrell.ross@oregonstate.edu)[1], Arielle L. Arsenault[2], Nathan Havill[3], Albert Mayfield[4], Kimberly Wallin[2,5] and Mark Whitmore[6], [1]Oregon State Univ., Corvallis, OR, [2]Univ. of Vermont, Burlington, VT, [3]USDA - Forest Service, Hamden, CT, [4]USDA - Forest Service, Asheville, NC, [5]USDA - Forest Service, Burlington, VT, [6]Cornell Univ., Ithaca, NY

D3516 Japanese maple scale management options in field nursery production. **Karla Addesso** (kaddesso@tnstate.edu), Adam Blalock and Paul A. O'Neal, Tennessee State Univ., McMinnville, TN

D3517 Colonization of the winter cherry bug, *Acanthocoris sordidus (*Hemiptera: Coreidae). **Chan-yeong Kang** (rkdcksdud44@hanmail.net), Tae-Hee Ryu, Yu-Bin Jung, Hyun Ju Jang, Jeong Hee Kim, Min Gyu Cho, Ji Hyun Min, Il Hyun Byun, Yong-Man Yu and Young-Nam Youn, Chungnam National Univ., Daejeon, South Korea

D3518 Diversity and abundance of nocturnal Lepidoptera species as a measure of the effect of invasive saltcedar, *Tamarix ramosissima* Ledeb., on Great Basin riparian habitats. **Kirk C. Tonkel** (kirk.tonkel@ars.usda.gov)[1], Cassandra Hughes[2], Jennifer Schoener[2] and Brian G. Rector[1], [1]USDA - ARS, Reno, NV, [2]Univ. of Nevada, Reno, NV

D3519 Fungal microbiome diversity differs in live versus dead galls of baldcypress trees. **George Washburn** (gwashbur@tulane.edu) and Sunshine Van Bael, Tulane Univ., New Orleans, LA

D3520 Life history information on *Allokermes rattani,* the kermes scale associated with drippy blight disease of red oaks. **Rachael Sitz** (rachael.fithian@colostate.edu) and Whitney Cranshaw, Colorado State Univ., Fort Collins, CO

D3521 Essential oils as repellent agents against *Pochazia shantungensis* (Hemiptera: Ricaniidae). **Tae-Hee Ryu** (fbxogml89@naver.com), Hyun Ju Jang, Jeong Hee Kim, Min Gyu Cho, Ji Hyun Min, Il Hyun Byun, Yu-Bin Jung, Chan-yeong Kang, Hye-Ri Kwon, Mi-Ja Seo, Yong-Man Yu and Young-Nam Youn, Chungnam National Univ., Daejeon, South Korea

D3522 Functional role of neuropeptide leucokininii in growth inhibition of red palm weevil *Rhynchophorus ferrugineus*. **Mona Al Dawsary** (wisdom1425@yahoo.com), Sattam bin Abdel Azizi Univ., Al Kharj, Saudi Arabia

D3523 Physiology of the invasive ambrosia beetle, *Euwallacea* near *fornicatus*, in response to four stereoisomers of *p*-menth-2-en-1-ol and their absolute configurations. **Allard Cossé** (allard.cosse@ars.usda.gov)[1], Miriam Cooperband[2], Bruce W. Zilkowski[1], Tappey H. Jones[3], Richard Stouthamer[4] and Daniel Carrillo[5], [1]USDA - ARS, Peoria, IL, [2]USDA - APHIS, Buzzards Bay, MA, [3]Virginia Military Institute, Lexington, VA, [4]Univ. of California, Riverside, CA, [5]Univ. of Florida, Homestead, FL

D3524 Ambrosia beetle communities in forest and agricultural ecosystems with laurel wilt disease. **Paul E. Kendra** (paul.kendra@ars.usda.gov)[1], Teresa Narvaez[2], Wayne S. Montgomery[1] and Daniel Carrillo[2], [1]USDA - ARS, Miami, FL, [2]Univ. of Florida, Homestead, FL

D3525 Range expansion of the invasive pest *Maconellicoccus hirsutus* in the major cocoa producing region of South America. **Mark Culik** (markculik3@yahoo.com)[1], David Martins[1], Carlos Souza[2], Mauricio Fornazier[1] and José Zanuncio[3], [1]Instituto Capixaba de Pesquisa Assistência Técnica e Extensão Rural, Vitória, Brazil, [2]Estação Experimental Filogônio Peixoto – CEPLAC, Linhares, Brazil, [3]Federal Univ. of Viçosa, Viçosa, Brazil

D3526 Efficacy of spray applications of *Beauveria bassiana* strain GHA (BotaniGard®) against coffee berry borer, *Hypothenemus hampei*, on Hawaii island. **Stephen Wraight** (steve.wraight@ars.usda.gov)[1] and Lisa Keith[2], [1]USDA - ARS, Ithaca, NY, [2]USDA - ARS, Hilo, HI

D3527 Predaceous flat bark beetles munch on coffee berry borer in Hawaii coffee. **Peter A. Follett** (peter.follett@ars.usda.gov)[1], Andrea Kawabata[2], Robert Nelson[2], Glenn Asmus[1], Jennifer Burt[2] and Kally Goschke[2], [1]USDA - ARS, Hilo, HI, [2]Univ. of Hawai'i, Kealakekua, HI

D3528 Impact of the automobile exhaust polluted mulberry, *Morrus alba* L., leaves on the physiology and economical performance of the silkworm, *Bombyx mori* L., in the Kashmir, India. **Faroz Ahanger** (farozhamid75@gmail.com)[1], Ruqeya Sheikh[2] and Irfan Illahi[3], [1]Dept. of Environmental Sciences/Center of Research for Development, Srinagar, India, [2]Univ. of Kashmir, Srinagar, India, [3]Central Silk Board, Pampore, India

D3529 Developing sustainable methods of control: Foliar arthropods: Mitigation during shipping. **Lorin Lima** (llima@ucanr.edu)[1], James A. Bethke[1], Lance Osborne[2], Arnold Hara[3], Cristi L. Palmer[4], Katherine Houben[2], Susan Cabral[3], Marianne Whitehead[1] and Gary Tanizaki[1], [1]Univ. of California Cooperative Extension, San Diego, CA, [2]Univ. of Florida, Apopka, FL, [3]Univ. of Hawai'i, Hilo, HI, [4]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

D3530 Evaluation of a large grower-based tart cherry trial comparing biopesticides and conventional insecticides targeting cherry fruit fly, *Rhagolitis singulata*, and SWD, *Drosophila suzukii*. **Mark E. Whalon** (whalon@msu.edu), Rosemary Bolton and Willye Bryan, Michigan State Univ., East Lansing, MI

D3531 PestLens: An early-warning system supporting United States' safeguarding against exotic plant pests. Jennifer Fritz, **Heather M.C. Moylett** (hmcampbe@ncsu.edu), Sherrie Emerine and Amanda Kaye, North Carolina State Univ., Raleigh, NC

D3532 Chemical ecology of *Apion* spp.: Are cuticular hydrocarbons involved in mating behaviour? **Nicoletta Faraone** (nicoletta.faraone@biol.lu.se)[1], Olle Anderbrant[1], Maj Rundlöf[1], Glenn Svensson[1], Mattias Larsson[2], Göran Birgersson[2] and Åsa Lankinen[2], [1]Lund Univ., Lund, Sweden, [2]Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

D3533 Experimental psyllid traps. **Bobbie Jo Davis** (bobbie.davis@freshfromflorida.com)[1], Anthony Dickens[1], Susan Halbert[1], Trevor Smith[1] and Russell Mizell[2], [1]Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, [2]Univ. of Florida, Quincy, FL

SysEB Section Poster Session B

Exhibit Hall BC (Convention Center)

D3534 Drive-by sifting: An expedition from Baton Rouge to Portland, Oregon, and return, November 2014; reporting travel conditions, collection methods, and Coleoptera collected; plus selected entomological poems from Christopher E. Carlton. **Michael Ferro** (spongymesophyll@gmail.com), Brittany Owens, Jong-Seok Park and Christopher E. Carlton, Louisiana State Univ., Baton Rouge, LA

D3535 Caddisfly (Trichoptera) inventories in the U.S. National Park System: Addressing a crucial biodiversity gap. **David E. Bowles** (david_bowles@nps.gov), United States National Park Service, Republic, MO

D3536 The beetles (Insecta: Coleoptera) associated with the plains pocket gopher, *Geomys bursarius* (Shaw), in northwestern Indiana. **Gareth Powell** (powellg@purdue.edu) and R. Brattain, Purdue Univ., West Lafayette, IN

D3537 Diversity of western Ecuadorian bark and ambrosia beetles (Coleoptera: Curculionidae: Scolytinae). **Sarah M. Smith** (smith462@msu.edu) and Anthony I. Cognato, Michigan State Univ., East Lansing, MI

D3538 Reliability of insect population size estimators and indices: Implications for conservation. Douglas H. Deutschman and **Daniel A. Marschalek** (danmarschalek@hotmail.com), San Diego State Univ., San Diego, CA

D3539 The bees' needs: Assessing the conservation value of bee nesting blocks through citizen science. **Virginia L. Scott** (Virginia.Scott@colorado.edu), Alexandra Rose, Collin Schwantes, Katherine Wolfson, Adrian L. Carper and M. Deane Bowers, Univ. of Colorado, Boulder, CO

D3540 Pollinator diversity associated with willow biomass crop. **Giuseppe Tumminello** (gtummine@syr.edu)[1], Scott McArt[2], Timothy Volk[1] and Melissa K. Fierke[1], [1]State Univ. of New York, Syracuse, NY, [2]Cornell Univ., Ithaca, NY

D3541 Native bee pollination networks in New England. **Erika Tucker** (erika.tucker@unh.edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

D3542 *Aprostocetus bromi* (Hymenoptera: Eulophidae) invaded parasitoid guilds of *Stenodiplosis* (Diptera: Cecidomyiidae) in the northern Great Plains. Manuel Perilla Lopez[1], **Paul J. Johnson** (Paul.johnson@sdstate.edu)[1], Zoya Yefremova[2], Ekaterina Yegorenkova[3] and Arvid Boe[1], [1]South Dakota State Univ., Brookings, SD, [2]Tel-Aviv Univ., Tel Aviv, Israel, [3]Ulyanovsk State Pedagogical Univ., Ulyanovsk, Russia

D3543 Grape juice bait for *Zaprionus indianus* (Diptera: Drosophilidae). **Nancy D. Epsky** (nancy.epsky@ars.usda.gov), Micah A. Gill, C. Teri Allen and Elena Q. Schnell, USDA - ARS, Miami, FL

D3544 A comparative study of the growth in knowledge of biodiversity, taxonomy and systematics in the order Hymenoptera. **Norman Johnson** (johnson.2@osu.edu), The Ohio State Univ., Columbus, OH

D3545 A survey of the bark and ambrosia beetles (Curculionidae: Scolytidae) of North Dakota. **Gerald Fauske** (gerald.fauske@ndsu.edu) and David Rider, North Dakota State Univ., Fargo, ND

D3546 Tracking the global spread of a common and pest ambrosia beetle using genome sequencing. **Caroline Storer** (cgstorer@gmail.com) and Jiri Hulcr, Univ. of Florida, Gainesville, FL

D3547 Habitat suitability and distribution patterns of the North American fungus-farming ant *Trachymyrmex septentrionalis*. **Andrea Ortiz** (aortiz2@patriots.uttyler.edu)[1], Josh Banta[1], Jon Seal[1], Ulrich G. Mueller[2] and Katrin Kellner[1], [1]Univ. of Texas, Tyler, TX, [2]Univ. of Texas, Austin, TX

D3548 Costa Rica to the Arctic ocean, via Los Angeles: Documenting Chloropidae (Diptera) diversity from collaborative surveys. **Terry Wheeler** (terry.wheeler@mcgill.ca), McGill Univ., Sainte Anne-de-Bellevue, QC, Canada

D3549 Presentation withdrawn

D3550 Range changes in native and invasive Coccinellids based on new citizen scientist submissions to the Lost Ladybug Project. Rebecca R. Smyth[1], **Leslie Allee** (lla1@cornell.edu)[1], Louis Hesler[2] and John Losey[1], [1]Cornell Univ., Ithaca, NY, [2]USDA - ARS, Brookings, SD

D3551 Four uncommon assassin bug species (Hemiptera: Reduviidae: Emesinae) new for Arkansas, USA. **Steve Chordas** (Chordas.2@osu.edu)[1] and Renn Tumlison[2], [1]The Ohio State Univ., Columbus, OH, [2]Henderson State Univ., Arkadelphia, AR

D3552 The effect of snow removal on litter macroinvertebrate community composition. **Corianne Tatariw** (ctatariw@gmail.com)[1], Kaizad Patel[1], Jean MacRae[1], Ivan Fernandez[1] and Kevin Simon[2], [1]Univ. of Maine, Orono, ME, [2]Univ. of Auckland, Auckland, New Zealand

D3553 Invertebrate diversity in little fire ant, *Wasmannia auropunctata*, infestations in Costa Rica and in the recently infested Micronesian island of Guam. **Ross Miller** (rmiller@uguam.uog.edu)[1], Maia Raymundo[1], Hannah White[2] and Jamie McBryde[3], [1]Univ. of Guam, Mangilao, Guam, [2]Oklahoma State Univ., Stillwater, OK, [3]Colorado State Univ., Fort Collins, CO

D3554 The *Scirtothrips dorsalis* species complex: Endemism and invasion in a global pest. Aaron Dickey[1], Vivek Kumar[2], Mark S. Hoddle[3], Joe Funderburk[4], J. Kent Morgan[5], Antonella Jara-Cavieres[6], Robert G. Shatters, Jr.[7], Lance Osborne[2] and **Cindy L. McKenzie** (cindy.mckenzie@ars.usda.gov)[7], [1]USDA - ARS, Clay Center, NE, [2]Univ. of Florida, Apopka, FL, [3]Univ. of California, Riverside, CA, [4]Univ. of Florida, Quincy, FL, [5]J. Kent Morgan Consulting, Ft. Pierce, FL, [6]Indian River Research and Education Center, Fort Pierce, FL, [7]USDA - ARS, Ft. Pierce, FL

D3555 Genetic diversity and gene flow in *Helicoverpa zea* populations from Brazil. **Alberto Correa** (ascorrea@usp.br)[1], Natália Leite[1], Alessandro Alves-Pereira[1], Maria I. Zucchi[2] and Celso Omoto[1], [1]Univ. of São Paulo, Piracicaba, Brazil, [2]Agribusiness Technological Development of São Paulo, Piracicaba, Brazil

D3556 Temporal and habitat influences on population genetics of *Helicoverpa zea* (bollworm). **Mathew Seymour** (mathew.seymour@ars.usda.gov) and Omaththage P. Perera, USDA - ARS, Stoneville, MS

D3557 The genomic architecture of flight capacity in gypsy moths (Lepidoptera: Erebidae). **Nathan Havill** (nphavill@fs.fed.us)[1], Melody A. Keena[1], Andrea Gloria-Soria[2], Fang Chen[3] and Adalgisa Caccone[2], [1]USDA - Forest Service, Hamden, CT, [2]Yale Univ., New Haven, CT, [3]Beijing Forestry Univ., Beijing, China

D3558 Species sorting as the main mechanistic factor controlling Arctiinae (Lepidoptera: Erebidae) species in an area of the Brazilian savanna. **Carolina Moreno** (s.moreno.carol@gmail.com)[1], Victor Landeiro[2] and Viviane Ferro[1], [1]Univ. Federal de Goiás, Goiás, Brazil, [2]Univ. Federal do Mato Grosso, Mato Grosso, Brazil

D3559 Convergence in ant-associated gut microbiota at extreme ends of the trophic scale. **Jacob Russell** (jar337@drexel.edu)[1], Piotr Lukasik[2] and Corrie Moreau[3], [1]Drexel Univ., Philadelphia, PA, [2]Universitiy of Montana, Missoula, MT, [3]Field Museum of Natural History, Chicago, IL

D3560 Social signals in the cuticular chemical profile of *Odontomachus* trap-jaw ants. **Adrian A. Smith** (smithaa@illinois.edu)[1], Andrew Suarez[1], Jocelyn G. Millar[2] and Lawrence M. Hanks[1], [1]Univ. of Illinois, Champaign, IL, [2]Univ. of California, Riverside, CA

D3561 Origin of the hungry caterpillar: Evolution of fasting in slug moths (Insecta: Lepidoptera: Limacodidae). Jennifer Zaspel[1], Susan J. Weller[2] and **Marc Epstein** (mepstein@cdfa.ca.gov)[3], [1]Purdue Univ., West Lafayette, IN, [2]Univ. of Minnesota, Minneapolis, MN, [3]California Dept. of Food and Agriculture, Sacramento, CA

D3562 Molecular phylogeny and biogeography of the giant water scavenger beetles (Coleoptera: Hydrophilidae: Hydrophilini). **Andrew Short** (aezshort@ku.edu), Univ. of Kansas, Lawrence, KS

D3563 Evidence of host-plant partitioning between three genetically distinct sympatric lineages of the sunflower maggot fly, *Strauzia longipennis*. **Alaine Hippee** (alaine-hippee@uiowa.edu) and Andrew Forbes, Univ. of Iowa, Iowa City, IA

D3564 Mosquito larval habitat ecology in the cold arid Patagonia region of Argentina. **Marta Grech** (grechmarta@gmail.com)[1], Luis Epele[1], Luz Manzo[1], Alfredo Claverie[1], Magdalena Laurito[2], Walter Almirón[2], María Miserendino[1] and Francisco Ludueña-Almeida[2], [1]Universidad Nacional de la Patagonia San Juan Bosco, Esquel, Argentina, [2]Universidad Nacional de Córdoba, Córdoba, Argentina

D3565 Exploring the role of a male produced pheromone in the mating system of the parasitoid wasp Urolepis rufipes. **Tyler Wittman** (twittman@niu.edu) and Bethia H. King, Northern Illinois Univ., Dekalb, IL

D3566 Intraspecific hybridization and the recovery of fitness in the biocontrol agent *Trichogramma galloi* (Hymenoptera: Trichogrammatidae). **Aline Bertin** (aline.bertin@usp.br)[1], Vitor A. C. Pavinato[2] and José Postali Parra[3], [1]Luiz de Queiroz College of Agriculture, Piracicaba, Brazil, [2]The Ohio State Univ., Wooster, OH, [3]Univ. of São Paulo, Piracicaba, Brazil

D3567 Diet breadth of the aphid predator *Chrysoperla rufilabris* (Neuroptera: Chrysopidae). **Michela C. Batista Matos** (matos021@umn.edu)[1], George E. Heimpel[2] and Madelaine Venzon[3], [1]Univ. Federal de Viçosa, Viçosa, Brazil, [2]Univ. of Minnesota, St. Paul, MN, [3]Agriculture and Livestock Research Enterprise of Minas Gerais, Viçosa, Brazil

D3568 Wing shape divergence reflects genetic patterns in a Mesoamerican bumble bee species complex, *Bombus ephippiatus sensu lato*. **Christopher Petranek** (chrispetranek@gmail.com)[1], Michelle A. Duennes[2], Jorge Merida[3], Esteban Pineda[3], Oscar Martínez[4], Philippe Sagot[3], Remy Vandame[3] and Sydney A. Cameron[2], [1]Lake Forest College, Lake Forest, IL, [2]Univ. of Illinois, Champaign, IL, [3]El Colegio de la Frontera Sur, San Cristóbal de las Casas, Mexico, [4]Universidad de San Carlos de Guatemala, San Carlos, Guatemala

D3569 Investigating the effect of limb-patterning genes on the development of mandibular outgrowths in weevils (Coleoptera: Curculionidae). **Kyle DeMarr** (kad259@cornell.edu)[1] and Steve Davis[2], [1]Cornell Univ., Ithaca, NY, [2]American Museum of Natural History, New York, NY

D3570 Field study to evaluate the joint action of some pesticides, flufenoxuron and baculoviruses against *Spodoptera littoralis* (Bosid.). **Alexandra Magdalina Rabei** (alex.ahmad@yahoo.com), Cairo University, Giza, Egypt

D3571 Rare plant pollinatoin biology of the California Channel Islands. **C. Sheena Sidhu** (cssidhu@ucr.edu) and Erin E. Wilson-Ranking, Univ. of California, Riverside, CA

Virtual Posters

Exhibit Hall BC (Convention Center)

Virtual Posters displayed on Wednesday will be the same as those displayed on Tuesday, VP0022-VP0036. See pages 182-183 for titles and authors.

Program Symposium: Arthropods and Wildlife Conservation: Synergy in Complex Biological Systems

Auditorium 1 (Convention Center)

Moderators and Organizers: David Taylor[1] and Roger D. Moon[2], [1]USDA - ARS, Lincoln, NE, [2]Univ. of Minnesota, St. Paul, MN

8:00 1491 Introduction. **David Taylor** (dave.taylor@ars.usda.gov), USDA - ARS, Lincoln, NE

8:05 1492 *Stomoxys* flies, distemper and/or babesia: What killed the lions? **Craig Packer** (packer@umn.edu), Univ. of Minnesota, St. Paul, MN

8:30 1493 Premier Presentation: Dynamics and impacts of sarcoptic mange in Yellowstone's wolves. **Emily Almberg** (esa5046@psu.edu)[1,2], Paul Cross[2], Andrew Dobson[3], Douglas Smith[4] and Peter Hudson[1], [1]Pennsylvania State Univ., University Park, PA, [2]USGS, Bozeman, MT, [3]Princeton Univ., Princeton, NJ, [4]National Park Service, Yellowstone National Park, WY

8:55 1494 Role of parasites in Minnesota's moose decline. **Michelle Carstensen** (michelle.carstensen@state.mn.us), Minnesota Dept. of Natural Resources, Forest Lake, MN

9:20 1495 Impact of imported fire ants on native wildlife. **Craig Allen** (callen3@unl.edu), Univ. of Nebraska, Lincoln, NE

9:45 Break

9:55 1496 Premier Presentation: Introduced parasite causes significant mortality in Darwin's finches: Is there an immediate solution? **Sarah Knutie** (saknutie@gmail.com)[1] and Dale H. Clayton[2], [1]Univ. of South Florida, Tampa, FL, [2]Univ. of Utah, Salt Lake City, UT

10:20 1497 Prospects for biological control of the avian nest parasite *Philornis downsi* in the Galápagos Islands. **Mariana Bulgarella** (mbulgare@umn.edu)[1], George Heimpel[1], Gabriel Brito Vera[2] and Martin Quiroga[3], [1]Univ. of Minnesota, St. Paul, MN, [2]Universidad de Guayaquil, Guayaquil, Ecuador, [3]Universidad Nacional del Litoral, Esperanza, Argentina

10:45 1498 Premier Presentation: From island to subarctic populations: What role do vectors play in the transmission of avian malaria in a naive avifauna? **Jenny S. Carlson** (jencarlson@ucdavis.edu), Univ. of California, Davis, CA

11:10 1499 Transmission of West Nile virus in a colony of American white pelicans. **Kristina Friesen** (Kristina.Friesen@ars.usda.gov), USDA - ARS, Lincoln, NE

11:35 1500 Panel discussion. **Roger D. Moon** (rdmoon@umn.edu), Univ. of Minnesota, St. Paul, MN

PBT Section Symposium: Insect Cell Lines: Models to Study Novel Biological Interactions for Devising Control Strategies

211 A (Convention Center)

Moderators and Organizers: Amit Sethi[1] and Partha Ramaseshadri[2], [1]DuPont Pioneer, Johnston, IA, [2]Monsanto Company, Chesterfield, MO

8:00 Introductory Remarks

8:05 1501 Establishing cell lines to investigate insect biology. **David W. Stanley** (stanleyd@missouri.edu), Cynthia Goodman and Joseph Ringbauer, Jr., USDA - ARS, Columbia, MO

8:28 1502 TcA *Tribolium* cell line: Model system for study of RNA interference. **Yoonseong Park** (ypark@ksu.edu), Kansas State Univ., Manhattan, KS

8:51 1503 Cell-based assays and modeling to understand *in vivo* activity by sulfakinin peptide mimetic. **Guy Smagghe** (guy.smagghe@ugent.be), Ghent Univ., Ghent, Belgium

9:14 1504 The antiviral RNAi response in lepidopteran cell lines. **Luc Swevers** (swevers@bio.demokritos.gr), Institute of Biology, Athens, Greece

9:37 SP1505 RNAi in coleopteran and lepidopteran cell lines. **Jayendra Shukla** (jayendrashukla@gmail.com) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

9:49 Break

9:59 1506 Production of LdNPV in the Wave® Cell Culture Bioreactor: Comparison to production in a stirred tank bioreactor. **Jim Slavicek** (jslavicek@fs.fed.us), USDA - Forest Service, Delaware, OH

10:22 1507 Cell line development for studies of parasite-virus-host interactions. **Michael R. Strand** (mrstrand@uga.edu), Univ. of Georgia, Athens, GA

10:45 1508 Studies on juvenile hormone action in mosquito cell line. **Subba Reddy Palli** (rpalli@uky.edu), Univ. of Kentucky, Lexington, KY

11:08 1509 Cell-based reporter assay for EcR: Focus on antagonists coupled with molecular modelling. **Moisés Zotti** (moises.zotti@ufsm.br), Univ. Federal de Pelotas, Pelotas, Brazil

11:31 SP1510 Replication of viruses of the honey bee, *Apis mellifera,* in cell culture. Jimena Carrillo-Tripp, Adam Dolezal, Allen Miller, Amy L. Toth and **Bryony Bonning** (bbonning@iastate.edu), Iowa State Univ., Ames, IA

11:43 SP1511 The G-protein-coupled receptor/PKA signaling pathway in insecticide resistance in the mosquito, *Culex quinquefasciatus*. **Ting Li** (litingwinner@gmail.com) and Nannan Liu, Auburn Univ., Auburn, AL

11:55 Concluding Remarks

P-IE Section Symposium: Forest Entomology: Synergy from Symbiosis

200 C (Convention Center)

Moderators and Organizers: Nathan Havill[1], Richard Hofstetter[2] and Kimberly F. Wallin[3], [1]USDA - Forest Service, Hamden, CT, [2]Northern Arizona Univ., Flagstaff, AZ, [3]USDA - Forest Service, South Burlington, VT

8:00 Welcoming Remarks

8:05 1512 Post-invasion assessment of *Euwallacea* ambrosia beetles, their fungal partners, and the diseases they cause. **Matther Kasson** (mtkasson@mail.wvu.edu), Dylan Short and Matthew Berger, West Virginia Univ., Morgantown, WV

8:25 1513 Degradation of tree defense compounds by bacteria associated with folivores and bark beetles. **Kenneth Raffa** (raffa@entomology.wisc.edu)[1], Celia Boone[2], Ken Keefover-Ring[1] and Charles Mason[3], [1]Univ. of Wisconsin, Madison, WI, [2]Univ. of Northern British Columbia, Prince George, BC, Canada, [3]Pennsylvania State Univ., University Park, PA

8:45 1514 Cooperation under the bark: Studying the evolution of microbial symbioses and sociality in ambrosia beetles. **Peter Biedermann** (pbiedermann@ice.mpg.de) and Martin Kaltenpoth, Max Planck Institute for Chemical Ecology, Jena, Germany

9:05 1515 Acoustic communication and management of bark and ambrosia beetles. **Richard W. Hofstetter** (rich.hofstetter@nau.edu), David Dunn and Nicholas C. Aflitto, Northern Arizona Univ., Flagstaff, AZ

9:25 SP1516 Effects of native nematodes on size and fecundity of native woodwasps in southeastern pine forests. **Jessica Hartshorn** (jhartsho@uark.edu), Larry D. Galligan and Fred M. Stephen, Univ. of Arkansas, Fayetteville, AR

9:37 Break

10:07 SP1517 Mycobiont maintenance: Establishing the basis for symbiont identity, specificity, and diversity in the ambrosia symbiosis. **Craig Bateman** (batemanc@gmail.com) and Jiri Hulcr, Univ. of Florida, Gainesville, FL

10:19 1518 Hitchhiker or harbinger: Where do bluestain fungi fit in forest food webs? **John Riggins** (jriggins@entomology.msstate.edu)[1], Natalie Clay[2], Nathan Little[3], Courtney Siegert[1], Juliet Tang[4] and Lauren Gamblin[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Starkville, MS, [3]USDA - ARS, Stoneville, MS, [4]USDA - Forest Service, Madison, WI

10:39 1519 Obligate endosymbionts as indicators of host population structure. **Zakee Sabree** (sabree.8@osu.edu)[1], Ryan C. Garrick[2] and Benjamin Jahnes[1], [1]The Ohio State Univ., Columbus, OH, [2]Univ. of Mississippi, University, MS

10:59 1520 Adelgids and their bacterial partners: Occasionally unfaithful but always synergistic. **Carol D. von Dohlen** (Carol.vonDohlen@usu.edu)[1], Kathryn Weglarz[1], Nathan Havill[2], Robert Foottit[3] and John McCutcheon[4], [1]Utah State Univ., Logan, UT, [2]USDA - Forest Service, Hamden, CT, [3]Agriculture and Agri-Food Canada, Ottawa, ON, Canada, [4]Univ. of Montana, Missoula, MT

11:19 1521 Premier Presentation: Diversity of interactions in mutualism-centered plant-insect symbioses: The case of figs and fig wasps. **Renee Borges** (renee@ces.iisc.ernet.in), Ananya Jana, Satyajeet Gupta, Vignesh Venkateswaran and Pratibha Yadav, Indian Institute of Science, Bangalore, India

11:39 1522 Interactions between the Asian longhorned beetle and its microbial symbionts. **Charles Mason** (cjm360@psu.edu) and Kelli Hoover, Pennsylvania State Univ., University Park, PA

P-IE Section Symposium: Insecticide Resistance Management (IRM) vs Integrated Pest Management (IPM): Overlap and Conflicts, IRAC US Symposium Series No. 11

200 D (Convention Center)

Moderators and Organizers: Graham P. Head[1], Bradley W. Hopkins[2], Scott W. Ludwig[3], Clinton D. Pilcher[4], Christopher Sansone[5], Caydee Savinelli[6] and Sean Whipple[7], [1]Monsanto Company, St. Louis, MO, [2]Texas A&M Univ., College Station, TX, [3]Nichino America, Arp, TX, [4]DuPont Pioneer, Johnston, IA, [5]Bayer CropScience, Research Triangle Park, NC, [6]Syngenta Plant Protection, Greensboro, NC, [7]ISK Biosciences Corporation, Kearney, MO

8:00 Introductory Remarks

8:05 1523 The confusion of IRM and IPM among policy makers, pest managers, and producers. **B. Rogers Leonard** (rleonard@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

8:29 1524 The strange loop of IPM and IRM: A self-referential paradox or confounded compatibility in the Arizona agro-ecosystem. **Steven Naranjo** (steve.naranjo@ars.usda.gov)[1], Peter Ellsworth[2] and Steven J. Castle[1], [1]USDA - ARS, Maricopa, AZ, [2]Univ. of Arizona, Maricopa, AZ

8:53 1525 Overlaps and confilcts of IPM vs. IRM; USDA perspective. **David L. Epstein** (david.epstein@ars.usda.gov), USDA - ARS, Wahington, DC

9:17 1526 Invasives, resistance and maximum residue levels: A severe challenge for tree fruit IPM. **Mark E. Whalon** (whalon@msu.edu), Michigan State Univ., East Lansing, MI

9:41 1527 IPM, IRM and biotechnology: Optimum optimorum. **Anthony M. Shelton** (ams5@cornell.edu), Cornell Univ., Geneva, NY

10:05 Break

10:15 1528 Whitefly management in Arizona vegetables: Are growers relying too much on chemistry? **John C. Palumbo** (jpalumbo@ag.arizona.edu)[1] and Peter Ellsworth[2], [1]Univ. of Arizona, Yuma, AZ, [2]Univ. of Arizona, Maricopa, AZ

10:39 1529 Fall armyworm in the landscape of corn, soybean and cotton in Brazil. **Silvana de Paula-Moraes** (silvana.moraes@embrapa.br), Empresa Brasileira de Pesquisa Agropecuária Cerrados, Planaltina, Brazil

11:03 1530 Corn rootworm management: The conflicts associated with choosing different management options. **Anthony D. Burd** (tony.burd@syngenta.com)[1], Graham P. Head[2], Clinton D. Pilcher[3] and Nicholas Storer[4], [1]Syngenta Plant Protection, Greensboro, NC, [2]Monsanto Company, St. Louis, MO, [3]DuPont Pioneer, Johnston, IA, [4]Dow AgroSciences, Indianapolis, IN

11:27 1531 Data-driven IPM: Accurate predictions of risk and plant protection. **Russell L. Groves** (groves@entomology.wisc.edu), Univ. of Wisconsin, Madison, WI

11:51 Concluding Remarks

P-IE Section Symposium: Landscape Simplification: Effects on Arthropod Mediated Ecosystem Services and Agricultural Production

200 E (Convention Center)

Moderators and Organizers: Katja Poveda and Heather Connelly, Cornell Univ., Ithaca, NY

8:00 Welcoming Remarks

8:05 1532 A novel approach to quantifying the importance of wild bees in apple pollination. **Bryan N. Danforth** (bnd1@cornell.edu)[1], Laura Russo[1], Mia Park[2], Jason Gibbs[3] and Eleanor Blitzer[1], [1]Cornell Univ., Ithaca, NY, [2]Univ. of North Dakota, Grand Forks, ND, [3]Michigan State Univ., East Lansing, MI

8:30 1533 Local, landscape and regional effects on pollinator diversity and yield of highbush blueberry. **Jason Gibbs** (jgibbs@msu.edu)[1], Kyle Bobiwash[2], Tiia Haapalainen[2], Elizabeth Elle[2], Cory Stanley-Stahr[3], James D. Ellis[3], George Hoffmann[4], Sujaya Rao[4] and Rufus Isaacs[1], [1]Michigan State Univ., East Lansing, MI, [2]Simon Fraser Univ., Burnaby, BC, Canada, [3]Univ. of Florida, Gainesville, FL, [4]Oregon State Univ., Corvallis, OR

8:55 1534 Getting from pollinator visitation to yield: A synthesis across multiple crop types. **James Reilly** (jreilly45@gmail.com) and Rachael Winfree, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:20 Break

9:30 1535 Landscape composition effects on the diversity and stability of beneficial insects and biocontrol. **Tania Kim** (tania.kim@wisc.edu)[1], Aaron Fox[2], Douglas A. Landis[2] and Claudio Gratton[1], [1]Univ. of Wisconsin, Madison, WI, [2]Michigan State Univ., East Lansing, MI

9:55 1536 Arthropod diversity and biocontrol in small vs. large scale agriculture in Germany. **Péter Batáry** (p.batary@gmail.com) and Teja Tscharntke, Georg-August-Univ., Göttingen, Germany

10:20 1537 Landscape effects mediated through plant induced responses on yield. **Katja Poveda** (kap235@cornell.edu)[1] and Maria Diaz[2], [1]Cornell Univ., Ithaca, NY, [2]Universidad Nacional de Colombia, Bogota, Colombia

10:40 Break

10:50 1538 Local and landscape scale drivers of ecosystem services: Pollination, biological control and yield. **Heather Connelly** (hlc66@cornell.edu)[1], Katja Poveda[1] and Gregory M. Loeb[2], [1]Cornell Univ., Ithaca, NY, [2]Cornell Univ., Geneva, NY

11:15 1539 Landscape simplification effects on honey bees, wild insects and smallholding agriculture. **Lucas Garibaldi** (lgaribaldi@unrn.edu.ar), Universidad Nacional de Río Negro, Río Negro, Argentina

11:40 Concluding Remarks

11:45 Discussion

SysEB Section Symposium: Social Wasps, the Model "Non-Model" Organisms: Celebrating the Synergistic Contributions of Robert L. Jeanne (Professor Emeritus, University of Wisconsin)

200 F (Convention Center)

Moderators and Organizers: Jennifer M. Jandt[1], Sean O'Donnell[2] and Amy L. Toth[1], [1]Iowa State Univ., Ames, IA, [2]Drexel Univ., Philadelphia, PA

8:00 1540 An introduction to Bob Jeanne: He knows these wasps better than any of us and loves them more. **Karen London** (london@uwalumni.com), Northern Arizona Univ., Flagstaff, AZ

8:18 1541 Role of social wasps in understanding the evolution of sociality. **Justin Schmidt** (ponerine@dakotacom.net), Southwestern Biological Institute, Tucson, AZ

8:36 1542 The evolution of recognition cue diversity in paper wasp societies. **Kevin Loope** (kjl75@cornell.edu), Cornell Univ., Ithaca, NY

8:54 1543 Integration of foraging in colonies of a highly eusocial wasp through cue-based learning and recruitment. **Teresa I. Schueller** (tleon@wisc.edu)[1], Robert L. Jeanne[2], Erik V. Nordheim[2] and Benjamin J. Taylor[3], [1]Univ. of Wisconsin, Waukesha, WI, [2]Univ. of Wisconsin, Madison, WI, [3]LaGuardia Community College, L.I.C., NY

9:12 1544 Carbohydrate foraging behavior in the swarm-founding wasp *Polybia occidentalis*. **Benjamin J. Taylor** (bjtaylor1@wisc.edu)[1], Teresa I. Schueller[2] and Robert L. Jeanne[3], [1]LaGuardia Community College, New York, NY, [2]Univ. of Wisconsin, Waukesha, WI, [3]Univ. of Wisconsin, Madison, WI

9:30 1545 Ecological consequences of social wasp foraging. **Monica Raveret Richter** (mrichter@skidmore.edu)[1] and Jennifer M. Jandt[2], [1]Skidmore College, Saratoga Springs, NY, [2]Iowa State Univ., Ames, IA

9:48 Break

10:12 1546 Vespidae: Social brains and the sweet sting of diversity. **Sean O'Donnell** (so356@drexel.edu), Drexel Univ., Philadelphia, PA

10:30 1547 Paper wasps as neurogenomic models for complex social behavior. **Amy L. Toth** (amytoth@iastate.edu), Iowa State Univ., Ames, IA

10:48 1548 Morphological evolution and reproductive caste in swarming wasps (Epiponini, Polistinae, Vespidae). Fernando Noll[1] and **John Wenzel** (wenzelj@CarnegieMNH.Org)[2], [1]Sao Paulo State Univ., São José do Rio Preto, Brazil, [2]Carnegie Museum of Natural History, Rector, PA

11:06 1549 Direct and indirect benefits of joining and helping behavior in newly-established colonies of primitively eusocial wasps. **Floria Mora-Kepfer Uy** (floriamk@bio.miami.edu) and Krisha Patel, Univ. of Miami, Coral Gables, FL

11:24 1550 Asleep or astray? Paper wasps as viable sleep subjects. **Barrett Klein** (barrett@pupating.org), Univ. of Wisconsin, La Crosse, WI

11:42 1551 Antennal drumming affects caste-biased gene expression during larval development in *Polistes* wasps. **Jennifer M. Jandt** (jjandt2@gmail.com)[1], Amy L. Toth[1], John Hermanson[2] and Robert L. Jeanne[3], [1]Iowa State Univ., Ames, IA, [2]USDA - Forest Service, Madison, WI, [3]Univ. of Wisconsin, Madison, WI

Member Symposium: Advances in Pest Management for Turfgrass and Ornamentals

200 B (Convention Center)

Moderator and Organizer: R. Murphey Coy, Auburn Univ., Auburn, AL

8:00 Introductory Remarks

8:05 1552 Demonstrating a decrease in feeding damage by Japanese beetles in Wisconsin grape vineyards with the use of Kaolin clay. **Reid Maier** (rmaier2@wisc.edu), Univ. of Wisconsin, Madison, WI

8:19 1553 Management effort on *Brachymyrmex spp.*, a nuisance pest in Hawaii's golf courses. **Zhiqiang Cheng** (cheng241@hawaii.edu), Univ. of Hawai'i at Manoa, Honolulu, HI

8:33 1554 Assessing portable devices for detecting stress induced ethanol emissions from trees. **Christopher Ranger** (christopher.ranger@ars.usda.gov)[1] and Peter B. Schultz[2], [1]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, [2]Virginia Polytechnic Institute and State Univ., Virginia Beach, VA

8:47 1555 Urban bee conservation and woody ornamentals. **Bernadette Mach** (bernadettemach@uky.edu), Abiya Saeed, Carl T. Redmond and Daniel Potter, Univ. of Kentucky, Lexington, KY

9:01 1556 Assessing and mitigating neonicotinoid insecticide residues in nectar and pollen of flowering lawn weeds and woody ornamental plants. **Daniel Potter** (dapotter@email.uky.edu)[1], Jonathan Larson[2], Bernadette Mach[1], Abiya Saeed[1] and Carl T. Redmond[1], [1]Univ. of Kentucky, Lexington, KY, [2]Univ. of Nebraska, Omaha, NE

9:15 1557 Sod webworms: Distribution, biology and management. **Steven P. Arthurs** (spa@ufl.edu)[1], Nastaran Tofangsazi[2] and Ronald H. Cherry[3], [1]Univ. of Florida, Apopka, FL, [2]Univ. of California, Riverside, CA, [3]Univ. of Florida, Belle Glade, FL

9:29 1558 Presentation withdrawn

9:43 1559 Fungicides alter soil biota and ecological services in turfgrass. Kyle Wickings and **Huijie Gan** (hg326@cornell.edu), Cornell Univ., Geneva, NY

9:57 Break

10:07 1560 Characterizing movement of ambrosia beetles in nurseries and surrounding habitats. **Michael E. Reding** (mike.reding@ars.usda.gov)[1], Christopher Ranger[2], Blair Sampson[3], Chris Werle[4], Jason B. Oliver[5] and Peter B. Schultz[6], [1]USDA - ARS, Wooster, OH, [2]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, [3]USDA - ARS, Poplarville, MS, [4]Louisiana State Univ., Baton Rouge, LA, [5]Tennessee State Univ., McMinnville, TN, [6]Virginia Polytechnic Institute and State Univ., Virginia Beach, VA

10:21 1561 The effects of urban habitats on herbivore life history and street tree ecosystem services. **Adam Dale** (agdale2@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

10:35 1562 Does bacterial inoculation of bermudagrass induce systemic acquired resistance? **R. Murphey Coy** (rmc0023@tigermail.auburn.edu), David Held and Joseph Kloepper, Auburn Univ., Auburn, AL

10:49 1563 Greenhouse production practices for making flowers safer for yard and garden pollinators. **David Smitley** (smitley@msu.edu), Michigan State Univ., East Lansing, MI

11:03 1564 Pest and environmental factors influencing the success of young street trees in urban tree planting programs. **Kristi Backe** (kbacke@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

11:17 1565 Recent advances in the ecophysiology of Japanese beetles and implications for management. **David Held** (dwh0004@auburn.edu)[1], Adekunle Adesanya[1], Shahid Karim[2], Nannan Liu[1] and Steven Adamson[2], [1]Auburn Univ., Auburn, AL, [2]Univ. of Southern Mississippi, Hattiesburg, MS

11:31 1566 Effects of residue of imidacloprid and clothianidin in ornamentals on bumble bee foraging and colony health. **Vera Aber Krischik** (krisc001@umn.edu), Univ. of Minnesota, St. Paul, MN

11:45 1567 Reproductive diapause in annual bluegrass weevil, *Listronotus maculicolis* (Coleoptera: Curculionidae). **Shaohui Wu** (sw687@rci.rutgers.edu), Olga Kostromytska and Albrecht Koppenhöfer, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

Member Symposium: Synergies in Entomophagy: Taking Insect Eating to the Next Level

205 CD (Convention Center)

Moderators and Organizers: Marianne Shockley[1] and John Guyton[2], [1]Univ. of Georgia, Athens, GA, [2]Mississippi State Univ., Mississippi State, MS

8:00 Introductory Remarks

8:05 1568 Black soldier fly, *Hermetia illucens* (L.), as a model system for waste reduction and feed production: Accomplishments and future hurdles. **Jonathan A. Cammack** (jonathan.cammack@ag.tamu.edu) and Jeffery K. Tomberlin, Texas A&M Univ., College Station, TX

8:25 1569 Aspire. **Robert Allen** (RNA@aspirefg.com), Aspire, Buda, TX

8:45 SP1570 Eating bugs for fun and profit. **Daniella Martin** (girlmeetsbug@gmail.com), GirlMeetsBug.com, CA

8:57 SP1571 Promoting edible insects through service-learning. **Marianne Shockley** (entomolo@uga.edu), Univ. of Georgia, Athens, GA

SD1572 Biological characteristics of the black soldier fly relevant to mass production of protein and lipid for use in livestock feeds. **John C. Schneider** (jcs1@msstate.edu), Mississippi State Univ., Mississippi State, MS

SD1573 Smart micro insect breeding. **Katharina Unger** (hello@kunger.at), Farm432, Austria

SD1574 Acaricidal activity of orange peel citrus essential oil, commercial acaricides and their binary mixtures against adult female of *Tetranychus urticae*. **Khalil Talebi** (khtalebi@ut.ac.ir) and seyed Ebrahim Shafiei, Univ. of Tehran, Karaj, Iran

9:09 Break and Poster Displays

9:19 SP1575 Policies and regulations governing insects use as food for humans. **John Guyton** (j.guyton@msstate.edu), Mississippi State Univ., Mississippi State, MS

9:31 SP1576 Entomophagy in Thailand and beyond: Rearing practices of cricket species, *Acheta domesticus* and *Teloegryllus testaceus,* in Thailand, and an education program model for the introduction of edible insects to western audiences. **Kiah Brasch** (kiah.brasch@gmail.com), Rustle Up Some Grub, St. Paul, MN

9:43 SP1577 Evaluation of different food substrates for use in mass rearing of African oil palm weevil, *Rhynchophorus phoenicis*, for food in Ghana. **Clement Akotsen-Mensah** (cakotsen@ug.edu.gh), Univ. of Ghana, Accra, Ghana

9:55 SP1578 Desert locust: A notorious pest of crops but with potential health benefits to humans as food. Xavier Cheseto, David Tchouassi and **Baldwyn Torto** (btorto@icipe.org), International Centre of Insect Physiology and Ecology, Nairobi, Kenya

10:07 1579 Farm432: Growing healthy insect protein in your home. **Katharina Unger** (katharina@livinstudio.com), Farm432, Austria

10:27 1955 Entomophagy; Strategies to affect and incorporate the third world. **Harman Johar** (harmansj1@gmail.com), World Ento, Austin, TX

10:47 Discussion

10:57 Tasting

11:07 Concluding Remarks

Member Symposium: Urban Soil Ecology - A New Frontier

206 AB (Convention Center)

Moderators and Organizers: Parwinder Grewal[1], Katalin Szlavecz[2], Richard Pouyat[3] and Douglas S. Richmond[4], [1]Univ. of Tennessee, Knoxville, TN, [2]Johns Hopkins Univ., Baltimore, MD, [3]USDA - Forest Service, Washington, DC, [4]Purdue Univ., West Lafayette, IN

8:00 1580 The Global Soil Biodiversity Initiative. **Diana Wall** (diana.wall@colostate.edu), Colorado State Univ., Fort Collins, CO

8:25 1581 Urban soil biodiversity and ecosystem function: A connection. **Heikki Setälä** (heikki.setala@helsinki.fi), Univ. of Helsinki, Helsinki, Finland

8:50 1582 Macroinvertebrates in urban soils: The global perspective. **Katalin Szlavecz** (Szlavecz@jhu.edu), Johns Hopkins Univ., Baltimore, MD

9:15 1583 Invasive soil insects: Patterns and processes in urban ecosystems. **Douglas S. Richmond** (drichmond@purdue.edu), Purdue Univ., West Lafayette, IN

9:40 1584 Patterns and processes of soil nematode biodiversity in urban ecosystems. **Parwinder Grewal** (pgrewal@utk.edu), Univ. of Tennessee, Knoxville, TN

10:05 Break

10:15 1585 Microbial communities in green infrastructure across New York City: Spatial and temporal patterns. **Krista McGuire** (kmcguire@barnard.edu), Columbia Univ., New York, NY

10:40 1586 A case study in soil biogeography: How bacterial, archaeal and fungal communities respond to urbanization on a global scale. **Dietrich Schmidt** (djeppschmidt@gmail.com), Univ. of Maryland, College Park, MD

11:00 SP1587 Turf management and the structure of the urban soil food web. **Zhiqiang Cheng** (cheng241@hawaii.edu)[1], Bishnu Bhandari[1], Parwinder Grewal[2] and Douglas S. Richmond[3], [1]Univ. of Hawai'i at Manoa, Honolulu, HI, [2]Univ. of Tennessee, Knoxville, TN, [3]Purdue Univ., West Lafayette, IN

11:12 1588 Analyzing resilience of urban soil food webs. **Satyendra Pothula** (spothula@vols.utk.edu) and Parwinder Grewal, Univ. of Tennessee, Knoxville, TN

11:32 SP1589 Root herbivory alters soil microbial processes and carbon cycling. **Kyle Wickings** (kgw37@cornell.edu) and Huijie Gan, Cornell Univ., Geneva, NY

11:44 Discussion

Member Symposium: Leadership in Entomology

210 AB (Convention Center)

Moderators and Organizers: Swapna Priya Rajarapu[1], Harit K. Bal[2] and Ameya D. Gondhalekar[1], [1]Purdue Univ., West Lafayette, IN, [2]The Ohio State Univ., Wooster, OH

8:00 Introductory Remarks

8:05 1590 How the science of entomology relates to a billion dollar plus international company. **Ron Harrison** (Rharriso@rollins.com), Orkin/Rollins Pest Control, Atlanta, GA

8:30 1591 Leading from behind in big entomology. **Graham White** (gbwhite@ufl.edu), USDA - ARS, Gainesville, FL

8:55 1592 Entomological entrepreneurship. **Dangsheng Liang** (dliang@apex-bait.com), Apex Bait Technologies, Inc, Santa Clara, CA

9:20 1593 Women as leaders in entomology: We can do it too! **Sujaya Rao** (sujaya@oregonstate.edu), Oregon State Univ., Corvallis, OR

9:45 Break

10:10 1594 Leaders in science: An industry perspective. **Michelle S. Smith** (mssmith@dow.com), Dow AgroSciences, Indianapolis, IN

10:35 1595 Leadership in entomology: Journey of four decades. **Ashok Dhawan** (ashokdhawan@yahoo.com), Punjab Agricultural Univ., Ludhiana, India

11:00 1596 Challenges, grand challenges, and academic positions in entomology. **Forrest Ravlin** (ravlin@msu.edu), Michigan State Univ., East Lansing, MI

11:25 1597 Early career field scientists in industry: Opportunities and challenges. **Sunil Tewari** (stewari@dow.com), Dow AgroSciences, Fowler, IN

11:50 Concluding Remarks

Member Symposium: Integrating and Synergizing Multidisciplinary Approaches in Science: 3rd Latin American/Hispanic Symposium

211 C (Convention Center)

Moderators and Organizers: Raul Medina[1], Silvia Rondon[2], Ana Legrand[3] and Steven Reyna[4], [1]Texas A&M Univ., College Station, TX, [2]Oregon State Univ., Hermiston, OR, [3]Univ. of Connecticut, Storrs, CT, [4]North Carolina State Univ., Raleigh, NC

8:00 1598 Welcoming remarks. **Raul Medina** (rfmedina@tamu.edu)[1], Ana Legrand[2] and Silvia Rondon[3], [1]Texas A&M Univ., College Station, TX, [2]Univ. of Connecticut, Storrs, CT, [3]Oregon State Univ., Hermiston, OR

8:05 1599 SACNAS: At the intersection of science, culture and community. **David Wilson** (dave@sacnas.org), Society for Advancement of Chicanos/Hispanics and Native Americans in Science, Santa Cruz, CA

8:25 1600 Oportunidades: Tips and pointers for Hispanic-American students for funding and other opportunities. **Steven Reyna** (smreyna@ncsu.edu), North Carolina State Univ., Raleigh, NC

8:45 1601 Industry and academia collaborations in the discovery and commercialization of new insecticides. **Hector E. Portillo** (hector.e.portillo@dupont.com), DuPont Crop Protection, Newark, DE

9:05 1602 My career in retrospect: How I became a bridge to Latin American scientists. **Patricia Stock** (spstock@email.arizona.edu), Univ. of Arizona, Tucson, AZ

9:25 1603 Thought I was not ready for them…they were not ready for me! **Patricia Pietrantonio** (PPietran@ag.tamu.edu), Texas A&M Univ., College Station, TX

9:45 Break

9:55 1604 Being full-brighter back at home: How to do science with less money. **Juan Cabrera** (jcabreral@upao.edu.pe), Universidad Antenor Orrego, Trujillo, Peru

10:15 1605 Urban agriculture and IPM training for the Latino community in Connecticut. **German Cutz** (german.cutz@uconn.edu) and Ana Legrand, Univ. of Connecticut, Storrs, CT

10:35 1606 The pros and cons of a migratory life in entomology. **Cecilia Tamborindeguy** (ctamborindeguy@ag.tamu.edu), Texas A&M Univ., College Station, TX

10:55 1607 Establishment of a Hispanic ESA Chapter. **Silvia Rondon** (Silvia.rondon@oregonstate.edu)[1], Raul Medina[2] and Ana Legrand[3], [1]Oregon State Univ., Hermiston, OR, [2]Texas A&M Univ., College Station, TX, [3]Univ. of Connecticut, Storrs, CT

Member Symposium: Arthropod Mediated Associational Effects Among Native and Non-Native Plants

211 D (Convention Center)

Moderators and Organizers: Sarah O'Neill[1] and Carl Clem[2], [1]Univ. of California, Riverside, CA, [2]Auburn Univ., Auburn, AL

8:00 1608 Can interactions between native and non-native trees in urban landscapes influence herbivore abundance and diversity? **Carl Clem** (csc0013@tigermail.auburn.edu) and David Held, Auburn Univ., Auburn, AL

8:20 1609 Invasive annual promotes spillover of invasive herbivore on to native perennial. **Sarah O'Neill** (sdave001@ucr.edu), Richard A. Redak and Matt Daugherty, Univ. of California, Riverside, CA

8:40 1610 The impact of non-native plants on insect herbivore alpha and beta diversity. **Douglas W. Tallamy** (dtallamy@udel.edu), Univ. of Delaware, Newark, DE

9:00 1611 Plant provenance and natural enemy diversity: Parasitoid and spider data from a residential-scale experiment. **Matthew Greenstone** (Matt.Greenstone@ars.usda.gov)[1], Richard Olsen[2], Matthew L. Buffington[2], Michael Gates[2], Robert Kula[2], Mary Cornelius[1] and Mark Payton[3], [1]USDA - ARS, Beltsville, MD, [2]USDA - ARS, Washington, DC, [3]Oklahoma State Univ., Stillwater, OK

9:20 1612 Resource density, resource frequency, and herbivore density: Assembling associational effects from behavioral choices. **Andrew Merwin** (acmerwin@bio.fsu.edu), Nora Underwood and Brian Inouye, Florida State Univ., Tallahassee, FL

9:40 1613 Influence of patch size and neighborhood composition on arthropod communities in the face of plant invasion. **Andrea Litt** (andrea.litt@montana.edu), Montana State Univ., Bozeman, MT

10:00 1614 Plant frequency generates associational effects by altering grasshopper foraging behavior. **Philip Hahn** (pghahn@wisc.edu) and John Orrock, Univ. of Wisconsin, Madison, WI

10:20 1615 Disentangling the aboveground and belowground associational effects of native plants on aboveground insects associated to ragwort. **Martijn Bezemer** (m.bezemer@nioo.knaw.nl) and Martine Kos, Netherlands Institute of Ecology, Wageningen, Netherlands

Member Symposium: Vegetation Management for Beneficial Insect Conservation in Agroecosystems

212 AB (Convention Center)

Moderators and Organizers: Mary Rogers and Chris Philips, Univ. of Minnesota, St. Paul, MN

8:00 Welcoming Remarks

8:05 SP1616 Sugar and nectar feeding by *Tamarixia radiata*, parasitoid of Asian citrus psyllid, *Diaphorina citri*. Peter D'Aiuto[1], Eric Rohrig[2] and **Joseph Patt** (joseph.patt@ars.usda.gov)[1], [1]USDA - ARS, Ft. Pierce, FL, [2]Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

8:17 1617 Extending the resource concentration hypothesis to the landscape scale. **Megan E. O'Rourke** (megorust@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

8:37 1618 Biodiversity and natural pest suppression on organic farms in the western US. **Jacob Asplund** (jake.asplund@wsu.edu)[1], Carmen K. Blubaugh[2], Christopher R. Philips[3] and William E. Snyder[1], [1]Washington State Univ., Pullman, WA, [2]Purdue Univ., West Lafayette, IN, [3]Univ. of Minnesota, Grand Rapids, MN

8:57 1619 Enhancing non-consumptive suppression of pest populations through vegetation complexity. **Kathryn Ingerslew** (ksiggc@mail.missouri.edu) and Debbie Finke, Univ. of Missouri, Columbia, MO

SD1620 Ornamental pepper banker plants: Can we bank on them? **Vivek Kumar** (vivekiari@ufl.edu)[1], Cindy L. McKenzie[2] and Lance Osborne[1], [1]Univ. of Florida, Apopka, FL, [2]USDA - ARS, Fort Pierce, FL

SD1621 Wildflower ecotype utilization by insect pollinators in Missouri. **Terryl L. Woods** (woodst@missouri.edu), Univ. of Missouri, Columbia, MO

9:17 Break and Poster Displays

9:37 1622 Cover crops promote aggregation of omnivorous predators and facilitate weed biological control. **Carmen K. Blubaugh** (blubaugh@purdue.edu)[1], James Hagler[2] and Ian Kaplan[1], [1]Purdue Univ., West Lafayette, IN, [2]USDA - ARS, Maricopa, AZ

9:57 1623 Giving winter cover crops a larger role in conservation biological control. Cerruti Hooks, **Armando Rosario-Lebron** (arosario@umd.edu) and Guihua Chen, Univ. of Maryland, College Park, MD

10:17 1624 Conservation practices on Nebraska farms and their impact on arthropod-mediated ecosystem services. **Julie A. Peterson** (julie.peterson@unl.edu) and Kayla A. Mollet, Univ. of Nebraska, North Platte, NE

10:37 1625 Maximizing ecosystem services in the design of agroecosystems: Implications of integrating field to watershed heterogeneity. **Jason M. Schmidt** (jschmid2@uga.edu)[1], Dawn Olson[2], Tom Potter[2], Richard Davis[2], Michael Toews[1] and Alisa Coffin[2], [1]Univ. of Georgia, Tifton, GA, [2]USDA - ARS, Tifton, GA

10:57 SP1626 Forest successional processes drive changes in abundance not diversity of bee communities within Mississippi production forests. **Robinson Sudan** (rs@pollinator.org)[1] and John Neff[2], [1]Pollinator Partnership, Austin, TX, [2]Central Texas Melittological Institute, Austin, TX

11:09 1627 *Macaranga tanarius*, a remarkable source of anthocorids for greenhouse and tropical crops. **Robert G. Hollingsworth** (Robert.Hollingsworth@ars.usda.gov) and Frances Calvert, USDA - ARS, Hilo, HI

11:24 Concluding Remarks

Member Symposium: Citizen Scientists Contribute to Conservation

213 AB (Convention Center)

Moderators and Organizers: Theresa E. Andrew and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK

8:00 Introductory Remarks

8:05 1628 The Banished Beetle Project: Involving ctizen scientists in the conservation of the American burying beetle. **Theresa E. Andrew** (theresa.e.andrew@okstate.edu), Oklahoma State Univ., Stillwater, OK

8:25 1629 Pieris Project: A partnership with the public to explore evolutionary response to environmental change through a globally distributed butterfly. **Sean Ryan** (ecophylic@gmail.com), Univ. of Notre Dame, Notre Dame, IN

8:45 1630 Citizen science and future opportunities for insect conservation. **Daniel P. Duran** (daniel.p.duran@vanderbilt.edu), Drexel Univ., Philadelphia, PA

9:05 1631 The Beetle Snatchers: *Cerceris fumipennis*as as a biosurveillance tool for monitoring emerald ash borer. **Stacy R. Blomquist**, USDA - Forest Service, Pineville, LA

9:25 1632 The Monarch Larva Monitoring Project: 19 years of tracking an insect icon. Wendy Caldwell[1] and **Dane Elmquist** (elmquo59@umn.edu)[2], [1]Monarch Watch Joint Venture, St. Paul, MN, [2]Univ. of Minnesota, Minneapolis, MN

9:45 Break

9:55 1633 The Migratory Dragonfly Partnership: Engaging citizen scientists to promote dragonfly conservation, provide habitat, and study their migration in North America. **Scott Black**, Xerces Society, Portland, OR

10:15 1634 Using citizen science to track and conserve North America's bumble bees. **Sheila R Colla** (scolla@yorku.ca)[1] and Rich Hatfield[2], [1]York Univ., Toronto, ON, Canada, [2]The Xerces Society for Invertebrate Conservation, Portland, OR

10:35 1635 Notes from nature: Advancing a citizen science platform for annotating biocollections. **Robert Guralnick** (robert.guralnick@colorado.edu), Univ. of Colorado, Boulder, CO

10:55 1636 Bugs in our backyard: Biology education and research in your own backyard. **Dave Angelini** (dangelini@colby.edu), Colby College, Waterville, ME

11:15 1637 ZomBee Watch: A citizen science project tracking the honey bee parasite, *Apocephalus borealis*. **John Hafernik** (hafernik@sfsu.edu), San Fransisco State Univ., San Fransisco, CA

11:35 Concluding Remarks

Workshop: Marketing for Scientists

208 AB (Convention Center)

Facilitator: Dr. Marc Kuchner, NASA Goddard Space Flight Center Exoplanets and Stellar Astrophysics Laboratory, Greenbelt, MD

8:45 AM – 9:45 AM

Member Symposium: Expand your Brand, Publicize your Publication, and Sell Yourself Well: The Marketing and Communications Toolbox that Every Scientist Needs

208 AB (Convention Center)

Moderators and Organizers: Richard Levine[1], and Rayda Krell[2], [1]Entomological Society of America, Annapolis, MD, [2]Independent Consultant, Ridgefield, CT

10:00 1638 Don't just publish an article, publicize it! **Richard Levine** (rlevine@entsoc.org), Entomological Society of America, Annapolis, MD

10:20 1639 Tips and challenges for effective science communication in a polarized, risk-focused world. **Jay Byrne** (jay.byrne@v-fluence.com), v-Fluence Interactive, St. Louis, MO

10:40 1640 Exploring the myriad avenues to effectively communicate science and entomology. **Jerome Goddard** (jgoddard@entomology.msstate.edu), Mississippi State Univ., Mississippi State, MS

11:00 1641 How social media will make you a better funded and engaging scientist in the lab and classroom. **Marianne Alleyne** (vanlaarh@life.illinois.edu), Univ. of Illinois, Champaign, IL

11:20 1642 The importance of being a spokesperson for your science and communicating basic biology through digital multimedia. **Adrian A. Smith** (Smithaa@illinois.edu), Univ. of Illinois, Champaign, IL

11:40 1643 Telling a story about your science: How to use the methods of storytelling to engage an audience with your work. **Marc Kuchner** (marc@marketingforscientists.com), NASA Goddard Space Flight Center, Greenbelt, MD

Joint Symopsium: Applications of UAV-Based Remote Sensing for Assessing Crop Stress

101 A (Convention Center)

Moderators and Organizers: Kevin Smith[1] and Robert Koch[2], [1]Brown Univ., Providence, RI, [2]Univ. of Minnesota, St. Paul, MN

8:20 Introductory Remarks

8:25 1644 UAS: Understanding aviation and a state's role. **Cassandra Isackson** (cassandra.isackson@state.mn.us), Minnesota Dept. of Transportation, St. Paul, MN

8:45 1645 Drones: Rapid advancements in aerial remote sensing technologies for agriculture. **Todd Colten**, Sentera LLC, Minneapolis, MN

9:05 1646 Application of unmanned aerial systems for high-throughput phenotyping in wheat. **Jesse Poland** (jpoland@ksu.edu), Daljit Singh, Atena Haghighattalab and Dale Schinstock, Kansas State Univ., Manhattan, KS

9:25 1647 Use of aerial remote sensing platforms for evaluation of nitrogen and water stress of irrigated maize. **Richard Ferguson** (rferguson1@unl.edu), Brian Krienke and Bijesh Maharjan, Univ. of Nebraska, Lincoln, NE

9:45 Break

10:00 1648 Remote scouting of Colorado potato beetle, *Leptinotarsa decemlineata*, defoliation. **Ian MacRae** (imacrae@umn.edu), Univ. of Minnesota, Crookston, MN

10:20 1649 Optimizing surveillance strategies for invasive pests using unmanned aerial systems. **Brian McCornack** (mccornac@ksu.edu), Kansas State Univ., Manhattan, KS

10:40 1650 Precision detection and control of pests using unmanned aerial vehicles. **Yong-Lak Park** (Yong-Lak.Park@mail.wvu.edu), West Virginia Univ., Morgantown, WV

11:00 Adjorn

Joint Session: Grant Application Navigation and Resources for Expanding Early Career Opportunities

Minneapolis Ballroom B (Hilton)

Moderators and Organizers: Emily Fuger[1] and Aaron Daigh[2], [1]ASA, CSSA, and SSSA, Madison, WI, [2]North Dakota State Univ., Fargo, ND

9:00 AM - 10:30 AM

Joint Session: Linking Soil Macrofaunal and Microbial Communities with Crop Dynamics Including Diseases

101 J (Convention Center)

Moderators and Organizers: Christopher Penton, Arizona State Univ., Tempe, AZ

11:00 Introductory Remarks

11:05 1651 Biological suppression of crop diseases: Role of microbial communities and microflora-faunal interactions. **Gupta Vadakattu** (gupta.vadakattu@csiro.au)[1], Stephen Neate[2], Christopher Penton[3] and James Tiedje[4], [1]CSIRO, Glen Osmond, Australia, [2]Univ. of Southern Queensland, Towoomba, Australia, [3]Arizona State Univ., Tempe, AZ, [4]Michigan State Univ., East Lansing, MI

11:20 1652 Micorrhizal Fungi: A biocontrol agent of plant parasitic nematodes. **Krishnaswamy Jayachandran** (jayachan@fiu.edu), Eduardo Peres and Pushpa Soti, Florida International Univ., Miami, FL

11:35 1653 Biocontrol practices alter rhizosphere community structure in *Phytophthora capsici* infested soil and increase pepper growth. **Lori Hoagland** (lhoaglan@purdue.edu), Purdue Univ., West Lafayette, IN

11:50 Lunch Break

1:00 1654 Soil microbial ecology associated with disease control of *Fusarium oxysporum* f. Sp. *Cucumerinum* in *Cucumis sativus* cultivation following soil fumigation with anhydrous ammonia in China. **Joshua Kendall**[1], Warren Dick[2] and Richard Dick[1], [1]The Ohio State Univ., Columbus, OH, [2]The Ohio State Univ., Wooster, OH

1:15 1655 Measuring cover crop benefits from a fungal perspective. **Maria Benitez** (soledad.benitezponce@ars.usda.gov), Wendy Taheri and Michael Lehman, USDA - ARS, Brookings, SD

1:30 1656 Natural disease suppression of *Rhizoctonia* by a network of fungal players: Evidence of direct competition and competitive exclusion. **Christopher Penton** (crpenton@asu.edu)[1], Gupta Vadakattu[2], James Tiedje[3], Stephen Neate[4], Kathy Ophel-Keller[5], Michael Gillings[6], Paul Harvey[2] and David Roget[2], [1]Arizona State Univ., Tempe, AZ, [2]CSIRO, Glen Osmond, Australia, [3]Michigan State Univ., East Lansing, MI, [4]Univ. of Southern Queensland, Towoomba, Australia, [5]South Australian Research and Development Institute, Glen Osmond, Australia, [6]Macquarie Univ., Sydney, Australia

1:45 1657 Specificity of root-bacterial interactions for drought stress tolerance in winter wheat. **Mary Stromberger** (mary.stromberger@colostate.edu)[1], Patrick Byrne[1], Daniel Manter[2], Tiffany Weir[1] and Galel Saleh[1], [1]Colorado State Univ., Fort Collins, CO, [2]USDA - ARS, Fort Collins, CO

2:00 1658 Tripartite plant-soil-microbial relationships may impact changing tree species distributions. **Daniel Keymer** (daniel.keymer@uwsp.edu)[1] and Richard Lankau[2], [1]Univ. of Wisconsin, Stevens Point, WI, [2]Univ. of Wisconsin, Madison, WI

2:15 1659 Diffusible signals in associations of rice with arbuscular mycorrhizal fungi. **Audrey Kalil** (akwiley@wisc.edu), Marcus Babcock, Jeremy Volkening, Michael Sussman and Jean-Michel Ané, Univ. of Wisconsin, Madison, WI

2:30 Adjorn

Ten-Minute Papers, MUVE Section: Specialty Areas and Emerging Pests

208 CD (Convention Center)

Moderators: Sharon Dobesh[1] and Mark Janowiecki[2], [1]Kansas State Univ., Manhattan, KS, [2]Univ. of Arkansas, Fayetteville, AR

8:00 Introductory Remarks

8:05 1660 Characterizing introduction, establishment and impact of an invasive insect pest in an urban landscape. **Shyam Thomas** (shyam.thomas@ucr.edu)[1], Gregory Simmons[2] and Matthew Daugherty[1], [1]Univ. of California, Riverside, CA, [2]USDA - APHIS, Salinas, CA

8:17 1661 Efficacy of several pesticide products on brown widow spider (Araneae: Theridiidae) egg sacs and their penetration through the egg sac silk layer. **Dong-Hwan Choe** (donghwan.choe@ucr.edu) and R. S. Vetter, Univ. of California, Riverside, CA

8:29 1662 Efficacy of a novel emamectin benzoate formulation for emerald ash borer, Agrilus planipennis, control. **Emily Bick** (enb45@cornell.edu)[1], Shawn Bernick[1] and Daniel A. Herms[2], [1]Rainbow Treecare Scientific Advancements, Minneapolis, MN, [2]The Ohio State Univ., Wooster, OH

8:41 1663 Evaluation of insecticide tools for seven year management of the emerald ash borer, Agrilus planipennis, in green ash, Fraxinus pennsylvanica, trees in Illinois. Emily Bick[1], **Shawn Bernick** (SBernick@treecarescience.com)[1], Grant Jones[2] and Fredric D. Miller[3], [1]Rainbow Treecare Scientific Advancements, Minneapolis, MN, [2]Longwood Gardens, Kennett Square, PA, [3]Joilet Junior College, Joilet, IL

8:53 Break

8:58 1664 Spatiotemporal dynamics of the Southern California Asian citrus psyllid invasion. **Brett Bayles** (brett.r.bayles@gmail.com)[1], Shyam Thomas[1], Gregory S. Simmons[2] and Matt Daugherty[1], [1]Univ. of California, Riverside, CA, [2]Center for Plant Health Science and Technology, Salinas, CA

9:10 1665 Susceptibility of three life stages of warehouse beetle, *Trogoderma variabile*, and red flour beetle, *Tribolium castaneum*, to pyrethrin aerosol. **Sharon Dobesh** (sdobesh@ksu.edu)[1], Frank Arthur[2] and R. Jeff Whitworth[1], [1]Kansas State Univ., Manhattan, KS, [2]USDA - ARS, Manhattan, KS

9:22 1666 Grain depth: Contribution to the performance of hermetic storage. **Scott Williams** (sbwillia88@gmail.com), Dieudonne Baributsa and Larry Murdock, Purdue Univ., West Lafayette, IN

9:34 1667 The search for a null hypothesis in vertebrate decomposition: Should insects be included? **Trevor I. Stamper** (stampert@purdue.edu)[1], M. Eric Benbow[2] and Jeffrey Holland[1], [1]Purdue Univ., West Lafayette, IN, [2]Michigan State Univ., East Lansing, MI

9:46 1668 Seasonal effects on insect succession in pig carrion in Northern California. **Alex Dedmon** (acdedmon@ucdavis.edu), Univ. of California, Davis, CA

Ten-Minute Paper, MUVE Section: Social Insects

208 CD (Convention Center)

Moderators: Michael Merchant[1] and Lucas Carnohan[2], [1]Texas A&M Univ., Dallas, TX, [2]Univ. of Florida, Davie, FL

10:00 Introductory Remarks

10:05 1669 Hybridization of two termite invaders: Causes and consequences. **Thomas Chouvenc** (tomchouv@ufl.edu), Ericka Helmick and Nan-Yao Su, Univ. of Florida, Davie, FL

10:17 1670 Field trials of fluid baits for remedial control of the Formosan subterranean termite. **Nan-Yao Su** (nysu@ufl.edu)[1], Barry P. Yokum[2], Ed Bordes[2], Carrie Cottone[2] and Claudia Riegel[2], [1]Univ. of Florida, Davie, FL, [2]City of New Orleans Mosquito, Termite & Rodent Control Board, New Orleans, LA

10:29 1671 Field evaluation of fipronil and chlorfenapyr against the desert subterranean termite, *Heterotermes aureus*. **Javier G. Miguelena** (javierm@email.arizona.edu) and Paul B. Baker, Univ. of Arizona, Tucson, AZ

10:41 1672 Overland versus underground movement of American cockroaches, *Periplaneta americana*, in New Orleans, Louisiana: Results of the NICHE study. **John Carlson** (jcarlso@tulane.edu), Felicia Rabito and Mark S. Fox, Tulane Univ., New Orleans, LA

10:53 Break

11:03 1673 Molecular approaches for Argentine ant, *Linepithema humile*, management. **Kevin Welzel** (kwelz001@ucr.edu) and Dong-Hwan Choe, Univ. of California, Riverside, CA

11:27 1674 Role of ant larvae in the management of carpenter ants, *Camponotus modoc*, and odorous house ants, *Tapinoma sessile*, with granular baits. **Laurel Hansen** (LaurelH@spokanefalls.edu), Spokane Falls Community College, Spokane, WA

11:39 1675 Repellent and toxic effects of rosemary and camphor essential oils against the European fire ant, *Myrmica rubra* (Hymenoptera: Formicidae). Augusto L. Meyer[1], Yasmin Akhtar[2] and **Murray B. Isman** (murray.isman@ubc.ca)[2], [1]Laboratory of Chemical Ecology and Insect Ethology, Univ. Federal do Rio Grande do Sul, Porto Alegre, Brazil, [2]Faculty of Land and Food Systems, Univ. of British Columbia, Vancouver, BC, Canada

11:51 1676 Tawny crazy ant, *Nylanderia fulva* Mayr, management strategies in urban environments. **Robert Puckett** (rpuck@tamu.edu), Phillip Shults, Edward Vargo and Roger Gold, Texas A&M Univ., College Station, TX

Ten-Minute Papers, P-IE Section: Chemical Ecology

200 H (Convention Center)

Moderators: William R. Morrison[1] and Chase Stratton[2], [1]Michigan State Univ., East Lansing, MI, [2]Univ. of Vermont, Burlington, VT

8:00 Introductory Remarks

8:02 1677 Effects of exogenous application of methyl jasmonate on foliar volatile emission in citrus. Joseph Patt, **Paul S. Robbins** (Paul.Robbins@ars.usda.gov), Peter D'Aiuto and Rocco Alessandro, USDA - ARS, Ft. Pierce, FL

8:14 1678 Role of jasmonate and salicylate pathways in rice defense against herbivore insects. **Rensen Zeng** (rszeng@scau.edu.cn)[1], Mao Ye[2] and YuanYuan Song[1], [1]Fujian Agriculture and Forestry Univ., Fuzhou, China, [2]South China Agricultural Univ., Guangzhou, China

8:26 1679 Effect of plant extract, *Peganum harmala*, against the whitefly, *Bemisia tabaci* (Homoptera: Aleyrodidae), at Doucen, Biskra Oasis, Algeria. **Nacer Tarai** (tarainacer@yahoo.fr), Univ. Mohamed Khider, Biskra, Algeria

8:38 1680 Evaluation of traps and attractants for mass trapping of African invader fly, *Bactrocera invadens*, on mango in southwest Nigeria. **Juliana Ugwu** (amakajul01@yahoo.com)[1], Adebayo Omoloye[2] and Akindele Ogunfunmilayo[3], [1]Forestry Research Institute of Nigeria, Ibadan, Nigeria, [2]Univ. of Ibadan, Ibadan, Nigeria, [3]Nigeria Agricultural Quarantine Services, Ibadan, Nigeria

8:50 1681 The role of volatile and host stimuli in the foraging of *Halyomorpha halys*: Attraction and retention of adults on tree fruit. **William R. Morrison** (william.morrison@ars.usda.gov) and Tracy C. Leskey, USDA - ARS, Kearneysville, WV

9:02 1682 Chemical and microbial ecology of the bee brood cell: Insights from the hoary squash bee, *Peponapis pruinosa* (Eucerini, Apidae). **Kristen Brochu** (kb532@cornell.edu), Andre Kessler and Bryan N. Danforth, Cornell Univ., Ithaca, NY

9:14 1683 Exposure to the plant compound alpha-humulene reduces mating success in male Mediterranean fruit flies. **Todd Shelly** (todd.e.shelly@aphis.usda.gov), USDA - APHIS, Waimanalo, HI

9:26 1684 Which plant traits are most repellent as intercrops for pest control? Tests from simulated intercropping systems. **Gemelle Brion** (gemelle.brion@md.usda.gov)[1,2], Weston Testo[2] and Yolanda Chen[2], [1]USDA - NRCS, Princess Anne, MD, [2]Univ. of Vermont, Burlington, VT

9:38 1685 Captures of *Ostrinia* species with pheromones in northeastern China. **Ri-zhao Chen** (bobob1972@163.com)[1] and Michael G. Klein[2], [1]Jilin Agricultural Univ., Changchun, China, [2]The Ohio State Univ. (retired), Heber, AZ

9:50 1686 Isolation of a behaviorally active sex pheromone component of the mushroom fly, *Lycoriella ingenua,* using GC/EAG and an unusual, coupled GC/Behavior technique. **Stefanos Andreadis** (ssa18@psu.edu), Kevin Cloonan and Thomas C. Baker, Pennsylvania State Univ., University Park, PA

10:02 Break

10:12 1687 Plant defense chemistry effects on parasitoid size vs. number tradeoffs: Females get smaller but males become fewer. **Paul Ode** (paul.ode@colostate.edu), Colorado State Univ., Fort Collins, CO

10:24 1688 Can phylogenetic distance of plant essential oils influence repellency to the specialist swede midge, *Contarinia nasturtii* (Diptera: Cecidomyiidae)? **Chase Stratton** (castratt@uvm.edu)[1], Anthony M. Shelton[2], Cesar Rodriguez-Saona[3], Elvira de Lange[4] and Yolanda Chen[1], [1]Univ. of Vermont, Burlington, VT, [2]Cornell Univ., Geneva, NY, [3]Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, [4]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

10:36 1689 The roles of volatile and non-volatile phytochemicals in host-plant selection by cerambycid beetles. **Joseph Wong** (wong62@life.illinois.edu)[1], Jocelyn G. Millar[2] and Lawrence M. Hanks[1], [1]Univ. of Illinois, Champaign, IL, [2]Univ. of California, Riverside, CA

10:48 1690 Interplay of insect and plant volatiles in attraction of harlequin bug. **Donald C. Weber** (don.weber@ars.usda.gov)[1], Guillermo Cabrera Walsh[2], Anthony S. DiMeglio[1], Megan Herlihy[1], Emma Thrift[1] and Ashot Khrimian[3], [1]USDA - ARS, Beltsville, MD, [2]Fundación para el Estudio de Especies Invasivas, Hurlingham, Buenos Aires, Argentina, [3]USDA - ARS, NEA, Beltsville, MD

11:00 1691 Operational use of SPLAT Verb to protect pine trees from mountain pine beetle attack. **Christopher J. Fettig** (cfettig@fs.fed.us)[1], Robert A. Progar[2], Lia Spiegel[3], Steve Munson[3], Anna Hermosillo[4], Jonathan Rico[4], Kavita Sharma[4], William Urrutia[4], Rodrigo Oliveira da Silva[4], Carmem Bernardi[4], Kim Spencer[4] and Agenor Mafra-Neto[4], [1]USDA - Forest Service, Davis, CA, [2]USDA - Forest Service, LaGrande, OR, [3]USDA - Forest Service, Ogden, UT, [4]ISCA Technologies, Riverside, CA

11:12 1692 NOCTOVI : A general attractant for noctuid moths. Rafael Borges[1], **Sérgio Chidi** (sergio.chidi@arysta.com)[2], Márcio Fernandes Peixoto[3], Rodrigo Oliveira da Silva[4], William Urrutia[4], Josh Ponce[4], Carmem Bernardi[4], Jonathan Rico[4], Kavita Sharma[4], Leandro Ernesto Jost Mafra[5] and Agenor Mafra-Neto[4], [1]ISCA Tecnologias Ltda, Ijui, Brazil, [2]Arysta LifeScience, São Paulo, Brazil, [3]Instituto Federal Goiano, Goiano, Brazil, [4]ISCA Technologies, Riverside, CA, [5]ISCA Tecnologias Ltda, Vacaria, Brazil

11:24 1693 HOOK RPW and ISCA smart traps: Revolutionary new tools for the management of the red palm weevil in Gulf countries. J. R. Falerio[1], Abdallah Ben Abdallah[2], Abdulrahman Aldawood[3], H.A. Elshafie[4], Saleh Al Homaidi[5], Yousuf AboHassan[5], William Urrutia[6], Rodrigo Oliveira da Silva[6], Carmem Bernardi[6], Katherine Villagran[6], Emerson Christie[6], Jonathan Rico[6], Kavita Sharma[6] and **Agenor Mafra-Neto** (president@iscatech.com)[6], [1]Ministry of Agriculture, Al Hassa, Saudi Arabia, [2]Food and Agriculture Organization Project, Al Hassa, Saudi Arabia, [3]King Saud Univ., Riyadh, Saudi Arabia, [4]King Faisal Univ., Al Hassa, Saudi Arabia, [5]Center of Palms and Dates, Al Hassa, Saudi Arabia, [6]ISCA Technologies, Riverside, CA

11:36 1694 Anamed, an effective long-lasting protein attract and kill system for Tephritid fruit flies. **Rodrigo Oliveira da Silva** (rodrigo.silva@iscatech.com)[1], William Urrutia[1], Carmem Bernardi[1], Marcos Botton[2], Rafael Borges[3], Ruben Machota, Jr.[4], Jonathan Rico[1], Kavita Sharma[1], Leandro Ernesto Jost Mafra[5] and Agenor Mafra-Neto[1], [1]ISCA Technologies, Riverside, CA, [2]Embrapa Grape and Wine, Bento Goncalves, Brazil, [3]ISCA Tecnologias Ltda, Ijui, Brazil, [4]Univ. Federal de Pelotas, Pelotas, Brazil, [5]ISCA Tecnologias Ltda, Vacaria, Brazil

Ten-Minute Papers, P-IE Section: Ecology

200 G (Convention Center)

Moderators: Jennifer A. White[1] and Emily Mohl[2], [1]Univ. of Kentucky, Lexington, KY, [2]St. Olaf College, Northfield, MN

8:00 Introductory Remarks

8:02 1695 Exploring a novel plant-insect interaction: Goldenrod eavesdrops on the sexual communication of its gall fly. **Eric Yip** (ecy7@cornell.edu), Pennsylvania State Univ., University Park, PA

8:14 1696 Presentation withdrawn

8:26 1697 Does exposure to stress elevate mutation rates in aphid endosymbionts? **Laramy Enders** (lenders2@unl.edu) and Nicholas Miller, Univ. of Nebraska, Lincoln, NE

8:50 1698 Monitoring the recovery of streams in the San Gabriel mountains following the largest wildfire in Los Angeles county history: Station fire - 2009. **Wendy L. Willis** (wendy@aquabio.org), Karin Patrick and Scott Johnson, Aquatic Bioassay and Consulting Laboratories, Ventura, CA

9:02 1699 Long-term changes in aphidophagous coccinellid communities explained by native species niche shifts. **Matthew J. Petersen** (mpetersen13@gmail.com)[1], Wilson Farthing[1], Caroline Peterson[1] and John Losey[2], [1]Roanoke College, Salem, VA, [2]Cornell Univ., Ithaca, NY

9:14 1700 Can predation explain variation in plant defense? Considering the key assumptions in a tri-trophic model of optimal defense. **Emily Mohl** (mohl@stolaf.edu)[1], Grant Kern[1] and George E. Heimpel[2], [1]St. Olaf College, Northfield, MN, [2]Univ. of Minnesota, St. Paul, MN

9:26 1701 Implications of grassland management practices for monarch butterflies, *Danaus plexippus*. **Kristen Baum** (kristen.baum@okstate.edu), Oklahoma State Univ., Stillwater, OK

9:38 1702 Temporal changes in skipper caterpillar performance across multiple host plants explained by weather and leaf nutrient content. **Eric Lind** (elind@umn.edu)[1], John T. Lill[2] and Martha Weiss[3], [1]Univ. of Minnesota, St. Paul, MN, [2]George Washington Univ., Washington, DC, [3]Georgetown Univ., Washington, DC

9:50 1703 Poisoning the multicolored Asian lady beetle: Ecological effects of a defensive aphid phenotype. **Paul Lenhart** (palenhart@uky.edu) and Jennifer White, Univ. of Kentucky, Lexington, KY

10:02 Break

10:12 1704 Diversity of bacterial microflora in thrips belonging to multiple feeding guilds. Rajagopalbabu Srinivasan[1], Sivamani Sundaraj[2], **Bhabesh Dutta** (Bhabeshd@gmail.com)[1], Ron Gitaitis[1], Stan Diffie[1] and Saioa Legarrea[1], [1]Univ. of Georgia, Tifton, GA, [2]Coastal Plains Experiment Station, Tifton, GA

10:24 1705 Habitat selectivity of the endangered Laguna Mountains skipper in a montane meadow with and without cattle grazing. **Daniel A. Marschalek** (danmarschalek@hotmail.com) and Douglas H. Deutschman, San Diego State Univ., San Diego, CA

10:36 1706 Beetle and predator behavior altered at increased temperature determining rates of predation and herbivory. **Jamin Dreyer** (jamin.dreyer@uky.edu)[1], Orsolya Beleznai[2], Mark A. Williams[1] and James D. Harwood[1], [1]Univ. of Kentucky, Lexington, KY, [2]Hungarian Academy of Sciences, Budapest, Hungary

10:48 1707 Multiple symbiont infection is common and variable in spider populations. **Alex Styer** (styer.alex@gmail.com), Meghan M. Curry, Eric G. Chapman, James D. Harwood and Jennifer White, Univ. of Kentucky, Lexington, KY

11:00 1708 Plant plasticity in response to insect herbivory differs between native and introduced populations of *Verbascum thapsus*. **Stacy Endriss** (stacy.endriss@gmail.com)[1], Andrew P. Norton[1], Ruth A. Hufbauer[1] and Christina Alba[2], [1]Colorado State Univ., Fort Collins, CO, [2]Academy of Sciences of the Czech Republic, Pruhonice, Czech Republic

11:12 1709 Facultative endosymbionts mediate dietary breadth in a polyphagous herbivore. **Jennifer A. White** (jenawhite@uky.edu)[1], Steven M. Wagner[1], Adam J. Martinez[2], Yong-Ming Ruan[3], Kyungsun Kim[2], Paul A. Lenhart[1], Allison Dehnel[1] and Kerry M. Oliver[2], [1]Univ. of Kentucky, Lexington, KY, [2]Univ. of Georgia, Athens, GA, [3]Zhejiang Normal Univ., Jinhua, China

11:24 1710 Laser ablation tomography: Vaporizing insects with 1 million watts to quantify fitness. **Kevin Rice** (kbr10@psu.edu)[1], Benjamin Hall[2], Andrew Yanders[2], Brian Reinhardt[2], Shelby J. Fleischer[1] and John Tooker[1], [1]Pennsylvania State Univ., University Park, PA, [2]L4iS | Lasers for Innovative Solutions LLC, State College, PA

11:36 1711 Escape and radiate: Have orchids escaped herbivory or insect ecologists? **Micky Eubanks** (m-eubanks@tamu.edu), Texas A&M Univ., College Station, TX

11:48 1712 Effects of habitat restoration on the morphology and life history traits of a rare wetland butterfly. **Frances S. Sivakoff** (sivakoff.3@osu.edu)[1], Brian R. Hudgens[2], William F. Morris[3], Erik T. Aschehoug[4] and Nick M. Haddad[4], [1]The Ohio State Univ., Columbus, OH, [2]Institute for Wildlife Studies, Arcata, CA, [3]Duke Univ., Durham, NC, [4]North Carolina State Univ., Raleigh, NC

Ten-Minute Papers, P-IE Section: IPM - Field Crops 2

200 A (Convention Center)

Moderators: Vonny Barlow[1] and Amanda Jacobson[2], [1]Univ. of California, Blythe, CA, [2]Dow AgroSciences, Greenville, MS

8:00 Introductory Remarks

8:02 1713 Pheromone trapping as a monitoring tool of brown stink bug, *Euschistus servus*, movement within cotton fields. **Vonny Barlow** (vmbarlow@ucdavis.edu), Univ. of California, Blythe, CA

8:14 1714 Plant genotype mediates cotton aphid, *Aphis gossypii*, response to plants colonized by the endophytic entomopathogen, *Beauveria bassiana*. **Janice Krumm** (jlkrumm@widener.edu)[1], Wenqing Zhou[2] and Gregory Sword[2], [1]Widener Univ., Chester, PA, [2]Texas A&M Univ., College Station, TX

8:26 1715 Amount of applied signal voltage affects behaviors in EPG recordings of *Lygus lineolaris* adults on pin-head cotton squares. **Felix Cervantes** (felix.cervantes@ars.usda.gov)[1] and Elaine Backus[2], [1]Univ. of California-Davis, Parlier, CA, [2]USDA - ARS, Parlier, CA

8:38 1716 Incorporation of Transform™ WG insecticide in tarnished plant bug, *Lygus lineolaris,* and western plant bug, *Lygus hesperus*, programs in cotton: Efficacy and yields. Larry Walton[1], **Melissa Siebert** (mwillrichsiebert@dow.com)[2], Robert Haygood[3], Gary D. Thompson[4], John Richburg[5], Jeff Ellis[6] and Jesse M. Richardson[7], [1]Dow AgroSciences, Tupelo, MS, [2]Dow AgroSciences, Greenville, MS, [3]Dow AgroSciences, Indianapolis, IN, [4]Dow AgroSciences, Omaha, AR, [5]Dow AgroSciences, Headland, AL, [6]Dow AgroSciences, Sterlington, LA, [7]Dow AgroSciences, Hesperia, CA

8:50 1717 Photosynthesis: A plant physiological parameter to evaluate the damage caused by bollworm, *Helicoverpa armigera* (Hübner), in cotton cultivars. **Muhammad Afzal** (chafzal64@yahoo.com), Muhammad Ullah, Khursheed Khan and Muhammad Arshad, Univ. of Sargodha, Sargodha, Pakistan

9:02 1718 Quality assurance program for approval of new cotton varieties containing WideStrike® insect protection and WideStrike 3. **Ed King** (jeking@dow.com)[1], Mary Kubiszak-Rushton[1], Gary D. Thompson[2], Bo Braxton[3], Ning Zhou[1] and Brad Witte[1], [1]Dow AgroSciences, Indianapolis, IN, [2]Dow AgroSciences, Omaha, AR, [3]Dow AgroSciences, Travelers Rest, SC

9:14 1719 Impact of twospotted spider mite herbivory on phytohormone expression in cotton treated with imidacloprid and jasmonic acid. **Sebe Brown** (SBrown@agcenter.lsu.edu)[1], David L. Kerns[1] and Michael Stout[2], [1]Louisiana State Univ., Winnsboro, LA, [2]Louisiana State Univ., Baton Rouge, LA

9:26 1720 Does *Bemisia tabaci* play a role in the emergence of new virus strains in cotton-okra agroecosystem? **Satnam Singh** (satnam@pau.edu)[1], Abhiskek Sharma[2] and Suneet Pandher[1], [1]Punjab Agricultural Univ., Faridkot, India, [2]Punjab Agricultural Univ., Ludhiana, India

9:38 1721 Modeling evolution of resistance by *Helicoverpa zea* to insecticidal crops in the southern United States. **Philip Crain** (philip.crain@cgr.dupont.com)[1], Zaiqi Pan[1], Andre Crespo[2] and David Onstad[1], [1]DuPont, Wilmington, DE, [2]DuPont Pioneer, Johnston, IA

9:50 1722 Response of bollworm, *Helicoverpa armigera* (Hübner), feeding in relation to water status of cotton. **Muhammad Ullah** (mirfanullah@uos.edu.pk)[1], Muhammad Afzal[1], Fatima Mustafa[2], Yasir Iftikhar[1] and Muhammad Khan[1], [1]Univ. of Sargodha, Sargodha, Pakistan, [2]Univ. of Agriculture, Faisalabad, Pakistan

10:02 Break

10:12 1723 Operational deployment of an unmanned aircraft system to release sterile pink bollworm, *Pectinophora gossypiella*, over cotton in Arizona as a rapid response tool. **Nathan Moses-Gonzales** (nmosesgo@m3cg.us)[1] and Michelle Walters[2], [1]M3 Consulting Group, Dayton, OH, [2]USDA - APHIS, Phoenix, AZ

10:24 1724 Performance of Transform®WG insecticide against sugarcane aphid in southern U.S. grain sorghum. **Amanda Jacobson** (ajjacobson@dow.com)[1], Mike Lovelace[2] and Melissa Siebert[1], [1]Dow AgroSciences, Greenville, MS, [2]Dow AgroSciences, Lubbock, TX

10:36 1725 Distribution of the sugarcane stem borers, *Diatraea* spp., and their natural enemies in the Cauca River Valley of Colombia. **German Vargas** (gavargas@cenicana.org), Gerson Ramirez and Luz Lastra, Colombian Sugarcane Research Center - Cenicaña, Cali, Colombia

10:48 1726 Intraguild competition of western bean cutworm, *Striacosta albicosta*, fall armyworm, *Spodoptera frugiperda*, and corn earworm, *Helicoverpa zea*, on non-Bt corn under field conditions. **José P. G. F. Silva** (jpgfdsilva@gmail.com)[1], Thomas Hunt[2], Silvana V. Paula-Moraes[3], Edson Baldin[1] and E. Blankenship[4], [1]São Paulo State Univ., Botucatu, Brazil, [2]Univ. of Nebraska, Concord, NE, [3]Empresa Brasileira de Pesquisa Agropecuária Cerrados, Planaltina, Brazil, [4]Univ. of Nebraska, Lincoln, NE

11:00 1727 Population genetic structure and migration revealed signal of spatial and ecological divergence among populations of sugarcane borer, *Diatraea saccharalis* (Lepidoptera: Crambidae). **Vitor A. C. Pavinato** (vitor.pavi@gmail.com)[1], Jaqueline B. de Campos[2], Fabricio J. B. Francischini[3], José B. Pinheiro[4], Celso Omoto[4], Andrew Michel[1] and Maria I. Zucchi[5], [1]The Ohio State Univ., Wooster, OH, [2]Univ. of Campinas, Campinas, Brazil, [3]Monsanto Brazil, Campinas, Brazil, [4]Univ. of São Paulo, Piracicaba, Brazil, [5]Agribusiness Technological Development of São Paulo, Piracicaba, Brazil

11:12 1728 Monitoring susceptibility of western bean cutworm (Lepidoptera: Noctuidae) field populations to *Bacillus thuringiensis* Cry1F protein. **Zaiqi Pan** (zaiqi.pan@cgr.dupont.com)[1], Jared Ostrem[2], J. Lindsey Flexner[1], Elizabeth Owens[2], Rachel R. Binning[2], Dwain M. Rule[3] and Laura S. Higgins[2], [1]DuPont, Wilmington, DE, [2]DuPont Pioneer, Johnston, IA, [3]Dow AgroSciences, Indianapolis, IN

11:24 1729 Damage caused by cowpea mild mottle virus and *Bemisia tabaci* on conventional bean cultivars and on bean golden mosaic virus resistant transgenic isolines. **Eliane Quintela** (eliane.quintela@embrapa.br), Marcus Vinícius Santana, José Alexandre Barrigossi, Josias Faria, Thiago Souza and Maria José Peloso, Embrapa Rice and Beans, Santo Antônio de Goiás, Brazil

11:36 1730 Fungal endophytes, *Beauvaria bassiana* and *Purpureocilium lilacinum*, positively affect the growth of sorghum and impact the behavior and performance of the sugarcane aphid, *Melanaphis sacchari*. **Josephine Antwi** (jossyantwi@tamu.edu), Raul Medina and Gregory Sword, Texas A&M Univ., College Station, TX

11:48 1731 Insect pest responses to reduced tillage and irrigation rates in sugar beet. **Erik Wenninger** (erikw@uidaho.edu)[1], Jessica Vogt[1], Kristin Daku[1], Don Morishita[1], William Neibling[1] and Oliver Neher[2], [1]Univ. of Idaho, Kimberly, ID, [2]The Amalgated Sugar Company, Boise, ID

Ten-Minute Papers, P-IE Section: IPM - General

200 I (Convention Center)

Moderators: John Losey[1] and Christy Jones[2], [1]Cornell Univ., Ithaca, NY, [2]BASF Corporation, Research Triangle Park, NC

8:00 Introductory Remarks

8:02 1732 TrapGrid, a model of invasive pest detection: Development and field parameterization. **Nicholas Manoukis** (nicholas.manoukis@ars.usda.gov), USDA - ARS, Hilo, HI

8:14 1733 Preliminary research on attract-and-kill station for controlling the green june beetle, *Cotinis nitida* L. Anderson Varela[1], Sebastian Zmudzki[2] and **Maciej A. Pszczolkowski** (MPszczolkowski@missouristate.edu)[3], [1]Univ. Federal de Santa Catarina, Curitibanos, Brazil, [2]Jagiellonian Univ., Krakow, Poland, [3]Missouri State Univ., Mountain Grove, MO

8:26 1734 Integrated pest management of redheaded flea beetles in the mid-Atlantic. **Kayla Krenitsky** (kkrenit@udel.edu) and Brian Kunkel, Univ. of Delaware, Newark, DE

8:38 1735 Effects of *Azadiracta indica* and *Duranta erecta* on *Amblyomma variegatum* and *Rhipicephalus annulatu* pests of sheep in the University of Nigeria Telefood Research Project farm. **Ekenma Agwu** (ekenma.agwu@unn.edu.ng), Greg Odo and Damaris Abunwa, Univ. of Nigeria, Nsukka, Nigeria

8:50 1736 Efficacy of SEQUOIA on western specialty crops. **C. Kuniyoshi** (chkuniyoshi@dow.com)[1], Jesse M. Richardson[2], James P. Mueller[3], Harvey A. Yoshida[4], Alistair McKay[5] and Melissa Siebert[6], [1]Dow AgroSciences, Fresno, CA, [2]Dow AgroSciences, Hesperia, CA, [3]Dow AgroSciences, Brentwood, CA, [4]Dow AgroSciences, Richland, WA, [5]Dow AgroSciences, Clovis, CA, [6]Dow AgroSciences, Greenville, MS

9:02 1737 Assessment of soil treatment with neem cake on larval mortality of *Bactrocera dorsalis* in the lab. **Assa Balayara** (balayara@vt.edu) and Douglas G. Pfeiffer, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:14 1738 Effects of prior landscape use on European corn borer populations in processing vegetables. **Rebecca Schmidt-Jeffris** (schmidt-jeffris@cornell.edu)[1], Anders Huseth[2] and Brian A. Nault[1], [1]Cornell Univ., Geneva, NY, [2]North Carolina State Univ., Raleigh, NC

9:26 1739 BASF innovations powered by alpha-cypermethrin. **Siddharth Tiwari** (siddharth.tiwari@basf.com), Christa Ellers-Kirk, Daniel O'Byrne, Mitchell Blair, Rebecca Willis, Rianna Guethling, Richard Tyler and H. Alejandro Arevalo, BASF Corporation, Research Triangle Park, NC

9:38 1740 Fastac™ CS: A new innovation by BASF. Christa Ellers-Kirk, Daniel O'Byrne, Mitchell Blair, **Rebecca Willis** (rebecca.willis@basf.com), Rianna Guethling, Richard Tyler, H. Alejandro Arevalo and Siddharth Tiwari, BASF Corporation, Research Triangle Park, NC

9:50 1741 Neonicotinoid insecticide detections in Wisconsin's groundwater resources. **Benjamin Bradford** (bbradford@wisc.edu) and Russell L. Groves, Univ. of Wisconsin, Madison, WI

10:02 Break

10:12 1742 A closed loop system improves phosphine fumigation in stored grain facilities. **Edmond L. Bonjour** (edmond.bonjour@okstate.edu), Carol Jones and Randy L. Beeby, Oklahoma State Univ., Stillwater, OK

10:24 1743 Managing insect pests in mosaic landscapes of bioenergy and conventional cropping systems in the U.S. Gulf Coast. **Yubin Yang** (yyang@aesrg.tamu.edu)[1], Lloyd T. (Ted) Wilson[1], Thomas E. Reagan[2], Julien M. Beuzelin[3] and Jing Wang[1], [1]Texas A&M AgriLife Research, Beaumont, TX, [2]Louisiana State Univ., Baton Rouge, LA, [3]Louisiana State Univ., Alexandria, LA

10:36 1744 Managing rice root aphid and honeysuckle aphid with microbial and botanical pesticides in organic celery. **Surendra Dara** (skdara@ucdavis.edu), Univ. of California, San Luis Obispo, CA

10:48 1745 The changing world of IPM on the southern high plains of Texas. **Tommy Doederlein** (t-doederlein@tamu.edu), Texas AgriLife Extension Service, Lamesa, TX

11:00 1746 Integrated Pest Information Platform for Extension and Education (iPIPE): An early warning system for invasive pests in Utah. **Lori R. Spears** (lori.spears@usu.edu), Utah State Univ., Logan, UT

11:12 1747 Clean diesel agriculture: Opportunities for reducing diesel emissions in the agriculture sector. **P. Dilip Venugopal** (dilip@umd.edu)[1,2], Elizabeth Etchells[2] and Britney McCoy[2], [1]Univ. of Maryland, College Park, MD, [2]USEPA, Washington, DC

11:24 1748 Decline in global coccinellid diversity: Implications for pest suppression and food security. **John Losey** (jel27@cornell.edu)[1], Leslie Allee[1], Peter Brown[2], Mary Gardiner[3], Audrey Grez[4], Louis Hesler[5], Giles Hooker[1], Harsimran Gill[6], Lou Jost[7], Helen Roy[8] and Rebecca R. Smyth[1], [1]Cornell Univ., Ithaca, NY, [2]Anglia Ruskin University, Cambridge, United Kingdom, [3]The Ohio State Univ., Wooster, OH, [4]Univ. of Chile, Santiago, Chile, [5]USDA - ARS, Brookings, SD, [6]Univ. of Florida, Lake Alfred, FL, [7]South American Explorers, Banos, Ecuador, [8]Natural Environment Research Council, Wallingford, United Kingdom

11:36 1749 Global commodity trade and quarantine security: Biological vs. regulatory hosts with special emphasis on host-plant relationship in the Tephritidae (Diptera). **Nicanor Liquido** (Nicanor.J.Liquido@aphis.usda.gov), USDA - APHIS, Honolulu, HI

11:48 1750 Overview of APHIS's 7 CFR 330 proposed rulemaking. Dorothy Wayson, Clarissa Maroon-Lango, Osmond Baron, Wayne F. Wehling, Robert H. Tichenor and **Gregg Goodman** (Gregg.B.Goodman@aphis.usda.gov), USDA - APHIS, Riverdale, MD

Ten-Minute Papers, P-IE Section: Pollinators

200 J (Convention Center)

Moderators: Amber D. Tripodi[1] and Sara M. Galbraith[2], [1]USDA - ARS, Logan, UT, [2]Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica

8:00 Introductory Remarks

8:02 1751 Wild bee community change over a 26-year chronosequence of restored tallgrass prairie. **Sean Griffin** (srg228@

cornell.edu)[1], Bethanne Bruninga-Socolar[1], Morgan Kerr[2], Jason Gibbs[3] and Rachael Winfree[1], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]Rowan Univ., Glassboro, NJ, [3]Michigan State Univ., East Lansing, MI

8:14 1752 The impact of land use and landscape context on bee functional diversity in a seasonally dry tropical agro-ecosystem. **Sara M. Galbraith** (sara.marie.galbraith@gmail.com)[1], Lee A. Vierling[2], Terry Griswold[3], Jenny Ordoñez[4] and Nilsa A. Bosque-Pérez[2], [1]Tropical Agricultural Research and Higher Education Center, Turrialba, Costa Rica, [2]Univ. of Idaho, Moscow, ID, [3]USDA - ARS, Logan, UT, [4]World Agroforestry Centre - Latin America, Turrialba, Costa Rica

8:26 1753 Evaluating pollination ecology of *Pityopsis ruthii*, an endangered southern Appalachian species. **Philip Moore** (pmoore17@utk.edu), John Skinner, Phillip Wadl and William Klingeman, Univ. of Tennessee, Knoxville, TN

8:38 1754 Comparing the behavior of three bee species foraging on alfalfa flowers. **Johanne Brunet** (johanne.brunet@ars.usda.gov)[1], Yang Zhao[2], Margaret W. Thairu[2] and Murray Clayton[2], [1]USDA - ARS, Madison, WI, [2]Univ. of Wisconsin, Madison, WI

8:50 1755 Pollen resources for pollinators in specialty oilseed crops. **Matthew Thom** (matt.thom@ars.usda.gov)[1], Carrie Eberle[2] and Frank Forcella[1], [1]USDA - ARS, Morris, MN, [2]Univ. of Minnesota, Morris, MN

9:02 1756 Pollination deficits in Bluecrop and Draper blueberries, *Vaccinium corymbosum*, in the Willamette Valley, Oregon. **George Hoffman** (george.hoffman@oregonstate.edu) and Sujaya Rao, Oregon State Univ., Corvallis, OR

9:14 1757 Hygiene or hysteria: Pathogens of larvae discarded from bumble bee nests. **Amber D. Tripodi** (amber.tripodi@ars.usda.gov)[1], Houston Judd[1,2] and James Strange[1], [1]USDA - ARS, Logan, UT, [2]Utah State Univ., Logan, UT

9:26 1758 Diversity of pollen diet and viral infection affect survival and physiology in honey bees. **Adam Dolezal** (adolezal@iastate.edu), Jimena Carrillo-Tripp, W. Allen Miller, Bryony Bonning and Amy L. Toth, Iowa State Univ., Ames, IA

9:38 1759 Conservation ecology of Japanese honey bee, *Apis cerana japonica*. **Ayumi Fujiwara** (fujiwara328@gmail.com)[1], Takehito Yoshida[1] and Izumi Washitani[2], [1]Univ. of Tokyo, Tokyo, Japan, [2]Chuo Univ., Tokyo, Japan

9:50 Break

10:00 1760 Occurrence of *Malpighamoeba mellificae* in honey bees, *Apis mellifera*, in Arkansas. **Donald C. Steinkraus** (steinkr@uark.edu) and Allen L. Szalanski, Univ. of Arkansas, Fayetteville, AR

10:12 1761 Africanization of a feral honey bee, *Apis mellifera*, population in South Texas: Does a decade make a difference? **Juliana Rangel** (jrangel@tamu.edu)[1], Melissa Giresi[1], Maria Pinto[2], Kristen Baum[3], William Rubink[4], Robert Coulson[1] and J. Spencer Johnston[1], [1]Texas A&M Univ., College Station, TX, [2]Mountain Research Centre, Bragança, Portugal, [3]Oklahoma State Univ., Stillwater, OK, [4]Texas A&M Univ., Edinburg, TX

10:24 1762 Determining the impact of pesticides applied to southern row crops on honey bee health: A two year summary of results across the Mid-South agricultural landscape. **John J. Adamczyk** (john.adamczyk@ars.usda.gov)[1], Gus Lorenz[2], Scott Stewart[3], Don Cook[4], Angus Catchot[5], Don Johnson[6], Jeff Gore[4], William Meikle[7], Milagra Weiss[7], Mohamed Alburaki[3] and Ales Gregorc[8], [1]USDA - ARS, Poplarville, MS, [2]Univ. of Arkansas, Lonoke, AR, [3]Univ. of Tennessee, Jackson, TN, [4]Mississippi State Univ., Stoneville, MS, [5]Mississippi State Univ., Mississippi State, MS, [6]Univ. of Arkansas, Fayetteville, AR, [7]USDA - ARS, Tucson, AZ, [8]Mississippi State Univ., Poplarville, MS

10:36 1763 The Mississippi Honey Bee Stewardship Program: Implementation and adoption. **Angus Catchot** (acatchot@entomology.msstate.edu)[1], Jeff Gore[2] and Jeffrey W. Harris[1], [1]Mississippi State Univ., Mississippi State, MS, [2]Mississippi State Univ., Stoneville, MS

10:48 1764 Refinement of techniques for monitoring bee health and productivity in commercial orchards of the Upper Midwest. **Meghan Milbrath** (mpi@msu.edu) and Rufus Isaacs, Michigan State Univ., East Lansing, MI

11:00 1765 Building bumble bee, (Hymenoptera: Apidae) *Bombus sp.* (Apinae), populations with selected cover crops and wildflowers. **Terryl L. Woods** (woodst@missouri.edu), Univ. of Missouri, Columbia, MO

11:12 1766 Non-target plant uptake of neonicotinoids in pollinator conservation strips. **Christina Mogren** (cmogren@gmail.com) and Jonathan Lundgren, USDA - ARS, Brookings, SD

Ten-Minute Papers, SysEB Section: Morphology, Taxonomy and Systematics

211 B (Convention Center)

Moderators: Michael Caterino[1] and Elijah Talamas[2], [1]Clemson Univ., Clemson, SC, [2]USDA - ARS, Washington, DC

8:00 Welcoming Remarks

8:02 1767 The early history of Histeridae (Coleoptera): New fossils and new techniques yield new insights. **Michael Caterino** (mcateri@clemson.edu), Clemson Univ., Clemson, SC

8:14 1768 Cryptic diversity in *Nicrophorus* (Coleoptera: Silphidae): *Nicrophorus vespilloides* refers to two species. **Derek S. Sikes** (dssikes@alaska.edu)[1], Stephen Trumbo[2] and Stewart B. Peck[3], [1]Univ. of Alaska, Fairbanks, AK, [2]Univ. of Connecticut, Waterbury, CT, [3]Canadian Museum of Nature, Ottawa, ON, Canada

8:26 1769 Urban moth phenotypic and taxonomic characteristics. **Peter White** (pwhite@msu.edu)[1] and Amanda Rice[2], [1]Michigan State Univ., East Lansing, MI, [2]Michigan State Univ., St. Clair Shores, MI

8:38 1770 Systematics of *Trissolcus* and the role of taxonomy in control of the brown marmorated stink bug. Matthew L. Buffington and **Elijah Talamas** (elijah.talamas@ars.usda.gov), USDA - ARS, Washington, DC

8:50 1771 DNA barcoding of fire ant species, genus *Solenopsis*, from Riyadh region, Kingdom of Saudi Arabia. **Khawaja Ghulam Rasool** (krasool@ksu.edu.sa), Muhammad Tufail, Shehzad Salamn and Abdulrahman Aldawood, King Saud Univ., Riyadh, Saudi Arabia

9:02 1772 An overview of North American planthoppers (Hemiptera: Fulgoroidea). **Charles R. Bartlett** (bartlett@udel.edu)[1], Stephen W. Wilson[2] and Lois O'Brien[3], [1]Univ. of Delaware, Newark, DE, [2]Univ. of Central Missouri, Warrensburg, MO, [3]Univ. of Arizona, Tucson, AZ

9:14 1773 Largely ignored: What are we missing in the male genitalia of Ichneumonidae? **Mabel Alvarado** (malvarado@ku.edu), Univ. of Kansas, Lawrence, KS

9:26 Break

9:38 1774 Preliminary results on the taxonomy and systematics of native and introduced *Oobius* (Hymenoptera: Encyrtidae) in North America. **Jason Mottern** (jmott002@ucr.edu) and Michael Gates, USDA - ARS, Washington, DC

9:50 1775 Revisionary studies of *Zaeucoila* (Hymenoptera: Figitidae), leafminer parasitoids in the New World. **Matthew L. Buffington** (matt.buffington@ars.usda.gov), USDA - ARS, Washington, DC

10:02 1776 Mining morphology of dirt-colored seed bug (Hemiptera: Rhyparochromidae) tribes for accurate and rapid identifications. **Adam Wallner** (adam.m.wallner@aphis.usda.gov), USDA - APHIS, Miami, FL

10:14 1777 Three novel *Tamalia* (Hemiptera, Aphididae, Tamaliinae) species associated with leaf galls on *Arbutus*, *Arctostaphylos*, and *Comarostaphylis* shrubs (Ericaceae) in North America. **Donald G. Miller** (dgmiller@csuchico.edu)[1], Keith S. Pike[2], Robert Foottit[3] and Eric Maw[4], [1]California State Univ., Chico, CA, [2]Washington State Univ., Prosser, WA, [3]Agriculture and Agri-Food Canada, Ottawa, ON, Canada, [4]Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, ON

10:26 1778 A new species of genus *Oobius* (Hymenoptera: Encyrtidae) parasitizing eggs of emerald ash borer from the Russian Far East. **Yan-Xia Yao** (yanxia.yao1@gmail.com)[1], Jian Duan[2] and Keith R. Hopper[2], [1]Chinese Academy of Forestry, Beijing, China, [2]USDA - ARS, Newark, DE

10:38 1779 The status of the members of the *Aphis carduella* species group (Hemiptera: Aphididae) in the United States of America. **Doris Lagos-Kutz** (dlagos@illinois.edu)[1], Colin Favret[2], Rosanna Giordano[1] and David Voegtlin[1], [1]Univ. of Illinois, Champaign, IL, [2]Univ. de Montréal, Montreal, QC, Canada

10:50 1780 A new predatory mite species of the genus A*gistemus, Agistemus officinarumus*, (Acari: Stigmaeide) from Pakistan. **Bilal Khan** (dr.bilal.saeed@uaf.edu.pk), Univ. of Agriculture, Faisalabad, Pakistan

11:02 1781 Use of mt COI sequences for the identification of subterranean termite species from Punjab, Pakistan. **Farkhanda Manzoor** (doc_farkhanda@yahoo.com), Lahore College For Women Univ., Lahore, Pakistan

11:14 1782 Morphology and ultrastructure of the antennal glands in the Samsum ant, *Brachyponera* (*Pachycondyla*) *sennarensis*. Mohammed Siddiqui and **Mohammed Al-Khalif** (mkhalifa@ksu.edu.sa), King Saud Univ., Riyadh, Saudi Arabia

11:26 Concluding Remarks

WEDNESDAY, NOVEMBER 18, 2015, AFTERNOON

Joint Town Hall Meeting: Perspectives on Sustainably Supporting the Human Populace in the Future

102 A-F (Convention Center)

Organizer and Moderator: Ronald Turco[1] and Manjit Misra[2], [1]Purdue Univ., West Lafayette, IN, [2]Iowa State Univ., Ames, IA

12:00 Introductory Remarks by Manjit Misra

12:05 1783 Doing more with less: Changes in crop protection technology are helping ideals of IPM succeed. **Allan Felsot** (afelsot@wsu.edu), Washington State Univ., Richland, WA

12:20 **1954** Digital Agriculture for Enhancing Sustainable Productivity. **David Fischhoff**, The Climate Corporation, St Louis, MO

12:35 1784 Sustainable intensification in a world of change. **Siegline S. Snapp** (snapp@msu.edu), Michigan State Univ., East Lansing, MI

12:50 1785 An agroecological perspective. **Ricardo J. Salvador**, Union of Concerned Scientists, Washington, DC

1:05 Panel Discussion, Audience Q&A

1:30 Adjorn

Lunch and Learn: Meet the ESA Editors

209 AB (Convention Center)

Moderators and Organizers: Lisa Junker[1], E. Alan Cameron[2], Kelly Tilmon[3], Eric Natwick[4], William Reisen[5], Marlin Rice[6], Kevin Steffey[7], John T. Trumble[8], Phyllis Weintraub[9] and James Woolley[10], [1]Entomological Society of America, Annapolis, MD, [2]Pennsylvania State Univ., University Park, PA, [3]South Dakota State University, SD, [4]Univ. of California Agriculture and Natural Resources, Holtville, CA, [5]Univ. of California, Davis, CA, [6]DuPont Pioneer, Johnston, IA, [7]Dow AgroSciences, Indianapolis, IN, [8]Univ. of California, Riverside, CA, [9]Agricultural Research Organization, Gilat Research Center, Israel, [10]Texas A&M Univ., College Station, TX

12:15 PM - 1:15 PM

Social Hour with Poster Presenters

Exhibit Hall BC (Convention Center)

Moderators and Organizers: Sue Blodgett[1] and Melody A. Keena[2], [1]Iowa State Univ., Ames, IA, [2]USDA - Forest Service, Hamden, CT

12:15 PM - 1:15 PM

Program Symposium: Molecular Evolution in Social Insects: Insights from the Synergy of Natural History, Diversity, and Genomics

Auditorium 1 (Convention Center)

Moderators and Organizers: Amy L. Toth[1] and Sandra Rehan[2], [1]Iowa State Univ., Ames, IA, [2]Univ. of New Hampshire, Durham, NH

1:30 Welcoming Remarks

1:33 1786 Evolution of sociality in termites: A synergistic approach from ecology to genomics. **Judith Korb** (judith.korb@biologie.uni-freiburg.de), Univ. of Freiburg, Freiburg, Germany

1:50 1787 DNA methylation in termites. **Karl Glastad** (karlglastad@gmail.com), Georgia Institute of Technology, Atlanta, GA

2:07 1788 Maternal manipulation, DNA methylation and neuroplasticity in a subsocial bee. **Sandra Rehan** (sandra.rehan@unh.edu), Univ. of New Hampshire, Durham, NH

2:24 1789 The genetic basis of a social polymorphism in the halictid bee, *Lasioglossum albipes*. **Sarah D. Kocher** (skocher@gmail.com), Harvard Univ., Cambridge, MA

2:41 1790 Molecular mechanisms of social plasticity in bees. **Karen Kapheim** (karen.kapheim@usu.edu), Utah State Univ., Logan, UT

2:58 1791 It's all about balance: Evidence of balancing selection in advanced and primitively social bees. **Amro Zayed** (zayed@yorku.ca), York Univ., Toronto, ON, Canada

3:15 Break

3:31 1792 Molecular basis of key innovations in social evolution. Seirian Sumner and **Daisy Taylor** (daisy.taylor@bristol.ac.uk), Univ. of Bristol, Bristol, United Kingdom

3:48 1797 Genome evolution in social insects. **Michael A. D. Goodisman** (michael.goodisman@biology.gatech.edu), Georgia Institute of Technology, Atlanta, GA

4:05 1794 The impact of mutualism on genome evolution in plant-ants and their endosymbiotic bacteria. **Benjamin E. Rubin** (brubin@fieldmuseum.org), Field Museum of Natural History, Chicago, IL

4:22 1795 The ecology of a social chromosome. **Jessica Purcell** (Jessica.Purcell@unil.ch), Univ. of Lausanne, Lausanne, Switzerland

4:39 1796 The fire ant sex locus. **John Wang** (johnwang@gate.sinica.edu.tw), Academia Sinica, Taipei, Taiwan

4:56 1793 Parasite manipulation of host social behavior in paper wasps: Can a genetic toolkit be hijacked by a parasite? **Amy Geffre** (acgeffre@iastate.edu) and Amy L. Toth, Iowa State Univ., Ames, IA

5:13 1798 Exploring the role of 'hub' genes in the regulation of animal personalities. **Mark Fitzpatrick** (mark.fitzpatrick@utoronto.ca), Univ. of Toronto, Toronto, ON, Canada

MUVE Section Symposium: Advances in Research and Development of Insect Repellents

206 AB (Convention Center)

Moderator and Organizer: Mustapha Debboun, Harris County Public Health & Environmental Services, Houston, TX

1:30 Introductory Remarks

1:33 1799 Comparative repellency of commercial products against *Aedes aegypti* utilizing the K&D *in vitro* bioassay system. **John Smith**, Florida State Univ., Panama City, FL

1:53 1800 The taste of repellency. **Joseph C. Dickens** (Joseph.Dickens@ars.usda.gov), USDA - ARS, Beltsville, MD

2:13 1801 Host specific response to DEET selection in *Anopheles coluzzi*. **James Ricci** (jricc001@ucr.edu), Univ. of California, Riverside, CA

2:33 1802 Behavioral and physiological responses of ticks to repellents and other behavior modifying compounds. **Andrew Li** (andrew.li@ars.usda.gov), USDA - ARS, Beltsville, MD

2:53 1803 Management of insect pests with semiochemicals. **Agenor Mafra-Neto** (president@iscatech.com), ISCA Technologies, Riverside, CA

3:13 1804 Optimizing volatility to select spatial repellents. **Joel Coats** (jcoats@iastate.edu), Iowa State Univ., Ames, IA

3:33 Break

3:43 1805 Evaluation of bite protection of permethrin and etofenprox treated U.S. military combat uniforms. **Ulrich R. Bernier** (uli.bernier@ars.usda.gov)[1], Melynda Perry[2], Natasha Agramonte[1] and Gregory Allen[1], [1]USDA - ARS, Gainesville, FL, [2]Natick Soldier Research, Development, and Engineering Center, Natick, MA

4:03 1806 Plant-based products: Use and development as repellents against mosquitoes. **Junaid Rehman** (junaiddua@gmail.com), Univ. of Mississippi, Abbeville, MS

4:23 1807 Natural products: Screening and evaluation for repellency against mosquitoes. **Abbas Ali** (aali@olemiss.edu), Univ. of Mississippi, University, MS

4:43 1808 Laboratory evaluations of mosquito repellents: Interactions of the host, environment and vector in a small world. **William A. Donahue** (srl@clearwire.net), Bret E. Vinson and Michael W. Donahue, Sierra Research Laboratories, Modesto, CA

5:03 1809 Does multimodal repellency contribute to host specificity of the weed biological control agent, *Mogulones borraginis*? **Ikju Park** (park0563@vandals.uidaho.edu), Mark Schwarzländer, Stephen Cook and Sanford D. Eigenbrode, Univ. of Idaho, Moscow, ID

5:23 Concluding Remarks

P-IE Section Symposium: How Pollinators Work: The Importance of Integrative Physiology in Natural and Agricultural Systems with Changing Climates

212 AB (Convention Center)

Moderators and Organizers: Bryan Helm[1], Kendra Greenlee[1], Julia Bowsher[1], Joseph Rinehart[2] and George D. Yocum[2], [1]North Dakota State Univ., Fargo, ND, [2]USDA - ARS, Fargo, ND

1:30 Introductory Remarks

1:32 1810 An integrative approach to improving honey bee health: From workers to queens. **Michael Simone-Finstrom** (mdsimone@ncsu.edu)[1], Timothy A. Linksvayer[1] and David Tarpy[2], [1]Univ. of Pennsylvania, Philadelphia, PA, [2]North Carolina State Univ., Raleigh, NC

1:57 1811 Variable responses in population genetic structure to climate change within bumble bee communities of the Pacific Northwest. **James Strange** (James.Strange@ars.usda.gov), USDA - ARS, Logan, UT

2:22 1812 Incorporating thermal fluctuations in management protocols improves pollinator health. **Joseph P. Rinehart** (joseph.rinehart@ars.usda.gov), USDA - ARS, Fargo, ND

2:47 1813 Transcriptional responses to temperature stress across life stages in the alfalfa leafcutting bee, *Megachile rotundata*. **Alex Torson** (alex.torson@ndsu.edu), North Dakota State Univ., Fargo, ND

3:12 1814 Physiological limits to upslope range shifts in pollinators. **Michael E. Dillon** (Michael.Dillon@uwyo.edu), Univ. of Wyoming, Laramie, WY

SD1815 Effects of floral polymorphism on pollinators and herbivores in the invasive weed, *Solanum eleaegnifolium*. **Rupesh Kariyat** (rupesh.kariyat@usys.ethz.ch), Swiss Federal Institute of Technology, Zürich, Switzerland

SD1816 Engineering pollinator phenotypes: Consequences of induced size variation on adult morphology and flight performance metrics in the solitary bee, *Osmia lignaria*. **Maxwell Baldwin** (maxwell.baldwin@ndsu.edu)[1], Bryan Helm[1], George D. Yocum[2], Joseph P. Rinehart[2], Julia H. Bowsher[1] and Kendra Greenlee[1], [1]North Dakota State Univ., Fargo, ND, [2]USDA - ARS, Fargo, ND

SD1817 Presentation withdrawn

3:37 Break

3:50 1818 What time is it? Environmental impacts mediating biological rhythms of the alfalfa leafcutting bee, *Megachile rotundata*. **Meghan Bennett** (meghan.bennett@ndsu.edu), North Dakota State Univ., Fargo, ND

4:15 SP1819 Simulating expected changes in pollinator resources as a function of climate change. **Audrey McCombs** (amccombs@iastate.edu)[1], Diane Debinski[1], Kimberly Szcodronski[1], Toni Proescholdt[1], Matthew Germino[2] and Keith Reinhardt[3], [1]Iowa State Univ., Ames, IA, [2]USGS, Boise, ID, [3]Idaho State Univ., Pocatello, ID

4:27 SP1820 A critical evaluation of the insect body size model and causes of metamorphosis in solitary bees. **Bryan Helm** (bryan.r.helm@ndsu.edu)[1], Joseph P. Rinehart[2], George D. Yocum[2], Julia H. Bowsher[1] and Kendra Greenlee[1], [1]North Dakota State Univ., Fargo, ND, [2]USDA - ARS, Fargo, ND

4:39 SP1821 Acute spray toxicity and sub-lethal dose toxicity of major pesticides against honey bees. **Yu Cheng Zhu** (yc.zhu@ars.usda.gov)[1], Jianxiu Yao[1] and John J. Adamczyk[2], [1]USDA - ARS, Stoneville, MS, [2]USDA - ARS, Poplarville, MS

4:51 SP1822 Bee nutrition and floral resource restoration: Integrating nutritional ecology and conservation. **Anthony Vaudo** (adv124@psu.edu)[1], Harland M. Patch[1], David A. Mortensen[1], Daniel Stabler[2], Geraldine A. Wright[2], John Tooker[1] and Christina M. Grozinger[1], [1]Pennsylvania State Univ., University Park, PA, [2]Newcastle Univ., Newcastle Upon Tyne, United Kingdom

5:03 SP1823 Variation in nutrient composition of bee pollen from *Apis mellifera* colonies under crop drought stress. **Arathi Seshadri** (arathi@colostate.edu), Colorado State Univ., Fort Collins, CO

5:15 1824 Honey bees: A jack of many climates. **Mehmet Ali Doke** (mad435@psu.edu), Pennsylvania State Univ., University Park, PA

P-IE Section Symposium: Integrating Ecological and Social Science to Support Synergies and Applied Solutions in Agro-ecosystems

200 D (Convention Center)

Moderators and Organizers: Kelly Garbach[1] and Katharina Ullmann[2], [1]Loyola Univ., Chicago, IL, [2]Univ. of California, Davis, CA

1:30 Welcoming Remarks

1:38 1825 Integrating social and agro-ecological research in a large-scale transdisciplinary project: The STRIPs project experience. **J. Arbuckle** (arbuckle@iastate.edu), Iowa State Univ., Ames, IA

2:02 1826 Prairie strips within row crops provide native bee habitat and a new conservation practice for farmers. **Mary Harris** (maharris@iastate.edu), Iowa State Univ., Ames, IA

2:26 1827 Bees in the shrinking city: Social, economic and infrastructure drivers. **Gerardo Camilo** (camilogr@slu.edu), St. Louis Univ., St. Louis, MO

2:50 1828 Overcoming barriers for field edge habitat plantings on farms in California's Sacramento Valley. **Rachael Long** (rflong@ucanr.edu), Univ. of California, Woodland, CA

3:14 Break

3:29 1829 Avian pest control in walnut orchards: Does local scale biodiversity enhancement facilitate the provision of pest control services? **Sacha Heath** (skheath@ucdavis.edu), Univ. of California, Davis, CA

3:53 1830 Working with growers to enhance crop pollination using wildflower plantings. **Kimiora Ward** (kiward@ucdavis.edu), Univ. of California, Davis, CA

4:17 1831 Sustainable winegrowing programs and practices in Lodi, California. **Matthew Hoffman** (matthew@lodiwine.com), Lodi Winegrape Commission, Lodi, CA

4:41 1832 Making the case for disease prevention in perfectly healthy vineyards. **Kendra Baumgartner** (kbaumgartner@ucdavis.edu), USDA - ARS, Davis, CA

5:05 Panel Discussion

P-IE Section Symposium: Synergy in Agricultural Pest Control: Use of Interdisciplinary Approaches to Feed a Growing Population

200 C (Convention Center)

Moderators and Organizers: Rebecca Schmidt-Jeffris[1] and Kyndall Dye[2], [1]Cornell Univ., Geneva, NY, [2]Univ. of Kentucky, Lexington, KY

1:30 Introductory Remarks

1:35 1833 Weaving networks that transcend disciplines. **Casey W. Hoy** (hoy.1@osu.edu), Ohio State Univ., Wooster, OH

1:55 1834 Cross-disciplinary dialog between animal scientists, rangeland ecologists and veterinary entomologists leads to novel control practices of external parasites in beef systems. **J. Talley** (justin.talley@okstate.edu)[1], John Scasta[2], Josh Payne[3], Trisha Dubie[1], Chris Richards[1], Megan Rolf[1] and Bruce Noden[1], [1]Oklahoma State Univ., Stillwater, OK, [2]Univ. of Wyoming, Laramie, WY, [3]Oklahoma State Univ., Muskogee, OK

2:15 1835 New tools and opportunities to combat mosquito-borne disease. **Genevieve Tauxe** (genevieve.tauxe@email.ucr.edu), Univ. of California, Riverside, CA

2:35 SP1836 Threats and preparedness: The status of field crop entomology in the U.S. **Charles Allen** (ctallen@ag.tamu.edu), Texas A&M Univ., San Angelo, TX

2:47 1837 Incorporating prairie into cropland: Can conservation improve pest management for pests of annual crops? **Matt O'Neal** (oneal@iastate.edu)[1], Rachael Cox[2], Rene Hessel[1], Lisa Schulte[1] and Matthew Helmers[1], [1]Iowa State Univ., Ames, IA, [2]Programa global de Agricultura de Conservacion-Latinoamerica, El Batán, Texcoco, Mexico

3:07 1838 Big interdisciplinarity: Entomology within a large project on climate change and Pacific Northwest wheat systems. **Sanford Eigenbrode** (sanforde@uidaho.edu)[1], Thomas S. Davis[1], S. Ebrahim Sadeghi[1], Nilsa A. Bosque-Pérez[1], Jodi Johnson-Maynard[1], John Abatzoglou[1] and David Huggins[2], [1]Univ. of Idaho, Moscow, ID, [2]USDA - ARS, Pullman, WA

3:27 SP1839 Simulation of western corn rootworm Bt resistance evolution in agricultural landscapes: The importance of insect and human behavior. **John Doudna** (jdoudna@iastate.edu) and Aaron Gassmann, Iowa State Univ., Ames, IA

3:39 Break

3:49 1840 Evaluation of native entomopathogens from west-central Nebraska for use in integrated western corn rootworm management programs. **Camila F. Oliveira-Hofman** (coliveirahofman@gmail.com)[1], Kayla A. Mollet[2], Hsin-Ho Wei[1], Anthony Adesemoye[2], Lance Meinke[1] and Julie A. Peterson[2], [1]Univ. of Nebraska, Lincoln, NE, [2]Univ. of Nebraska, North Platte, NE

4:09 1841 Endophytic entomopathenogenic fungus *Beauveria bassiana*: A tool for comprehensive plant protection. **Shalini Yerukala** (syerukal@vols.utk.edu), Bonnie Ownley and Parwinder Grewal, Univ. of Tennessee, Knoxville, TN

4:29 1842 Using interdisciplinary approaches to find management solutions for spotted wing drosophila. **Kelly Hamby** (kahamby@umd.edu)[1], Kyria Boundy-Mills[1], Joanna Chiu[1], Zainulabeuddin Syed[2] and Frank Zalom[1], [1]Univ. of California, Davis, CA, [2]Univ. of Notre Dame, Notre Dame, IN

4:49 1843 Dynamics of woolly apple aphid, *Eriosoma lanigerum,* in organic and conventional Washington apple orchards. **Robert Orpet** (robert.orpet@wsu.edu)[1], Elizabeth H. Beers[1], John Reganold[2], Jessica Goldberger[2], Vincent Jones[1] and David Crowder[2], [1]Washington State Univ., Wenatchee, WA, [2]Washington State Univ., Pullman, WA

5:09 1844 Integrated pest management components and packages for tropical crops. **Rangaswamy R. Muniappan** (rmuni@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

SysEB Section Symposium: New Approaches in Big-Data Phylogenetics: Data Harvest and Phylogenomic Analyses That Transform Current Systematic Practice

213 AB (Convention Center)

Moderators and Organizers: John K. Moulton[1] and Brian M. Wiegmann[2], [1]Univ. of Tennessee, Knoxville, TN, [2]North Carolina State Univ., Raleigh, NC

1:30 1845 Premier Presentation: The 1KITE initiative: Past, present and future. **Karl M. Kjer** (kjer@aesop.rutgers.edu)[1], Bernhard Misof[2] and Xin Zhou[3], [1]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, [2]Museum Alexander Koenig, Bonn, Germany, [3]Beijing Genomics Institute, Shenzhen, China

1:50 1846 Phylogenomics from next-generation sequence data using aTRAM: Insect examples. **Kevin P. Johnson** (kjohnson@inhs.uiuc.edu)[1], Julie Allen[1] and Bret M. Boyd[2], [1]Univ. of Illinois, Champaign, IL, [2]Univ. of Florida, Gainesville, FL

2:10 1847 Phylogenomics of an ancient rapid radiation: Inferring the evolution of doryline ants. **Marek L. Borowiec** (mlborowiec@ucdavis.edu), Univ. of California, Davis, CA

2:30 1848 Phylogeny of the stinging Hymenoptera (Aculeata) using targeted enrichment of ultra-conserved elements. Michael Branstetter[1], Bryan N. Danforth[2], James P. Pitts[3] and **Seán Brady** (bradys@si.edu)[1], [1]Smithsonian Institution National Museum of Natural History, Washington, DC, [2]Cornell Univ., Ithaca, NY, [3]Utah State Univ., Logan, UT

2:50 1849 Premier Presentation: Genes and genomes yield new insights into the phylogeny and evolution of beetles (order Coleoptera). **Duane D. McKenna** (dmckenna@memphis.edu)[1], Stephanie Haddad[1] and Seunggwan Shin[2], [1]Univ. of Memphis, Memphis, TN, [2]North Carolina State Univ., Raleigh, NC

3:10 Break

3:20 1850 Phylogenomics provides strong evidence for relationships of butterflies and moths. **Akito Y. Kawahara** (kawahara@flmnh.ufl.edu)[1] and Jesse Breinholt[2], [1]Florida Museum of Natural History, Gainesville, FL, [2]Univ. of Florida, Gainesville, FL

3:40 1851 Increasing resolution in the Schizophora radiation (Diptera: Cyclorrhapha) using transcriptome based phylogenomics. **Keith M. Bayless** (kmbayles@ncsu.edu)[1], Michelle Trautwein[2] and Brian M. Wiegmann[1], [1]North Carolina State Univ., Raleigh, NC, [2]California Academy of Sciences, San Francisco, CA

4:00 1852 Using genomic resources to identify and implement genes useful for addressing rapid divergences in Diptera. **John K. Moulton** (jmoulton@utk.edu), Univ. of Tennessee, Knoxville, TN

4:20 SP1853 Dismantling the intercontinental pathway of invasion of *Bemisia tabaci* cryptic invasive species using the nextRAD genome-wide scans approach. **Samia Elfékih** (samia.elfekih@csiro.au)[1], Paul Etter[2], Wee Tek Tay[1], Karl Gordon[1], Eric Johnson[2] and Paul DeBarro[3], [1]CSIRO, Canberra, Australia, [2]Univ. of Oregon, Eugene, OR, [3]CSIRO, Dutton Park, Australia

4:32 SP1854 Population genomics of the potato psyllid in the Pacific Northwest. **Zhen Fu** (zhen.fu@wsu.edu), Carmen Castillo and William E. Snyder, Washington State Univ., Pullman, WA

Member Symposium: Challenges Associated with Managing Bt Resistance: Theory, Regulation, and Implementation

208 AB (Convention Center)

Moderators and Organizers: K. Clint Allen[1], Nathan Little[1] and Nicholas Seiter[2], [1]USDA - ARS, Stoneville, MS, [2]Univ. of Arkansas, Monticello, AR

1:30 Introductory Remarks

1:35 1855 Resistance management for Bt crops: Theory, successes and failures. **Bruce Tabashnik** (brucet@Ag.arizona.edu)[1], Jeffrey Fabrick[2] and Yves Carriere[1], [1]Univ. of Arizona, Tucson, AZ, [2]USDA - ARS, Maricopa, AZ

1:55 1856 Remediation of resistance to a pyramided Bt PIP: Hotspot vs. widespread resistance. **Jeannette Martinez** (martinez.jeannette@epa.gov), USEPA, Washington, DC

2:15 1857 The use of best management practices in optimizing corn rootworm resistance management programs: An ABSTC perspective. **Clinton D. Pilcher** (clint.pilcher@pioneer.com), DuPont Pioneer, Johnston, IA

2:35 1858 Challenges of managing resistance in fall armyworm to Bt crops. **Fangneng Huang** (fhunag@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

2:55 1859 The best laid plans: The reality of rootworm movement and mating in Bt cornfields. **Sarah Hughson** (sahughson@gmail.com) and Joseph Spencer, Univ. of Illinois, Champaign, IL

3:15 Break

3:30 1860 Current and future IRM challenges for the United States cotton industry: The need for collaborations with public-sector scientists. **Doug Sumerford** (douglas.v.sumerford@monsanto.com), Monsanto Company, St. Louis, MO

3:50 1861 Opportunities and limitations in commodity checkoff programs' involvement in Bt resistance management. **Ryan Kurtz** (rkurtz@cottoninc.com), Cotton Incorporated, Cary, NC

4:10 1862 Assessing fitness of *Helicoverpa zea* on commercially available Bt corn hybrids to evaluate field-evolved resistance. **Dominic Reisig** (dominic_reisig@ncsu.edu), North Carolina State Univ., Plymouth, NC

4:30 1863 Are the goals of Bt resistance monitoring acceptable? Experiences with *Helicoverpa zea* in the southern US. **Jeff Gore** (jgore@drec.msstate.edu)[1], Gus Lorenz[2] and Don Cook[1], [1]Mississippi State Univ., Stoneville, MS, [2]Univ. of Arkansas, Lonoke, AR

4:50 Discussion

Member Symposium: Gearing Up Interdisciplinary Science Literacy for the Next Generation

205 CD (Convention Center)

Moderators and Organizers: Rebecca Baldwin[1], John Guyton[2], Andrine A. Shufran[3] and Marianne Shockley[4], [1]Univ. of Florida, Gainesville, FL, [2]Mississippi State Univ., Mississippi State, MS, [3]Oklahoma State Univ., Stillwater, OK, [4]Univ. of Georgia, Athens, GA

1:30 1864 Welcome to the ESA Education and Outreach Symposium. **Andrine A. Shufran** (andrine@okstate.edu), Oklahoma State Univ., Stillwater, OK

1:40 1865 The arthropod project: The link to all things entomological for lessons, activities and demonstrations. **John Guyton** (jguyton@ext.msstate.edu), Mississippi State Univ., Mississippi State, MS

2:05 1866 Providing entomology educational resources: Interdisciplinary studies with Project Wild and Growing Up Wild. **Rebecca Baldwin** (baldwinr@ufl.edu), Univ. of Florida, Gainesville, FL

2:30 1867 Natural resource education by competition: An experience with Environthon. **David Lindbo** (david_lindbo@ncsu.edu), North Carolina State Univ., Raleigh, NC

2:55 1868 Don't let the NGSS bug you: Let's make it user friendly. **Julie Angle** (Julie.angle@okstate.edu), Oklahoma State Univ., Stillwater, OK

3:30 1869 Science literacy across borders. **Robert Ahern** (robert.ahern@iica.int), Inter-American Institute for Cooperation on Agriculture, San Jose, Costa Rica

3:55 1870 Entomology service learning. **Marianne Shockley** (entomolo@uga.edu), Univ. of Georgia, Athens, GA

Member Symposium: How Cool is Entomology?

200 B (Convention Center)

Moderators and Organizers: Brian G. Rector[1] and Theresa L. Pitts-Singer[2], [1]USDA - ARS, Reno, NV, [2]USDA - ARS, Logan, UT

1:30 Welcoming Remarks

1:35 1871 Bombs, beavers, and butterflies. **Erik T. Aschehoug** (erik_aschehoug@ncsu.edu), North Carolina State Univ., Raleigh, NC

1:57 1872 The Moorea Avatar Project: Digitizing a tropical Pacific island from insects to ecosystems. **George Roderick** (roderick@berkeley.edu), Univ. of California, Berkeley, CA

2:19 Break

2:24 1873 Presentation withdrawn

2:46 1874 Confusing colors and suspicious species: The world's largest mimicry complex (Hymenoptera: Mutillidae). **James P. Pitts** (jpitts@biology.usu.edu)[1] and Joseph S. Wilson[2], [1]Utah State Univ., Logan, UT, [2]Utah State Univ., Tooele, UT

3:08 1875 A tale of red ants with green beards. **DeWayne Shoemaker** (dewayne.shoemaker@ars.usda.gov), USDA - ARS, Gainesville, FL

3:30 Break

3:35 1876 Monarchs: Together we can solve the mysteries of America's favorite butterfly. **Carl Stenoien** (sten0364@umn.edu), Univ. of Minnesota, St. Paul, MN

3:57 1877 When entomology unexpectedly goes ballistic: A story of weevils and warplanes. **Brian Aukema** (brianaukema@umn.edu), Univ. of Minnesota, St. Paul, MN

4:19 1878 Studies into real-life zombies: How can a microbe manipulate ant behavior? **Raquel Loreto** (raquelgloreto@gmail.com), Pennsylvania State Univ., University Park, PA

Member Symposium: Pollen Analysis in Bee Research: Sharing Discoveries, Methods, and Resources

204 AB (Convention Center)

Moderators and Organizers: Juliana Rangel[1], Pierre Lau[1], Morgan Carr-Markell[2] and Chia-Hua Lin[3], [1]Texas A&M Univ., College Station, TX, [2]Univ. of Minnesota, St. Paul, MN, [3]The Ohio State Univ., Wooster, OH

1:30 Introductory Remarks

1:35 1879 Pollen coefficients and unifloral honey types. **Vaughn Bryant** (vbryant@tamu.edu), Texas A&M Univ., College Station, TX

1:54 1880 Pollen identification as a tool in studies of bee ecology. **Laurence Packer** (laurencepacker@yahoo.com), Bahar Salehi and Scott MacIvor, York Univ., Toronto, ON, Canada

2:13 1881 Comparing the suitability of the ITS2, matK and rbcL loci for pollen metabarcoding. **Rodney Richardson** (richardson.827@osu.edu)[1], Chia-Hua Lin[2], Juan Quijia Pillajo[2], Natalia Riusech[2], Karen Goodell[3] and Reed Johnson[2], [1]The Ohio State Univ., Columbus, OH, [2]The Ohio State Univ., Wooster, OH, [3]The Ohio State Univ., Newark, OH

2:32 1882 Floral resources used by honey bees in a corn-soybean agro-ecosystem. **Chia-Hua Lin** (Lin.724@osu.edu)[1], Paityn Monagan[2] and Reed Johnson[1], [1]The Ohio State Univ., Wooster, OH, [2]Metro Early College High School, Columbus, OH

2:51 1883 Analysis of pollen collected by honey bees, *Apis mellifera,* in developed areas. **Pierre Lau** (plau0168@tamu.edu)[1], Juliana Rangel[1], Vaughn Bryant[1], Ana Cabrera[2], Daniel Schmehl[2], Joseph Sullivan[3], Zachary Y. Huang[4] and James D. Ellis[5], [1]Texas A&M Univ., College Station, TX, [2]Bayer CropScience, Research Triangle Park, NC, [3]Ardea Consulting, Woodland, CA, [4]Michigan State Univ., East Lansing, MI, [5]Univ. of Florida, Gainesville, FL

3:10 1884 DNA barcoding of pollen with next-generation sequencing: Guidelines and prospects. **Berry J. Brosi** (bbrosi@emory.edu)[1], Karen Bell[1] and Kevin Burgess[2], [1]Emory Univ., Atlanta, GA, [2]Columbus State Univ., Columbus, GA

3:29 1885 Where I've been versus where I am: Inferences from pollen on insects' bodies versus visited flowers. **Diane Larson** (larso268@umn.edu), Research Biologist, St. Paul, MN

3:48 Break

3:55 1886 Identification of Mid-Atlantic pollen collected by honey bees. **Deborah A. Delaney** (dadelane@udel.edu) and Owen Cass, Univ. of Delaware, Newark, DE

4:14 1887 Using the ITS1 gene fragment for barcoding pollen samples and an assessment of accuracy using the BLAST function in GenBank. **Karen W. Wright** (karen@sevilleta.unm.edu), Univ. of New Mexico, Albuquerque, NM

4:33 1888 The effects of drought stressed sunflower pollen on the ability of honey bees to combat *Nosema ceranae*. **Andrew Garavito** (agaravit@terpmail.umd.edu) and Dennis vanEngelsdorp, Univ. of Maryland, College Park, MD

4:52 1889 Pesticides found in pollen and nectar collected by honey bees in urban environments. **Juliana Rangel** (jrangel@tamu.edu)[1], Pierre Lau[1], Vaughn Bryant[1], Ana Cabrera[2], Daniel Schmehl[2], Joseph Sullivan[3], Zachary Y. Huang[4] and James D. Ellis[5], [1]Texas A&M Univ., College Station, TX, [2]Bayer CropScience, Research Triangle Park, NC, [3]Ardea Consulting, Woodland, CA, [4]Michigan State Univ., East Lansing, MI, [5]Univ. of Florida, Gainesville, FL

5:11 1890 Using pollen identification to determine which native prairie species honey bees, *Apis mellifera* L., use as major sources of food. **Morgan Carr-Markell** (carrm163@umn.edu), Marla Spivak and Margaret McDermott-Kubeczko, Univ. of Minnesota, St. Paul, MN

Member Symposium: Use of Arthropods in Wildlife and Applied Ecology: Recognition of Our Common Goals

211 C (Convention Center)

Moderators and Organizers: Adam Mitchell[1] and Steven Grodsky[2], [1]Univ. of Delaware, Newark, DE, [2]North Carolina State Univ., Raleigh, NC

1:30 1891 Invertebrates are wildlife too. **Steven Grodsky** (smgrodsk@ncsu.edu), North Carolina State Univ., Raleigh, NC

1:50 1892 Using arthropods to assess ecosystem health and the impacts of habitat management: Case studies from the North Carolina sandhills. **Clyde E. Sorenson** (clyde_sorenson@ncsu.edu), Heather M.C. Moylett and Samuel Buzuleciu, North Carolina State Univ., Raleigh, NC

2:10 1893 Effect of forest management on red-cockaded woodpecker prey and other invertebrates. **James L. Hanula** (jhanula@fs.fed.us), USDA - Forest Service, Athens, GA

2:30 1894 Arthropods as indicators of restoration success: Lessons from an invaded grassland. **Adam Mitchell** (mitchell.adam.b@gmail.com)[1] and Andrea Litt[2], [1]Univ. of Delaware, Newark, DE, [2]Montana State Univ., Bozeman, MT

2:50 1895 Applying community ecology to understand invertebrate-wildlife interactions in the context of management. **Dean E. Pearson** (dpearson@fs.fed.us), USDA - Forest Service, Missoula, MT

3:10 Discussion

Member Symposium: Regulatory Taxonomy: The Study of Organisms and How You "Phylum"

211 D (Convention Center)

Moderators and Organizers: Laura Jeffers[1] and Esther Serrano[2] [1]USDA - APHIS, Raleigh, NC, [2]USDA - APHIS, Ft. Lauderdale, FL

1:30 1896 Welcome to the 2015 Society for Regulatory Entomology Symposium. **Laura Jeffers** (laura.a.jeffers@aphis.usda.gov), USDA - APHIS, Raleigh, NC

1:35 1897 Science influencing regulation: How APHIS entomologists support the USDA mission. **Rebecca Bech** (christie.a.bertone@aphis.usda.gov), USDA - APHIS, Raleigh, NC

2:05 1898 Balancing accuracy and efficiency: Technical and resource challenges of APHIS identifiers. **William Thomas** (william.e.thomas@aphis.usda.gov), USDA - APHIS, Riverdale, MD

2:35 1899 I want to be an APHIS entomologist! **James Young** (jim.d.young@aphis.usda.gov), USDA - APHIS, Baltimore, MD

2:55 1900 The tick stops here: Identifying ectoparasites of interest to USDA APHIS Veterinary Services. **H. Joel Hutcheson** (hjoel.hutcheson@aphis.usda.gov), James W. Mertins, Jeffery T. Alfred and Jack L. Schlater, National Veterinary Services Laboratories, Ames, IA

3:15 Break

3:30 1901 The roles of still and live digital imaging in PPQ identifier work. **Esther Serrano** (esther.s.serrano@aphis.usda.gov) and William Tang, USDA - APHIS, Ft Lauderdale, FL

3:45 1902 What? A molecular lab at a port of entry? **Cheryle A. O'Donnell** (cheryle.a.o'donnell@aphis.usda.gov), USDA - APHIS, San Diego, CA

4:00 1903 Determining the identity and risks posed by cerambycids intercepted in solid wood packing material: Part A. **Peter F. Reagel** (peter.f.reagel@aphis.usda.gov)[1] and Sindhu M. Krishnankutty[2], [1]Xavier Univ., Cincinnati, OH, [2]Univ. of Illinois, Champaign, IL

4:15 1904 Determining the identity and risks posed by cerambycids intercepted in solid wood packing material: Part B. **Hannah Nadel** (hannah.nadel@aphis.usda.gov), USDA - APHIS, Buzzards Bay, MA

4:30 1905 Using digital x-ray imaging and other methods for pest interception at JFK International Airport. **James Korecki** (james.a.korecki@aphis.usda.gov), USDA - APHIS, Jamaica, NY

4:45 1906 Intercepted Heliothinae: The USDA's challenge of identifying a steady stream of foreign larvae. **Alexander P. Cunningham** (apc@unlserve.unl.edu), USDA - APHIS, Moss Landing, CA

5:00 1907 Passion vs. pragmatism: Creating new diagnostic resources balancing the roles of "good academic scientist" and "good service scientist". **John Moeller Leavengood** (tokay@ufl.edu)[1], David W. McCoy[2] and Adam M. Wallner[3], [1]Univ. of Kentucky, Lexington, KY, [2]USDA - APHIS, Los Indios, TX, [3]Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

5:15 1908 Exotic Cicadellidae interceptions from Mexico at United States ports of entry. **Joel Perez-Mendoza** (Joel.Perez-Mendoza@aphis.usda.gov), USDA - APHIS, Laredo, TX

Late Breaking Symposium: Monarch Butterfly Conservation in North America: Challenges and Opportunities

200 E (Convention Center)

Moderators and Organizers: Sue Blodgett and Steven Bradbury, Iowa State Univ., Ames, IA

1:30 Introductory Remarks

1:35 1909 Status and trends in monarch populations: Basic biology, migration challenges and habitat considerations. **Chip Taylor** (chip@ku.edu), Univ. of Kansas, Lawrence, KS

1:55 1910 Forecasting monarch population responses at continental scales/climatic time scales. **Tyler Flockhart** (dflockha@uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada

2:15 1911 Monarch conservation science: Storylines for recovery. **Wayne Thogmartin** (wthogmartin@usgs.gov), USGS, La Crosse, WI

2:35 1912 Trilateral agreement. **Donita Cotter** (donita_cotter@fws.gov), USFWS, Falls Church, VA

2:55 1913 Role of land grant institutions and states within agriculture-based conservation initiatives. Wendy Wintersteen and **Steven Bradbury** (spbrad@iastate.edu), Iowa State Univ., Ames, IA

3:15 1914 Movement and egg laying in monarch butterflies: Influence of the spatial arrangement of habitat patches. **Myron Zalucki** (m.zalucki@uq.edu.au)[1], Hazel R. Parry[2] and Jacinta Zalucki[3], [1]Univ. of Queensland, Brisbane, Australia, [2]CSIRO, Dutton Park, Australia, [3]Griffith Univ., Brisbane, Australia

3:35 Break

3:45 1915 Landscapes for monarch conservation. **Diane Debinski** (debinski@iastate.edu)[1], Leslie Ries[2], Jessica Petersen[3], Ray Moranz[4], Katy Reeder[5], Stephanie Shepherd[6], John Delaney[1] and Jennifer Vogel[1], [1]Iowa State Univ., Ames, IA, [2]Georgetown Univ., Washington, DC, [3]Roanoke College, Salem, VA, [4]Oklahoma State Univ., Stillwater, OK, [5]Iowa Dept. of Natural Resources, Des Moines, IA, [6]Iowa Dept. of Natural Resources, Boone, IA

4:05 1916 Monarch habitat, NRCS activities. **Philip Barbour** (philip.barbour@ftw.usda.gov), USDA - NRCS, Ft. Worth, TX

4:25 1917 Prescribed fire and mowing as best management practices for monarch habitat in the southern Great Plains. **Kristen Baum** (kristen.baum@okstate.edu), Oklahoma State Univ., Stillwater, OK

4:45 1918 Utilizing spectroscopy to monitor milkweed responses to stress. **John Couture** (jjcouture@wisc.edu) and Phil Townsend, Univ. of Wisconsin, Madison, WI

5:05 1919 Monarch Joint Venture and citizen science. **Karen Oberhauser** (oberh001@umn.edu)[1] and Wendy Caldwell[2], [1]Univ. of Minnesota, St. Paul, MN, [2]Monarch Watch Joint Venture, St. Paul, MN

5:25 Future needs and wrap up

Ten-Minute Papers, MUVE Section: Filth and Biting Flies

208 CD (Convention Center)

Moderators: Nancy Hinkle[1] and Barbara Hull[2], [1]Univ. of Georgia, Athens, GA, [2]Y-TEX Corporation, Cody, WY

1:30 Introductory Remarks

1:35 1920 Effect of dietary restriction on survival, longevity and fecundity of blowfly, *Chrysomya chloropyga (*Wied.) (Diptera: Calliphoridae). **Wasiu Muse** (wmuse2002@yahoo.co.uk), Obafemi Awolowo Univ., Ile-Ife, Nigeria

1:47 1921 Insects, salmon and their microbiomes: The influence of resource pulses on ecological networks. **Jennifer L. Pechal** (pechalje@msu.edu) and M. Eric Benbow, Michigan State Univ., East Lansing, MI

1:59 1922 Techniques for management of adult stable flies, *Stomoxys calcitrans*, in zoological parks. **Jerome A. Hogsette** (jerry.hogsette@ars.usda.gov), USDA - ARS, Gainesville, FL

2:11 1923 Sublethal effects of a neonicotinoid on the filth fly parasitoid *Spalangia endius*. **Edwin Burgess** (tedwin183@comcast.net) and Bethia H. King, Northern Illinois Univ., DeKalb, IL

2:23 1924 Enhanced trapping of stable flies via olfactory and visual cues. **Jerry Zhu** (jerry.zhu@ars.usda.gov)[1], Qing-He Zhang[2], Kristina Friesen[1] and David Taylor[1], [1]USDA - ARS, Lincoln, NE, [2]Sterling International, Spokane, WA

2:35 Break

2:45 1925 Utization of spatial repellents for population management of biting flies. **Daniel L. Kline** (dan.kline@ars.usda.gov), USDA - ARS, Gainesville, FL

2:57 1926 Responses of *Haematobia irritans* to repellents applied to host cattle. **Bradley Mullens** (bradley.mullens@ucr.edu)[1], D. Wes Watson[2], Alec Gerry[1], Diane Soto[1] and Broc Sandelin[3], [1]Univ. of California, Riverside, CA, [2]North Carolina State Univ., Raleigh, NC, [3]California State Polytechnic Univ., Pomona, CA

3:09 1927 Multi-locus markers identify possible routes of introduction of *Culicoides brevitarsis* to Australia and their dispersal within the continent. **Maria Onyango** (Maria.Onyango@csiro.au), Australia Animal Health Laboratory, Geelong, Australia

3:21 1928 Tracking an invader: Range expansion of *Culicoides insignis* in the southeastern United States. **Stacey Vigil** (svigil@uga.edu) and Joseph Corn, Univ. of Georgia, Athens, GA

3:33 1929 Presentation withdrawn

3:45 1930 Ants (Hymenoptera: Formicidae) associated with rabbit carcasses in different ecological habitats in Riyadh, Kingdom of Saudi Arabia. **Ashraf Mashaly** (mmashely@ksu.edu.sa), King Saud Univ., Riyadh, Saudi Arabia

Ten-Minute Papers, SysEB Section: Insect Evolution

211 A (Convention Center)

Moderators: Nate Hardy[1] and Marc Branham[2], [1]Auburn Univ., Auburn, AL, [2]Univ. of Florida, Gainesville, FL

1:30 Welcoming Remarks

1:32 1931 Genetic structure reveals migration of the rice brown planthopper, *Nilaparvata lugens* Stål (Hemiptera: Delphacidae) from China to Japan. **Muhammad Tufail**[1], Muhammad Naeemullah[2], Chiharu Nakamura[2], Khawaja Ghulam Rasool[1], Abdulrahman Aldawood[1] and Makio Takeda[2], [1]King Saud Univ., Riyadh, Saudi Arabia, [2]Kobe Univ., Kobe, Japan

1:44 1932 Speciation before the host shift? Prezygotic reproductive isolation among three varieties of the sunflower maggot using a single host plant. **Andrew Forbes** (andrew-forbes@uiowa.edu)[1], Alaine Hippee[1] and Marty A. Condon[2], [1]Univ. of Iowa, Iowa City, IA, [2]Cornell College, Mount Vernon, IA

1:56 1933 Convergence in liquid-uptake mechanisms among fluid-feeding insects. **Matthew Lehnert** (mlehner1@kent.edu)[1], Andrew Bennett[1], Kristen Reiter[1], Miranda Bowman[1] and Huan Yan[2], [1]Kent State Univ. at Stark, North Canton, OH, [2]Kent State Univ., Kent, OH

2:08 1934 Evolution of diet breadth in scale insects is consistent with specialization by drift. **Nate Hardy** (n8@auburn.edu)[1] and Benjamin B. Normark[2], [1]Auburn Univ., Auburn, AL, [2]Univ. of Massachusetts, Amherst, MA

2:20 1935 Gall size in *Eurosta solidaginis* is influenced by plant-insect-natural enemy coevolution. **Timothy P. Craig** (tcraig@d.umn.edu) and Joanne Itami, Univ. of Minnesota, Duluth, MN

2:32 1936 Jewel beetle color visual systems: From residues to reflectance spectra (Coleoptera: Buprestidae). **Nathan Lord** (bothriderid@gmail.com) and Seth M. Bybee, Brigham Young Univ., Provo, UT

2:44 Break

2:56 1937 The Mexican potato beetle? Phylogeographic insights into the historical expansion of *Leptinotarsa decemlineta.* **Victor Izzo** (izzovi@gmail.com)[1], Joseph T. Labrum[1], David J. Hawthorne[2], Sean Schoville[3] and Yolanda Chen[1], [1]Univ. of Vermont, Burlington, VT, [2]Univ. of Maryland, College Park, MD, [3]Univ. of Wisconsin, Madison, WI

3:08 1938 Evolution and caste plasticity of brain architecture in Neotropical army ants (Formicidae: Ecitoninae). **Sean O'Donnell** (so356@drexel.edu), Susan Bulova, Kevin Purce, Paulina Khodak and Elisabeth Sulger, Drexel Univ., Philadelphia, PA

3:20 1939 Desert Hoppers (Hemiptera: Fulgoroidea: Dictyopharidae: Orgeriini): Diversification and undescribed speciation among the flightless planthoppers of the southwestern US. **Julie Urban** (julie.urban@naturalsciences.org), North Carolina Museum of Natural Sciences, Raleigh, NC

3:32 1940 The neural basis for sympatric speciation in the apple maggot fly, *Rhagoletis pomonella*. **Cheyenne Tait** (ctait@nd.edu)[1], Jeffrey Feder[1] and Shannon Olsson[2], [1]Univ. of Notre Dame, Notre Dame, IN, [2]National Centre for Biological Sciences, Tata Institute of Fundamental Research, Bangalore, India

3:44 1941 Firefly fossils: Their diversity and contributions to understanding the evolution of the family Lampyridae. **Marc Branham** (marcbran@ufl.edu), Univ. of Florida, Gainesville, FL

3:56 1942 Insect integument: The link between insect taxonomy and evolutionary developmental biology. **István Mikó** (istvan.miko@gmail.com), Andrew R. Deans and Heather M. Hines, Pennsylvania State Univ., University Park, PA

4:08 1943 Presentation withdrawn

4:20 Concluding Remarks

Ten-Minute Papers, SysEB Section: Evolution and Ecology of Social Insects

211 B (Convention Center)

Moderators: Shauna Price[1] and Clare Rittschof[2], [1]The George Washington Univ., Washington, DC, [2]Pennsylvania State Univ., University Park, PA

1:30 Welcoming Remarks

1:32 1944 The morphology and kinematics of the trap-jaw ant, *Myrmoteras*. **Fredrick Larabee** (larabee@life.illinois.edu)[1] and Andrew Suarez[2], [1]Smithsonian Institution National Museum of Natural History, Washington, DC, [2]Univ. of Illinois, Champaign, IL

1:44 1945 Ants and their defenses: An evolutionary trade-off? **Benjamin Blanchard** (bblanchard@fieldmuseum.org)[1,2] and Corrie Moreau[2], [1]Univ. of Chicago, Chicago, IL, [2]Field Museum of Natural History, Chicago, IL

1:56 1946 The evolution specialized castes: Testing a classic hypothesis using the turtle ants, *Cephalotes*. **Shauna Price** (slprice@gmail.com)[1,2], Scott Powell[1] and Daniel Kronauer[3], [1]The George Washington Univ., Washington, DC, [2]The Field Museum, Chicago, DC, [3]Rockefeller Univ., New York, NY

2:08 1947 Who are the 'lazy' ants? Inter-worker variation gives insight into potential functions of inactivity. **Daniel Charbonneau** (charbonneau.daniel@gmail.com) and Anna Dornhaus, Univ. of Arizona, Tucson, AZ

2:20 1948 Vespidae phylogeny and caste emergence. **Patrick Piekarski** (pkpiekarski@gmail.com) and Barbara Sharanowski, Univ. of Manitoba, Winnipeg, MB, Canada

2:32 1949 Phylogeny of *Melissodes* (Hymenoptera: Apidae). **Karen Wright** (karen@sevilleta.unm.edu) and Kelly Miller, Univ. of New Mexico, Albuquerque, NM

2:44 Break

2:56 1950 The pre-adult social environment has lasting impacts on adult behavior and health in the honey bee, *Apis mellifera*. **Clare Rittschof** (clare.rittschof@gmail.com), Univ. of Illinois, Champaign, IL

3:08 1951 Theoretical support for balancing selection and reduced diploid male production in multiple-locus complementary sex determination. **Jerome Weis** (weis@umn.edu)[1], Paul Ode[2] and George Heimpel[1], [1]Univ. of Minnesota, St. Paul, MN, [2]Colorado State Univ., Fort Collins, CO

3:20 1952 Presentation withdrawn

3:44 1953 Rates of genomic recombination in two termites with sexual, *Reticulitermes flavipes*, and asexual, *R. speratus*, reproduction as determined by high density, SNP-based markers. **Edward Vargo** (ed.vargo@ag.tamu.edu)[1], Olav Rueppell[2], Kenji Matsuura[3], Paul Labadie[4] and Melissa Giresi[1], [1]Texas A&M Univ., College Station, TX, [2]Univ. of North Carolina, Greensboro, NC, [3]Kyoto Univ., Kyoto, Japan, [4]North Carolina State Univ., Raleigh, NC

3:56 Concluding Remarks

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Common Name Index (Arthropods)

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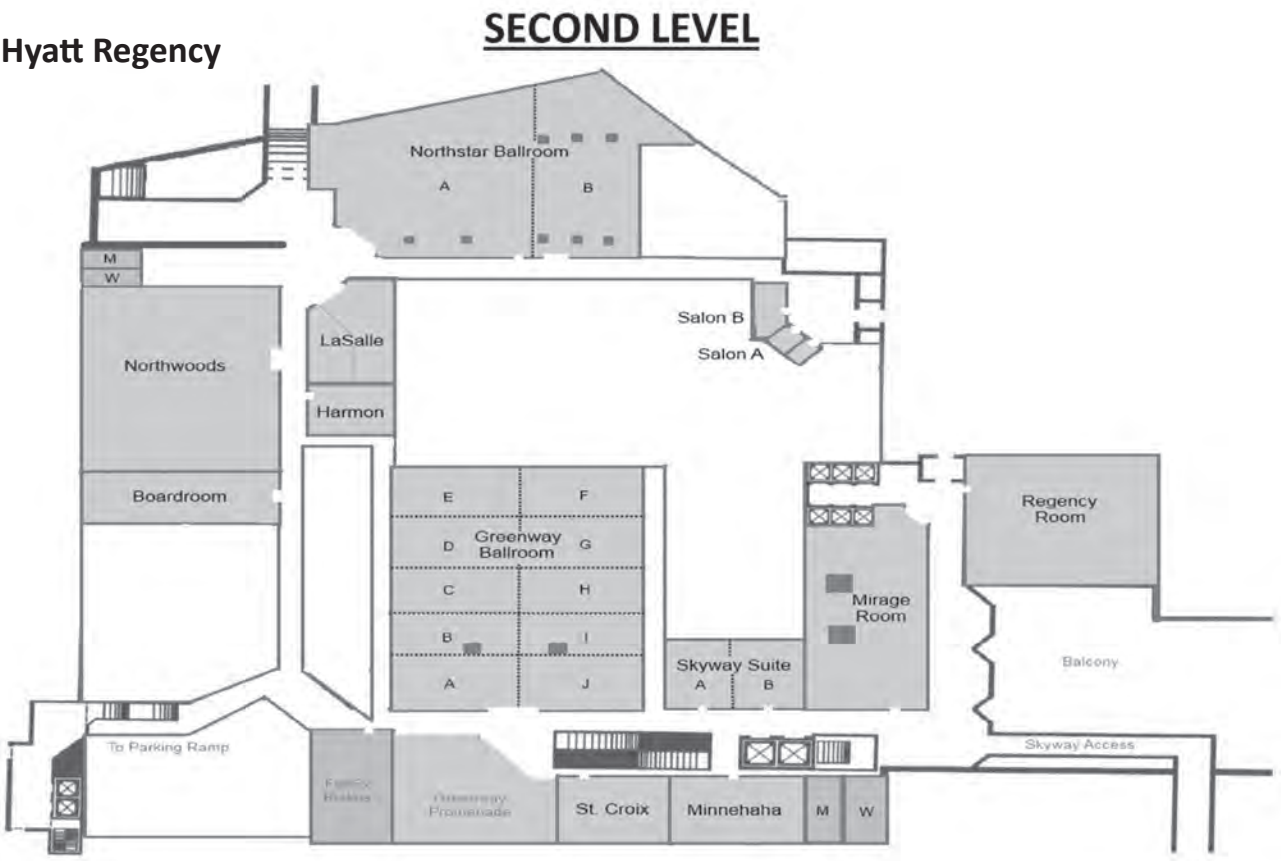
Scientific Name Index (Arthropods)

NOTES:

Hyatt Regency



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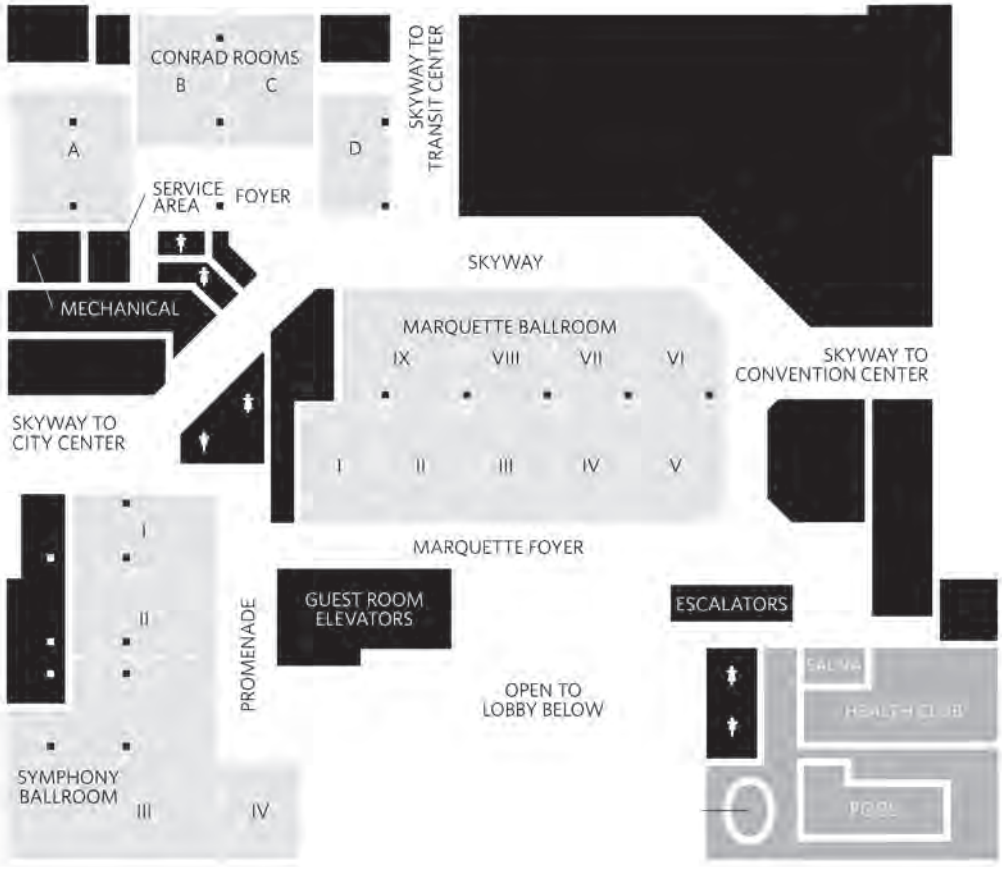

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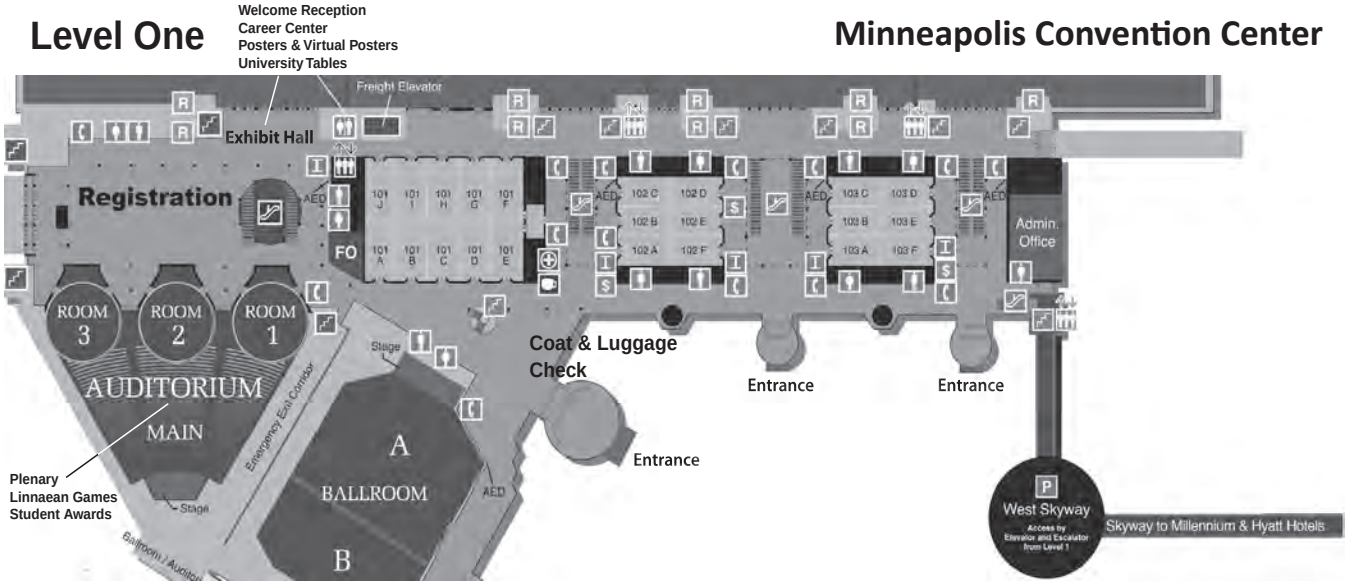

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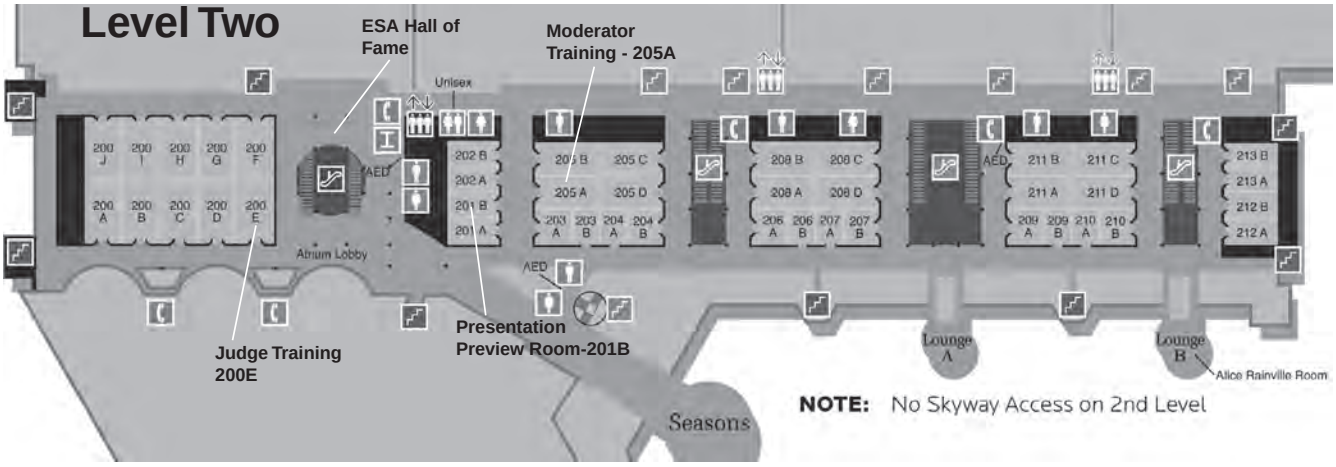

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