



2018 ESA, ESC and ESBC Joint Annual Meeting
Crossing Borders: Entomology in a Changing World

11-14 November | Vancouver, BC, Canada

Réunion annuelle conjointe ESA, SEC et SECB 2018
Au-delà des frontières: l'entomologie dans un monde en changement

11-14 novembre | Vancouver, Colombie-Britannique, Canada



PROGRAM BOOK



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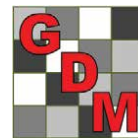
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Presidential Welcome Message for the Joint Annual Meeting

Welcome to Vancouver, British Columbia, and Entomology 2018! The *New York Times* described the city best: “You’re gorgeous, baby, you’re sophisticated, you live well. ...Vancouver is Manhattan with mountains. It’s a liquid city, a tomorrow city, equal parts India, China, England, France, and the Pacific Northwest. It’s the cool North American sibling.” Majestic mountains, sparkling ocean, rainforests, and beautiful foliage throughout all four seasons make Vancouver one of the most beautiful cities in the world.

At this location the Entomological Society of America (ESA), the Entomological Society of Canada (ESC), and the Entomological Society of British Columbia (ESBC) combine to deliver Entomology 2018. Together we developed the theme for the meeting: “Crossing Borders: Entomology in a Changing World.” Michael Blackstock, a Pacific Northwest Gitksan artist, created original artwork for the meeting based on cultural lore. His artwork fits the theme of our scientific meeting by depicting the trickster (a human) crossing from an aquatic environment into a terrestrial one and turning from a human into a mosquito.

The four program committee co-chairs—Surendra Dara and Cheryle O’Donnell (ESA), Chris MacQuarrie (ESC), and Bill Riel (ESBC)—have developed a remarkable and truly integrated program. This team (with the help of others) had their work cut out for them—we had a near-record number of symposia vie for the coveted Program Symposium slots, in addition to a record number of general symposia, paper, and poster submissions. Symposia selected embodied the theme of the meeting, involved international participants, and embraced the diversity and inclusion principles of the societies.

We are confident when we say there is something for everyone at this meeting. Some may complain that the meeting is too big as there will be so many overlapping sessions, you will need to prioritize how to spend your time. This is an artifact of successful scientific organizations with strong national meetings. We guarantee that the level of professionalism, the quality of science, the exchange of ideas, the socializing, and the networking will be second to none. Again, welcome to Vancouver!



Dr. Patrice Bouchard
Agriculture and Agri-Food Canada
President, Entomological Society of Canada



Dr. Jenny S. Cory
Simon Fraser University
President, Entomological Society of British Columbia



Dr. Michael P. Parrella
Dean, College of Agricultural and Life Science
University of Idaho
President, Entomological Society of America

Mot de bienvenue présidentiel pour la réunion annuelle conjointe

Bienvenue à Vancouver, Colombie-Britannique et à Entomology 2018! Le *New York Times* décrit très bien la ville : « Tu es magnifique chérie, tu es sophistiquée, tu vis bien. ...Vancouver est Manhattan avec des montagnes. C’est une ville liquide, une ville de demain, constituée à part égale de l’Inde, la Chine, l’Angleterre, la France et le Nord-Ouest Pacifique. C’est le cousin nord-américain sympa. »¹ Des montagnes majestueuses, un océan scintillant, des forêts humides et du feuillage magnifique tout au long des quatre saisons font de Vancouver une des plus belles villes du monde.

Dans ce lieu, la Société d’entomologie d’Amérique (ESA), la Société d’entomologie du Canada (SEC) et la Société d’entomologie de Colombie-Britannique (SECB) se combinent pour livrer Entomology 2018. Ensemble, nous avons développé le thème pour la prochaine réunion : « Au-delà des frontières : l’entomologie dans un monde en changement ». Michael Blackstock, un artiste Gitksan du Nord-Ouest Pacifique, a créé une œuvre originale pour la réunion basée sur les traditions culturelles. Son œuvre correspond au thème de notre réunion scientifique en décrivant le filou (un humain) passant d’un environnement aquatique à terrestre et se changeant d’humain à moustique.

Les quatre co-présidents du comité du programme – Surendra Dara et Cheryle O’Donnell (ESA), Chris MacQuarrie (SEC), et Bill Riel (SECB) – ont développé un programme remarquable et réellement intégré. Cette équipe (avec l’aide d’autres) a travaillé d’arrache-pied – nous avons eu un nombre presque record de symposiums en compétition pour les créneaux convoités des symposiums du programme, en plus d’un nombre record de soumissions pour les symposiums généraux, présentations et affiches. Les symposiums sélectionnés englobent le thème de la réunion, impliquant des participants internationaux, et incluent les principes de diversité et d’inclusion des sociétés.

Nous sommes confiants lorsque nous disons qu’il y a quelque chose pour tout le monde à cette réunion. Certains se plaindront que la réunion est trop grosse puisque comme il y aura tellement de sessions concurrentes, vous devrez prioriser les activités dans votre horaire. Il s’agit d’un artefact des organisations scientifiques à succès avec des réunions nationales fortes. Nous garantissons que le niveau de professionnalisme, la qualité de la science, les échanges d’idées, le social et le réseautage ne seront secondaires pour personne. Encore une fois, bienvenue à Vancouver!



Dr. Patrice Bouchard
Agriculture et agroalimentaire Canada
Président, Société d’entomologie du Canada



Dr. Jenny S. Cory
Université Simon Fraser
Présidente, Société d’entomologie de Colombie-Britannique



Dr. Michael P. Parrella
Doyen, Collège des sciences de l’agriculture et de la vie
Université de l’Idaho
Président, Société d’entomologie d’Amérique

¹ Traduction libre de la version originale anglaise



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Program Committee Co-Chairs' Welcome

We would like to extend a warm welcome to Entomology 2018 in the cool and vibrant city of Vancouver in beautiful British Columbia, Canada. Entomology 2018 is a joint annual meeting of the Entomological Society of America, the Entomological Society of Canada, and the Entomological Society of British Columbia. Our conference venue is the Vancouver Convention Centre, which has an award-winning, green-themed, waterfront facility in downtown Vancouver located on the unceded territory of the Coast Salish Peoples, including the territories of the x̱w̱məθkwəyəm (Musqueam), Skwxwú7mesh (Squamish), and Səlilwətaʔ/Selilwitulh (Tsleil-Waututh) Nations.

Our theme, "Crossing Borders: Entomology in a Changing World," represents the important status of entomology in global trade, travel, addressing invasive pests, understanding global climate change, citizen science, government policies, and most importantly ensuring food security around the globe. Carefully chosen program and member symposia cover a variety of topics that enhance our understanding of basic and applied aspects of entomology in all facets of our life regionally, nationally, and globally.

The logo of Entomology 2018 is designed by Michael Blackstock, a status native with the Gitanmax Band in Hazelton, as well as a professional forester. The art pays homage to native Canadian culture, in particular the legend of the origin of the mosquito from the Tsimshian, an indigenous people of the Pacific Northwest. Limited prints of the art, signed by artist Michael Blackstock, will be available for sale in the ESA, ESC and ESBC booths (Booths 300, 500 and 502, respectively) in the Exhibit Hall.

Being a joint conference of three esteemed societies, Entomology 2018 is more than a national conference and is hosting nearly 3,800 attendees, which is the highest number of attendees to date. Vancouver offers an excellent location not only for those in North America, but also for other international attendees. After participating in the conference, workshops, mixers, and other social events, you can explore several art galleries, fine restaurants and lively pubs, museums, parks, and other attractions in downtown Vancouver and surrounding areas. Vancouver in November can be wet, so expect showers and come prepared. Please also note that the opening day of Entomology 2018 this year falls on the observance of Remembrance Day in Canada. We ask you to join Canadians by participating in a brief moment of silence to mark this occasion at 11:00 AM on November 11. More information can be found elsewhere in the program book.

We have constructed a program consisting of six program symposia that highlight the major theme of the meeting. These symposia are well complemented by 40 section and 57 member symposia, 800+ student presentations, 1,100+ oral and poster presentations, and 70+ three-minute presentations that highlight the present state of research and knowledge across a wide variety of topics, including a joint ESA-ESC-ESBC Graduate Student Showcase highlighting some of the best student research on the continent. This curation of the submissions this year would not have been possible without the hard work of your poster and student competition co-chairs, Jason Gibbs, Dezene Huber, Rayda Krell, and Patti Prasifka.

Sunday evening kicks off with a plenary lecture by scientist-turned-filmmaker Randy Olson. He'll teach us a new communications strategy to share your story with a nonscientific audience. Wednesday morning, Ryan Church, an independent special-effects artist, will showcase his work from Hollywood movies that is often inspired by insects and nature. Join both of them for a more in-depth conversation after their plenary lectures.

Mot de bienvenue des co-présidents du comité du programme

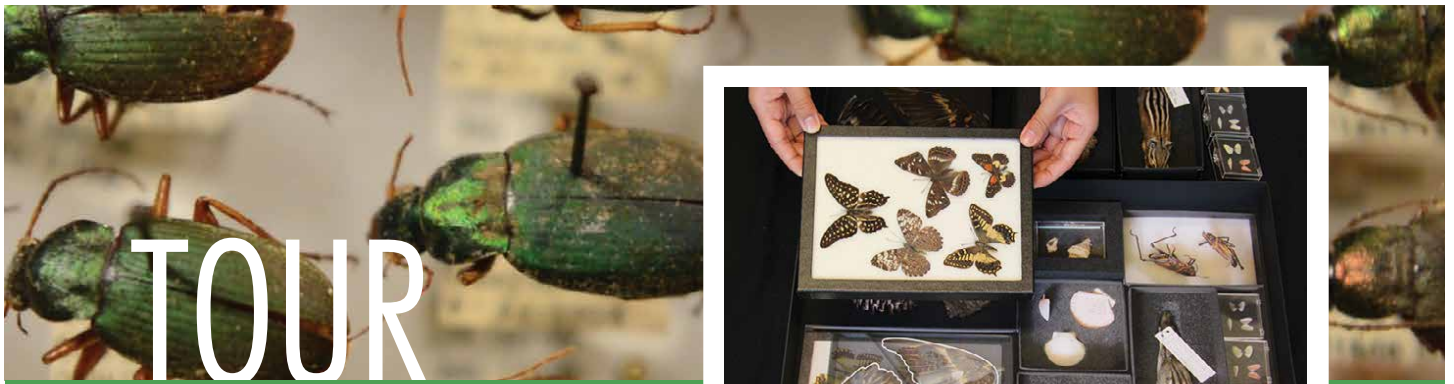
Nous aimerions vous souhaiter un accueil chaleureux à Entomology 2018 dans la ville branchée et vibrante de Vancouver dans la magnifique Colombie-Britannique, Canada. Entomology 2018 est une réunion annuelle conjointe de la Société d'entomologie d'Amérique, de la Société d'entomologie du Canada et de la Société d'entomologie de Colombie-Britannique. Le lieu de notre conférence est le centre des congrès de Vancouver situé dans le centre-ville de Vancouver, en bord de mer. En plus d'être un centre des congrès vert, il a gagné des prix et est situé sur le territoire non-cédé du Peuple Salishe de la côte, incluant les territoires des Nations x̱w̱məθkwəyəm (Musqueam), Skwxwú7mesh (Squamish), et Səlilwətaʔ/Selilwitulh (Tsleil-Waututh).

Notre thème, « Au-delà des frontières : l'entomologie dans un monde en changement », représente le statut important de l'entomologie dans les échanges globaux, les voyages, la question des ravageurs envahissants, la compréhension du changement climatique global, la science citoyenne, les politiques gouvernementales et, de la plus haute importance, assurer la sécurité alimentaire autour du monde. Un programme choisi avec soin et des symposiums des membres qui couvrent une variété de sujets qui améliorent notre compréhension des aspects fondamentaux et appliqués de l'entomologie dans toutes les facettes de notre vie régionalement, nationalement et globalement.

Le logo de Entomology 2018 a été développé par Michael Blackstock, un autochtone de la bande Gitanmax à Hazelton, ainsi qu'un forestier professionnel. L'art rend hommage à la culture des Premières Nations canadiennes, en particulier la légende de l'origine du moustique des Tsimshians, un peuple autochtone du Nord-Ouest Pacifique. Des impressions limitées de l'œuvre, signées par l'artiste Michael Blackstock, seront en vente dans les kiosques de la ESA, SEC et de la SECB (kiosques 300, 500 et 502) dans le Hall d'exposition.

En tant que conférence conjointe des trois sociétés prestigieuses, Entomology 2018 est plus qu'une conférence nationale et reçoit près de 3800 participants, soit le plus haut nombre de participants jusqu'à maintenant. Vancouver offre un excellent lieu, pas seulement pour les gens d'Amérique du Nord, mais aussi pour les participants internationaux. Après avoir participé aux conférences, aux ateliers, aux réceptions et aux autres événements sociaux, vous pourrez explorer les nombreuses galeries d'art, restaurants fins et pubs vivants, musées, parcs et autres attractions dans le centre-ville de Vancouver et dans les régions autour. Vancouver peut être pluvieuse en novembre, alors attendez-vous à de la pluie et arrivez préparés. Veuillez également noter que le jour d'ouverture d'Entomology 2018 tombe cette année le Jour du Souvenir au Canada. Nous vous demandons de vous joindre aux Canadiens en participant à un bref moment de silence pour marquer cette occasion à 11h00 le 11 novembre. Plus d'informations sont disponibles ailleurs dans ce livre du programme.

Nous avons bâti un programme consistant en six symposiums de programmes qui soulignent le thème majeur de la réunion. Ces symposiums sont bien complétés par 40 symposiums des sections et 57 symposiums des membres, plus de 800 présentations étudiantes, plus de 1100 présentations orales et par affiche et plus de 70 présentations de trois minutes qui mettent en valeur le statut actuel de la recherche et des connaissances sur une vaste gamme de sujets, incluant une vitrine conjointe des étudiants diplômés de la ESA-SEC-SECB qui met en vedette certaines des meilleures recherches étudiantes sur le continent. Le traitement des soumissions cette année n'aurait pas été possible sans le travail ardu de vos co-présidents des compétitions étudiantes Jason Gibbs, Dezene Huber, Rayda Krell et Patti Prasifka.



TOUR



Tour the Beaty Biodiversity Museum at the University of British Columbia for FREE!

The Beaty Museum is offering complimentary admission for all Annual Meeting attendees. Just show your badge for complimentary admission and enjoy all of the exhibits and events taking place during your visit.

The museum is open 10:00 AM – 5:00 PM Saturday, Tuesday and Wednesday
(Closed for Remembrance Day and Monday).

For directions and more information, visit beatymuseum.ubc.ca

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Please share the excitement of the more than 3,800 entomologists in Vancouver this November by posting, tweeting, tagging, and sharing with the hashtags #Entsoc18 and #JAM18. Our conference app, ESA Annual Meeting, is a great source to explore the events, engage with participants, and enjoy the conference. Download the app on Google Play Store and Apple Store. Each download and use is one step closer to eliminating the program book.

We are very thankful for the direction of the presidents of the three societies, Michael Parrella, Patrice Bouchard, and Jenny Cory, and the support of the highly organized, dedicated, and efficient ESA staff, section leaders, and the rest of the Program Committee. They made this herculean task a very rewarding and humbling experience. We would also like to thank student competition judges, moderators, and other volunteers who contribute to the success of our conference. And a very special thank you to Véronique Martel who has served as our official translator for the website and program book, making this a truly joint meeting.

We hope that you have a scientifically enriching, environmentally pleasing, and socially fulfilling conference.

Surendra Dara, Cheryle O'Donnell, Chris MacQuarrie, and Bill Riel

2018 ESA, ESC, ESBC Joint Annual Meeting Co-Chairs

Le dimanche soir démarre avec une allocution plénière par le scientifique-devenu-cinéaste Randy Olson. Il nous en apprendra davantage sur une nouvelle stratégie de communication pour partager votre histoire avec un auditoire non-scientifique. Mercredi matin, Ryan Church, un artiste d'effets spéciaux indépendant, nous présentera son travail dans des films d'Hollywood qui sont souvent inspirés par les insectes et la nature. Rencontrez-les tous les deux pour des conversations plus approfondies après leurs allocutions plénières.

Partagez l'excitation de plus de 3800 entomologistes à Vancouver en novembre en affichant, gazouillant, étiquetant et en partageant #Entsoc18 et #JAM18. Notre application de la conférence, ESA Annual Meeting, est une excellente source pour explorer les événements, s'engager auprès des participants et apprécier la conférence. Téléchargez l'application sur Google Play Store et Apple Store. Chaque téléchargement et utilisation est un pas de plus pour éliminer le livre du programme.

Nous sommes très reconnaissants envers les présidents des trois sociétés, Michael Parrella, Patrice Bouchard, et Jenny Cory, ainsi que le soutien du personnel de la ESA, des chefs de sections et du reste du comité du programme, tous hautement organisés, dévoués et efficaces. Ils ont fait de cette tâche herculéenne une expérience très gratifiante et pleine d'humilité. Nous aimerions également remercier les juges des compétitions étudiantes, les modérateurs et les autres bénévoles qui ont contribué au succès de la conférence. Et un merci très spécial à Véronique Martel, qui a nous a servi de traductrice officielle pour le site Internet et le livre du programme, rendant cette réunion réellement conjointe.

Nous espérons que vous aurez une conférence scientifiquement enrichissante, environnementalement plaisante, et socialement satisfaisante.

Surendra Dara, Cheryle O'Donnell, Chris MacQuarrie, et Bill Riel

Co-présidents de la réunion annuelle conjointe ESA, SEC, SECB 2018



PROGRAM COMMITTEE

From left to right: (Back row) Peter Jensen, Dan Peach, Mark Wright, Bill Riel, David O'Brochta, and Staffan Lindgren

(Center row) Jenny Cory, Blair Siegfried, Rob Meagher, Changlu Wang, Mustapha Debboun, Jason Gibbs, Casey Parker, Joanna Konopka, Cheryle O'Donnell, Michael Parrella, Surendra Dara, Floyd Shockley, and Chris Beatty

(Front row) Pat Bouchard, Dezene Huber, Julie Peterson, Rayda Krell, Patty Prasifka, Diane Alston, Dana Nayduch, Chris MacQuarrie, and Wendy Johnson

Comité du programme

De gauche à droite : (Rangée arrière) Peter Jensen, Dan Peach, Mark Wright, Bill Riel, David O'Brochta, et Staffan Lindgren

(Rangée centrale) Jenny Cory, Blair Siegfried, Rob Meagher, Changlu Wang, Mustapha Debboun, Jason Gibbs, Casey Parker, Joanna Konopka, Cheryle O'Donnell, Michael Parrella, Surendra Dara, Floyd Shockley, et Chris Beatty

(Rangée avant) Pat Bouchard, Dezene Huber, Julie Peterson, Rayda Krell, Patty Prasifka, Diane Alston, Dana Nayduch, Chris MacQuarrie, et Wendy Johnson

2018 SILENT AUCTION



NOVEMBER 11-14
IN THE EXHIBIT HALL

Proceeds benefit the ESC and ESBC Student Awards Programs.

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Visit the Silent Auction in the Exhibit Hall to bid on your favorite item(s).

BIDDING OPENS: Sunday, November 11 at 7:30 pm

ITEMS CLOSE each day starting Monday, November 12 at 4:00 pm, Tuesday, November 13 at 4:00 pm and Wednesday, November 14 at 12:00 pm.



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THE *Fairmont*
WATERFRONT
VANCOUVER



Vancouver
Artgallery



Thank you to all our donors, including members of ESA, ESC, and ESBC.

The Silent Auction is organized and run by students. All proceeds go towards supporting outstanding entomology students in their research. **Questions or comments?** Contact Joanna Konopka | jkonopka@uwo.ca



About Vancouver

Cradled amid skyscraping mountains and sparkling ocean, scenic Vancouver is one of the world's premier meeting and convention destinations. World-renowned cuisine, luxury hotels, and unique venues—including the two-time winner of “World's Best Convention Centre”—all add up to an unforgettable conference experience. Visitors experience a modern, cosmopolitan city that blends culture and landscape.

Ground Transportation

The Canada Line connects the Vancouver International Airport (YVR) and downtown Vancouver in less than 30 minutes, dropping you just a few blocks from the Convention Centre. You can access trains from both the international and domestic terminals. Visit the official Canada Line website (thecanadalineline.com) for fare information and schedules. Once downtown, continue to use SkyTrain, the oldest and longest, fully automated, driverless, rapid-transit system, to get around and see the rest of the city (translink.ca).

Vancouver Convention Centre—West Building

1055 Canada Place

Located on Vancouver's waterfront, the West building of the Vancouver Convention Centre (VCC) has received numerous sustainability awards. As the first double LEED® Platinum certified Convention Centre, the building features a six-acre living roof, home to four beehives, where the honey is used in their onsite, made-from-scratch kitchen.

Headquarters Hotels

The Fairmont Waterfront Hotel (900 Canada Place Way) serves as the ESA Headquarters Hotel, and the Pan Pacific (300-999 Canada Place) serves as the ESC and ESBC Headquarters Hotel. Committee meetings and evening mixers will be scheduled at these two hotels in addition to the VCC.

November 11 Remembrance Day

Every year, at the 11th hour of the 11th day of the 11th month, we gather in memorial parks, community halls, workplaces, schools, and homes to stand in honor of all who have fallen. Together, we observe a moment of silence to mark the sacrifice of the many who have fallen in the service of their country, and to acknowledge the courage of those who still serve.

À propos de Vancouver

Entourée de hautes montagnes et d'un océan scintillant, la pittoresque Vancouver est une des premières destinations pour les réunions et les congrès. Sa cuisine reconnue mondialement, ses hôtels luxueux et ses lieux uniques – incluant le lauréat, à deux reprises, du « meilleur centre des congrès au monde » - s'additionnent pour créer une expérience de conférence inoubliable. Les visiteurs font l'expérience d'une ville moderne et cosmopolite qui mélange les cultures et les paysages.

Transport terrestre

La Canada Line relie l'aéroport international de Vancouver (YVR) et le centre-ville de Vancouver en moins de 30 minutes, vous débarquant à quelques pâtés de maison du centre des congrès. Vous pouvez accéder au train des terminaux international et domestique. Visitez le site Internet officiel de Canada Line (thecanadalineline.com) pour les tarifs et les horaires. Une fois au centre-ville, continuez à utiliser le SkyTrain, le plus vieux et le plus long système de transport en commun rapide, complètement automatisé et sans conducteur, afin de vous déplacer et de voir le reste de la ville (translink.ca).

Centre des congrès de Vancouver — Bâtiment ouest

1055 Canada Place

Situé sur le bord de mer, le bâtiment ouest du centre des congrès de Vancouver (CCV) a reçu de nombreux prix de durabilité. En tant que premier centre des congrès double certifié LEED® Platinum, le bâtiment présente un toit vert de six acres, accueillant quatre ruches d'abeille, et le miel est utilisé sur place, dans leur cuisine préparée maison.

Hôtels des quartiers généraux

L'hôtel Fairmont Waterfront (900 Canada Place Way) sert de quartier général à la ESA, et le Pan Pacific (300-999 Canada Place) sert de quartier général à la SEC et la SECB. Les réunions de comité et les réceptions en soirée seront organisées dans ces deux hôtels en plus du CCV.

Jour du souvenir du 11 novembre

Chaque année, à la 11e heure du 11e jour du 11e mois, nous nous rassemblons dans des parcs commémoratifs, les centres communautaires, sur les lieux de travail, dans les écoles et les maisons, pour rendre hommage à tous ceux qui sont morts au combat. Ensemble, prenons un temps d'arrêt et observons un



Eco-Evo-Ento 2019

August 18-21, 2019
Fredericton, NB, Canada

Join us as we bring together
three societies in their
first-ever joint meeting!

Entomological Society of Canada

Acadian Entomological Society

Canadian Society for Ecology and Evolution

Naturally connected - Naturellement branchés

***Connect with entomologists, ecologists, and evolutionary biologists
from across Canada and around the world
at a mid-size meeting with heart!***

- ✓ Link ecological principles and theory to applied entomology
- ✓ Learn new tools and approaches relevant to your work
- ✓ Discover how insects fit into broader studies in ecology
- ✓ Meet new colleagues who can provide novel perspectives

csee-esc2019.ca

 **@CSEE_Meetings**

csee.esc.2019@gmail.com



ACT OF REMEMBRANCE

They shall grow not old,
as we that are left grow old:
Age shall not weary them,
nor the years condemn.
At the going down of the sun
and in the morning
We will remember them.

To show gratitude and support, we invite you to wear a poppy in remembrance of those who sacrificed for our freedom. A poppy box, provided by the Royal Canadian Legion, will be set up at the Registration & Information Center.

moment de silence pour se rappeler les sacrifices de ceux qui sont tombés en service, et saluer le courage de ceux qui sont présentement en service actif.

L'ACTE DU SOUVENIR

Ils ne vieilliront pas comme nous,
qui leur avons survécus.
Ils ne connaîtront jamais l'outrage
ni le poids des années.
Quand viendra l'heure du crépuscule
Et celle de l'aurore,
Nous nous souviendrons d'eux.

Afin de montrer votre gratitude et soutien, nous vous invitons à porter un coquelicot en souvenir de ceux qui se sont sacrifiés pour notre liberté. Une boîte à coquelicots, fournie par la Légion canadienne royale, sera au Centre des inscriptions et informations.



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Visit insectscience.org to learn more.

GENERAL INFORMATION /
INFORMATIONS GÉNÉRALES



Our roots *run deep*

Chances are, you've seen us around the house, or around the yard. In the store, or even out in the field. In fact, families and farmers have turned to Bayer for six generations and counting.

Because for over 150 years, we've been right by your side. Advancing the health of the people, plants and pets you love.

Thank you for trusting us, then and now. Honored to sponsor the Entomological Society of America.

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 Science for a **better life**



General Information

About This Year's Logo

The logo draws inspiration from the legend of the origin of the mosquito from the Tsimshian, an indigenous people of the Pacific Northwest: "In ancient times, blood sucking animals in human form used to invite travelers to their village and then drain their victims' blood by stabbing their long crystal noses into the necks of the unsuspecting travelers while they slept. One young man awoke in time to save himself. He fled from the village with the chief in hot pursuit. The chief tracked the young man to a lake where he had hidden in a tree on the shore. The chief exhausted and soaked himself trying to attack the man's reflection in the water and then, while recovering on the shore, froze solid. The young man and his people took the frozen chief and burned him to ashes. When the fire had burned out, a wind came up and blew the ashes into the air where they turned into clouds of mosquitoes."

Registration & Information Center

Registration will be held in the ballroom lobby of the Vancouver Convention Centre (VCC), during the following times:

Saturday, November 10 • 10:00 AM – 4:00 PM
Sunday, November 11 • 7:00 AM – 9:00 PM
Monday, November 12 • 7:00 AM – 5:00 PM
Tuesday, November 13 • 7:00 AM – 5:00 PM
Wednesday, November 14 • 7:00 AM – 12:00 PM

Attendees can pick up their registration materials at the Registration & Information Center. ESA staff are always available to answer your questions. Registration & Information Center phone number: +1 604-647-7470

Certificates of Presentation and Attendance

Presenters can download and print onsite certificates of presentation and attendance in the Presentation Preview Room (PPR) in Meeting Room 107/108 of the Convention Centre after their presentation has taken place. For hours of operation of the PPR, please see page 23. Attendees who did not present during the Joint Annual Meeting may request certificates of attendance at the Registration & 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.

Code of Conduct

By attending any ESA event, 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, gender identity, 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.

Informations générales

À propos du logo de cette année

Le logo prend son inspiration de la légende de l'origine du moustique des Tsimshians, un peuple autochtone du Nord-Ouest Pacifique : « Dans les temps anciens, les animaux suceurs de sang dans leur forme humaine invitaient les voyageurs dans leur village et drainaient leurs victimes de leur sang en enfonçant leur long nez de cristal dans le cou de ces voyageurs durant leur sommeil. Un jeune homme s'est réveillé à temps pour se sauver. Il s'est enfui du village avec le chef à ses trousses. Le chef a pisté le jeune homme jusqu'à un lac où il se cachait dans un arbre sur la berge. Le chef s'est épuisé et trempé en essayant d'attaquer l'image de l'homme réfléchi dans l'eau, et récupérant sur la berge, s'est figé en glace. Le jeune homme et son peuple ont pris le chef glacé et l'ont brûlé. Quand le feu s'est éteint, le vent s'est levé et a soufflé les cendres dans l'air, où elles se sont transformées en nuage de moustiques. »²

Centre d'inscriptions et d'information

Les inscriptions se tiendront dans le Ballroom du hall d'entrée du Centre des congrès de Vancouver (CCV), aux heures suivantes :

Samedi 10 novembre • 10h – 16h
Dimanche 11 novembre • 7h – 21h
Lundi 12 novembre • 7h – 17h
Mardi 13 novembre • 7h – 17h
Mercredi 14 novembre • 7h – 12h

Les participants peuvent récupérer leur matériel d'inscription au Centre d'inscriptions et d'information. Le personnel de la ESA est toujours disponible pour répondre à vos questions. Numéro de téléphone du centre d'inscriptions et d'information : +1 604-647-7470

Certificats de présentations et de présence

Les présentateurs peuvent télécharger et imprimer sur place des certificats de présentations et de présence dans la Salle de prévisionnement des présentations (SPP) dans la salle de réunion 107/108 du centre des congrès après la tenue de leur présentation. Pour les heures d'ouverture de la SPP, merci de consulter la page 23. Les participants qui n'ont pas donné de présentation durant la réunion annuelle conjointe peuvent demander un certificat de présence au centre d'inscriptions et d'information. Les certificats seront aussi disponibles pour téléchargement via le coin des orateurs après la fin de la conférence; un lien personnalisé vous sera fourni après la réunion annuelle.

Code de conduite

En assistant à tout événement de la ESA, vous acceptez volontairement de vous conformer à nos politiques éthiques.

Auteurs : Tous les auteurs liés à une présentation et/ou un résumé doivent accepter toutes les informations contenues dans la présentation. L'omission pour un auteur d'accepter le format de la présentation mènera au retrait de la présentation de la conférence.

Un auteur qui soumet une présentation à la réunion annuelle doit avoir l'intention d'y assister, s'y inscrire et de présenter à la réunion une fois la soumission acceptée dans le programme. Des annulations à la dernière minute répétées ou consécutives par les présentateurs pourraient résulter dans le rejet de futures soumissions.

Harcèlement et sécurité : La ESA est dévouée à fournir un environnement sécuritaire, accueillant et productif pour toute personne assistant à nos événements, sans égard pour l'ethnicité, la religion, les invalidités, l'apparence physique, le genre, l'identité de genre ou l'orientation sexuelle. Il est important de se rappeler qu'une

² Traduction libre



ENTOMOLOGY 2019

NOVEMBER 17-20 • ST. LOUIS, MO
America's Center Convention Complex

Share your visionary ideas!

Increase awareness of our science and its importance to Society through your research and other creative work. Plan to share your ideas with more than 3,600 others interested in reshaping and elevating the exciting world of entomology during Entomology 2019.



St. Louis, our host city

Centrally located in America's heartland, St. Louis offers many treasures. Come explore the famous Gateway Arch, Riverfront, Forest Park, river boats on the Mississippi, Botanical Gardens, Science Center, Zoo, museums, and more. Also known for its world-class sports, you can enjoy an abundance of walking paths and biking trails, diverse live music venues and a vibrant food scene in the Gateway City.

Watch eNews and visit entsoc.org/entomology2019 for details.

QUESTIONS? meet@entsoc.org

IMPORTANT DATES/DEADLINES:

Program Symposia submission deadline	FEBRUARY 1, 2019
Section & Member Symposia, Organized Meetings and Workshops submission deadline	MARCH 1, 2019
Paper, Posters, 3-min Presentations including Student Competition, and Lunch & Learns submission deadline	MAY 24, 2019
ESA Awards nominations deadline	MAY 31, 2019
Registration & Housing opens	JUNE 5, 2019



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 contact ESA staff who can work with appropriate ESA leadership to resolve the situation.

ESA staff will work with Convention Centre/hotel/venue security and/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.

Expected Behavior:

- Communicate openly with respect and consideration for others, valuing a diversity of views and opinions.
- Avoid personal attacks directed toward other attendees, participants, volunteers, exhibitors, staff, and suppliers/ vendors.
- Be mindful of our surroundings and your fellow participants. Alert staff if you notice a dangerous situation or someone in distress.
- Respect the rules and policies of the Convention Centre, hotels, contracted facility, or any other venue.
- Request permission from speakers before recording or taking photographs during their presentation. Turn off any ringers or otherwise disrupting devices during oral or poster sessions.

Unacceptable Behavior:

It is important that our meeting be a place where no attendee or staff is ever belittled, criticized, or made to feel unsafe. The following behavior will not be tolerated:

- Harassment, intimidation, or discrimination in any form.
- Physical, written, or verbal abuse of any attendee, speaker, volunteer, exhibitor, staff member, service provider, or other meeting guest.
- Examples of unacceptable behavior include, but are not limited to, verbal comments related to gender, sexual orientation, disability, physical appearance, body size, race, religion, or national origin; inappropriate use of nudity and/or sexual images in public spaces or in presentations; and threatening or stalking any attendee, speaker, volunteer, exhibitor, staff member, service provider, or other meeting guest.

Want to file a complaint? Please contact Sherry Marts, our onsite and post conference ombudsman. She can be reached at 202-670-7746 or via email at smartsconsultingllc@gmail.com. For any safety concerns, please contact Rosina Romano, ESA director of meetings, at 703-593-0222, or any nearby staff.

- All reports are kept confidential to the extent possible. We do not share the names of reporters with leadership when determining next steps.
- You may choose to submit an anonymous report. Please note that while we will keep track of anonymous reports, we cannot act on a single anonymous report without further corroboration.
- All reports are taken seriously and will be investigated.
- We will gather all relevant details and information (verbal or written) from the reporter, the target (if they are not the reporter), and witnesses. Please note that investigations may extend beyond the end of the meeting.

communauté où les gens se sentent inconfortables ou menacés n'est ni saine, ni productive. Ainsi, la ESA interdit les conduites intimidantes, menaçantes ou harcelantes durant ses conférences. Cette politique s'applique aux conférenciers, au personnel, aux bénévoles et aux participants. Les participants de la conférence qui violent ces règles pourront être sanctionnés ou expulsés de la conférence, à la discrétion de la direction de la ESA.

Le harcèlement des participants de la ESA ne sera toléré sous aucune forme. Le harcèlement inclut des gestes ou des commentaires verbaux offensants concernant l'ethnicité, la religion, les invalidités, l'apparence physique, le genre ou l'orientation sexuelle dans les espaces publics, l'intimidation délibérée, la traque, le fait de suivre quelqu'un, les photographies ou enregistrements harcelants, l'interruption prolongée de présentations ou autres événements, des contacts physiques inappropriés et de l'attention non sollicitée. Les participants à qui l'on demande de cesser tout comportement de harcèlement devront s'y conformer immédiatement.

Si un participant ou un exposant démontre un comportement de harcèlement, la direction de la ESA pourra prendre toute action jugée appropriée, du simple avertissement du fautif à l'expulsion de cette conférence et toute conférence future. Si vous êtes harcelés, que vous constatez que quelqu'un d'autre est harcelé, ou que vous avez toute inquiétude, merci de contacter le personnel de la ESA qui pourra travailler avec la direction appropriée de la ESA pour résoudre la situation.

Le personnel de la ESA travaillera avec la sécurité du centre des congrès/hôtel/lieu de la réunion et/ou les autorités policières locales, et assistera ceux qui ont subi du harcèlement, afin de les aider à se sentir en sécurité pour la durée de la conférence. Nous apprécions votre présence et nous voulons rendre votre expérience aussi productive et professionnellement stimulante que possible.

Comportements attendus :

- Communiquer de façon ouverte avec respect et considération pour les autres, en valorisant la diversité de points de vue et d'opinion.
- Éviter les attaques personnelles dirigées contre l'assistance, les autres participants, les bénévoles, les exposants, le personnel et les fournisseurs/vendeurs.
- Être attentif à notre environnement et de nos collègues participants. Alerter le personnel si vous notez une situation dangereuse ou quelqu'un en détresse.
- Respecter les règles et les politiques du centre des congrès, des hôtels, des installations contractées, ou de tout autre endroit.
- Demander la permission des présentateurs avant d'enregistrer ou prendre des photographies durant leur présentation. Éteindre toute sonnerie ou autre appareil disruptif durant les sessions orales et d'affiches.

Comportements inacceptables :

Il est important que notre réunion soit un endroit où aucune personne de l'audience ou personnel ne soit dénigrée, critiquée ou ne se sente pas en sécurité. Les comportements suivants ne seront pas tolérés :

- Le harcèlement, l'intimidation ou la discrimination sous toute forme que ce soit.
- Les abus physiques, écrits ou verbaux de toute personne de l'audience, présentateur, bénévole, exposant, membre du personnel, fournisseur de service ou autre invité de la réunion.
- Des exemples de comportements inacceptables incluent, mais ne se limitent pas à des commentaires verbaux liés au genre, à l'orientation sexuelle, aux invalidités, à l'apparence physique, à la taille corporelle, à l'ethnicité, à la religion, à l'origine nationale, l'utilisation inappropriée de nudité et/ou d'images sexuelles dans les espaces publics ou dans les présentations, les menaces ou la traque de toute personne de l'audience, présentateur, bénévole, exposant, membre du personnel, fournisseur de service ou tout autre invité de la réunion.

The Entomological Foundation

STEM Education



Awards



Grants



Raffle



■ The Entomological Foundation exists to support the STEM education needs of K-12 teachers. We believe that a good way to develop a strong foundation in science is through the use of insects in the classroom as an educational tool. Your tax-deductible donations to the Entomological Foundation help to support our work. Stop by the ESA Central booth in the exhibit hall to learn more. And be sure to check

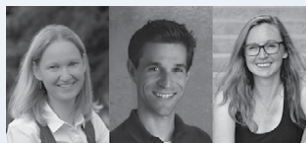


ideas to use in the classroom.

out **STEMbugs** on Tuesday from 2-5 pm in the exhibit hall to pick up some new

■ The Entomological Foundation provides grants for schools, camps, and museums that use insects as a way to get kids excited about entomology. During the 2017-2018 school year, we funded a mosquito education project in Annapolis, MD that featured lifecycle education, habitat reduction, sampling, and even construction of a giant 8-foot mosquito art project permanently displayed at a middle school.

■ The Entomological Foundation offers awards for educators who effectively use insects in the classroom. The President's Prizes for Primary and Secondary Education provide cash for teachers as well as recognition. And the Foundation's Medal of Honor is our highest award, recognizing those who support the mission of the organization. Congratulations to this year's winners, **Ronda Hamm**, **Chris Johnstone**, and **Katie Peterson**.



■ The Entomological Foundation is providing you with a way to win a VIP trip to the 2019 ESA Annual Meeting in St. Louis, MO or other cool prizes. Think you can't win? Just tell that to **Brandon Humburg** who was our big winner in 2017.



This year it could be you.

Your raffle ticket purchases help fund the mission of the Foundation, but they can also help you to win an iPad mini, a VIP trip to St. Louis, or other great prizes. The grand prize package is a VIP trip to the 2019 ESA Annual Meeting in St. Louis that is worth nearly \$2,500 (details online at the link below). There are lots of great prizes available – check them out in the ESA booth on the exhibit floor. Raffle tickets can be bought in the booth. Get one ticket for \$5, three for \$10, five for \$15, or (best value) 10 raffle tickets for \$20. You can also buy your tickets online through Sunday, November 4 at entfdn.org/support-ef-meeting.

Support YOUR discipline's future.

Donate to the Entomological Foundation today at www.entfdn.org.

- The outcomes of investigations and subsequent sanctions will not be made public; however, those reporting incidents may request to be informed of the outcome.
- In addition to the actions that may be taken at meetings (as described above), violators of the Code of Conduct will receive written documentation of the actions taken at and following the meeting.

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. Any presenters who are OK with photographs being taken of their slides are encouraged to indicate this at the beginning of their presentation. ESA reserves the right to use photographs and videos taken and testimonials given during any ESA event for informational and promotional purposes.

First Aid/Medical Emergencies

If first aid services are needed while in the Convention Centre, please call +1 (604) 647-7299 (or from any house phone, dial 7299). 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 in the ballroom lobby, near the rear entrance of Ballroom A.

Fitness Activities

SIGHTSEEING FUN RUN/WALK THROUGH THE STREETS OF VANCOUVER

Date/Time: Sunday, November 11 • 6:30 – 8:30 AM

Fee: \$32 USD • \$40 CND

Location: Meet at the Registration & Information Center

Time to lace up! Join us for a guided City Running & Walking Tour to experience Vancouver's temperate climate and never-ending scenic views—which make it one of the best running cities in the world. Jog or walk along with an experienced guide as you visit and learn about Vancouver landmarks, history, neighborhoods, and postmodern architecture, combining sightseeing with a workout. All tours are guided at a relaxed and comfortable pace, with many stops for interpretation along the way.

SUNRISE YOGA

Date/Time: Wednesday, November 14 • 6:30 – 7:30 AM

Location: Ballroom Foyer, VCC

An energizing morning yoga practice can work as a natural stimulant to set you up for a productive day. This back-bending sequence will help warm up your body and bring you from repose to refresh.

Internet Access

Complimentary internet access is available in all guest rooms. Complimentary Wi-Fi access will be provided in the public and meeting space for attendees at the VCC, the Fairmont Waterfront Hotel, and the Pan Pacific Hotel.

Password login is required at all facilities. Connect to the SSID network, open a browser, and enter the associated password.

SSID: Entomology
Password: #JAM2018

Vous désirez porter plainte? Contactez Sherry Marts, notre ombudsman sur le site et après la conférence. Elle peut être jointe à 202-670-7746 ou par courriel via smartsconsultingllc@gmail.com. Pour toute inquiétude concernant la sécurité, veuillez contacter Rosina Romano, Directrice des réunions de la ESA au 703-593-0222 ou n'importe quel membre du personnel à proximité.

- Tous les rapports sont confidentiels dans la mesure du possible. Nous ne partageons pas les noms des rapporteurs avec les personnes en charge lorsque nous déterminons les étapes suivantes.
- Vous pouvez choisir de soumettre un rapport anonyme. Veuillez noter que bien que nous gardions la trace des rapports anonymes, nous ne pouvons pas prendre d'action sur la base d'un seul rapport anonyme, sans autre corroboration.
- Tous les rapports sont pris au sérieux et seront investigués.
- Nous amasserons tous les détails et les informations pertinents (verbaux ou écrits) du rapporteur, la cible (si différente du rapporteur) et les témoins. Merci de noter que les investigations peuvent s'étendre au-delà de la fin de la réunion.
- Les conclusions des investigations et les sanctions subséquentes ne sont pas rendues publiques; cependant, ceux qui rapportent des incidents peuvent demander à être informés des résultats.
- En plus des actions qui peuvent être prises à la réunion (comme décrites ci-dessus), les transgresseurs du code de conduite recevront de la documentation écrite sur les actions prises durant et suite à la réunion.

Photographie

La ESA demande aux participants de ne pas prendre de photographies ou de vidéos durant les sessions puisqu'elles sont dérangeantes pour les présentateurs. Si vous désirez prendre des photographies d'une présentation ou d'une affiche, merci de contacter le présentateur pour obtenir sa permission. Les présentateurs qui sont d'accord à ce que leurs diapositives soient prises en photo sont encouragés à le dire au début de leur présentation. La ESA se réserve le droit d'utiliser les photographies ou vidéos prises, ainsi que les témoignages donnés durant tout événement de la ESA dans un but informationnel et promotionnel.

Premiers soins/Urgences médicales

Si des premiers soins sont requis au Centre des congrès, veuillez composer le +1 (604) 647-7299 (ou d'un téléphone fixe, composez 7299). Merci d'avoir les informations suivantes : (1) votre localisation précise, (2) la nature de l'urgence, (3) si le patient est conscient, et (4) s'il y a des blessures potentiellement mortelles, saignements, etc. Pour une urgence potentiellement mortelle, composez le 911. Il y a une station permanente de premiers soins dans le Ballroom du hall d'entrée, près de l'entrée arrière du Ballroom A.

Activités physiques

COURSE/MARCHE TOURISTIQUE AMUSANTE DANS LES RUES DE VANCOUVER

Date/heure : Dimanche 11 novembre • 6h30 – 8h30

Tarif : 32\$ USD • 40\$ CND

Lieu : Rendez-vous au centre des inscriptions et information

Joignez-vous à nous pour une visite guidée en courant et marchant afin de découvrir le climat tempéré et les vues scéniques sans fin de Vancouver – qui en fait une des meilleures villes pour la course au monde. Courez ou marchez avec un guide expérimenté alors que vous visitez et en apprenez plus sur les points de repères, l'histoire, les quartiers et l'architecture postmoderne de Vancouver, combinant le tourisme et l'exercice. Tous les tours sont guidés à un rythme détendu et confortable, avec plusieurs arrêts d'interprétation sur le trajet.



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. The Entomological Foundation appreciates all donations, including those that were made anonymously, purchased raffle tickets, and all who made bids at the National and Branch meeting silent auctions. **The Entomological Foundation is grateful for the continuing support of the Kenneth W. Gilstrap Fund to support the STEMbugs teacher workshop.** Financial and silent auction donors listed below are from August 1, 2017 - August 1, 2018.*

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*Every effort has been made to list all donors. If your donation was omitted from this list, please contact cstelzig@entsoc.org.

Mothers' Room

The Convention Centre offers a private space for nursing mothers located next to the first aid station in the Ballroom Foyer, outside the rear entrance of Ballroom A. First aid staff can assist you with accessing the room.

Silent Auction

This year, students are organizing a Silent Auction to support, on the basis of high scholastic achievement and innovative research, outstanding entomology students in their research and to help them increase the scope of their graduate training. The auction will be set up in the Exhibit Hall. Visit entsoc.org/esc-silent-auction for a list of donated items.

Women in Entomology Breakfast

Monday, November 12 • 6:30 – 7:45 AM

***Fee: \$22 USD • \$30 CDN for first 187 tickets sold
\$30 USD • \$38 CDN after the discount is exhausted**

Location: Ballroom Foyer, VCC

*Complimentary for the first 160 student and early-career professional members who arrive to the breakfast event on Monday morning.



Agriculture Division of DowDuPont™

The Women in Entomology Breakfast encourages networking, mentoring, and collegiality, with an emphasis on inspiring women to enter and stay in entomology and science. We thank **Corteva Agriscience™, Agriculture Division of DowDuPont™**, for generously sponsoring the breakfasts of students and postdocs! Open to all interested in promoting women in entomology.

YOGA MATINAL

Date/heure : Mercredi 14 novembre • 6h30 – 7h30

Lieu : Ballroom Foyer, CCV

Une pratique de yoga énérgisant le matin peut fonctionner comme un stimulant naturel pour lancer une journée productive. Cette séquence vous aidera à réchauffer votre corps et passer de reposé à ravivé.

Accès Internet

Un accès Internet gratuit est disponible dans toutes les chambres d'hôtels. L'accès Wi-Fi sera fourni dans les espaces publics et de réunions pour les participants au CCV, Hôtel Fairmont Waterfront et Pan Pacific Hotel. Un mot de passe est requis dans tous les établissements. Connectez-vous au réseau SSID, ouvrez un navigateur et entrez le mot de passe associé.

SSID : Entomology

Mot de passe : #JAM2018

Salle d'allaitement

Le centre de congrès offre un espace privé pour les mères qui allaitent, situé près de la station de premiers soins dans le Ballroom Foyer, à l'extérieur de l'entrée arrière du Ballroom A. Le personnel des premiers soins peut vous aider à accéder à la salle.

Enchères silencieuses

Cette année, les étudiants organisent des enchères silencieuses afin de soutenir les étudiants exceptionnels en entomologie, sur la base des accomplissements scolaires et de la recherche innovatrice, dans leur recherche et afin de les aider à élargir la portée de leur formation supérieure. Les enchères se tiendront dans le Hall d'exposition. Voir entsoc.org/esc-silent-auction pour une liste des objets aux enchères.

Déjeuner des femmes en entomologie

Lundi 12 novembre • 6h30 – 7h45

***Tarif: 22\$ USD • 30\$ CDN pour les 187 premiers billets vendus
30\$ USD • 38\$ CDN après l'épuisement du rabais**

Lieu : Ballroom Foyer, CCV

*Gratuit pour les 160 premiers membres étudiants et jeunes professionnels qui arrivent à l'événement le lundi matin.



Agriculture Division of DowDuPont™

Le déjeuner des femmes en entomologie encourage le réseautage, le mentorat et la collégialité, avec une emphase pour inspirer les femmes à entrer et rester en entomologie et en science. Nous remercions **Corteva Agriscience™, Agriculture Division of DowDuPont™**, pour avoir généreusement financé le déjeuner des étudiants et postdocs! Ouvert à tous ceux qui sont intéressés à promouvoir les femmes en entomologie.

ESA's Online Career Center Bringing a World of Entomologists Together!

Searching for a job? Looking to find a candidate for an open position?

Employers

Search resumes by name, education level and/or key words. More than 6,000 ESA members can post their resumes for free! Post your job ad for 60 days for any level of position you seek and include your logo and a PDF or Word document describing the position. It's easy and it's economical! entsoc.org/submit-job

Job Seekers

Search open positions by company, position, title and/or location. ESA members— post your resume or CV with full contact information so potential employers from around the world can find you. www.entsoc.org/find-job



Sharing Insect Science Globally | entsoc.org/careercenter

We've partnered with Landsea Tours and Adventures

to offer attendees a **10% discount** on all daily sightseeing tour offerings.



Sharing Insect Science Globally



View the tours and book online at vancouverstours.com/ento2018 or call 1-877-669-2277 and use code **"ENTO2018"** to **SAVE 10%**!

Program Information

■ Uploading Presentations

All presenters are requested to upload their presentation the day before their scheduled session. Presenters may upload and/or preview their presentations in the Presentation Preview Room (PPR) located in Meeting Room 107/108 of the VCC. Operating hours are as follows:

Saturday, November 10 • 3:00 – 6:00 PM
Sunday, November 11 • 7:00 AM – 6:00 PM
Monday, November 12 • 7:00 AM – 6:00 PM
Tuesday, November 13 • 7:00 AM – 6:00 PM
Wednesday, November 14 • 7:00 AM – 12:00 PM

■ Moderator Training

Moderators for symposia, Student Competition, 10-minute paper sessions, and 3-minute presentation sessions are required to attend one of the moderator training sessions. All moderator training sessions will be held in Meeting Room 109 of the Convention Centre. Following are the dates and times for the training sessions:

Saturday, November 10 • 2:00 – 2:30 PM
Sunday, November 11 • 7:00 – 7:30 AM
Monday, November 12 • 7:00 – 7:30 AM
Tuesday, November 13 • 7:00 – 7:30 AM

■ Student Competition Judges' Training

Judges for the Student Competition are required to attend one of the judges' training sessions. All judges' trainings will be held in Meeting Room 111/112 of the Convention Centre. The dates and times for the training sessions are as follows:

Saturday, November 10 • 3:00 – 3:30 PM
Sunday, November 11 • 7:00 – 7:30 AM
Monday, November 12 • 7:00 – 7:30 AM

■ Documentary Films

Tuesday, November 13 • 6:30 – 8:00 PM

Meeting Room 201, Convention Centre

We are delighted to host our first film night featuring four works by Dr. Urs Wyss of entofilm.com. Join us for popcorn as we showcase his work and offer an opportunity to ask questions to Dr. Wyss in between each film.

6:30 – 7:05 PM: *Highlights of Hidden Insect Worlds*
7:10 – 7:25 PM: *Behaviour and Development of the Medfly Ceratitis capitata*
7:30 – 7:45 PM: *Behaviour and Development of the European Corn Borer Ostrinia nubilalis*
7:45 – 8:00 PM: *Behaviour and Development of the Spotted-Wing Drosophila Drosophila suzukii*

Informations sur le programme

■ Chargement des présentations

Tous les présentateurs doivent téléverser leur présentation le jour précédent leur session. Les présentateurs peuvent téléverser et/ou pré-visionner leur présentation dans la salle de pré-visionnement des présentations (SPP) situé dans la salle de réunion 107/108 du CCV. Les heures d'ouverture sont les suivantes :

Samedi 10 novembre • 15h – 18h
Dimanche 11 novembre • 7h – 18h
Lundi 12 novembre • 7h – 18h
Mardi 13 novembre • 7h – 18h
Mercredi 14 novembre • 7h – 12h

■ Formations des modérateurs

Les modérateurs des symposiums, de la compétition étudiante et des sessions de présentations de 10 minutes et de 3 minutes doivent assister à une des sessions de formation des modérateurs. Toutes les sessions de formation des modérateurs se tiendront dans la salle de réunion 109 du centre des congrès. Les dates et heures pour les sessions de formations sont les suivantes :

Samedi 10 novembre • 14h – 14h30
Dimanche 11 novembre • 7h – 7h30
Lundi 12 novembre • 7h – 7h30
Mardi 13 novembre • 7h – 7h30

■ Formations des juges des compétitions étudiantes

Les juges pour les compétitions étudiantes doivent assister à une des sessions de formation des juges. Toutes les sessions de formation des juges se tiendront dans la salle de réunion 111/112 du centre des congrès. Les dates et heures pour les sessions de formations sont les suivantes :

Samedi 10 novembre • 15h – 15h30
Dimanche 11 novembre • 7h – 7h30
Lundi 12 novembre • 7h – 7h30

■ Films documentaires

Mardi 13 novembre • 18h30 – 20h

Salle de réunion 201, centre des congrès

Nous sommes ravis d'organiser notre première soirée de films mettant en vedette quatre travaux de Dr. Urs Wyss de entofilm.com. Joignez-vous à nous avec du maïs soufflé alors que nous présenterons son travail et offrirons une opportunité de poser des questions à Dr. Wyss après chaque film.

18h30 – 19h05: *Highlights of Hidden Insect Worlds*
19h10 – 19h25: *Behaviour and Development of the Medfly Ceratitis capitata*
19h30 – 19h45: *Behaviour and Development of the European Corn Borer Ostrinia nubilalis*
19h45 – 20h: *Behaviour and Development of the Spotted-Wing Drosophila Drosophila suzukii*

Lunch and Learns

Full descriptions are available in English and French online entsoc.org/lunch-learn. Unless otherwise specified, participants should bring lunch with them as lunch will not be provided.

OUTREACH AND EDUCATIONAL PROGRAM ASSESSMENT AND EVALUATION

Sunday, November 11 • 12:15 – 1:15 PM
City Foyer (Level 2), Convention Centre

ADVOCATE ENTOMOLOGY! LEARN HOW WITH THE SCIENCE POLICY COMMITTEE

Monday, November 12 • 12:30 – 1:30 PM
Meeting Room 205, Convention Centre

AVOIDING PITFALLS IN EARLY GRADUATE SCHOOL: PREPARING EARLY ON FOR THE JOB MARKET

Monday, November 12 • 12:30 – 1:30 PM
Meeting Room 207, Convention Centre

DOWN WITH PUBLISH OR PERISH! NONTRADITIONAL CAREERS IN ENTOMOLOGY

Monday, November 12 • 12:30 – 1:30 PM
Meeting Room 206, Convention Centre

WHAT IS THE FUTURE OF ESA AND WHERE DO I BELONG?

Monday, November 12 • 12:30 – 1:30 PM
West Ballroom ABC, Convention Centre

AN IMAGE IS WORTH A THOUSAND WORDS: SCIENCE VISUALIZATION AND COMMUNICATION FOR ENTOMOLOGICAL RESEARCH

Monday, November 12 • 12:45 – 1:45 PM
Meeting Room 201, Convention Centre

FUNDING OPPORTUNITIES AT THE NATIONAL SCIENCE FOUNDATION

Tuesday, November 13 • 12:15 – 1:15 PM
City Foyer (Level 2), Convention Centre

INSECT POLLINATORS AND REAL-WORLD SCIENCE: GETTING UNDERGRADUATES EXCITED ABOUT INSECTS

Tuesday, November 13 • 12:15 – 1:15 PM
Meeting Room 221/222, Convention Centre

BE A BETTER PEER REVIEWER

Tuesday, November 13 • 12:30 – 1:30 PM
Meeting Room 201, Convention Centre

GETTING AN UP-CLOSE LOOK AT CONCEPT ARTIST RYAN CHURCH'S ART AND INSPIRATION

Wednesday, November 14 • 10:30 AM – 12:00 PM
Ballroom, Convention Centre

A CROSS-BORDER APPROACH FOR ASSESSING THE RISK OF PESTICIDES TO BEES IN CANADA AND THE U.S.

Wednesday, November 14 • 12:15 – 1:15 PM
Meeting Room 306, Convention Centre

Ateliers-midi

Des descriptions complètes sont disponibles en anglais et en français en ligne sur entsoc.org/lunch-learn. Sauf indication contraire, les participants doivent apporter leur lunch puisque la nourriture ne sera pas fournie.

ANALYSE ET ÉVALUATION DES PROGRAMMES DE DIFFUSION ET D'ÉDUCATION

Dimanche 11 novembre • 12h15 – 13h15
City Foyer (niveau 2), Centre des congrès

DÉFENDEZ L'ENTOMOLOGIE! APPRENEZ COMMENT AVEC LE COMITÉ DES POLITIQUES SCIENTIFIQUES

Lundi 12 novembre • 12h30 – 13h30
Salle 205, Centre des congrès

ÉVITER LES PIÈGES AU DÉBUT DES ÉTUDES SUPÉRIEURES : SE PRÉPARER TÔT POUR LE MARCHÉ DU TRAVAIL

Lundi 12 novembre • 12h30 – 13h30
Salle 207, Centre des congrès

SORTIR DE PUBLIER OU PÉRIR! CARRIÈRES NON-TRADITIONNELLES EN ENTOMOLOGIE

Lundi 12 novembre • 12h30 – 13h30
Salle 206, Centre des congrès

QUEL EST L'AVENIR DE LA ESA ET OÙ EST-CE QUE JE ME SITUE?

Lundi 12 novembre • 12h30 – 13h30
West Ballroom ABC, Centre des congrès

UNE IMAGE VAUT MILLE MOTS : VISUALISATION ET COMMUNICATION DE LA SCIENCE POUR LA RECHERCHE ENTOMOLOGIQUE

Lundi 12 novembre • 12h45 – 13h45
Salle 201, Centre des congrès

LES OPPORTUNITÉS DE FINANCEMENT À LA FONDATION NATIONALE DE SCIENCES

Mardi 13 novembre • 12h15 – 13h15
City Foyer (niveau 2), Centre des congrès

LES INSECTES POLLINISATEURS ET LA SCIENCE DU MONDE RÉEL : AMENER LES ÉTUDIANTS DE PREMIER CYCLE À S'EMBALLER DEVANT LES INSECTES

Mardi 13 novembre • 12h15 – 13h15
Salle 221/222, Centre des congrès

ÊTRE UN MEILLEUR RÉVISEUR D'ARTICLES

Mardi 13 novembre • 12h30 – 13h30
Salle 201, Centre des congrès

REGARDER DE PRÈS L'ART ET L'INSPIRATION DE L'ARTISTE CONCEPTUEL RYAN CHURCH

Mercredi 14 novembre • 10h30 – 12h
Ballroom, Centre des congrès

UNE APPROCHE TRANSFRONTALIÈRE POUR ÉVALUER LES RISQUES DES PESTICIDES POUR LES ABEILLES DU CANADA ET DES ÉTATS-UNIS

Mercredi 14 novembre • 12h15 – 13h15
Salle 306, Centre des congrès

BREAKING DOWN THE PROVERBIAL WALL: USING EFFECTIVE MENTORING TO MAXIMIZE WORKING RELATIONSHIPS

Wednesday, November 14 • 12:15 – 1:15 PM
City Foyer (Level 2), Convention Centre

CERTIFICATIONS: WHAT THERE IS AND HOW IT HELPS

Wednesday, November 14 12:45 – 1:45 PM
Meeting Room 221/222, Convention Centre
A boxed lunch for the first 50 attendees will be provided.

Tours

Advance registration is suggested as we expect many of our tours to sell out. Don't see what you are looking for? We've partnered with Landsea Tours and Adventures to offer attendees a 10% discount on all daily sightseeing tour offerings. View the tours and book online at vancouverontours.com/ento2018 or call 1-877-669-2277 and use code "ENTO2018" to save 10%!

VANCOUVER FOODIE TOUR

Sunday, November 11 • 9:00 AM – 2:30 PM
Fee: \$72 USD • \$90 CND

Location: Meet at the Registration & Information Center

Join us for the best introduction to Vancouver, a combined city highlights tour *and* Granville Island Market Tour, tasting the best of the market! Start with a tour through the Queen Elizabeth Park, with a scenic stop at the sunken gardens on your way to visit the Bloedel Conservatory, a domed lush paradise atop the City of Vancouver's highest point. View more than 120 free-flying exotic birds and 500 exotic plants and flowers that thrive within the temperature-controlled environment.

Next, travel to the Granville Island, one of the most visited attractions in Vancouver, to experience Granville Market, and spend the next two hours exploring and tasting the best of the market. You won't leave hungry!

VANCOUVER'S NORTH SHORE, LYNN CANYON, & CAPILANO SALMON HATCHERY

Monday, November 12 • 1:30 – 5:00 PM
Fee: \$80 USD • \$99 CND

Location: Meet at the Registration & Information Center

Join us for a trip across the harbor to Vancouver's North Shore and spectacular city, with mountain and ocean views. Depart the VCC and travel through Stanley Park and over the impressive Lions Gate Bridge to the North Shore, for a visit to the Lynn Valley Canyon. Giant cedars and Douglas fir trees greet guests as they cross the spectacular Lynn Canyon Suspension Bridge, offering stunning views of the canyon below. Next, stop at the Capilano Salmon Hatchery, where guests will see the bright red salmon jump and fight their way upstream!

CURATORIAL TOUR OF THE BEATY BIODIVERSITY MUSEUM

Tuesday, November 13 • 1:00 – 4:30 PM
Fee: **SOLD OUT**
Location: Meet at the Registration & Information Center

UTILISER DU MENTORAT EFFICACE POUR MAXIMISER LES RELATIONS DE TRAVAIL

Mercredi 14 novembre • 12h15 – 13h15
City Foyer (niveau 2), Centre des congrès

CERTIFICATIONS : CE QUI EXISTE ET COMMENT ÇA PEUT AIDER

Mercredi 14 novembre • 12h45 – 13h45
Salle 221/222, Centre des congrès
Une boîte à lunch sera fournie pour les 50 premiers participants.

Excursions

L'inscription en avance est suggérée puisque nous anticipons que plusieurs excursions soient complètes. Vous n'avez pas trouvé ce que vous cherchiez? Nous avons un partenariat avec Landsea Tours and Adventures pour offrir aux congressistes un rabais de 10% sur toutes les visites touristiques d'une journée. Consultez les excursions et réservez en ligne sur vancouverontours.com/ento2018 ou appelez 1-877-669-2277 et utilisez le code « ENTO2018 » pour économiser 10%!

EXCURSION GOURMANDE À VANCOUVER

Dimanche 11 novembre • 9h – 14h30
Tarif : 72\$ USD • 90\$ CND

Lieu : Rendez-vous au centre des inscriptions et informations

Joignez-vous à nous pour la meilleure introduction à Vancouver, une visite combinant les attraits de la ville ET un tour du marché de Granville Island, en goûtant au meilleur du marché! Débutez avec un tour dans le parc Queen Elizabeth avec un arrêt pittoresque dans les jardins en contre-bas en route vers le Bloedel Conservatory, un paradis luxuriant sous un dôme au sommet du plus haut point de la ville de Vancouver. Voyez plus de 120 oiseaux exotiques en liberté et 500 plantes et fleurs exotiques s'épanouir dans l'environnement à température contrôlée.

Rendez-vous ensuite à Granville Island, un des attraits les plus visités de Vancouver, le marché Granville et passez les deux heures suivantes à explorer et goûtez le meilleur du marché. Vous ne partirez pas le ventre vide!

RIVE NORD DE VANCOUVER, LYNN CANYON & ÉCLOSERIE DE SAUMONS DE CAPILANO

Lundi 12 novembre • 13h30 – 17h
Tarif : 80\$ USD • 99\$ CND

Lieu : Rendez-vous au centre des inscriptions et informations

Joignez-vous à nous pour une excursion de l'autre côté du port de Vancouver à North Vancouver avec vue spectaculaire sur la ville, la montagne et l'océan. Partez du CCV par le parc Stanley et sur l'impressionnant pont Lions Gate pour la rive nord, pour une visite dans le canyon Lynn. Les cèdres et sapins de Douglas géants accueillent les visiteurs alors qu'ils traversent le spectaculaire pont suspendu du canyon Lynn, offrant des vues époustouflantes du canyon dessous. Arrêtez ensuite à l'écluserie de saumon de Capilano, où les visiteurs verront les saumons rouges vifs sauter et se battre à contre-courant!

VISITE DE CONSERVATION DU MUSÉE DE LA BIODIVERSITÉ BEATY

Mardi 13 novembre • 13h – 16h30
Tarif : **Complet**

Lieu : Rendez-vous au centre des inscriptions et informations

MOUNTAIN DISCOVERY TOUR

Wednesday, November 14 • 10:00 AM – 4:00 PM

Fee: \$120 USD • \$150 CND

Location: Meet at the Registration & Information Center

The Mountain Discovery Tour takes you to the mild rainforest of Vancouver's North Shore, with stops at Capilano Suspension Bridge Park and Grouse Mountain. Capilano Suspension Bridge Park is full of lively adventures. Walk among ancient cedar trees on the Treetops Adventure forest canopy walkways. Enjoy the thrill of Cliffwalk, a series of structured and suspended walkways jutting out from the granite cliff face. Don't miss the heart-pounding journey across the iconic suspension bridge, 73 meters (230 feet) above Capilano River.

Rising 1,250 meters (4,100 feet) above Vancouver, Grouse Mountain offers striking city views and a vast amount of things to do. Explore the Refuge for Endangered Wildlife, home to two grizzly bears, Grinder and Coola. Have lunch in one of several dining outlets or ride the Peak Chair to the very top of the mountain and visit the Eye of the Wind, a large wind turbine. Also, learn about the lifecycle of the Pacific salmon at the Capilano Salmon Hatchery. This is a terrific light adventure into the stunning nature that surrounds the city.

Workshops

Full descriptions are available in English and French online entsoc.org/workshops.

BREAKING DOWN THE BORDER BETWEEN READERS AND WRITERS: HOW TO IMPROVE YOUR SCIENTIFIC WRITING

Sunday, November 11 • 1:30 – 5:30 PM

Meeting Room 211, Convention Centre

Fee: **SOLD OUT****STORY CIRCLE DEMO DAY (WITH RANDY OLSON)**

Monday, November 12 • 9:00 AM – 12:00 PM

Meeting Room 201, Convention Centre

Fee: \$10 USD • \$12.50 CAD

Active participant registration limited to the first 50 participants. An additional complimentary 20 observer seats available at the door, first-come, first-served.

After November 12, participants will have the option to sign up for a weekly Story Circles group. The workshop registration fee will be applied to the 10-week story circles fee. An additional \$190 USD (\$240 CND) will be collected after the meeting for participants who wish to continue with story circles.

CREATING SAFE AND PRODUCTIVE ENVIRONMENTS FOR ALL ENTOMOLOGISTS THROUGH INCLUSIVE LEADERSHIP

Tuesday, November 13 • 10:00 AM – 12:00 PM

Meeting Room 201, Convention Centre

Fee: **SOLD OUT****EXTENSION ENTOMOLOGY SHARE FAIR**

Tuesday, November 13 • 10:30 AM – 12:30 PM

West Exhibit Hall A, Convention Centre

STEMBUGS 2018 STOP-AND-SHARE, GET-AND-GO WORKSHOP

Tuesday, November 13 • 2:00 – 5:00 PM

West Exhibit Hall A, Convention Centre

EXPLOITING THE DYNAMISM OF R SOFTWARE TO HELP ENTOMOLOGISTS ADAPT TO A CHANGING WORLD: CROSSING THE BORDER FROM R ADMIRER TO R USER

Wednesday, November 14 • 1:30 – 5:30 PM

Meeting Room 215/216, Convention Centre

Fee: **SOLD OUT****EXCURSION DÉCOUVERTE DE LA MONTAGNE**

Mercredi 14 novembre • 10h – 16h

Tarif : 120\$ USD • 150\$ CND

Lieu : Rendez-vous au centre des inscriptions et informations

L'excursion découverte de la montagne vous amène dans la forêt pluviale côtière de la rive nord de Vancouver avec des arrêts au pont suspendu de Capilano et au mont Grouse. Le parc du pont suspendu de Capilano est rempli d'aventures animées. Marchez parmi les anciens cèdres sur les sentiers de la canopée forestière de Treetops Adventure. Appréciez les sensations de Cliffwalk, une série de sentiers structurés et suspendus jaillissant de la surface de granite de la falaise. Ne manquez pas l'aventure excitante sur le pont suspendu emblématique, 73 mètres (230 pieds) au-dessus du fleuve Capilano.

Se dressant à 1 250 mètres (4 100 pieds) au-dessus de Vancouver, le mont Grouse offre une vue époustouflante de la ville et une grande variété de choses à faire. Explorez le refuge pour les espèces en péril, hébergeant deux ours grizzly, Grinder et Coola. Mangez dans un des nombreux restaurants ou kiosques alimentaires ou montez dans le Peak Chair au sommet de la montagne et visitez Eye of the Wind, une grande éolienne. Apprenez-en également sur le cycle de vie du saumon du Pacifique à l'écloserie de saumons de Capilano. Il s'agit d'une aventure légère incroyable dans la nature époustouflante qui entoure la ville.

Ateliers

Des descriptions complètes sont disponibles en anglais et en français en ligne sur entsoc.org/workshops.

ABAISSER LES FRONTIÈRES ENTRE LES LECTEURS ET LES AUTEURS : COMMENT AMÉLIORER VOTRE ÉCRITURE SCIENTIFIQUE

Dimanche 11 novembre • 13h30 – 17h30

Salle 211, Centre des congrès

Coût : **Complet****JOURNÉE DE DÉMONSTRATION DE CERCLES D'HISTOIRES (AVEC RANDY OLSON)**

Lundi 12 novembre • 9h – 12h

Salle 201, Centre des congrès

Coût : **10\$ USD • 12,50\$ CAD**

L'inscription des participants actifs est limitée aux 50 premiers participants. 20 places supplémentaires gratuites sont disponibles pour des observateurs, à la porte, premier arrivé, premier servi.

Après le 12 novembre, les participants auront l'option de s'inscrire pour un groupe hebdomadaire de cercles d'histoires. Les frais d'inscriptions à l'atelier seront appliqués aux frais du cercle d'histoires de 10 semaines. Un montant additionnel de 190\$ USD (240\$ CAD) sera perçu après la réunion pour les participants qui veulent continuer avec les cercles d'histoires.

CRÉER DES ENVIRONNEMENTS SÉCURITAIRES ET PRODUCTIFS POUR TOUS LES ENTOMOLOGISTES PAR UN LEADERSHIP INCLUSIF

Mardi 13 novembre • 10h – 12h

Salle 201, Centre des congrès

Coût : **Complet****FOIRE DE VULGARISATION DE L'ENTOMOLOGIE**

Mardi 13 novembre • 10h30 – 12h30

West Exhibit Hall A, Centre des congrès

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A new insecticide is coming soon for the control of aphids, whiteflies and psyllids in specific specialty and row crops. **Grow Smart with BASF**

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ATELIER STIM INSECTES 2018

Mardi 13 novembre • 14h – 17h
West Exhibit Hall A, Centre des congrès

EXPLOITER LE DYNAMISME DU LOGICIEL R AFIN D'AIDER LES ENTOMOLOGISTES À S'ADAPTER À UN MONDE EN CHANGEMENT : FRANCHIR LA FRONTIÈRE ENTRE ADMIRATEUR DE R ET UTILISATEUR DE R

Mercredi 14 novembre • 13h30 – 17h30
Salle 215/216, Centre des congrès
Coût : **Complet**



STUDENT RECEPTION at STEAMWORKS

**Tuesday November 13, 2018
8:00 PM – 11:30 PM**

Located near the Vancouver Convention Centre, Steamworks Brew Pub is the perfect venue to host the annual Student Reception. Mix and mingle as you spend the night sampling the seasonal offerings of the venue (or any other beverage) as you explore the space and activities available to you throughout the evening.

All registered students and recent graduates are invited to attend—please be sure to have your ID and name badge as proof of registration.

75 WATER STREET • VANCOUVER, BC

PROGRAM INFORMATION /
INFORMATIONS SUR LE PROGRAMME

Plenaries

Opening Plenary Session with Keynote Speaker Randy Olson

Narrative is Everything: Communicating Science in the Age of Information

Sunday, November 18 • 5:30 – 7:30 PM

Ballroom, Convention Centre

Join us for an exciting opening plenary session featuring a local welcome, all three society presidents, and Randy Olson for a stimulating presentation of his “and-but-therefore” communication technique.



Randy Olson is a scientist-turned-filmmaker who is the author of three books on science communication. He earned his PhD in biology from Harvard University, then became a professor of marine biology at the University of New Hampshire. After achieving tenure, he departed academia to attend film school at the

University of Southern California, followed by two decades of filmmaking in Hollywood, and now has circled back to science and academia to relate what he has learned.

After the plenary, join us for our Welcome Reception downstairs in the Exhibit Hall.

Graduate Student Showcase

Sunday, November 11 • 3:00 – 5:00 PM

Ballroom, Convention Centre

Five winning submissions will be highlighted as part of this year's Graduate Student Showcase (GSS). The purpose of the GSS is to provide a high-profile opportunity for recent graduates or graduate students near the completion of their degrees to present a more in-depth overview of their thesis research. View the list of winning submissions on page 123.

Plénières

Session de plénière d'ouverture avec le conférencier invité Randy Olson

Le narratif est tout : communiquer la science à l'âge de l'information

Dimanche 11 novembre • 17h30 – 19h30

Ballroom, Centre des congrès

Joignez-vous à nous pour une session plénière d'ouverture excitante présentant un mot de bienvenue local, les trois présidents des sociétés, et Randy Olson pour une présentation stimulante de sa technique de communication « et-mais-donc ».



Randy Olson est un scientifique-devenu-cinéaste auteur de trois livres sur la communication de la science. Il a obtenu son doctorat en biologie de l'Université Harvard et est ensuite devenu professeur de biologie marine à l'Université du New Hampshire. Après avoir obtenu sa permanence, il a quitté le milieu

académique pour aller à l'école de films à l'Université du Sud de la Californie, suivi de deux décennies de réalisation à Hollywood, et est maintenant revenu à la science et au milieu académique pour raconter ce qu'il a appris.

Après la plénière, venez à la réception de bienvenue en bas dans le Hall d'exposition.

Vitrine aux étudiants diplômés

Dimanche 11 novembre • 15h – 17h

Ballroom, Centre des congrès

Cinq soumissions gagnantes seront mises en valeur dans le cadre de la vitrine aux étudiants diplômés de cette année. Le but de cette vitrine est de fournir une opportunité de haute visibilité pour les étudiants tout juste diplômés ou qui sont près de la fin de leur diplôme de présenter un survol plus en profondeur de leur recherche. Consultez la liste des soumissions gagnantes à la page 123.

Volunteer Today

Whether you've been a member for one day or 60 years, ESA encourages everyone to get involved.

OPPORTUNITIES INCLUDE:

- Service on Committees
- Judging Panels
- Moderating
- Section and Branch Support
- Manuscript Review
- Certification support
- and more.

www.entsoc.org/volunteer



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Get Involved
Gain Experience
Get Connected

ESA & ESC Awards Breakfast Featuring the Founders' Memorial Lecture and Heritage Lecture

Tuesday, November 13 • *7:00 – 9:30 AM

Ballroom, Convention Centre

FOUNDERS' MEMORIAL LECTURE

He gave to man control over that dreadful scourge, yellow fever



Shirley Luckhart, Ph.D., is a professor and co-director of Center for Health in the Human Ecosystem at the University of Idaho. Dr. Luckhart got her start in entomology more than 30 years ago, and in that time her research on the biochemistry and molecular cell biology of *Anopheles* mosquitoes has continued the

scientific progress sparked by Reed more than a century ago. Her work has been continuously funded by the U.S. National Institutes of Health since 1997, focused broadly on understanding the transmission of the causative agent of malaria by *Anopheles* mosquitoes. Many of her findings have led to interventions that block both infection and transmission, and, as a result, she has several patents in process. Luckhart first made strides early in her career as a National Research Council postdoctoral scientist at the Walter Reed Army Institute of Research after she completed her Ph.D. at Rutgers University in 1995. Since then, Luckhart has served in research and teaching roles at the Uniformed Service University of the Health Sciences; Virginia Tech; and the University of California, Davis. In 2017, she joined the faculty of the University of Idaho, as a professor in both the Department of Entomology, Nematology and Plant Pathology and the Department of Biological Sciences and as a founding co-director of the university's Center for Health in the Human Ecosystem. In 2014, Luckhart was named a Fellow of the American Society for Tropical Medicine and Hygiene, and in 2017 she received a career excellence award in medical, urban, and veterinary entomology from the ESA Pacific Branch.

HERITAGE LECTURE

Insect pests and invasive species don't stop at the border



Judy Myers is Professor Emerita in the Departments of Zoology and Applied Biology at the University of British Columbia. She is an insect and plant ecologist. With students and colleagues, she has studied the causes of population cycles in western tent caterpillars and biological control of winter moth, tansy

ragwort, and purple loosestrife. From the mid-1970's she was involved with the biological control of diffuse knapweed in British Columbia, a program which resulted in significant reductions in this serious rangeland pest. In 2003 she published "Ecology and Control of Introduced Plants" (Cambridge University Press) with coauthor Dawn Bazely, and in 2004 she was awarded the Gold Medal by the Entomological Society of Canada for her contributions to the theory and practice of biological control. She is also an honorary member of the ESC. Of particular importance in her studies has been the consideration of how many species of biological control agents are required for successful weed control, and how plant communities change following successful control. In addition, Judy and her students have investigated the resistance of cabbage loopers to the microbial control agent *Bacillus thuringiensis*, and with Jenny Cory has elucidated the role of a naturally occurring viral disease in the population dynamics of the tent caterpillars under changing climatic conditions. Judy is a past president of the Canadian Society for Ecology and Evolution and has been a long-time advocate of increasing the participation of women in science.

Déjeuner des prix ESA et SEC présentant l'allocation commémorative des fondateurs et l'allocation du patrimoine

Mardi 13 novembre • *7h – 9h30

Ballroom, Centre des congrès

Allocation commémorative des fondateurs

Il a donné à l'humain le contrôle de ce terrible fléau, la fièvre jaune



Shirley Luckhart, Ph.D., est professeure et co-directrice du Centre pour la santé de l'écosystème humain à l'Université de l'Idaho. Dre Luckhart a débuté en entomologie il y a plus de 30 ans, et à ce moment, ses recherches sur la biochimie et la biologie cellulaire et

moléculaire des moustiques anophèles ont poursuivi le progrès scientifique débuté par Reed plus d'un siècle auparavant. Son travail a été continuellement financé par l'Institut National de la Santé des É.-U. depuis 1997, se concentrant sur la compréhension de la transmission de l'agent causal de la malaria par les moustiques *anophèles*. Plusieurs de ses découvertes ont menés à des interventions qui ont bloqué autant l'infection que la transmission et, par conséquent, elle a obtenu plusieurs brevets en cours de route. Dre Luckhart a d'abord progressé tôt dans sa carrière comme chercheuse postdoctorale au Conseil national de recherches à l'Institut de recherche de l'armée Walter Reed après avoir terminé son doctorat à l'Université Rutgers en 1995. Depuis, Dre Luckhart a rempli des rôles en recherche et a enseigné à Uniformed Service University of the Health Sciences; Virginia Tech; et l'Université de Californie, Davis. En 2017, elle a rejoint l'Université de l'Idaho comme professeure dans le Département d'entomologie, nématologie et pathologie des plantes, ainsi que le Département des sciences biologiques, et comme co-directrice fondatrice du centre pour la santé de l'écosystème humain de l'université. En 2014, Dre Luckhart a été nommée membre associée de la Société américaine pour la médecine tropicale et l'hygiène, et, en 2017, elle a reçu un prix d'excellence pour sa carrière en entomologie médicale, urbaine et vétérinaire de la branche Pacifique de la ESA.

Allocation du patrimoine

Les insectes ravageurs et les espèces envahissantes ne s'arrêtent pas à la frontière



Judy Myers est professeure émérite au département de zoologie et de biologie appliquée de l'Université de Colombie-Britannique. Elle est écologiste des insectes et des plantes. Avec des étudiants et des collègues, elle a étudié les causes des cycles de populations de livrée d'Amérique et la lutte

biologique contre l'arpenreuse tardive, le séneçon jacobée et la salicaire commune. À partir du milieu des années 1970, elle a été impliquée dans la lutte biologique contre la renouée diffuse en Colombie-Britannique, un programme qui a permis la réduction significative dans le parcours de ce ravageur grave. En 2003, elle a publié « Ecology and Control of Introduced Plants » (Presses de l'Université Cambridge) avec Dawn Bazely comme co-auteure, et en 2004, elle a reçu la médaille d'or de la Société d'entomologie du Canada pour ses contributions autant théoriques que pratiques à la lutte biologique. Elle est également membre honoraire de la SEC. Parmi ses contributions particulièrement importantes, la considération du nombre d'espèces d'agents de lutte biologique requis pour contrôler de façon efficace les mauvaises herbes, ainsi que la façon dont les communautés de plantes changent après un contrôle réussi. De plus, Judy et ses étudiants ont investigué la résistance de la fausse-arpenreuse du chou à l'agent de contrôle microbien *Bacillus thuringiensis*, et, avec Jenny Cory, ont élucidé le rôle des maladies virales naturelles dans la dynamique des populations des livrées en conditions de changement climatique. Judy est une ancienne présidente de la Société canadienne d'écologie et d'évolution et est une défenseure de longue date de l'augmentation de la participation des femmes en science.

Ticket Prices:

\$5 USD • \$6 CDN ESA, ESC, and ESBC Student Members
\$7.50 USD • \$9.50 CDN ESA, ESC, and ESBC Student
Transition and Early-Career Professionals
\$10 USD • \$12.50 CDN ESA, ESC, and ESBC Members
\$20 USD • \$25 CDN Nonmembers

Limited tickets will be available for onsite purchase.

**Those wishing to view the award winners without enjoying breakfast may enter through a separate entrance of the ballroom starting at 7:30 AM.*

ESA and ESC will jointly recognize all our award winners at this year's awards breakfast. Help recognize your colleagues and peers for their outstanding achievement. All ESA Professional Awards, ECP Awards, and ESC Awards winners will be recognized. After we've acknowledged all of the winners, we'll hear the Founders' Memorial Lecture by Shirley Luckhart and the Heritage Lecture by Judy Myers. Full breakfast buffet is included.

Student Awards Ceremony

Tuesday, November 13 • 6:30 – 7:30 PM

Ballroom, Convention Centre

The winners of the President's Prize, ESA Student Awards, Student Debates, and Linnaean Games will be recognized. After the conclusion of the program, be sure to head over to the Student Reception.

Note that ESC student awards will be presented Tuesday between 1:00 - 2:30 PM the ESC Gold Medal Address and Awards Ceremony.

Closing Plenary Session with Special Effects Artist Ryan Church

Wednesday, November 14 • 8:00 – 9:30 AM

Ballroom, Convention Centre



Get an up-close-and-personal journey of one man's experience working on major Hollywood blockbuster movies' special effects from independent artist Ryan Church. We'll see how nature and science inspire his work on the big screen. Can't get enough? Stay behind after the plenary for more one-on-one interaction in his

lunch-and-learn session immediately following the closing plenary.

Our ESBC, ESC, and ESA 2019 presidents will close the conference and get us ready for next year.

Prix des billets:

5\$ USD • 6\$ CDN membres étudiants de la ESA, SEC, ou SECB
7,50\$ USD • 9,50\$ CDN Étudiants en transition et jeunes
professionnels de la ESA, SEC, et SECB
10\$ USD • 12,50\$ CDN membres de la ESA, SEC, ou SECB
20\$ USD • 25\$ CDN non-membres

Un nombre limité de billets sera disponible pour achat sur place.

**Ceux qui désirent voir les gagnants des prix sans profiter du déjeuner pourront entrer par une entrée séparée dans la salle à partir de 7h30.*

La ESA et la SEC vont conjointement reconnaître les gagnants des prix au déjeuner des prix de cette année. Aidez à reconnaître vos collègues et vos pairs pour leurs accomplissements exceptionnels. Tous les gagnants des prix professionnels de la ESA, des prix ECP et des prix de la SEC seront reconnus. Après avoir reconnu tous les gagnants, nous entendrons l'allocution commémorative des fondateurs par Shirley Luckhart ainsi que l'allocution du patrimoine par Judy Myers. Le buffet de déjeuner complet est inclus.

Cérémonie des prix étudiants

Mardi 13 novembre • 18h30 – 19h30

Ballroom, Centre des congrès

Les gagnants des prix du président, des prix étudiants de la ESA, des débats étudiants et des jeux linnéens seront reconnus. Après la conclusion du programme, rendez-vous à la réception étudiante.

Veillez noter que les prix étudiants de la SEC seront présentés le mardi entre 13h et 14h30 à l'allocution du médaillé d'or et à la cérémonie des prix de la SEC.

Session plénière de clôture avec l'artiste des effets spéciaux Ryan Church

Mercredi 14 novembre • 8h – 9h30

Ballroom, Centre des congrès



Entreprenez un voyage dans l'expérience d'un homme travaillant sur les effets spéciaux de films majeurs à succès d'Hollywood, l'artiste indépendant Ryan Church. Nous verrons comment la nature et la science inspirent son travail sur le grand écran. Vous n'en avez toujours pas assez? Restez sur place après la plénière pour des interactions individuelles lors de son atelier-midi tout de suite après la session plénière de clôture.

Nos présidents de la SECB, SEC et ESA 2019 termineront la conférence et nous prépareront pour l'an prochain.

Poster Presentations

Printed Posters

The Program Committee has scheduled three days of poster sessions for the Joint 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.

SETUP:

For Posters within Symposia: You may display your poster 30 minutes prior to the start of the symposium and up to 30 minutes after the end of the symposium. Bring your own Velcro strips or push pins 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.

For Student Competition and Contributed Posters: Your poster must be placed in the assigned numbered space in the Exhibit Hall the night before your poster is scheduled (see "Poster Presentation Times" for additional information). Bring your own velcro strips or push pins 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:

For Posters within Symposia: Each symposium has designated a specific time for poster presenters to be present at their posters. Presenters are expected to be available at their displays during the "Poster Session" time slot for questions and discussion. Check your symposium schedule for exact times.

For Student Competition and Contributed Posters: 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.

MONDAY, NOVEMBER 12 (STUDENT COMPETITION):

Setup: Sunday, 7:30 - 9:30 PM
Viewing: Monday, 9:00 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 13 (CONTRIBUTED POSTERS):

Setup: Monday, 7:30 - 9:30 PM
Viewing: Tuesday, 9:00 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 14 (CONTRIBUTED POSTERS):

Setup: Tuesday, 7:30 - 9:30 PM
Viewing: Wednesday, 9:00 AM - 2:00 PM
Authors Present: Posters with odd numbers: 12:30 - 1:00 PM;
Posters with even numbers: 1:00 - 1:30 PM
Takedown: Wednesday, 2:00 - 3:00 PM

Présentations par affiche

Affiches imprimées

Le comité du programme a planifié trois jours de sessions d'affiches durant la réunion annuelle. Les affiches sont numérotées séquentiellement dans le livre du programme et, lorsque possible, groupées selon les sections de la ESA et les sujets. Les auteurs doivent installer leur affiche sur le panneau portant le même numéro qu'indiqué dans le livre du programme pour chaque affiche.

INSTALLATION :

Pour les affiches dans les symposiums : Vous devez installer votre affiche 30 minutes avant le début du symposium et jusqu'à 30 minutes après la fin du symposium. Apportez vos propres bandes Velcro ou punaises afin de fixer votre affiche sur le panneau d'affichage. Le panneau d'affichage est couvert d'une étoffe de feutre et le cadre est en aluminium. Merci de ne rien fixer au cadre de métal.

Pour les affiches de la compétition étudiante et régulières :

Votre affiche doit être placée dans la place numérotée assignée dans le Hall d'exposition le soir avant la plage horaire pour votre affiche (voir « Horaire des présentations par affiches » pour plus d'informations). Apportez vos propres bandes Velcro ou punaises afin de fixer votre affiche sur le panneau d'affichage. Le panneau d'affichage est couvert d'une étoffe de feutre et le cadre est en aluminium. Merci de ne rien fixer au cadre de métal.

HORAIRE DES PRÉSENTATIONS PAR AFFICHES :

Pour les affiches dans les symposiums : Chaque symposium a un horaire spécifique pour que les présentateurs d'affiches soient présents à leur affiche. Les présentateurs doivent être disponibles à leur affiche durant la plage horaire de la « session d'affiches » pour des questions et discussions. Vérifiez l'horaire de votre symposium pour les horaires exacts.

Pour les affiches dans les compétitions étudiantes et régulières :

Puisque le Hall d'exposition peut devenir congestionné durant les heures de présentations, les présentateurs d'affiches avec des nombres pairs et impairs ont des horaires spécifiques durant lesquels ils doivent être présents à leur affiche. Les présentateurs doivent être disponibles à leur affiche durant les plages horaires « auteurs présents » pour questions et discussions. Une zone de bar payant sera installée près de l'aire des affiches durant les heures de présentations.

LUNDI 12 NOVEMBRE (COMPÉTITION ÉTUDIANTE) :

Installation : Dimanche 19h30 – 21h30
Visites : Lundi 9h - 18h30
Auteurs présents : Les affiches avec des nombres impairs :
17h30 - 18h; Les affiches avec des nombres pairs : 18h - 18h30
Retrait : Lundi 18h30 - 19h30

MARDI 13 NOVEMBRE (AFFICHES RÉGULIÈRES) :

Installation : Lundi, 19h30 – 21h30
Visites : Mardi 9h - 18h30
Auteurs présents : Les affiches avec des nombres impairs :
17h30 - 18h; Les affiches avec des nombres pairs : 18h - 18h30
Retrait : Mardi 18h30 - 19h30

Poster Removal: Posters should be removed promptly between 6:30 and 7:30 PM on Monday and Tuesday, and between 2:00 and 3:00 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 provide a unique opportunity to view the research of entomologists from across the globe who are unable to attend the meeting in person. These e-posters will be positioned in the Exhibit Hall 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.

MERCREDI 14 NOVEMBRE (AFFICHES RÉGULIÈRES) :

Installation : Mardi 19h30 – 21h30

Visites : Mercredi 9h – 14h

Auteurs présents : Les affiches avec des nombres impairs : 12h30 - 13h; Les affiches avec des nombres pairs : 13h - 13h30

Retrait : Mercredi 14h - 15h

Retrait des affiches : Les affiches doivent être retirées rapidement entre 18h30 et 19h30 le lundi et mardi, et entre 14h et 15h le mercredi. Merci de ne pas retirer votre affiche avant la fin de l'horaire de visites. Ne pas retirer les numéros d'affiches lorsque vous retirez votre affiche du panneau.

Affiches virtuelles

Les affiches virtuelles fournissent une opportunité unique de voir les recherches d'entomologistes du monde entier qui sont incapables d'assister à la réunion en personne. Ces e-affiches seront placées dans le Hall d'exposition près des affiches imprimées, sur de grands moniteurs à écrans plats. Les participants pourront naviguer dans les affiches virtuelles durant toute la journée afin de voir une variété de recherches prenant place à travers le monde.

Social Activities & Mixers

Welcome Reception

Sunday, November 11 • 7:30 – 9:30 PM
Exhibit Hall A, Convention Centre

This is a great opportunity to spend time with the exhibitors and colleagues and learn about the latest resources and tools available to entomologists. Grab some light refreshments and a drink, network with colleagues and friends, and check out the posters.

Social Hour with Poster Presenters

Join us for our Social Hour with Poster Presenters each day of the meeting during poster presentation hours in Exhibit Hall A.

STUDENT COMPETITION POSTERS

Monday, November 12 • 5:30 – 6:30 PM

POSTER PRESENTATIONS

Tuesday, November 13 • 5:30 – 6:30 PM

Wednesday, November 14 • 12:30 – 1:30 PM

Activités sociales et réceptions

Réception de bienvenue

Dimanche 11 novembre • 19h30 – 21h30
Hall d'exposition A, Centre des congrès

Il s'agit d'une belle opportunité de passer du temps avec les exposants et les collègues et d'en apprendre plus sur les dernières ressources et outils disponibles aux entomologistes. Prenez une boisson, réseautez avec des collègues et amis, et regardez les affiches.

Réception sociale avec les présentateurs d'affiches

Joignez-vous à nous pour la réception sociale avec les présentateurs d'affiches chaque jour de la réunion durant les heures de présentations des affiches dans le Hall d'exposition A.

AFFICHES DE LA COMPÉTITION ÉTUDIANTE

Lundi 12 novembre • 17h30 - 18h30

PRÉSENTATIONS PAR AFFICHE

Mardi 13 novembre • 17h30 - 18h30

Mercredi 14 novembre • 12h30 - 13h30



Student Activities

Linnaean Games

Preliminary Round: Sunday, November 11 • 12:00 - 3:00 PM
Final Round: Tuesday, November 12 • 5:00 - 6:30 PM
Ballroom, Convention Centre

Don't miss this year's Linnaean Games, 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!

Student Competition for the President's Prize

Sunday, November 11 – Monday, November 12
Various times and locations, Convention Centre

To support student attendees and encourage them to become more involved in the world of entomology, Sunday and Monday mornings are dedicated to the student paper competition. There are 74 sessions containing graduate and undergraduate student 10-minute oral presentations, three minute oral presentations, posters, and virtual posters. A full list of presentations for all formats of the Student Competition can be found on pages 93, 124 and 138. Stop by and show your support for the students! This year's first-place winners will receive a \$75 USD cash prize, complimentary 2019 membership with their respective society, and a certificate. A complimentary 2019 membership and a certificate will be awarded to second place winners.

Student Debates

Tuesday, November 12 • 1:00 – 4:00 PM
Ballroom, Convention Centre

The 2018 debate topic is "Entomology in the 21st Century: Tackling Insect Invasions, Promoting Advancements in Technology, and Using Effective Science Communication." 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!

Student Awards Ceremony

Tuesday, November 13 • 6:30 – 7:30 PM
Ballroom, Convention Centre

The winners of the President's Prize, ESA Student Awards, Student Debates, and Linnaean Games will be recognized. After the conclusion of the program, be sure to head over to the Student Reception.

Note that ESC student awards will be presented Tuesday between 1:00 - 2:30 PM the ESC Gold Medal Address and Awards Ceremony.

Activités étudiantes

Jeux linnéens

Ronde préliminaire : Dimanche 11 novembre • 12h - 15h
Ronde finale : Mardi 12 novembre • 17h - 18h30
Ballroom, Centre des congrès

Ne manquez pas les jeux linnéens de cette année, une compétition de type « college bowl » qui est une des sessions les plus vives de nos réunions annuelles. Passez faire un tour et trinquez à votre équipe favorite!

Compétition étudiante pour le prix du président

Dimanche 11 novembre – lundi 12 novembre
Différentes heures et lieux, centre des congrès

Afin de soutenir les étudiants et les encourager à s'impliquer davantage dans l'univers de l'entomologie, les matinées du dimanche et lundi sont dédiées à la compétition étudiante. Il y a 73 sessions contenant des présentations d'étudiants du premier cycle et des cycles supérieurs, que ce soit pour les présentations orales de 10 minutes, de 3 minutes, les affiches ou les affiches virtuelles. Une liste complète des présentations de tous les formats pour les compétitions étudiantes débute à la pages 93, 124 et 138. Les gagnants de la première place de cette année recevront un prix en argent comptant de 75\$ US, une adhésion offerte pour 2019 pour leur société respective, et un certificat. Une adhésion offerte pour 2019 et un certificat seront remis aux gagnants de la deuxième place.

Débats étudiants

Mardi 12 novembre • 13h - 16h
Ballroom, centre des congrès

Le sujet du débat 2018 est « L'entomologie au 21e siècle : Faire face aux invasions d'insectes, promouvoir les avancées en technologie et utiliser une communication efficace de la science ». Les trois débats seront intéressants, informatifs et divertissants. Les membres de l'auditoire sont invités à poser des questions à la fin de chaque débat. Venez encourager votre équipe favorite!

Cérémonie des prix étudiants

Mardi 13 novembre • 18h30- 19h30
Ballroom, centre des congrès

Les gagnants des prix du président, des prix étudiants de la ESA, des débats étudiants et des jeux linnéens seront reconnus. Après la conclusion du programme, rendez-vous à la réception étudiante.

Veuillez noter que les prix étudiants de la SEC seront présentés le mardi entre 13h et 14h30 à l'allocation du médaillé d'or et à la cérémonie des prix de la SEC.



Student Reception

Tuesday, November 13 • 8:00 – 11:30 PM
 Steamworks Brew Pub (75 Water Street)

All registered students and recent graduates are invited to attend—please be sure to have your ID and name badge as proof of registration. See ad on page 27 for more information.

University Entomology Clubs

Club representatives will be available to sell T-shirts and more in the Exhibit Hall (Exhibit Hall A) during normal Exhibit Hall hours. As of August 1, the list of clubs participating includes the following:

- Aldrich Entomology Club at the University of Idaho
- C.V. Riley Entomological Society/University of Missouri
- Clemson University Entomology Club
- Department of Entomology Grad Students Association at the University of Manitoba
- Louisiana State University
- Michigan State University Graduate and Undergraduate Entomology Student Society (GUESS)
- North Carolina State University Graduate Student Association
- Ohio State University's Entomology Graduate Student Association
- Penn State EGSA
- Student and Early Professional Affairs Committee (SEPAC) of the ESC
- Texas A&M Entomology Graduate Student Organization
- The Cornell Entomology Graduate Student Club
- The Entomology Student Organization (ESO) of the University of Maryland
- The University of Arizona Entomology Graduate Student Association
- The University of California, Riverside Department of Entomology Graduate Student Association
- The University of California, Davis Entomology Graduate Student Association
- University of Florida, Entomology and Nematology Student Organization (ENSO)
- University of Nebraska at Lincoln
- Utah State University Entomology Club
- Virginia Tech W.B. Alwood Entomological Society

Réception étudiante

Mardi 13 novembre • 20h - 23h30
 Pub Steamworks Brew (75 rue Water)

Tous les étudiants inscrits et les récents diplômés sont invités à y assister – assurez-vous d'avoir votre identification et badge comme preuve d'inscription.

Clubs d'entomologie universitaires

Les représentants des clubs seront disponibles pour vendre des T-shirts et autres dans le Hall d'exposition (Hall d'exposition A) durant les heures normales du Hall d'exposition. En date du 1er août, la liste des clubs participants était la suivante :

- Aldrich Entomology Club at the University of Idaho
- C.V. Riley Entomological Society/University of Missouri
- Clemson University Entomology Club
- Department of Entomology Grad Students Association at the University of Manitoba
- Louisiana State University
- Michigan State University Graduate and Undergraduate Entomology Student Society (GUESS)
- North Carolina State University Graduate Student Association
- Ohio State University's Entomology Graduate Student Association
- Penn State EGSA
- Student and Early Professional Affairs Committee (SEPAC) of the ESC
- Texas A&M Entomology Graduate Student Organization
- The Cornell Entomology Graduate Student Club
- The Entomology Student Organization (ESO) of the University of Maryland
- The University of Arizona Entomology Graduate Student Association
- The University of California, Riverside Department of Entomology Graduate Student Association
- The University of California, Davis Entomology Graduate Student Association
- University of Florida, Entomology and Nematology Student Organization (ENSO)
- University of Nebraska at Lincoln
- Utah State University Entomology Club
- Virginia Tech W.B. Alwood Entomological Society

Exhibitors

Exhibit Hall

The Exhibit Hall will feature exhibitors, poster presentations, virtual posters, a cyber café and charging station, and student club tables in Exhibit Hall A in the Convention Centre. Our exhibitors have the latest entomological equipment, supplies, gifts, and reference materials.

EXHIBIT HALL HOURS:

Sunday, November 5 7:30 – 9:30 PM
 Monday, November 6 9:00 AM – 5:00 PM
 Tuesday, November 7 9:00 AM – 5:00 PM
 Wednesday, November 8 9:00 AM – 2:00 PM

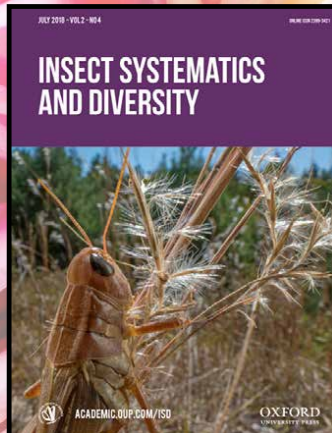
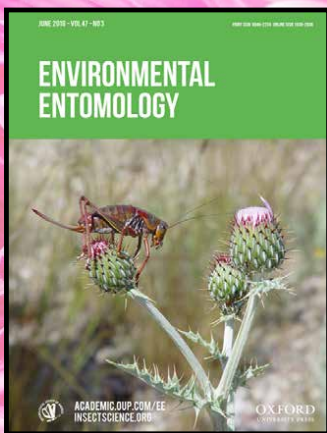
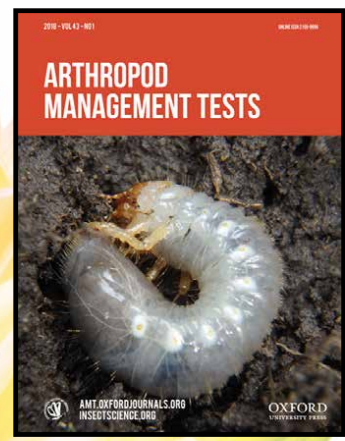
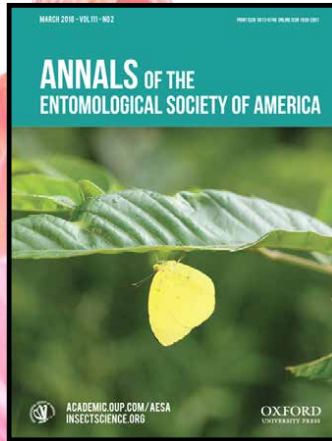


Exhibitors (as of August 1)

For a full listing of all of the exhibitor descriptions be sure to download the mobile app and search for your favorite exhibitor.

ESA Corporate Partners are highlighted in blue.

Abell Pest Control Etobicoke, ON	Booth: 606 ca.abellpestcontrol.com	ConidioTec – Aprehend Centre Hall, PA	Booth: 111 aprehend.com
Agdia Inc. Elkhart, IN	Booth: 415 agdia.com	Conviron Winnipeg, MB, Canada	Booth: 103 conviron.com
Alpha Scents, Inc. West Linn, OR	Booth: 412 alphascents.com	Cornell University Press Ithaca, NY	Booth: 204 cornellpress.cornell.edu
BASF Research Triangle Park, NC	Booth: 101 agriculture.basf.com	Corteva Agriscience™, Agriculture Division of DowDuPont™ Indianapolis, IN	Booth: 400 corteva.com
Bayer St. Louis, MO	Booth: 700 www.bayer.com	Dino-Lite Scopes Torrance, CA	Booth: 312 dinolite.us
Bio Chambers Inc. Winnipeg, MB, Canada	Booth: 403 biochambers.com	Empire Technical Development Spokane, WA	Booth: 508 empiretechdev.com
BioQuip Products Rancho Dominguez, CA	Booth: 100 bioquip.com	Entomological Society of America Annapolis, MD	Center of Exhibit Hall entsoc.org
Brill Leiden, The Netherlands and Boston, MA	Booth: 211 brill.com/search/subject/science/subject/biology/subject/entomology	Entomological Society of British Columbia British Columbia, Canada	Booth: 502 entsocbc.ca
CABI/CSIRO Sterling, VA	Booth: 109 styluspub.com	Entomological Society of Canada Winnipeg, MB, Canada	Booth: 500 esc-sec.ca
Cambridge University Press New York, NY	Booth: 604 cambridge.org/academic	Explore St. Louis St. Louis, MO	Booth: 505 explorestlouis.com
Canadian Centre for DNA Barcoding Guelph, ON, Canada	Booth: 214 ccdb.ca	Frontier Scientific Newark, DE	Booth: 215 fsiag.com
Caron Products Marietta, OH	Booth: 512 caronproducts.com	Genolution Inc. Songpa-gu, Seoul, Korea	Booth: 506 agrorna.com
Chirps Chips San Francisco, CA	Booth: 612 chirpschips.com	Gyilling Data Management Brookings, SD	Booth: 401 gdmdata.com
Celestron Scappoose, OR	Booth: 514 celestron.com	i2LResearch Cardiff, United Kingdom	Booth: 216 i2LResearch.com



Visit Booth #507 to learn more about the Entomological Society of America's full spectrum of journals.

Insects MDPI
Basel, CH, Switzerland
Booth: 407
mdpi.com/journal/insects

ICE2020Helsinki
Helsinki, Finland
Booth: 614
ice2020helsinki.fi

iDigBio Data Help Desk
Tallahassee, FL
Booth: 616
idigbio.com

ISCA Technologies, Inc.
Riverside, CA
Booth: 202
iscatech.com

LATscan
State College, PA
Booth: 315
latscan.com

Laudier Histology
New York, NY
Booth: 409
laudierhistology.com

Loligo Systems
Visborg, Demark
Booth: 316
loligosystems.com

Macroscopic Solutions
Tolland, CT
Booth: 501
macroscopicsolutions.com

Michael Blackstock
Kanloops, BC, Canada
Booth: 600
michaelblackstock.com

Monsanto
St. Louis, MO
Booth: 700
monsanto.com

NIGHTSEA
Lexington, MA
Booth: 515
nightsea.com

North American Plant Protection Organization (NAPPO)
Raleigh, NC
Booth: 311
nappo.org

Oxford University Press
New York, NY
Booth: 507
global.oup.com

Percival Scientific, Inc.
Perry, IA
Booth: 212
percival-scientific.com

PLOS (Public Library of Science)
San Francisco, CA
Booth: 516
plos.org

Polyguard Barrier Systems
Ennis, TX
Booth: 503
polyguardbarriers.com

Rad Source Technologies, Inc.
Suwanee, GA
Booth: 206
radsources.com

Rose Micro Solutions
West Seneca, NY
Booth: 405
rosemicrosolutions.com

SC Johnson & Son
Racine, WI
Booth: 608
scjohnson.com

Springer Nature
New York, NY
Booth: 208
springernature.com

Syngenta, LLC
Greensboro, NC
Booth: 602
syngenta.com

The Coleopterists Society
Santa Barbara, CA
Booth: 113
coleopsoc.org

The Lepidopterists' Society
San Francisco, CA
Booth: 213
lepsoc.org

The Resource Shop, Inc.
Palatka, FL
Booth: 314
jeffmcgovern.com

Tousimis
Rockville, MD
Booth: 416
tousimis.com

Union Biometrica, Inc.
Holliston, MA
Booth: 411
unionbio.com

University of Arkansas
Fayetteville, AR
Booth: 413
entomology.uark.edu

University of Florida DPM and University of Nebraska DPH Programs
Booth: 513
ufplantdoctors.org
and dph.unl.edu

University of Maryland Entomology Department
College Park, MD
Booth: 313
entomology.umd.edu

University of Maryland Insect Transformation Facility
Rockville, MD
Booth: 414
ibbr.umd.edu/facilities/itf

USDA APHIS PPQ
Blaine, WA
Booth: 107
aphis.usda.gov

Virginia Tech Department of Entomology
Blacksburg, VA
Booth: 511
ento.vt.edu

Wiley
Medford, MA
Booth: 504
wiley.com

Awards Hall of Fame

Please help us recognize these outstanding individuals at the associated events listed below.

ESA and ESC Awards Breakfast

Tuesday, November 13, 7:00 AM
West Ballroom ABC, Convention Centre

Purchase your tickets in advance at registration. Limited tickets will be available on the day.

\$5 USD | \$6 CDN

ESA, ESC and ESBC Student Members

\$7.50 USD | \$9.50 CDN

ESA, ESC and ESBC Student Transition and Early-Career Professionals

\$10 USD | \$12.50 CDN

ESA, ESC and ESBC Members

\$20 USD | \$25 CDN

Non-Members

HONORARY MEMBERS

Grayson Brown

Phil Mulder

Charles Vincent

ESA FELLOWS

John Clark

Christina Grozinger

Ann Hajek

Kenneth Haynes

Daniel Herms

Mark Hoddle

Bruce McPherson

Paul Opler

Alma Solis

Richard Stouthamer

ESA PROFESSIONAL AWARDS

Rufus Isaacs, Award for Excellence in Integrated Pest Management
(sponsored by Syngenta Crop Protection, Inc.)

Paula Shrewsbury, Distinguished Achievement Award in Extension

William Walton, Distinguished Achievement Award in Teaching

Consuelo De Moraes, Nan-Yao Su Award for Innovation and Creativity in Entomology

EARLY CAREER PROFESSIONAL AWARDS

Rajeswaran (Raj) Jagadeesan, Henry & Silvia Richard Research Grant

Alexandria Bryant, Early Career Professional Outreach and Public Engagement Award

Rebecca Schmidt-Jeffris, Early Career Professional Extension Award

Margarita López-Urbe, Early Career Professional Research Award

Megan E. Meuti, Early Career Teaching Award

ESA CERTIFICATION AWARDS

George Schoeler, BCE, Distinguished Service Award to the Certification Program

Miguel Diaz, ACE, ACE Professional Award

ENTOMOLOGICAL FOUNDATION AWARDS

Katie Peterson, President's Prizes for Outstanding Achievement in Primary Education

Chris Johnstone, President's Prizes for Outstanding Achievement in Secondary Education

Ronda Hamm, Foundation Medal of Honor

ESC AWARDS

Jacques Brodeur, Gold Medal for Outstanding Achievement in Canadian Entomology

Rob Johns, C. Gordon Hewitt Award for an Early Career Researcher

Hugh Danks, Honorary Membership Award for Outstanding Contributions to the Advancement of Entomology

John Spence, Fellowship Award for Major Contributions to Entomology

Paul Fields, Fellowship Award for Major Contributions to Entomology

Monique Keiran, Norman Criddle Award for Contributions by an Outstanding Nonprofessional Entomologist to the Furtherance of Entomology in Canada

Congratulations to this year's award winners!

ESC Student Awards

Tuesday, November 13, 1:00 PM – 2:30 PM
Meeting Room 211, Convention Centre

■ POSTGRADUATE STUDENT AWARDS / LES BOURSES POUR ÉTUDES GRADUÉES

Ph.D.: Catherine Scott, University of Toronto
Melanie Scallion, Carleton University
M.Sc.: Asim Renyard, Simon Fraser University
Jenny Liu, University of Guelph
Joel Goodwin, Acadia University

■ JOHN H. BORDEN SCHOLARSHIP / LA BOURSE JOHN H. BORDEN

Dan Peach, Simon Fraser University

■ DR. LLOYD M. DOSDALL MEMORIAL SCHOLARSHIP / LA BOURSE COMMÉMORATIVE DR LLOYD M. DOSDALL

Pauline Deschodt, Simon Fraser University
Matthew Muzzatti, University of Guelph

■ DANKS SCHOLARSHIPS / LES BOURSES DANKS

Anthony Zerafa, McGill University
Catherine Scott, University of Toronto

■ ESC GRADUATE RESEARCH TRAVEL SCHOLARSHIP (PHD) / LA BOURSE DE VOYAGE POUR LA RECHERCHE (PHD)

Catherine Little, Memorial University
Melanie Scallion, Carleton University

■ ESC GRADUATE RESEARCH TRAVEL SCHOLARSHIP (MSC) / LA BOURSE DE VOYAGE POUR LA RECHERCHE (MSC)

Anthony Zerafa, McGill University
Cassandra Russell, University of Guelph

■ BIOLOGICAL SURVEY OF CANADA SCHOLARSHIP / LA BOURSE D'ÉTUDES SUPÉRIEURES DE LA COMMISSION BIOLOGIQUE DU CANADA

Anthony Zerafa, McGill University

■ ESC ED BECKER CONFERENCE TRAVEL AWARD / BOURSE ED BECKER POUR LA RÉUNION ANNUELLE DE LA SEC

Joel Goodwin, Acadia University
Joanna Konopka, Western University
Samantha MacPherson, Acadia University

Student Awards Ceremony

Tuesday, November 13, 6:30 PM
West Ballroom ABC, Convention Centre

■ JOHN HENRY COMSTOCK AWARDS

Ashley Kennedy
Eastern Branch

Ximena Cibils-Stewart
International Branch

Racheal Sitz
North Central Branch

Adekunle Adesanya
Pacific Branch

Zachary DeVries
Southeastern Branch

Freddy Ibanez
Southwestern Branch

■ ESA STUDENT AWARDS

Daniela Pezzini
The Larry Larson Graduate Student Award for
Leadership in Applied Entomology

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

Lina Bernaola
Student Activity Award
(sponsored by Monsanto Company)

Emily Bick
ESA Student Certification Award
(sponsored by PestWest Environmental Science)

All Student Award winners will also be recognized
during the Student Awards Ceremony.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

The winners of the ESA Professional, Certification, Entomological Foundation Awards and the Entomological Society of Canada Awards will be honored during the ESA and ESC Awards Breakfast Tuesday, November 13, at 7:00 AM, West Ballroom ABC, Convention Centre.

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. Grayson Brown first joined ESA in 1974. Since then, he has given over 40 years of ESA service on various committees, boards, and elected

positions, including ESA President and President of the ESA Certification Board in 2012. This service includes many achievements of importance to ESA. He chaired the committee that selected the first computer system for the ESA headquarters in 1981. He wrote the first software to computerize the ESA Annual Meeting in 1988 (this led to the adoption of the modern Confex System). As co-chair of the 2003 Local Arrangements Committee, he introduced video projectors and PowerPoint presentations throughout the Annual Meeting for the first time.

He created the current networked Presentation Preview Room in 2004, personally introduced remote video presentations to the Annual Meeting in 2005 and virtual posters and the CyberCafe in 2006. As Program Co-Chair in 2008, he implemented the present Annual Meeting arrangement with extended section meetings as part of the Renewal. As ESA President in 2012, he led the team that wrote and presented the successful ICE proposal that brought ICE to Orlando in 2016—the first time that meeting had been held in the U.S. in 40 years.

Dr. Brown is co-founder of Vector Management Professionals, LLC, a global vector management consulting firm. Now based in Guam, he serves as the Public Health Entomologist for the Pacific Island Health Officers Association and consults with Pacific island public health agencies to improve vector management throughout the western Pacific region.



Dr. Phillip G. Mulder, Jr., is Professor and Head of Entomology and Plant Pathology at Oklahoma State University (OSU). Dr. Mulder received his

B.S. in Science Education from Ferris State College (1978) and his M.S. and Ph.D. (1981 and 1984) in Entomology from Iowa State University. He joined OSU in 1985 as Area Extension Entomologist, transferred to the OSU campus in 1995, and assumed statewide responsibilities.

In 2004, Phil was recognized by the Entomological Society of America (ESA) with the Distinguished Achievement Award in Extension. In 2007, he became Department Head at OSU. Phil has been a member of ESA since 1979, serving in many capacities, including President (2004-2005) of the Southwestern Branch (SWB), co-chair of ESA Program Committee (2006) and chair/gamesmaster of Linnaean Games for the SWB (20 years) and ESA (10 years). Since 2006 he has served as co-editor for "Postmarked: Extension, U.S.A." in *American Entomologist*.

From 2007-2010 Phil served as ESA Treasurer, and, in 2015, as President of ESA and the Certification Corporation. In 2016, he served as President of the Entomological Foundation. Phil chaired the 2016 ESA Science Policy Capabilities Committee and helped select ESA's first 10 Science Policy Fellows. Collectively, Phil served the ESA Governing Board for 10 years. Highlights of his service include establishing the Diversity and Inclusion Committee and initiating special awards for early-career professionals to engage young entomologists in ESA. Due to his initiatives and membership drive, ESA exceeded 7,000 members and experienced one of its largest meetings ever.



Dr. Charles Vincent has worked since 1983 as an entomologist for Agriculture and Agri-Food Canada at Saint-Jean-sur-

Richelieu, Quebec, Canada, after completing a Ph.D. (1983) in entomology at McGill University (Montreal, Canada). He works on alternatives to insecticides, notably knowledge-based methods, including biological and physical control methods. To date he has published 180 scientific papers, eight reviews (refereed), and more than 200 technical papers. He edited 25 books or technical bulletins. He has delivered more than 500 presentations before various national and international audiences.

As an ESA member since 1984, he has been involved in the affairs of ESA, notably as co-chair, Local Arrangement Committee, for the ESA/ESC/SEQ joint meeting in Montreal, Canada (2000); member, Standing Committee for International Affairs (2004-2010); member, selection panel for Fellows of the ESA (2013-2016); member, Preliminary Organizing Committee for a proposal to host the XXV International Congress of Entomology in Orlando, Florida; member representing the International Branch on the ESA Finance Committee (2017-2019). As President-Elect (2010) of the International Branch, he co-developed Lineups of the Committees as well as Bylaws of the International Branch de novo.

ESA presented him an Exceptional Service Award in 2000 as co-chair of the Local Arrangement Committee for the ESA/ESC/SEQ meeting in Montreal and a second Exceptional Service Award in 2007 for his contribution to the international affairs of ESA. In 2013, he became an ESA Fellow and received the L.O. Howard Distinguished Achievement Award from the ESA Eastern Branch. In 2016, the International Branch presented him the Distinguished Scientist Award.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

ESA Fellows

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



Dr. John M. Clark, a professor in the Department of Veterinary & Animal Sciences (VASCI) and Director of the Massachusetts Pesticide Analysis Laboratory (MPAL) at the University of Massachusetts (UMass), Amherst, was elected as an ESA Fellow in 2018. He is internationally known for his research on the

mode of action and resistance mechanisms of insecticides, most notably pyrethroids.

Clark was born in Michigan City, Indiana, in 1949. He received both his B.S. (1972) and M.S. (1977) degrees from the University of Wisconsin-Madison in zoology and entomology, respectively, and his Ph.D. (1981) in entomology from Michigan State University. Clark accepted an assistant professor position in the Department of Entomology at UMass in 1981, was promoted to associate professor in 1987 and to professor in 1994, and then joined the VASCI Department in 2003.

Clark has maintained a well-funded (more than \$18 million) and productive research program (214 peer-reviewed publications, h factor 34) since 1981 in the areas of insect/invertebrate toxicology (146), vertebrate/mammalian toxicology (34), and environmental chemistry (34), and he has had productive collaborations with more than 200 established scientists worldwide. Clark has made 161 scientific presentations, 115 of which were invited; 108 dealt with insect-related topics, and 40 were international. His insect-related work is concentrated on the biochemistry, genetics, and molecular biology of resistance mechanisms and the monitoring and management of resistance with an emphasis on the Colorado potato beetle (34) and human head and body lice (64).

Clark received the International Award for Research in Agrochemicals in 2004 from the American Chemical Society (ACS), was named an Outstanding Research Faculty by UMass in 2005, and was elected as a Fellow of the AGRO Division, ACS, in 2007. Clark has served on numerous international, national, university, college, and departmental committees and professional societies, including the Entomological Society of America and the International Congress of Entomology. As Vice-, Program- and Division-Chair for AGRO/ACS (2010-13), he brought a strong presence of entomology-based science to the Division and has edited or co-edited eight ACS Symposium Series Books dealing with the control of insect pests and vectors. Clark has served for 17 years on the AGRO Executive Committee and has been a member of three Strategic Planning Panels, where he championed the inclusion of insect science, particularly that dealing with resistance and the control of vectors.

Clark is currently the editor-in-chief of Pesticide Biochemistry and Physiology (2010-present), was a subject editor for the Journal of Medical Entomology from 2005-10 and associate editor for Pest Management Science from 2004-10, and has served on the editorial boards of another five journals. Clark has been a panel member on seven national granting agencies (NIH, USDA, EPA), many of which have dealt with the control of insect vectors and other insect pests. He has served on 15 national or international symposia organizing or programming committees and organized or co-organized 23 symposia, 15 of which were entomologically focused.

Clark's daughter Tristin is raising his granddaughter, Livvy, and his son Zakary is a systems administrator for Data Evolution LLC in Cambridge, Massachusetts.



Dr. Christina M. Grozinger, distinguished professor of entomology and director for the Center of Pollinator Research at Pennsylvania State University, was elected as an ESA Fellow in 2018. Grozinger is internationally recognized for her integrative studies on the proximate and ultimate mechanisms underpinning social

behavior and health in bees and for her advocacy for research, education, and conservation of pollinators.

Grozinger was born in Montreal, Canada, in 1975 and emigrated with her family to the United States in 1978. Grozinger obtained her B.Sc. from McGill University in 1997, with a dual degree in chemistry and biology and certificate of proficiency in German. She was awarded a National Science Foundation Predoctoral Fellowship for her studies on histone deacetylases in the Department of Chemistry and Chemical Biology at Harvard University with Stuart Schreiber, obtaining her M.A. (1999) and Ph.D. (2001). Subsequently, Grozinger was awarded a Beckman Institute Fellowship to join Gene Robinson's group at the University of Illinois, Urbana-Champaign, to examine the neurogenomic basis of pheromone-mediated behavior. In 2004, she joined the faculty at North Carolina State University as an assistant professor of insect genomics. In 2008, she joined the Department of Entomology at Penn State as an associate professor, became the Director for the Center for Pollinator Research in 2009, and was named a Distinguished Professor of Entomology in 2015.

Grozinger uses a trans-disciplinary approach encompassing genomics, physiology, neurobiology, behavior, chemical ecology, and ecological modeling. Her studies examining the mechanisms mediating cooperation and conflict in insect societies reveal a nuanced communication system that interfaces with epigenetic and transcriptional networks to shape individual and group behavior. Her studies on pollinator health evaluate the impacts of biotic and abiotic stressors at the molecular, physiological, and behavioral level to design strategies to mitigate and improve resilience to these stressors. She has published more than 100 peer-reviewed articles with more than 10,000 citations and served as the principal or co-principal investigator on grants totaling \$16.5 million, with \$7.5 million directly supporting her program. Grozinger is dedicated to supporting the next generation of scientists, mentoring 45 undergraduates, 15 Ph.D. and six M.Sc. graduate students, and 13 postdoctoral scholars, many of whom received prestigious awards from NSF, USDA-NIFA-AFRI, US-Israel BARD, Sigma Xi, and the Barry Goldwater Foundation.

Grozinger actively promotes entomology to the public, stakeholders, policymakers, and international scientific community. She has organized multiple workshops, symposia, and conferences; obtained funding for undergraduate and graduate training programs; facilitated collaborative networks; and disseminated her research broadly, with 95 invited scientific presentations and more than 80 outreach and extension presentations. She has taken leadership roles in the Entomological Society of America and the International Union for the Study of Social Insects. Grozinger's achievements are recognized through multiple awards, including the NSF Faculty Early Career Development Award, Harbaugh Faculty Scholars Award for Excellence in Teaching & Learning, James Hambleton Memorial Award for excellence in apiculture, Black Award for Excellence in Research, and Outstanding Postdoctoral Mentor Award.

Grozinger is married to a fellow entomologist, Harland Patch. They are the proud parents of an aspiring entomologist, Evelyn Patch.

ESA and ESC Awards Breakfast: Tuesday, November 13 • 7:00 AM

2018 ESA, ESC, ESA CERTIFICATION CORPORATION AND ENTOMOLOGICAL FOUNDATION AWARDS

PRIX CERTIFICATIONS CORPORATIVES ET PRIX DES FONDATIONS ENTOMOLOGIQUES DE LA ESA, SEC ET SECB 2018

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards



Dr. Ann E. Hajek is a professor of the Department of Entomology at Cornell University, was elected as an ESA Fellow in 2018. She is nationally and internationally known for her research in invertebrate pathology, biological control, disease ecology, and invasive species.

Hajek was born in San Francisco, California, in 1952. She attended the University of California, Davis, for two years and graduated in 1974 from the University of California, Berkeley (UCB), where she first learned about entomology. She then spent three years as a practicing entomologist and a science writer before beginning graduate studies at UCB. Studying at the Division of Biological Control, she earned her M.S. in 1980 and her Ph.D. in 1984. Moving to Ithaca, New York, Hajek worked in insect pathology at the Boyce Thompson Institute (BTI) for 10 years. In 1994, the Cornell Department of Entomology conducted an international search for a professor of insect pathology, and Hajek accepted this position. She attained the ranks of associate in 2000 and full professor of entomology in 2005. Beginning with her time at BTI and continuing through her time at Cornell, Hajek has run an active research program including laboratory and field studies involving nearly 200 people in different capacities. She has also taught courses at Cornell on invertebrate pathology, symbiosis, biological control, and invasion ecology.

Hajek has worked with numerous natural enemies of well-established and novel invasive species, but her work has emphasized fungal entomopathogens and nematodes. Her research has focused on utilizing knowledge about disease ecology to help facilitate successful and environmentally safe biological control with entomopathogens. Hajek has published almost 250 research publications, literature reviews, and book chapters. She is most proud of the books for which she has taken a leadership role, including one single-authored introductory book on biological control (Natural Enemies) that has now (2018) been revised with a co-author. She has edited three books, including the recently published Ecology of Invertebrate Diseases (2018), and has also co-authored two versions of a catalogue of classical biological control introductions of pathogens and nematodes. Hajek has graduated two M.S. students and 10 Ph.D.s and has mentored 14 postdocs and eight visiting scientists. Hajek has been involved in the planning, design, and management of the quarantine facility at Cornell, enabling research on invasive species and biological control.

Hajek received the L. O. Howard Distinguished Achievement Award, Eastern Branch, ESA (2015) and the Distinguished Scientist Award, Nearctic Regional Section, International Organization of Biological Control (2011). Hajek served as visiting and honorary professor in zoology, University of Copenhagen (2011-2016) and adjunct professor, Anhui Agricultural University, China (2008-2011). She has presented invited talks in many U.S. states and in 14 countries on six continents. She has been very active in leadership roles within the Society for Invertebrate Pathology.

Hajek married James K. Liebherr, professor of systematic entomology, in 1984. Hajek's daughter Lisa is a practicing lawyer in Seattle, Washington, and her son Jonathan works in spatial analysis in Rochester, New York.



Dr. Ken Haynes is a professor in the Department of Entomology at the University of Kentucky. He is internationally known for his research on insect behavior and chemical ecology.

Ken was born in Lexington, Kentucky, in 1954. Before returning to Kentucky he lived in England, India, Massachusetts, Upstate New York, and California. He received a B.S. in biological science from the State University of New York at Binghamton in 1976. He studied with Professor Martin Birch (deceased), earning his Ph.D. in 1982 at the University of California, Davis. He continued to study pheromones of Lepidoptera with Professor Thomas C. Baker at the University of California, Riverside, as a postdoctoral scholar. Martin and Tom taught him the love and practice of good science. Ken accepted a position as an assistant professor of entomology at the University of Kentucky in 1986, and rose through the ranks to professor in 1995.

Ken's research interests have included the evolution of insect pheromones, chemical mimicry of moth pheromones by bolas spiders, behavior and management of bed bugs, and communication in many additional insects. His publications have dealt with basic studies of chemical communication and their applications for pest management. He and Professor Jocelyn Millar edited two books on Methods in Chemical Ecology. He also co-authored a book on Insect Pheromones with Professor Martin Birch. He has more than 100 peer-reviewed publications and more than 30 other publications (including book chapters, trade journal articles, and general science articles). He takes pride in the diverse collaborative projects that he has undertaken with his colleagues and students. He is particularly proud of the accomplishments of the graduate students and postdoctoral scholars who have studied with him. He enjoys teaching, particularly a course that he teaches on insect behavior to both undergraduate and graduate students.

He has served his profession in numerous ways and has been recognized by his university and professional societies including ESA. He has served ESA on the editorial board of the Annals of the Entomological Society and as a subject editor for insect behavior for Environmental Entomology. He is currently on the editorial board for the Journal of Insect Behavior. He edited a special edition of Current Opinion in Insect Science on pheromones. He has been a counselor, treasurer, and president for the International Society of Chemical Ecology. He is a Fellow of the American Association for the Advancement of Science (elected 2011). He was selected as the Bobby C. Pass Research Professor (2012-2016). He received the Thomas Poe Cooper Award for Research and the High Impact Research/Extension Program Award from his college. He received the C.V. Riley Award from the North Central Branch of ESA in 2012.

Ken is married to Joy Gall Haynes since 2000 and before then was married to Elizabeth Weber Haynes (deceased) for 18 years. He has two children and two stepchildren who have all scattered across the country.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards



Dr. Daniel Herms, vice president for research and development at The Davey Tree Expert Company, was elected as Fellow in 2018. He is internationally known for research on theory and ecology of plant defense and its application to management of insect pests of trees and shrubs.

Herms was born in Columbus, Ohio, in 1959 and raised in Portsmouth, Ohio, where he worked for the Herms Floral Company and Greenhouses. He received his B.S. in landscape horticulture from Ohio State University (OSU), where his interest in entomology was sparked by the animated teaching of Dave Horn. He earned an M.S. in 1984 from OSU with dual majors in entomology and horticulture, conducting his research in the lab of Dave Nielsen. From 1984 to 1996, Herms worked at Dow Gardens, a public display garden in Midland, Michigan, directing the IPM and research programs. While working at Dow Gardens, he received his Ph.D. in 1991 from Michigan State University (MSU) in entomology and the ecology and evolutionary biology graduate program, where he was mentored by Bill Mattson and appointed as an adjunct faculty member in 1992. Herms joined the Department of Entomology at OSU in Wooster in 1997 and was promoted to full professor in 2008. In 2018, he was hired by The Davey Tree Expert Company, the world's largest full-service tree care firm, as vice president of research and development.

Herms has published 256 papers, including 96 articles in peer-reviewed journals, 31 book and proceeding chapters, and 129 outreach and extension publications and has garnered more than \$10 million to support his work. He has been major advisor to 18 graduate students, served on the advisory committee of 39 graduate students, and supervised nine post-docs. His research with students and collaborators explores the ecophysiology of tree defense, including chemical ecology and response to abiotic factors as well as ecological impacts of invasive forest insects. His applied research and extension programs address IPM in urban forests, ornamental landscapes, and nurseries.

Herms has presented or coauthored 167 invited and 317 contributed research presentations and 448 extension talks. He taught or co-taught *The Nature and Practice of Science and Insect Ecology and Evolution* at MSU and OSU, *Forest and Shade Tree Entomology* at OSU, and served the OSU Department of Entomology as graduate studies chair (2004-2006), associate chair (2006-2011), interim chair (2012), and chair (2013-2016). He has served as subject editor for *Environmental Entomology*, associate editor for *Arboriculture and Urban Forestry*, coordinator of the International Union of Forest Research Organizations (IUFRO) working group on tree resistance to insects, and on USDA APHIS science advisory panels for emerald ash borer and Asian longhorned beetle. Major recognitions include the Richard W. Harris Authorship Award from the International Society of Arboriculture (2013), the ESA Distinguished Achievement Award in Horticultural Entomology (2014), and election as Fellow of the American Association for the Advancement of Science (2014).

His wife Cathy received her M.S. in forest entomology from MSU, and they enjoy birding, hiking, boating, paddling, scuba diving, and butterfly gardening.



Dr. Mark S. Hoddle, an extension specialist in biological control in the Department of Entomology at the University of California, Riverside (UCR), was elected as an ESA Fellow in 2018. Hoddle is internationally known for his work on the classical biological control of invasive arthropods that adversely affect agricultural, urban, and wilderness areas.

Hoddle was born in Auckland, New Zealand, in 1967. He attended the University of Auckland, receiving his B.Sc. in zoology in 1989 and M.Sc. in zoology in 1991. Hoddle's M.Sc. research investigated basic biological attributes of the gorse seed weevil, *Exapion* (formerly *Apion*) *ulicis*, a natural enemy of gorse, a highly invasive weed. In Fall 1992, Hoddle started his Ph.D. in entomology at the University of Massachusetts (UMass), Amherst, under the supervision of Dr. Roy Van Driesche. This work assessed the impacts of inundative releases of two parasitoid species for control of silverleaf whitefly, *Bemisia tabaci*, infesting greenhouse-grown poinsettias. In spring 1997, after graduating from UMass, Hoddle started at UCR. In May 2018, Hoddle received his D.Sc. from the University of Auckland, the culmination of more than 20 years of work on the biological control of invasive pests.

Major research accomplishments have included the biology and biological control of avocado pests in California; the highly effective classical biological control program targeting the glassy-winged sharpshooter, *Homalodisca vitripennis*, in the South Pacific; proactive biocontrol and elucidation and field evaluation of the sex pheromone of the avocado seed moth, *Stenoma catenifer*, in Guatemala and Perú; classical biological control of Asian citrus psyllid (ACP), *Diaphorina citri*, in California with parasitoids found from foreign exploration in Punjab Pakistan; biological control of invasive insect pests of conservation importance such as the cottony cushion scale in the Galapagos Islands; biology and management of invasive palm weevils, *Rhynchophorus* spp., in California and Saudi Arabia; and the taxonomy, biology, behavior, and control of invasive thrips (Thysanoptera).

Honors and awards received include: California Department of Pesticide Regulations Integrated Pest Management Award for ACP biocontrol (2017); University of California Agriculture and Natural Resources Staff Appreciation and Recognition Award for ACP extension (2016); International Organization of Biological Control Nearctic Regional Section Distinguished Scientist of the Year (2015); California Avocado Society's Oliver Atkins Award for outstanding research excellence and service to the California avocado industry (2014); ESA Pacific Branch Award for Excellence in Extension (2013); ESA Pacific Branch Plant-Insect Ecosystems Award (2012); ESA National Recognition Award in Entomology (2007); University of Massachusetts, Amherst, Rosenfield Award for Applied Pest Management (1996), and the ESA's President's Prize for best oral student presentation in biological control (1994 and 1995).

The majority of what Hoddle has accomplished would not have been possible without his wife and fellow entomologist, Christina Hoddle, who has been an integral part of organizing and executing field and lab work targeting *Stenoma*, cottony cushion scale, ACP, and palm weevils. Their two boys, Nicholas and Luke, enjoy looking for palm weevils and monarch caterpillars!

ESA and ESC Awards Breakfast: Tuesday, November 13 • 7:00 AM

2018 ESA, ESC, ESA CERTIFICATION CORPORATION AND ENTOMOLOGICAL FOUNDATION AWARDS

PRIX CERTIFICATIONS CORPORATIVES ET PRIX DES FONDATIONS ENTOMOLOGIQUES DE LA ESA, SEC ET SECB 2018

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards



Dr. Bruce A. McPheron, professor of entomology and executive vice president and provost of Ohio State University (OSU), was elected as an ESA Fellow in 2018. He is internationally known for the development of molecular diagnostic tools to understand and manage the spread of invasive fruit fly species

and work on the process of speciation, using native fruit fly species as model systems.

Even in his early childhood in Ohio, insects—and their role in the ecosystem—intrigued him. Later, he earned a bachelor's degree with honors in entomology from OSU and a master's degree in biology and a doctorate in entomology from the University of Illinois. His academic career at land-grant institutions began as an Ohio State county extension educator, followed by a position as a postdoctoral researcher at Louisiana State University. In 1988, he joined the faculty at Pennsylvania State University's College of Agricultural Sciences and later served as associate dean and director of the Pennsylvania Agricultural Experiment Station and as the college's dean. He returned to Ohio State in 2012 as vice president for agricultural administration and dean of the College of Food, Agricultural, and Environmental Sciences. In 2015, he served as interim executive vice president and provost during a national search and, in 2016, was appointed to the permanent position. In this role, he oversees of 15 colleges, five campuses, and more than 7,000 tenure-, clinical-, research-track and associated faculty. In addition, he has oversight of academic programs for 66,046 undergraduate, graduate, and professional students; more than 200 majors; and almost 13,000 courses.

He has conducted extensive fieldwork in Africa, Australia, and Latin America, focusing on the spread of invasive fruit fly species, in addition to international agriculture and agricultural biosecurity. His research is published in 60 refereed journals, two edited books, 16 articles in books, 22 non-refereed publications and 68 domestic and international invited presentations. In addition, he has taught at all levels and provided research supervision of five M.S. degrees, 10 Ph.D. degrees, and seven postdoctoral scholars; sponsored 17 undergraduate research projects; and hosted eight graduate students for significant components of their thesis research.

A longtime national leader in higher education administration, he has focused on the vital contributions of land-grant institutions to society. He served in national leadership within the Association of Public and Land-Grant Universities (APLU), chairing the agricultural research leadership organization, then the dean and administrative heads of agriculture and, finally, the Policy Board of Directors of the Board on Agriculture Assembly. As provost, he is active in the Big Ten Academic Alliance, the Association of American Universities, and APLU in advancing the land-grant mission in higher education.

He is a Fellow of the American Association for the Advancement of Science and has testified on the Farm Bill before the U. S. House of Representatives. In addition, as a food-security advocate, he serves on Feeding America's board of directors.

He and his wife, Marilyn, have two children and two grandchildren.



Dr. Paul Opler, a special appointment professor at Colorado State University (CSU), was elected as an ESA Fellow in 2018. He is best known for his research on insect host relationships of Lepidoptera and tropical ecology and his service as first editor of *American Entomologist*.

Opler was born in 1938 in Ann Arbor, Michigan, and raised in Michigan and northern California. He received his B.A. in entomology from the University of California, Berkeley in 1960. Paul continued his education in 1963 at San Jose State University with an M.A. in biological sciences in 1965. He returned to Berkeley and received his Ph.D. in entomology in 1970. After graduation he was a research associate with the Organization for Tropical Studies in Costa Rica until 1974, after which he was hired by the U.S. Fish and Wildlife Service as the first entomologist in the Endangered Species Program. He retired from the government in 1997 after which he was hired as a special appointment professor in the Department of Bioagricultural Sciences at CSU in 1998.

Opler's major career accomplishments have centered on his intense interest in Lepidoptera and have resulted in major publications on the species-area effects on leaf-miner species richness of host oak geographic distributions in California as evidenced by highly significant log species versus log host regressions. This should have major effects on the way that economically important crops and their herbivore and parasitoid communities are managed. His books include field guides to both eastern and western butterflies, his contribution to *Moths of Western North America*, and his role as scientific editor of "Status and Trends of our Nation's Biological Resources." At CSU, Opler has been major advisor or co-advisor to four students who have completed their advanced degrees. He has given many lectures on Lepidoptera systematics to undergraduate and graduate classes, has helped build the C.P. Gillette Museum of Arthropod Diversity, and is currently active in helping build a library of genomic DNA for North American butterflies.

Opler's major service to the ESA has been his role in serving as first editor of *American Entomologist* and in helping with the enduring format for its contents with significant input from past ESA President W. Donald Duckworth. Paul also served as chair of ESA's Section A.

Opler has been married twice, first to Sandra Sue Segler (1940-1992) and Evi Maria Lang (1950-). His three children are Tim C., David C., and Laura Maria. His hobbies include birding, traveling, genealogy, and paleoanthropology.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards



Dr. M. Alma Solis, research scientist and former research leader at the Systematic Entomology Laboratory (SEL), Agricultural Research Service, U.S. Department of Agriculture, was elected as an ES Fellow in 2018. She is internationally recognized as a world authority on the economically important

Pyraloidea, or snout moths, and is a curator at the National Museum of Natural History (NMNH), Smithsonian Institution, Washington, DC.

Solis was born in Texas and grew up in Brownsville. She attended Texas Southmost College and transferred to the University of Texas at Austin, where she majored in science education before continuing on to a Master's program in biological sciences with Larry Gilbert. She then went to the University of Maryland at College Park (UMCP) for a Ph.D. program in insect systematics at the Department of Entomology with Charles Mitter. She was hired as a research scientist by SEL in 1989. On a year-long detail in 1999 to the University of Texas at Brownsville, she was associate dean of the College of Math, Science, and Technology. She was appointed acting research leader of SEL in 2003 and as permanent research leader two years later. She briefly served as the ARS acting associate director for the Beltsville Agricultural Research Area in 2011. She was research leader for 10 years, returning to full-time research in 2014.

She has published more than 100 research papers and book chapters on the higher-level classification and taxonomic identity of ecologically and economically important Pyraloidea. She has conducted fieldwork worldwide, but her primary research focus has been the Neotropics, specifically in Costa Rica. She has been invited to teach workshops on Pyraloidea worldwide. She has provided research services supporting state, federal and international regulatory programs and has provided more than 28,000 identifications during her USDA career.

As SEL research leader, she was the "face" of arthropod systematics research in the federal government and supported university undergraduate and graduate student programs in the U.S and abroad. She has received various awards including the National ARS Administrator's Supervisory Outreach, Diversity, and Equal Opportunity Award; USDA Recognition for Outstanding Service on the ARS Research Position Evaluation System Advisory Committee; and the USDA Technology Transfer Group Award for providing extraordinary assistance to APHIS/PPQ at ports in the U.S. and around the world. She is a Distinguished Alumnus of the University of Texas at Brownsville/Texas Southmost College and a Leadership Texas alumnus. She is on various scientific and editorial boards and has been president of the ESA Systematics, Evolution, and Biodiversity Section, the Entomological Society of Washington, and the Washington Biologists' Field Club, where, as noted by The Washington Post, she was the first woman president in its more than 100-year history.

She and her husband, Jason P. W. Hall, a butterfly systematist, created a butterfly garden in Silver Spring, Maryland, that was featured by NPR in an interview titled "Rare Specimens: An Unusual Match-Up in Entomology." At home she is in the garden or reading science fiction and enjoys hiking and scuba diving with her husband.



Dr. Richard Stouthamer, a professor in the Department of Entomology at the University of California, Riverside (UCR), was elected as an ESA Fellow in 2018. He is internationally known for his research on Wolbachia, invasive species, and insect-transmitted plant pathogens.

Professor Stouthamer was born in The Netherlands in 1954. He attended the Delft University of Technology for one year studying chemistry, then changed to the Wageningen University where he studied environmental sciences and biology, receiving his M.Sc. in biology in 1983. He obtained his Ph.D. in 1989 in entomology from UCR, studying parthenogenetic reproduction in parasitoid wasps with Robert F. Luck. After graduation in 1989, he did a post-doc with Jack Werren at the University of Rochester, in Rochester, New York, working on sex ratio distorters initially in *Nasonia* and later in *Trichogramma* wasps. In 1991, he joined the faculty of the Laboratory of Entomology at the Wageningen University, continuing his work on host symbiont relationships in parasitoid wasps and biological control. In 2001, he took his current position at UCR.

Stouthamer's research has been motivated by trying to improve biological control of pests. His Ph.D. research focused on using the all-female reproduction in several parasitoid species to improve biological control. During these studies, he discovered the involvement of microorganisms in causing parthenogenesis in many different parasitoid wasp species. Follow-up studies on these bacteria identified them as *Wolbachia*. Fieldwork into this relationship in the desert wasp *Trichogramma kaykai* led to the discovery of an additional sex-ratio distorter that causes all-male offspring. His work on invasive species has centered on determining the identity and native range of invading populations, using mainly molecular methods. Such methods were also used to study the variety of pathovars of the plant pathogen *Xylella fastidiosa*, which causes various scorching diseases in different tree species globally.

Stouthamer has published more than 160 scientific papers and 15 book chapters. He has guided about 50 M.Sc. projects for students at the Wageningen University and has graduated one M.Sc. at UCR and 12 Ph.D. students, with two Ph.D. students currently in his group. He has also mentored 13 postdoctoral scientists and 16 visiting scientists. He has presented or coauthored numerous presentations at state, national, and international conferences. He was elected as a Fellow of the American Association for the Advancement of Science (2007), received the Recognition Award of the ESA Pacific Branch in Insect Physiology, Biochemistry and Toxicology (2008), the International Organisation of Biological Control-Nearctic Region Section's Distinguished Scientist Award (2010), and the ESA Recognition Award (2013).

Married to his wife, Carol, they have two daughters who are both biologists; their older daughter Claire is a fresh water ecologist in California, while their younger daughter Corinne is an entomologist in Arizona.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

ESA Professional Awards

Award for Excellence in Integrated Pest Management

This award, which is sponsored by Syngenta Crop Protection, recognizes outstanding contributions that have a direct relation to integrated pest management (IPM).



Dr. Rufus Isaacs is professor of entomology and extension specialist at Michigan State University, where he studies insects in

grapes and berry crops. He received his Ph.D. in applied biology from Imperial College in the University of London, United Kingdom. His research focuses on the biology of insect pests and natural enemies in fruit crops, as well as their management, with the goal of developing and implementing IPM programs that improve farm productivity and profitability while reducing environmental impacts. Along with collaborators, his lab's research has also expanded to crop pollination, with projects to understand how habitat management can improve pollinator health and boost crop yield, quality, and stability. This has been coordinated with basic and applied investigations into the ecology of wild bees, and their conservation, as part of the Integrated Crop Pollination project.

Currently Dr. Isaacs is working toward improved management of the invasive spotted-wing drosophila (*Drosophila suzukii*), a significant challenge to berry crops in the United States and around the world. Projects on this pest are coordinated with colleagues nationally and include evaluation of biopesticides, exploration of natural and cultural controls, seasonal prediction, sampling and decision making, optimizing chemical controls, and monitoring for resistance. His group is also exploring methods for control of native pests that threaten berry crops, both during the growing season and after harvest. His research program is complemented by an active online and in-person extension program that disseminates information about berry insect pest management to growers, crop consultants, and other extension colleagues.

Distinguished Achievement Award in Extension

This annual award recognizes outstanding contributions to extension entomology.



Dr. Paula Shrewsbury is an associate professor and extension specialist at the University of Maryland. Paula earned her B.S. in plant

science from the University of Rhode Island, M.S. in entomology from the University of California, Riverside, and Ph.D. in entomology from the University of Maryland. Paula's applied research generates knowledge for members of nursery, landscape, and turf management industries, extension educators, and volunteers, including Master Gardeners and Master Naturalists. Paula's research focuses on sustainable management practices, including natural enemy and pollinator conservation, integrated pest management, and biological control of invasive species. Her presentations at some 300 conferences, in-service trainings, green industry meetings, and field days at state (Maryland), regional, national, and international venues have provided training for more than 20,000 stakeholders. Each week her web-based "Beneficial of the Week" column and "Pest Prediction Calendar" reach more than 13,000 green industry members nationally and internationally. Her interviews in print, television, and internet reach millions of stakeholders. Her STEM activities include the award-winning "Insect Petting Zoo" at the University of Maryland's premier outreach event, Maryland Day, where more than 13,000 children and adults have explored the wonders of insects. Her Citizen Science project, "Stink-Be-Gone," trains Master Gardeners to gather data on the distribution and identity of native and exotic parasitoids of the brown marmorated stink bug. Paula has served as EB ESA president and program chair, and has held several other committee positions. Paula is currently the ESA EB Governing Board representative, and the P-IE Editorial Board representative to the *Journal of IPM*.

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. Bill Walton is a professor of entomology at the University of California, Riverside (UCR). He received Ph.D. and M.S. degrees from the

University of Maryland, College Park, and a B.S. from the University of Rhode Island. He currently teaches insect ecology, aquatic entomology, a freshman advising seminar for first-year learning communities, and graduate seminars in medical, veterinary, and urban entomology. Dr. Walton also has recently taught introductory evolution and ecology in the biology/life sciences curriculum and supraorganismal disciplines in the entomology graduate core curriculum. Dr. Walton has applied student-centered active learning approaches and assessments to courses that he teaches at UCR. For example, he and Dr. Brad Mullens developed an aquatic entomology course to emphasize "learning by doing." The students carry out a bioassessment of the Santa Ana River and write a report that summarizes the data collected on laboratory and weekend field trips as a way to encourage scientific synthesis and literacy. The exercise ties together aquatic insect identification, ecology, and concepts discussed in the classroom. Bill is currently vice chair of the Department of Entomology, a co-director of the Pacific Southwest Center of Excellence in Vector-borne Diseases, and president of the American Mosquito Control Association. Bill is a distinguished professor of teaching, a National Academies Education Fellow in the Life Sciences, and a recent recipient of the Western Region Award of Excellence in College and University Teaching in the Food and Agricultural Sciences.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

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. Consuelo De Moraes, a professor at The Swiss Federal Institute of Technology in Zürich, Switzerland, leads an internationally

recognized research program that produces innovative science at the leading edge of insect chemical ecology. Her work has produced numerous groundbreaking studies documenting novel and often unexpected aspects of chemical communication among plants, insects, and other organisms. In addition to exploring the complex and sophisticated information that plant odors can convey to insect herbivores and their natural enemies, research from her program has shown that plants themselves detect and respond to a variety of olfactory cues, including some insect pheromones. She has also made important contributions to the field of disease chemical ecology, exploring the role of olfactory cues in mediating disease transmission by insect vectors as well as their potential use as diagnostic biomarkers. Professor De Moraes's research findings have been published in leading scientific journals including *Science*, *Nature*, and *PNAS*. In addition to its broad influence within the scientific community, her work has also reached a broader audience, being featured in several life science textbooks and documentary films, as well as numerous articles in the scientific and popular press. Professor De Moraes's accomplishments have been recognized through numerous awards and honors, including the Packard Foundation's Fellowship for Science and Engineering and the Beckman Foundation's Young Investigator Award. She was also the recipient of a National Science Foundation Career Award, the Du Pont Young Professor Award, the ESA Early Career Innovation Award, and the International Society of Chemical Ecology's Silverstein-Simeone Award. She has been named a Fellow of the Entomological Society of America and the American Association for the Advancement of Science.

Early Career Professional (ECP) Awards

Henry & Silvia 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. Rajeswaran Jagadeesan (Raj) is a research scientist within the Postharvest Grain Protection Team of the Queensland Department of

Agriculture and Fisheries (QDAF), Australia. He holds B.Sc. and M.Sc. degrees in agriculture from Tamil Nadu Agricultural University, India, and a Ph.D. in molecular entomology from the University of Queensland, Australia. In his Ph.D. program, Raj worked on the genetics of resistance to phosphine (a fumigant insecticide) in red flour beetle, *Tribolium castaneum*, and identified the first resistance gene, dihydroliipoamide dehydrogenase (DLD), that has revealed significant insights in to the management of resistance in grain insect pests. Raj started his career within QDAF in 2011, which provided him an opportunity to connect with farmers and major stakeholders of the grain industry. During the last seven years, Raj has worked on several industry-driven research projects in stored product pest management and gained expertise in pest and resistance diagnosis, insecticide/fumigant efficacy and characterization, resistance genetics, molecular characterization, protocol establishment, and validation. Currently, Raj is exploring the efficacy of an alternative fumigant, sulfurly fluoride, by itself and in combination with other fumigants, to alleviate phosphine resistance in grain pests. He is also working in an international linkage project between India and Australia, where he is deploying advanced molecular tools to diagnose and manage phosphine resistance in key pest species along the entire stored grain value chain. Raj has attended several conferences, nationally and internationally, and published key findings in high-profile journals, including *Science*, *Genetics*, *Pest Management Science*, and *Journal of Economic Entomology*.

ECP Outreach and Public Engagement Award

This award honors a student transition or early professional working within the field of entomology who has demonstrated excellence, leadership, and creativity in outreach and public engagement.



Ms. Alexandria Bryant is originally from Beaver Dam, Kentucky. She graduated summa cum laude from the University of Louisville, Kentucky, in 2010 with

her B.A. in biology and psychology. For her master's research, she researched the impact of habitat complexity on insect communities in vegetable crops at Michigan State University, where she graduated with her M.S. in entomology in 2013. She enjoyed volunteering at the Michigan State Bug House, presenting at outreach events, and serving as a 4-H volunteer. Alexandria is currently a University of Kentucky extension agent for 4-H Youth Development in Breckinridge County, Kentucky. She manages 75 volunteers and teaches youth programs in school, after-school, and camp settings, reaching over 2,800 youth in 2018. For the past five years, she has taught programs and trained volunteers in natural resources, STEM education, agriculture, leadership, and other fields. Alexandria's entomological outreach has included initiating entomology school programs for more than 600 middle school youth annually, developing comprehensive Kentucky 4-H science curriculum centered on the Madagascar hissing cockroach, teaching entomology workshops at events across the commonwealth, establishing a 4-H Bug Club for youth, training extension agents on entomology programming, and initiating a county-wide bee ambassador program about honey bee management. Her Madagascar hissing cockroach curriculum, which she designed to fulfill state-mandated Next Generation Science Standards, has been especially popular, and has since been adopted in 13 other counties in Kentucky, reaching an estimated 25,000-plus youth. In total, Alex has started, overseen, or implemented over 60 STEM-related programs in her county.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

ECP Extension Award

This award is given to a student transition or early professional who excels in entomological extension.



Dr. Rebecca

Schmidt-Jeffris is an assistant professor and extension specialist in the Department of Plant and Environmental

Sciences at Clemson University. Her commodity responsibilities are strawberries and vegetables, including cucurbits, tomatoes, and leafy greens. She earned her B.S. in biology from Washburn University in Topeka, Kansas. She attended Washington State University for her Ph.D. in entomology, which she completed in 2015. Her research program focuses on biological control, mite management, landscape ecology, and soil health impacts on arthropods.

Dr. Schmidt-Jeffris is particularly interested in the behavior and ecology of natural enemies in agroecosystems. This includes nontarget impacts of agricultural practices, such as pesticide use, soil health management, and historical land-use patterns. Current projects in her lab include miticide resistance and nontarget effects in strawberries, impacts of organic weed management practices on natural enemies, predatory mite biodiversity in vegetables, and impacts of cover crops on host-plant selection. Her extension program includes county and regional grower meetings, conservation biocontrol trainings with the Natural Resources Conservation Service, and publication of production guides, including the myIPM app and the *Southeastern Vegetable Crop Handbook*. She is also active in K-12 and community outreach.

She enjoys participating in ESA and is a member of Plant-Insect Ecosystems Section Governing Council. Dr. Schmidt-Jeffris has previously served on the ECP Committee and chaired the ESA and ICE Student Affairs Committees. Rebecca is a prior recipient of ESA's Comstock, Student Activity, and Pacific Branch Leadership awards.

ECP Research Award

This award recognizes a student transition or early professional who has made outstanding research contributions to the field of entomology.



Dr. Margarita

López-Urbe received her bachelor's degree in biology from Universidad de los Andes (Colombia), her master's degree in

genetics and evolution from Universidade Federal de São Carlos (Brazil), and her Ph.D. in entomology from Cornell University. Margarita was an NSF Postdoctoral Fellow at North Carolina State University for two years. Afterwards, she transitioned to the Pennsylvania State University as an assistant professor of entomology.

Dr. López-Urbe is broadly interested in understanding how environmental change and life-history traits affect demography, health, and long-term persistence of wild bee pollinator populations. She integrates population genetics, comparative phylogenetics, landscape ecology, and field experiments to address these questions. Her research has focused on three main research themes. First, her research has revealed previously unknown patterns of male-biased dispersal, strong signatures of philopatry, and patchy nesting patterns in solitary bees. Second, her research in the field of social immunity has demonstrated that different aspects of immune function (internal vs. external immunity) respond differently to evolutionary changes in group size in social insects. More recently her research program is focusing on how beekeeping management practices impact honey bee health and host-pathogen dynamics in honey bees. Overall, these different lines of research comprise relevant topics for bee conservation and health while advancing our understanding of basic ecological and evolutionary processes of pollinators. Margarita is heavily involved in extension and outreach, and she hopes to serve as a mentor to younger scientists who are passionate about insects.

For more information about her program, please check her lab website: www.lopezuribelab.com.

ECP Teaching Award

This award is given to a student transition or early professional who excels in entomological education.



Dr. Megan Meuti

started as an assistant professor of entomology at Ohio State University (OSU) in 2016. She received dual bachelor's degrees

in entomology and microbiology from Ohio State, where she also completed her Ph.D. with David Denlinger. Next she taught at Kenyon College, a top-tier small liberal arts college, for one year as a visiting professor, where she developed lecture and laboratory courses on insect biology and taught first-year students how to design experiments and write scientific-style manuscripts in an introductory biology lab.

Since joining the faculty at OSU, Dr. Meuti has continued to use research-supported techniques to improve her teaching and support student learning. For example, she developed graduate-level insect physiology lecture and laboratory courses using backward design, and taught these courses for the first time last fall. In addition to teaching general entomology, she is currently modifying two high-enrollment, online courses: "Pests, Plagues, Pollinators, and Poisons: Insects in Human Affairs," and "The Biology of Hope and Belief." She has co-authored a freely available text for *Insects in Human Affairs*, is increasing student engagement and dialogue in both courses, and is implementing a research study to compare learning in online and in-person classes. Outside of her formal teaching responsibilities, Dr. Meuti mentors graduate and undergraduate students in research focusing on seasonal responses in mosquitoes. She enjoys the challenge of translating science to diverse audiences. She also delights in sharing her enthusiasm for insects, evolution, and molecular biology with students ranging from freshman, non-science majors to senior graduate students.

ESA Certification Corporation Awards

▀ Distinguished Service Award to the Certification Program

The purpose of this award is to encourage, recognize, and reward outstanding contributions to the ESA Certification Program and the professionalism of entomology.



Dr. George Schoeler, BCE, is a native of Seattle, Washington. He attended Boise State University, receiving a B.S. in biology in 1989. He earned his M.S. in entomology from the University of California, Berkeley, in 1992 and his Ph.D. from Oklahoma State University in 2000. His research activities have included field and laboratory studies on ticks and tick-borne diseases in the U.S. and South America; malaria and dengue vector surveillance studies in the Amazon Basin region of Peru and Southeast Asia; and studies on the development and testing of novel pest management technologies to better protect deployed military personnel from arthropod-borne diseases. A member of the Entomological Society of America for over 30 years, Dr. Schoeler has been board-certified by ESA in medical and veterinary entomology since 1995. He previously served as the chair of the Certification Examining Committee for the Board Certified Entomologist (BCE) program from January 2002 to August 2004. He recently served as the chair of the BCE Medical and Veterinary Entomology Examination Revision Committee, where he led a group of 20 medical and veterinary entomologists in updating and revising the medical and veterinary specialty exam for the BCE program. Continuing his service to ESA and the BCE program, Dr. Schoeler is the current director-elect of the BCE Certification Board.

▀ ACE Professional Award

The purpose of the award is to recognize superior contributions of an ACE in the field of structural pest management.



Miguel Diaz, ACE, began his journey in the pest management industry in 2005 by joining Orkin Pest Control. Shortly thereafter, he was introduced to California's pest management association, The Pest Control Operators of California (PCOC), where he began attending district meetings regularly. Diaz found those meetings very insightful, and there he developed a passion for the pest management profession. He realized then that what he did affected not only his employer, but the industry he represented. He was inspired to see different companies and people of all different backgrounds come together as an industry, and share knowledge and values. He was promoted to assistant branch manager in 2007 and call center manager in 2008. In 2010, he was promoted to operations manager, and also earned his master's degree in business administration from the University of Redlands. In 2015, he became ACE certified and began assisting co-workers and customers on a different level. Becoming an ACE gave him another perspective, and a more confident voice when developing integrated pest management programs. He has helped develop continuing education courses for his fellow co-workers and serves as a resource for difficult pest issues. In 2011, he was voted in as district chair for PCOC, San Gabriel Valley District, and held the position for several years. In 2016, Diaz was promoted to his current position as region service manager. He continues to develop and grow as a person, and he hopes to be a good influence to those around him.



2018 FINALISTS

“Aedes Ladies”

Justine LaViolette

“Death by Doodle: A Brief Natural History of the Antlion”

Adrian Smith

“Mosquito Metamorphosis”

Cella Wright, Mary Garvin and Claire Solomon

“Wasps to Human Surgery: Inspiration from Nature”

Jessika Raisor, Huayan Chen and Luciana Musetti

“What Do Bluebirds Eat?”

Ashley Kennedy, Justin Bredlau and Jessica Bray

Entomological Foundation 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.



Katie Peterson's passion for education grew because of influential teachers and educational experiences prior to her Ph.D. program at the

University of Idaho. She has worked at an outdoor science school, a state zoo, a city zoo, a county nature center, and an environmental nonprofit organization. While in graduate school, Katie continues to pursue teaching and outreach opportunities; for example, she has been involved for the past three years in an informal education series, "Science Saturdays," offered by the Arboretum Associates at the University of Idaho.

Katie's teaching philosophy was created, molded, and modified by the many diverse teaching and educational opportunities she has coordinated and participated in. These teaching experiences range from formal to informal, inside classrooms to outdoors, and with students of many ages. These experiences have repeatedly revealed to Katie that learning can happen at any age, anywhere, and in any situation. Exceptional educators recognize these teachable moments and are ready to use them when presented.

Katie is from White Bear Lake, Minnesota. She received her B.A. in biology from Gustavus Adolphus College in St. Peter, Minnesota, and an M.S. in natural resources from the University of Idaho, as well as an environmental education certificate. She is currently pursuing her Ph.D. in biology at the University of Idaho.

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.



Chris Johnstone is a high school science teacher in Vermont, where he lives with his partner and two young children. He has a master's degree in

biology and currently teaches introductory and advanced biology courses at Middlebury Union High School in Middlebury, Vermont. He has been teaching for 10 years and is passionate about project-based learning, a student-centered classroom, and integrating technology.

Chris was introduced to entomology as a work-study student in the Insect and Arthropod Collection at the University of New Hampshire. His curatorial duties helped him learn about systematics and the value of biological collections. He also learned a great deal by assisting graduate students and university researchers in the field, mostly collecting invertebrates from cold mountain streams in New Hampshire. To Chris, collecting and studying insects with his students aren't just ways to learn biology, but are also opportunities to learn about the scientific process and consider the ethics of studying living things.

Entomological Foundation Medal of Honor

The Entomological Foundation Medal of Honor was established in 2007 and is the highest award presented by the Foundation. It is given only to those who have made outstanding contributions toward fulfillment of the Foundation's mission or entomological outreach.



Dr. Ronda Hamm is passionate about providing enriching science and agriculture experiences for everyone. She received her bachelor of science

degree in agricultural education at Fresno State University. She received her master of science and doctorate degrees in entomology at Cornell University. She is the global academic relations manager for Corteva Agriscience. In this role, she develops and implements strategies and relationships to promote science, people, and innovations for the future of agriculture.

Throughout her career, Ronda has been a trailblazer in establishing outreach interactions between industry and educators. In an environment where outreach programs may not be prevalent, Ronda has reached thousands of individuals to spark their passion for entomology and continuously leads others. In 2016, Ronda was awarded the Distinguished Informal Educator Award from the National Science Teachers Association (NSTA) for her work in founding three successful science, technology, engineering, and mathematics (STEM) programs, two while in graduate school and one at Dow AgroSciences (now Corteva Agriscience), that continue to grow. The Science Ambassadors program inspires students to enter science careers, empowers teachers to bring insects and agricultural sciences into their classrooms, and engages adults on the importance of the agricultural industry. She created multiple hands-on activities that grow public awareness about the importance of insects. In the past seven years more than three quarters of a million people have been impacted by the program's volunteers. The program has grown rapidly, with more than 500 Corteva Agriscience employees around the world participating in STEM outreach within their communities.

Entomological Society of Canada Awards & Honours

Gold Medal for Outstanding Achievement in Canadian Entomology

Entomological Society of Canada Gold Medal for Outstanding Achievement in Canadian entomology – This award is annual, given by the Entomological Society of Canada to an individual judged to have made an outstanding contribution to entomology in Canada.



Dr. Jacques Brodeur is an experimental and theoretical ecologist who received his Ph.D. in biology in 1990 from Laval University. Following a postdoc at Wageningen University, The Netherlands, he accepted a professorship position at Laval University. Since 2005, J. Brodeur has been a full professor at the

Université de Montréal and holds the Canada Research Chair in Biological Control. For the past 30 years, he has studied the biology and ecology of natural enemies used for biological control. A long-term goal of his research is to identify the governing ecological principles and mechanisms of multispecies interactions within arthropod communities, and to apply these principles to develop reliable and predictive strategies to best take advantage of biological control agents.

Dr. Brodeur has published more than 200 refereed papers, chapters, and books on parasitoid and predator ecology, host-parasitoid relationships, the diversity of arthropod communities in natural and managed ecosystems, and biological control. He has served on the editorial board of several journals (*Biological Control*, *Biocontrol*, *Journal of Economic Entomology*, *The Canadian Entomologist*, *PeerJ*), has been active in a number of professional societies (Entomological Society of Canada, Société d'Entomologie du Québec, Entomological Society of America, Ecological Society of America, International Organization for Biological Control – IOBC NRS), and has contributed to the organization of national and international scientific meetings or symposia. He has been president of IOBC Global (2008-2012) and chair of the IOBC Commission on Biological Control and Access and Benefit-Sharing (2008-2016). He is currently director of the Institut de Recherche en Biologie Végétale.

Prix et honneurs de la Société d'entomologie du Canada

Médaille d'or pour accomplissement exceptionnel en entomologie canadienne

Médaille d'or de la Société d'entomologie du Canada pour des accomplissements exceptionnels en entomologie canadienne – Ce prix est remis annuellement par la Société d'entomologie du Canada à un individu jugé avoir fait une contribution exceptionnelle à l'entomologie au Canada.



Dr Jacques Brodeur est un écologiste expérimental et théorique qui a obtenu son doctorat en biologie de l'Université Laval en 1990. Après un post-doc à l'Université Wageningen, Pays-Bas, il a accepté un poste de professeur à l'Université Laval. Depuis 2005, J. Brodeur est professeur à l'Université de

Montréal et détient la chaire de recherche du Canada en biocontrôle. Durant les 3 dernières années, il a étudié la biologie et l'écologie des ennemis naturels utilisés en lutte biologique. Un objectif à long-terme de ses recherches est d'identifier les principes écologiques et les mécanismes des interactions multi-espèces au sein des communautés d'arthropodes, et d'appliquer ces principes au développement de stratégies fiables et prévisibles pour tirer avantage des agents de lutte biologique.

Dr Brodeur a publié plus de 200 articles, chapitres et livres sur l'écologie des parasitoïdes et des prédateurs, les relations hôte-parasitoïde, la diversité des communautés d'arthropodes dans les écosystème naturels et aménagés, et la lutte biologique. Il a été sur le comité éditorial de plusieurs revues (*Biological Control*, *Biocontrol*, *Journal of Economic Entomology*, *The Canadian Entomologist*, *PeerJ*), a été actif dans plusieurs sociétés professionnelles (Société d'entomologie du Canada, Société d'entomologie du Québec, Organisation internationale de lutte biologique et intégrée – OILB SRN) et a contribué à l'organisation de réunions scientifiques ou symposiums nationaux et internationaux. Il a été président de IOBC Global (2008-2012) et président de IOBC Commission on Biological Control and Access and Benefit-Sharing (2008-2016). Il est présentement directeur de l'Institut de recherche en biologie végétale.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

C. Gordon Hewitt Award

Entomological Society of Canada C. Gordon Hewitt Award – This award is annually given by the Entomological Society of Canada to an individual judged to have made an outstanding contribution to entomology in Canada, and who has received their Ph.D. within the preceding 12 years.



Dr. Rob Johns is a forest insect ecologist with the Canadian Forest Service in Fredericton, New Brunswick. Before joining the federal service, Rob earned his Ph.D. from the University of New Brunswick and enjoyed two years as a postdoc in northern Japan. Rob is a skilled project coordinator and cultivates an

atmosphere of teamwork and mentorship among his numerous staff and collaborators. In recent years Rob has been a lead on several large collaborative research programs on spruce budworm, including the recently announced \$75 million “Early Intervention Strategy” project aimed at containing the spread of the outbreak through Atlantic Canada.

Three themes have dominated Rob’s recent work. First, he seeks to address long-standing questions around why and how spruce budworm outbreaks develop in northeastern North America. Second, Rob works to translate this theoretical knowledge into practical methods for monitoring and managing outbreaks at an operational scale. Third, Rob embraces a role as a “public educator” on spruce budworm ecology and management (including on controversial issues around insecticides), and has given more than 100 public talks and 75 media interviews in this capacity. As part of their public engagement efforts, Rob’s group created a multi-award-winning citizen science program (aka Budworm Tracker), which helps to monitor budworm moths in northeastern North America. This collaborative program provides landscape-scale data for studying (among other things) budworm regional dispersal patterns, and serves as an extraordinary vehicle for public engagement and education.

Prix C. Gordon Hewitt Award

Prix C. Gordon Hewitt de la Société d’entomologie du Canada – Ce prix est remis annuellement par la Société d’entomologie du Canada à un individu ayant apporté des contributions exceptionnelles à l’entomologie au Canada, et qui a obtenu son doctorat dans les 12 dernières années.



Dr Rob Johns est un écologiste des insectes forestiers du Service canadien des forêts à Frédéricton, Nouveau-Brunswick. Rob a obtenu son doctorat de l’Université du Nouveau-Brunswick et a profité d’un post-doc de 2 ans au Japon. Rob est un coordonnateur de projet talentueux et cultive une atmosphère de travail

d’équipe et de mentorat parmi ses nombreux collaborateurs et son personnel. Récemment, Rob a mené plusieurs grands programmes collaboratifs de recherche sur la tordeuse des bourgeons de l’épinette, incluant le projet de 75\$ millions annoncé sur la « Stratégie d’intervention hâtive » visant à empêcher la dispersion de l’épidémie au Canada atlantique.

Trois thèmes principaux dominent les travaux de Rob. Premièrement, il cherche à répondre à des questions concernant le développement des épidémies dans le nord-est de l’Amérique du Nord. Ensuite, Rob travaille à traduire cette connaissance en méthodes pratiques pour surveiller et gérer les épidémies à une échelle opérationnelle. Finalement, Rob embrasse le rôle « d’éducateur public » sur l’écologie et la lutte contre la tordeuse (incluant des questions controversées sur les insecticides) et a donné plus de 100 présentations publiques et 75 entrevues média à ce titre. Le groupe de Rob a créé un programme de science citoyenne ayant reçu plusieurs prix (Pisteurs de tordeuses) qui aide à surveiller les papillons de tordeuses dans le nord-est de l’Amérique du Nord. Ce programme collaboratif fournit des données à l’échelle du paysage pour l’étude des patrons de dispersion régionale de la tordeuse et sert de véhicule remarquable pour l’engagement et l’éducation du public.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

Honorary Membership

Entomological Society of Canada Honorary Membership – Honorary Membership is bestowed by vote of the Society membership, to a current or former Active Member of the Entomological Society of Canada who has made an outstanding contribution to the advancement of entomology.



Dr. Hugh Danks retired in 2007 after serving for almost 40 years as head of the Biological Survey of Canada (BSC) (Canadian Museum of Nature). In that role, he was instrumental in the coordination and facilitation of national research and communication activities to highlight Canada's entomological fauna. He also excelled

in the coordination and editing of major multiauthor synthetic works; e.g., *Canada and Its Insect Fauna* (1979 – 58 contributors, 573 pages) and *Insects of the Yukon* (1997 – 34 contributors, 1,034 pages). His most recent book, *The Biological Survey of Canada: A Personal History* (2016, 180 pages), summarizes the history and accomplishments the BSC achieved during his tenure.

Hugh has authored or co-authored more than 115 refereed scientific publications; many of these review the physiological ecology of insects, particularly seasonal adaptations of insects and mechanisms of biological clocks. Six of his publications have been cited more than 100 times; his 1978 review, "Modes of Seasonal Adaptation in the Insects: I. Winter Survival," has been cited more than 200 times. Equally noteworthy is Hugh's publication, "The Bug Book and Bottle," an activity book for entomophilic youngsters. After sales of more than 2 million copies of the first edition, a second edition appeared in 2009.

Hugh has served the Entomological Society of Canada in numerous capacities, including president (1997–1998). He also served as secretary-treasurer for the Biological Survey Foundation (1990–2007). He was the 1980 recipient of the C. Gordon Hewitt Award, and was awarded a Fellowship of the Society in 1982.

Membres honoraires

Statut de membre honoraire de la Société d'entomologie du Canada – Le statut de membre honoraire est décerné par vote des membres de la Société, à un membre actif ou ancien membre actif de la Société d'entomologie du Canada qui a fait une contribution exceptionnelle à l'avancement de l'entomologie.



Dr Hugh Danks, retraité depuis 2007, a servi près de 40 ans comme agent principal à la Commission biologique du Canada (Musée canadien de la nature). Il a été déterminant dans la coordination et la facilitation d'activités nationales de recherche et de communication afin de mettre en valeur la faune entomologique du Canada. Il a également excellé dans la coordination et l'édition de travaux majeurs de synthèses à multiples auteurs; p. ex. *Canada and Its Insect Fauna* (1979 – 58 contributeurs, 573 pp.) et *Insects of the Yukon* (1997 – 34 contributeurs, 1034 pp). Son plus récent livre, *The Biological Survey of Canada: A Personal History* (2016, 180 pp), résume l'histoire et les accomplissements de la CBC durant son mandat.

Hugh a écrit ou co-écrit plus de 115 articles scientifiques; plusieurs de ces articles synthétisent l'écologie physiologique des insectes, particulièrement les adaptations saisonnières des insectes et les mécanismes d'horloge biologique. Six de ses publications ont été citées plus de 100 fois : sa synthèse de 1978 « Modes of seasonal adaptation in the insects: I. Winter survival » a été citée plus de 200 fois. À mentionner également le livre d'activités pour les jeunes entomophiles « The Bug Book and Bottle ». Après plus de 2 millions de copies vendues, une deuxième édition est parue en 2009.

Hugh a fréquemment servi la Société d'entomologie du Canada, incluant comme président (1997-98). Il a également été secrétaire-trésorier pour la Fondation de la Commission biologique (1990-2007). Il a reçu le prix C. Gordon Hewitt en 1980, et est devenu membre associé de la Société en 1982.

Hugh a fréquemment servi la Société d'entomologie du Canada, incluant comme président (1997-98). Il a également été secrétaire-trésorier pour la Fondation de la Commission biologique (1990-2007). Il a reçu le prix C. Gordon Hewitt en 1980, et est devenu membre associé de la Société en 1982.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

Fellowship Award

Entomological Society of Canada Fellowship – Fellowships are bestowed by the Entomological Society of Canada to recognize members of the Society for their major contributions to entomology via research, teaching, application, and (or) administration.



Dr. John Spence is professor emeritus at the University of Alberta, served for 10 years as chair of the Department of Renewable Resources, and was director of the George Lake Field Station for 31 years. He has published more than 300 scientific journal articles, book chapters, reports, and reviews,

with a focus on the ecology and evolution of gerrid bugs, carabid beetles, and spiders. He oversaw the establishment of the EMEND (Ecosystem Management Emulating Natural Disturbances) forestry experiment. The science behind EMEND has defined current retention harvesting guidelines by the province of Alberta, inspired many related international forestry experiments, and is used internationally to justify implementation of variable retention harvesting.

During his career, John has supervised 32 undergraduate, 47 M.Sc., and 16 Ph.D. students, and 12 postdoctoral fellows. In 2010, he received the Award for Excellence in Mentoring Graduate Students from the Department of Renewable Resources at the University of Alberta. In 2007, he was recognized as Faculty Teacher of the Year. He (co)organized at least 17 national and international entomologically oriented symposia and conferences, 10 of them as chairman and six in Canada. He has served on the editorial boards of *Ecography* (1999-2018), *Forest and Agriculture Entomology* (1999-2018), and *Canadian Journal of Zoology* (1991-1996). Scientists, both in Canada and internationally, have benefitted from his sharp editor's pen, thoughtful evaluation, advice, and decisions about scientific publication.

In 2001, John received the ESC's Gold Medal in recognition of his outstanding contributions to Canadian entomology.

Membre associé

Statut de membre associé de la Société d'entomologie du Canada – Le statut de membre associé est alloué par la Société d'entomologie du Canada pour reconnaître les membres de la Société pour leurs contributions majeures à l'entomologie par la recherche, l'enseignement, les applications et (ou) l'administration.



Dr John Spence est professeur émérite à l'Université de l'Alberta, a été directeur du département des ressources renouvelables pendant 10 ans et a été le directeur de la station expérimentale de Lake George pendant 31 ans. Il a publié plus de 300 articles scientifiques, chapitres de livres, rapports et synthèses,

principalement sur l'écologie et l'évolution des punaises gerridés, des carabidés et des araignées. Il a supervisé l'établissement de l'expérience en foresterie EMEND (Ecosystem Management Emulating Natural Disturbances). La science derrière EMEND a défini les lignes directrices actuelles de coupe avec rétention de l'Alberta, a inspiré plusieurs expériences internationales et est utilisée internationalement pour justifier l'implantation de coupe avec rétention variable.

Durant sa carrière, John a supervisé 32 étudiants de premier cycle, 47 maîtrises, 16 doctorats et 12 post-doctorats. En 2010, il a reçu le prix de l'excellence en mentorat d'étudiants de cycles supérieurs du département des ressources renouvelables de l'Université de l'Alberta. En 2007, il a été reconnu professeur de l'année. Il a (co-)organisé au moins 17 symposiums et conférences nationaux et internationaux, dont dix comme présidents et six au Canada. Il a siégé sur le comité éditorial de *Ecography* (1999-2018), *Forest and Agriculture Entomology* (1999-2018) et *Canadian Journal of Zoology* (1991-1996). Des scientifiques au Canada et à l'international ont bénéficié de sa plume affûtée d'éditeur, de son évaluation réfléchie, de ses conseils et de ses décisions sur des publications scientifiques.

En 2001, John a reçu la médaille d'or de la SEC en reconnaissance de ses contributions exceptionnelles à l'entomologie canadienne.

2018 ESA, ESC, ESA Certification Corporation and Entomological Foundation Awards

Fellowship Award

Entomological Society of Canada Fellowship – Fellowships are bestowed by the Entomological Society of Canada to recognize members of the Society for their major contributions to entomology via research, teaching, application, and (or) administration.



Dr. Paul Fields is a research scientist with Agriculture and Agri-Food Canada in Winnipeg, Manitoba. He is internationally recognized for his studies on stored-product pest insects, which have been published in 91 peer-reviewed papers, one of which has been cited almost 400 times. He also has authored or co-authored 12 book chapters and 89 conference proceedings. His applied research has resulted in three patents.

Paul has been a strong supporter of the ESC throughout his career. He was a member of the Executive Counsel for four years (president 2008/2009), and served for three years as editor of the *Bulletin of the ESC*. In this latter role, he was instrumental in streamlining the production process to lead the Bulletin into the digital age. He has served on several other ESC committees, and also as an associate editor for *The Canadian Entomologist* and the *Journal of Stored Products Research*.

Paul also has been a long-time member of the Entomological Society of America (since 1983) and of the Entomological Society of Manitoba (since 1988; president in 2002 and 2015), and was a member of Sigma Xi for 18 years (secretary 1991-1994). He (co) organized conferences on Stored Product Protection in Thailand (2014) and Portugal (2010) and joint annual meetings of the ESM in Winnipeg with the ESA (North Central Branch in 2007) and the ESC (2017).

Norman Criddle Award

Entomological Society of Canada Norman Criddle Award – The Norman Criddle Award recognizes the contribution of an outstanding non-professional entomologist to the furtherance of entomology in Canada.



Monique Keiran received a bachelor of journalism degree from Carleton University in 1989 and has maintained an interest in scientific writing ever since. For a number of years, she worked with the Royal Tyrrell Museum of Palaeontology in Drumheller, Alberta, where she authored many articles and reports, including

the book *Pachyrhinosaurus: The Mystery of the Horned Dinosaur* (Heritage House Publishing, 2006). In 2003, she moved to Victoria, British Columbia, to work as a publications officer for the Canadian Forest Service (CFS). In that role, she promoted the scientific and technical work of the CFS by authoring and editing numerous technical and general publications, and assisting scientists via coordination of peer review and editing of scientific manuscripts prior to publication.

In 2012 Monique left the Canadian Forest Service to become a freelance journalist, publishing regularly in the newspaper *The Victoria Times Colonist*. At that time, she also began to volunteer considerable time to copy-edited manuscripts accepted for publication in the *Journal of the Entomological Society of British Columbia (JESBC)*. Her precision, attention to detail, and clear understanding of scientific publishing have made her indispensable to the production of *JESBC* and have played a key role in helping the journal maintain its high degree of professionalism and quality.

Membre associé

Statut de membre associé de la Société d'entomologie du Canada – Le statut de membre associé est alloué par la Société d'entomologie du Canada pour reconnaître les membres de la Société pour leurs contributions majeures à l'entomologie par la recherche, l'enseignement, les applications et (ou) l'administration.



Dr Paul Fields est chercheur scientifique à Agriculture et agroalimentaire Canada à Winnipeg, Manitoba. Il est reconnu internationalement pour ses études sur les insectes ravageurs des produits entreposés, qui ont été publiés dans 91 articles scientifiques, dont un ayant été cité presque 400 fois. Il a également écrit ou co-écrit 12 chapitres de livres et 89 comptes rendus de conférences. Ses recherches appliquées ont mené à 3 brevets.

Paul a été un fervent défenseur de la SEC durant sa carrière. Il a été membre du conseil exécutif durant quatre ans (Président en 2008/2009), et a été éditeur du Bulletin de la SEC pendant trois ans. Dans ce dernier rôle, il a été déterminant pour la rationalisation du processus de production pour mener le Bulletin dans l'ère numérique. Il a siégé sur plusieurs autres comités de la SEC et comme éditeur associé de *The Canadian Entomologist* et *Journal of Stored Products Research*.

Paul est membre de longue date de la Société d'entomologie d'Amérique (depuis 1983), de la Société d'entomologie du Manitoba (depuis 1988; président en 2002 et 2015) et a été membre de Sigma Xi durant 18 ans (secrétaire 1991-1994). Il a (co-)organisé les conférences sur la production des produits entreposés en Thaïlande (2014) et au Portugal (2010) et les réunions annuelles conjointe de la SEM à Winnipeg avec la ESA (North Central Branch en 2007) et la SEC (2017).

Prix Norman Criddle

Prix Norman Criddle de la Société d'entomologie du Canada – Le prix Norman Criddle reconnaît la contribution d'un entomologiste non-professionnel remarquable à l'avancement de l'entomologie au Canada.

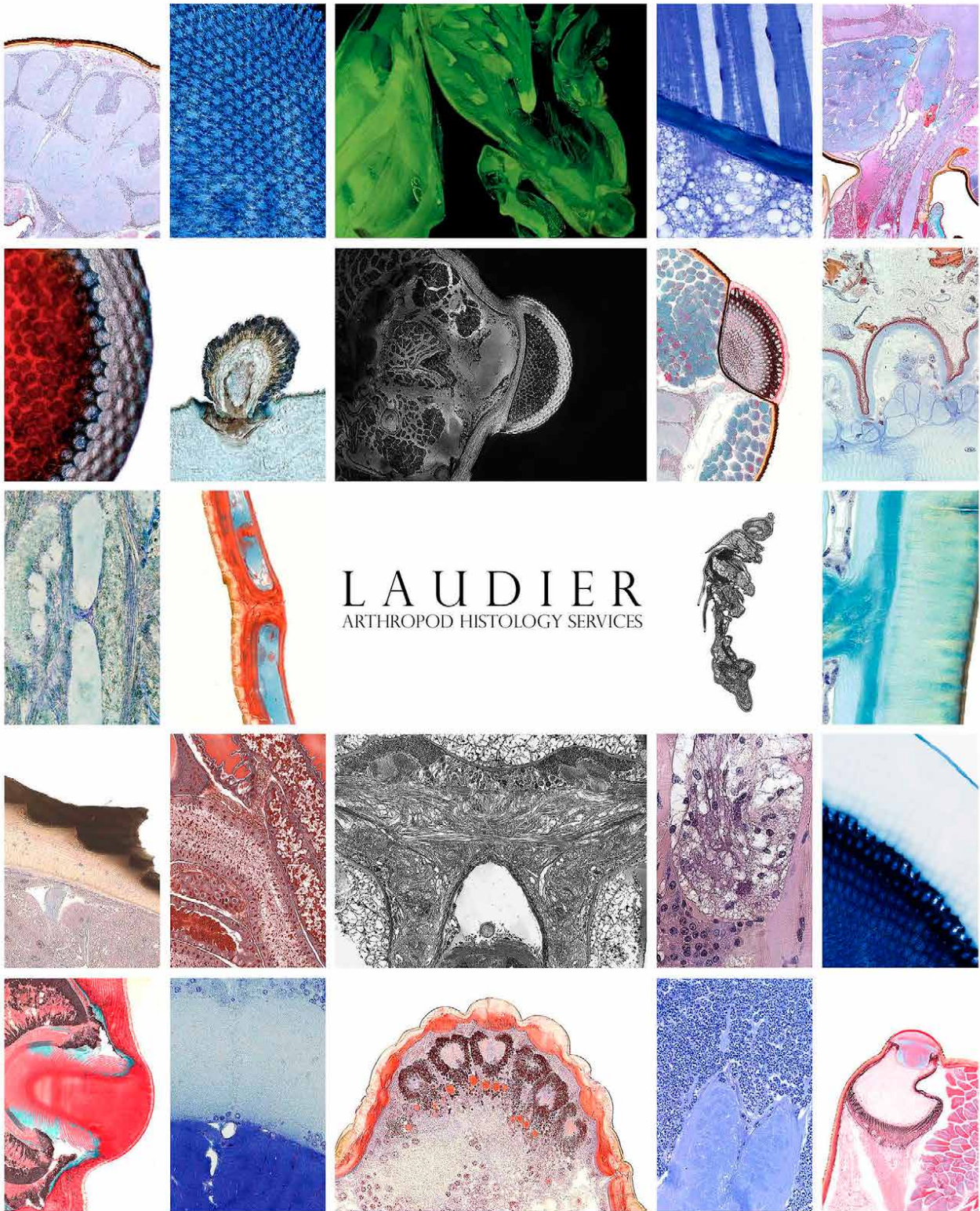


Monique Keiran a obtenu son baccalauréat en journalisme de l'Université Carleton en 1989 et a maintenu un intérêt dans l'écriture scientifique depuis ce temps. Pour un bon nombre d'années, elle a travaillé avec le Musée royal Tyrrel de paléontologie à Drumheller, Alberta, où elle a écrit plusieurs articles et rapports incluant

le livre *Pachyrhinosaurus: The Mystery of the Horned Dinosaur* (Heritage House Publishing, 2006). En 2003, elle a déménagé à Victoria, Colombie-Britannique, pour travailler comme agente des publications au Service canadien des forêts. À ce titre, elle a fait la promotion du travail scientifique et technique du SCF en écrivant et éditant de nombreuses publications techniques et générales, et en assistant les scientifiques par la coordination des révisions par les pairs et de l'édition des manuscrits scientifiques avant la publication.

En 2012, Monique a quitté le Service canadien des forêts pour devenir journaliste à la pige, publiant régulièrement dans le journal *The Victoria Times Colonist*. À cette époque, elle a également commencé à offrir bénévolement de son temps dans la révision de manuscrits acceptés pour publication dans *Journal of the Entomological Society of British Columbia*. Sa précision, son attention aux détails et sa bonne compréhension de la publication en science l'ont rendu indispensable dans la production de *JESBC* et ont joué un rôle clé pour aider le journal à maintenir son haut niveau de professionnalisme et sa qualité.

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John Henry Comstock Award, Larry Larson Award, Lillian and Alex Feir Travel Award, ESA Award, Student Certification Award

ESA Student Awards

The winners of the Student Competition for the President's Prize, ESA Student Awards, Linnaean Games, and Student Debates will be announced on Tuesday, November 13, 6:30 - 7:30 PM, VCC, West Ballroom ABC.

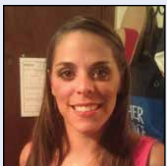
John Henry Comstock Graduate Student Awards

These six 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.



Ashley Kennedy (Eastern Branch) is a Ph.D. candidate at the University of Delaware in the Tallamy Lab. Her dissertation research focuses on bird-insect food webs, examining which species of insects are most important in North American bird species' diets. Ashley studied behavior of vervet monkeys for her

undergraduate thesis research at Johns Hopkins University, graduating in 2009. She completed internships at the Smithsonian Environmental Research Center, the National Zoo, and the Smithsonian Conservation Biology Institute between her undergraduate and graduate studies. In 2010, she joined Charles Bartlett's lab at the University of Delaware to begin an M.S. project on delphacid planthopper taxonomy, describing two new genera in the process. She received her M.S. in 2013 and began working as an educator for the Delaware Nature Society, and also worked as a taxonomist for Delaware Mosquito Control in 2014. In 2015, she began her current position in the Department of Entomology and Wildlife Ecology at University of Delaware. She serves as the Eastern Branch representative to the SAC, the student liaison to the Diversity & Inclusion Committee, and a member of the 2017 Class of Science Policy Fellows. Outside the realm of entomology, she enjoys volunteering with her therapy dog, running, reading, and costume parties.



Ximena Cibils-Stewart (International Branch) grew up in Colonia del Sacramento, Uruguay (South America). She earned a double B.Sc. degree in biology and entomology from Iowa State University in 2010, and an M.Sc. in entomology from Kansas State University in 2013. Her M.Sc. thesis was entitled, "Influence

of Plant Architecture on Trophic Interactions Involving Canola, Aphids, and Lady Beetles." After obtaining her M.Sc., she moved back to Uruguay, where she started working as an entomology scientist at INIA, Uruguay's National Institute for Agricultural Research. At INIA, Ximena's work has been majorly linked to the breeding programs of forage crops (legumes and grasses).

Currently, Ximena is a Ph.D. student at the Hawkesbury Institute for the Environment at Western Sydney University. Her Ph.D. focuses on elucidating the interactive effects between mutualistic fungi (novel endophytes and mycorrhiza) and silicon uptake in grasses since these associations might enhance plant defense against certain stressors, such as herbivores. Her Ph.D. thesis is entitled, "Down to Earth Defense: How Mutualistic Fungi Augment Silicon-Based Defense Against Above- and Below-Ground Insect Pests." These strategies have clear potential for plant protection with fewer environmental impacts than the insecticides they replace.

In the past, Ximena has been a recipient of numerous awards, including the Research Training Program Stipend Scholarship, supported by the Australian Government Research (2017); Plant Insect Ecosystems Legends of Entomology Award for Masters Student Achievement (2013); and Outstanding Graduate Research Assistant of the Year, sponsored by the Golden Key Honour Society, Kansas State University Chapter (2013).



Rachael Sitz (North Central Branch) graduated with B.S. degrees in insect science and plant biology from the University of Nebraska—Lincoln in 2011, where her research focused on plant-insect interactions in a biofuel grass system with Drs. Tiffany Heng-Moss and Fred Baxendale. During her M.S. and Ph.D. degrees

in Dr. Whitney Cranshaw's lab in the Department of Bioagricultural Sciences and Pest Management at Colorado State University, Rachael started work on insect-associated diseases of trees. Her focus is on the insect causal agents of two emergent diseases, including thousand cankers disease of walnut and drippy blight disease of red oak. Her M.S. research investigated cold tolerance in the walnut twig beetle, and sanitation options for thousand cankers diseased trees and felled logs. Her work has also looked at insecticide resistance in the European elm scale, the life history of the kermes scale involved in drippy blight disease, and insect involvement in the spread of a bacterial tree pathogen. Currently, she is a research scientist with the U.S. Forest Service Rocky Mountain Research Station, where she integrates basic entomology, microbiology, and ecology to answer applied research questions that aid management of insect-associated diseases in urban and natural forests.



Adekunle Adesanya, aka Kunle, (Pacific Branch) is a Ph.D. candidate in the Department of Entomology at Washington State University, under the mentorship of Dr. Doug Walsh (committee chair and major advisor), Dr. Laura Lavine, and Dr. Fang Zhu. Kunle's Ph.D.

research focus is on adaption of arthropods to xenobiotics, using the generalist herbivore two-spotted spider mite as a model organism. His Ph.D. project focus is on characterizing pesticides and allelochemical resistance in populations of two-spotted spider mites in multiple cropping systems such as hop, alfalfa, peppermint, and also strawberry, using toxicological and molecular diagnostic approaches. Kunle is also using transcriptomics to identify molecular markers involved in two-spotted spider mites' resistance to multiple chemistries of acaricides and also host plant adaption. Kunle was born and raised in Lagos, Nigeria, where he received his elementary and high school education. He then proceeded to obtain his bachelor's degree in crop production and protection at the Obafemi Awolowo University, Ile-ife Osun State, Nigeria, in 2010. He worked briefly as a production/supply chain associate in AACE food processing company and also as an agricultural consultant at Sahel Capital in Lagos, Nigeria. Kunle proceeded to earn a master of science degree in entomology at Auburn University, Alabama, graduating in summer 2015 under the direction of Dr. David Held (committee chair), Dr. Nannan Liu, Dr. Henry Fadamiro, and Dr. Arthur Appel. His master's research focused on characterizing detoxification enzymes in the invasive polyphagous herbivore pest Japanese beetle in response to diet breadth, host preference, and host plant intoxication. In the future, Kunle hopes to secure an academic faculty position, where he intends to use the triad of research, teaching, and extension to address food security, especially through crop protection and pest management.

John Henry Comstock Award, Larry Larson Award, Lillian and Alex Feir Travel Award, ESA Award, Student Certification Award



Dr. Zachary DeVries (Southeastern Branch) received his Ph.D. in entomology from North Carolina State University under the direction of Dr. Coby Schal. Zach received both his bachelor's degree in zoology and master's degree in entomology from Auburn University, where he developed a passion for working with urban pests (e.g., cockroaches, bed bugs, etc.). His dissertation research focused on several aspects of urban pest behavior, physiology, evolution, and management. Specifically, he evaluated the efficacy and exposure risks associated with total release foggers ("bug bombs") used for German cockroach control. In addition, he evaluated bed bug host-attraction and several behavioral and physiological factors responsible for preventing gene flow among different host-associated lineages (human- and bat-associated) of bed bugs. During his graduate tenure, Zach received numerous national and international level awards for his work relating to insect behavior, physiology, and integrated pest management. He has also taught several undergraduate entomology courses and has actively engaged the public in both extension and outreach activities throughout his career, including events such as BugFest and pest control association meetings. Zach is currently a postdoctoral research scholar at North Carolina State University, working with Dr. Coby Schal on the relationship among urban pest biology, management, and human health.



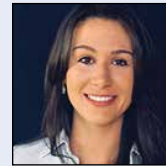
Dr. Freddy Ibanez (Southwestern Branch) received his bachelor's degree in biochemistry from the University of Santiago of Chile in 2006. He began his career studying molecular biology, focusing on developmental genes associated with gastrulation in *Drosophila melanogaster*, and epigenetic mechanisms. In 2013, Freddy started his Ph.D. in entomology under the direction of Dr. Cecilia Tamborindeguy at Texas A&M University. His dissertation research focused in the study on the effects of insect growth regulators and application of dsRNA in different aspects of reproduction of *Bactericera cockerelli*, known as potato psyllid, the vector of "zebra chip." His main research interests consist in understanding the host-pathogen-vector interaction, identifying the nutritional strategies of the pathogen on insect and plants, and finding novel strategies to control vector-pathogen spread on fields.

During his four years at Texas A&M University, Freddy contributed with nine manuscripts, six of them as first author. Also, he was a member of the Linnaean Games team awarded first place in ESA Southwestern Branch (2016); he was awarded the USDA-AFRI Student Travel Grant (2014); and he received the first-place award in the student poster competition for President's Prize, in the section of Physiology Biochemistry and Toxicology, in 2014.

Currently, he is a postdoctoral researcher in Department of Entomology and Nematology at the Citrus Research and Education Center, University of Florida, working with Dr. Lukasz Stelinski. The main goal of this research is to address the effectiveness of pesticide applications to control *Diaphorina citri* on *Candidatus Liberibacter asiaticus*-infected citrus groves and evaluating the effect of *Candidatus Liberibacter asiaticus* inoculation frequency on citrus greening progression and plant defense response.

Larry Larson Graduate Student Award for Leadership in Applied Entomology

This ESA award, 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.

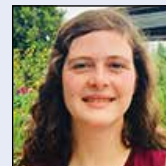


Daniela Pezzini graduated from the Federal University of Santa Maria in Brazil with a B.S. in agronomy. While an undergraduate, she acquired multiple experiences as a research assistant in an entomology laboratory. She is currently finishing her M.S. degree at the University of Minnesota under Dr. Robert Koch.

Her research project involves nine states of the North Central Region and aims to address questions related to the increasing threat posed by stink bugs in soybean. Specifically, it will fill the gap of literature on stink bug species composition and abundance in the region and develop sampling recommendations for growers and researchers. Daniela is passionate about agriculture and enjoys being able to help farmers better protect their crops.

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

The purpose of this ESA award is 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 Integrative Physiological and Molecular Insect Systems Section and to attend the ESA Annual Meeting.



Hillary Fischer found her passion for understanding the mechanisms of host-plant resistance while working as an undergraduate research assistant in Dr. Tiffany Heng-Moss' lab for plant-insect interactions at the University of Nebraska-Lincoln. She graduated from UNL in 2016 with Bachelor's degrees in both plant

biology and entomology and continued on to the University of Arkansas to pursue her Ph.D. with Dr. Fiona Goggin. Her dissertation research aims to understand the role of primary metabolism in plants for defense against aphids. Specifically, she investigates how singlet oxygen, a reactive oxygen species produced during photosynthesis, can serve as a signaling molecule for plant defense. Singlet oxygen has been largely overlooked in plant defense to herbivores due to a short half-life, making it difficult to study. Her research will improve techniques to more accurately and efficiently study singlet oxygen and elucidate its role in signaling for aphid resistance.

In the past two years of her Ph.D., she was awarded Honorable Mention for the NSF Graduate Student Fellowship and was a supporting author on three peer-reviewed publications. Along with numerous awards for her research, she is also active in leadership. She was president of the Arkansas Entomological Society from 2016 to Spring 2018, during which time she organized the annual entomology meeting for the state. She also served as president of the Isely-Baerg Entomology Club for the 2017-2018 term. After graduating, she hopes to continue in research focusing on the molecular aspects of host-plant resistance.

John Henry Comstock Award, Larry Larson Award, Lillian and Alex Feir Travel Award, ESA Award, Student Certification Award

ESA Student Activity Award

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



Lina Bernaola was born in Lima, Peru. She is a Ph.D. candidate at Louisiana State University (LSU) under the guidance of Dr. Michael Stout. Her research interests include plant-insect and plant-pathogen interactions as well as host plant resistance. 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 soil-borne organism, on rice resistance to insect herbivores and pathogens. 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. Lina earned her B.S. in biological sciences from San Marcos National University, Peru, and later completed her M.S. in agronomy at LSU. Lina has been actively involved in the Entomological Society of America since 2013. She has presented her research at several international, national, and Southeastern Branch meetings; she has also participated in LSU's Linnaean Games and Student Debate teams. Currently, she serves as student representative to the Governing Board and participates in both the Student Affairs Committee and the Early Career Professionals Committee. She has served on the P-IE Governing Council as the student representative and as president of LSU's Entomology Club, coordinating many of the club's educational outreach events about insects to kids. She is very grateful to the society for the many opportunities it has provided her. She has had a lifelong interest on science and looks forward to sharing this passion with younger generations.

Student Certification Award

This award recognizes and encourages outstanding entomology graduate students with interest in the mission of the ESA certification program.



Emily Bick is a Ph.D. candidate at the University of California, Davis. She received entomology degrees from Cornell University (B.S.) and University of California, Davis (M.S.).

Emily has focused her career on leveraging entomological knowledge to best serve people. After working in industry developing practical

solutions for invasion biology of urban forests, she focused her master's project on an invasive aquatic weed, the water hyacinth, and its insect biological control agent, *Neochetina bruchi*. Her Ph.D. project homed in on behaviorally manipulating a pesticide-resistant insect (*Lygus spp.*) away from high-value horticultural crops using a push-pull strategy. Emily utilizes simulation models of ecosystems to optimize integrated pest management strategies, a technique she learned while on an American Scandinavian Foundation Fellowship working with Dr. Niels Holst out of Aarhus University in Denmark.

Additionally, Emily is a Board Certified Entomologist with specialties in medical and plant entomology, holds a Linnaean Games championship, and is delighted to list "published theater critic" on her resume for her review of "An Entomologist's Love Story" in *Entomology Today*.

Postgraduate Student Awards, John H. Bordon Scholarship, Dr. Lloyd M. Dosdall Scholarship, Danks Scholarships, Graduate Research Travel Scholarships, Biological Survey of Canada Scholarship, Ed Becker Conference Travel Award

Pauline Deschodt

Dr. Lloyd M. Dosdall Memorial Scholarship



Pauline is a PhD candidate at Simon Fraser University in the Cory lab. Her work focuses on pathogen ecology and evolution, examining within and between host competition. Her work involves investigating the effects of mixed pathogen infections within a single host, as well as pathogen interactions at the host population level. She is primarily interested in the effects of pathogen competition on replication and secondary transmission. She uses laboratory as well as field experiments to explore factors affecting pathogen competition and disease outcome. Pauline hopes to understand the ecology of pathogen competition at the host and community level.

Joel Goodwin

ESC Ed Becker Conference Travel Award Postgraduate Student Awards (M.Sc.)



Joel is a MSc student at Acadia University, located in Nova Scotia, Canada. He is interested in the field of integrated pest management, specifically for the control of forest pests. Joel's thesis research, under the supervision of Dr. Kirk Hillier (Acadia) and Dr. Jon Sweeney (CFS), is focused on developing a multimodal monitoring

system for the invasive beech leaf mining weevil (*Orchestes fagi*) by analyzing the effects of visual, chemical, and auditory cues on the insect's behaviour.

Joanna Konopka

ESC Ed Becker Conference Travel Award



Joanna holds a BSc and an MSc degrees in Biology, and she has recently defended her PhD at Western University on trophic and competitive interactions of egg parasitoids of stink bugs (including *Halyomorpha halys*). She is a behavioural ecologist with experience and expertise in 3D high resolution live insect

imaging, insect molecular biology, insecticide toxicology, integrated pest management, chemical ecology, and biological control. Joanna is transitioning into public health and medical entomology research, with interest in zoonoses and vector-borne diseases, where she can bring her research skills and training in behavioural ecology to study arthropod disease-vectors including mosquitoes and ticks.

Pauline Deschodt

La bourse commémorative Dr Lloyd M. Dosdall



Pauline est étudiante au doctorat à l'Université Simon Fraser dans le labo Cory. Son travail s'intéresse à l'écologie et l'évolution des pathogènes, regardant la compétition à l'intérieur et entre les hôtes. Ses travaux investiguent les effets des infections mixtes de pathogènes à l'intérieur d'un seul hôte, ainsi que les interactions au niveau des populations d'hôtes. Elle est principalement intéressée par les effets de la compétition des pathogènes sur la réplication et la transmission secondaire. Elle mène des expériences en laboratoire et sur le terrain pour explorer les facteurs affectant la compétition entre les pathogène et le résultat en terme de maladie. Pauline espère comprendre l'écologie de la compétition des pathogènes aux niveau des hôtes et des communautés.

Joel Goodwin

Bourse Ed Becker pour la réunion annuelle de la SEC Les bourses pour études graduées (M.Sc.)



Joel est un étudiant à la maîtrise à l'Université Acadia (Nouvelle-Écosse, Canada). Il s'intéresse au domaine de la lutte intégrée, plus spécifiquement au contrôle des ravageurs forestiers. Joel effectue ses recherches sous la direction de Dr Kirk Hillier (Acadia) et Dr Jon Sweeney (SCF). Son mémoire porte sur le

développement d'un système multimodal de surveillance d'une espèce envahissante, le charançon du hêtre (*Orchestes fagi*), en analysant l'impact des signaux visuels, chimiques et auditifs sur le comportement de l'insecte.

Joanna Konopka

Bourse Ed Becker pour la réunion annuelle de la SEC



Joanna est titulaire d'un baccalauréat et d'une maîtrise en biologie. Elle a récemment soutenu sa thèse de doctorat à l'Université Western. Sa thèse portait sur les interactions trophiques et compétitives des parasitoïdes des œufs de punaises (y compris *Halyomorpha halys*).

Écologiste comportementale, elle possède une expérience et une expertise en imagerie 3D haute résolution des insectes vivants, en biologie moléculaire des insectes, en toxicologie des insecticides, en lutte intégrée des ravageurs, en écologie chimique et en lutte biologique. Joanna effectue présentement une transition vers la recherche en santé publique et en entomologie médicale. Elle s'intéresse particulièrement aux zoonoses et aux maladies à transmission vectorielle, deux domaines où ses compétences en recherche et sa formation en écologie comportementale lui seront utiles pour étudier les arthropodes vecteurs de maladies, notamment les moustiques et les tiques.

Postgraduate Student Awards, John H. Bordon Scholarship, Dr. Lloyd M. Dosdall Scholarship, Danks Scholarships, Graduate Research Travel Scholarships, Biological Survey of Canada Scholarship, Ed Becker Conference Travel Award

Catherine Little

Graduate Research Travel Scholarship (Ph.D.)



Catherine is currently completing her PhD at Memorial University of Newfoundland and Labrador under the supervision of Dr. Tom Chapman and Dr. Kirk Hillier. She is investigating interactions between olfactory reception, visual cues, and evolution of host preference in *Drosophila suzukii*. She has recently returned from The Swedish University of Agricultural Sciences (SLU) in Alnarp, Sweden, where she was invited as a visiting researcher to identify and confirm attraction to the female sex pheromone of *D. melanogaster* and *D. suzukii*. Catherine is continuing and expanding upon this collaboration at the new Insect NeuroScience and Ecology CenTre at Acadia (INSECTA).

Jenny Liu

Postgraduate Student Awards (M.Sc.)



Jenny is a second-year Master of Science student in the University of Guelph's School of Environmental Sciences. Her study insect is the swede midge, which is an invasive fly from Europe. It is a serious pest of cruciferous crops, most notably canola, and if populations are not controlled it may spread from Ontario to the major canola-producing regions of Canada. Jenny's research entails finding Ontario-specific development information for the midge and building a population dynamics model to predict emergences, with the end goal of improving current pest management strategies.

Samantha MacPherson

ESC Ed Becker Conference Travel Award



Samantha Macpherson is a fourth-year student completing a BSc in Biology with Honours at Acadia University. She has previously worked as a research assistant for Dr. Nicoletta Faraone and Dr. Kirk Hillier investigating the repellent and insecticidal properties of a novel granite dust product in crop protection. Currently she is completing her honours at Acadia University in INSECTA (Insect Neuroscience and Ecology Centre at Acadia) lab, investigating olfaction in ticks, the physiological and behavioural tick response to essential oils for the development of new repellent products for human protection.

Catherine Little

La bourse de voyage pour la recherche (PhD)



Catherine termine actuellement son doctorat à l'Université Memorial de Terre-Neuve-et-Labrador sous la direction de Dr Tom Chapman et Dr Kirk Hillier. Elle étudie les interactions entre la réception olfactive, les signaux visuels et l'évolution des préférences de l'hôte chez *Drosophila suzukii*. Elle revient de l'Université suédoise des sciences agricoles à Alnarp, en Suède, où elle a été invitée afin d'identifier et confirmer l'attraction pour la phéromone sexuelle femelle de *D. melanogaster* et *D. suzukii*. Catherine poursuit et développe cette collaboration au nouveau centre Insect NeuroScience and Ecology à Acadia (INSECTA).

Jenny Liu

Les bourses pour études graduées (M.Sc.)



Jenny est étudiante de deuxième année de maîtrise à la faculté des sciences de l'environnement de l'Université de Guelph. Son insecte d'étude est la cécidomyie du chou-fleur, un diptère envahissant d'origine européenne. Cet insecte est un ravageur important des cultures de crucifères, notamment du canola. Si ses populations ne sont pas contrôlées, cet insecte pourrait se disperser de l'Ontario vers les régions canadiennes majeures en production de canola. La recherche de Jenny implique de trouver des informations spécifiques sur le développement de la cécidomyie du chou-fleur en Ontario et de créer un modèle de dynamique des populations permettant de prévoir les émergences, l'objectif final étant d'améliorer les stratégies de lutte antiparasitaire actuelles.

Samantha MacPherson

Bourse Ed Becker pour la réunion annuelle de la SEC



Samantha Macpherson est une étudiante de 4^e année au baccalauréat en biologie (avec spécialisation) à l'Université Acadia. Elle a précédemment travaillé comme assistante de recherche pour Dre Nicoletta Faraone et Dr Kirk Hillier sur les propriétés répulsives et insecticides d'un nouveau produit à base de poussière de granit dans la protection des cultures. Elle complète présentement sa spécialisation à l'Université Acadia au labo INSECTA (Insect Neuroscience and Ecology Centre at Acadia), sur l'olfaction des tiques et la réponse physiologique et comportementale des tiques aux huiles essentielles pour le développement de nouveaux produits répulsifs pour la protection humaine.

Postgraduate Student Awards, John H. Borden Scholarship, Dr. Lloyd M. Dosdall Scholarship, Danks Scholarships, Graduate Research Travel Scholarships, Biological Survey of Canada Scholarship, Ed Becker Conference Travel Award

Matthew Muzzatti

Dr. Lloyd M. Dosdall Memorial Scholarship



Matthew completed a B.Sc. majoring in Biodiversity at the University of Guelph in 2015. He developed a passion for entomology after participating in a field entomology course in Missouri. He began his M.Sc. research in 2016 at Guelph under the supervision of Dr. Rebecca Hallett. His research is focused on developing a

pheromone-based action threshold to help control swede midge infestation levels in canola. Although his research is IPM-focused, Matthew is also very interested in insect diversity and behaviour, taxonomy, and entomophagy.

Dan Peach

John H. Borden Scholarship



Dan is a Ph. D. candidate in the Gries lab at Simon Fraser University, British Columbia, Canada. His research is focused on the relationships between mosquitoes and plants, using the mosquitoes *Aedes aegypti* and *Culex pipiens* as model organisms. Using chemical ecology, visual ecology, and microbiology, Dan

investigates how mosquitoes locate floral nectar, aphid honeydew, and other sources of plant sugar. He also investigates mosquito taxonomy, mosquito pollination, and natural history, as well as carries out applied research developing novel mosquito repellents and baits for an industrial sponsor. Dan has also worked as an environmental consultant in many different contexts and remote environments.

Asim Renyard

Postgraduate Student Awards (M.Sc.)



Asim is a Master of Pest Management student at Simon Fraser University (SFU) in the Gries Lab. He received a B.Sc (honours) in biology from SFU in 2016, and during his bachelor's he also attended research-oriented field courses. His current thesis focusses on researching the foraging and communication ecology of western

carpenter ants. His primary research interests are identifying pheromones used during ant's alarm and trail following behaviour, the semiochemical cues they exploit during foraging and the drivers of colony level recruitment to food sources. Outside of research, Asim is passionate about teaching and mentoring undergraduate students.

Matthew Muzzatti

La bourse commémorative Dr Lloyd M. Dosdall



Matthew a complété un baccalauréat avec une spécialisation en biodiversité à l'Université de Guelph en 2015. Il a développé une passion pour l'entomologie après avoir participé à un cours de terrain en entomologie au Missouri. Il a commencé ses études de maîtrise en 2016, à Guelph, sous la supervision de Dre Rebecca

Hallett. Ses recherches portent sur le développement d'un seuil d'intervention basé sur la phéromone pour aider à contrôler les niveaux d'infestation par la cécidomyie du chou-fleur dans le canola. Bien que ses recherches soient axées sur la lutte intégrée, Matthew s'intéresse également à la diversité et au comportement des insectes, à la taxonomie et à l'entomophagie.

Dan Peach

La bourse John H. Borden



Dan est étudiant au doctorat dans le labo Gries à l'Université Simon Fraser, Colombie-Britannique, Canada. Sa recherche regarde les relations entre les moustiques et les plantes, en utilisant les moustiques *Aedes aegypti* et *Culex pipiens* comme organismes modèles. En utilisant l'écologie chimique, l'écologie visuelle et

la microbiologie, Dan investigate la façon dont les moustiques localisent le nectar floral, le miellat de puceron et d'autres sources de sucres chez les plantes. Il regarde également la taxonomie des moustiques, la pollinisation par les moustiques et l'histoire naturelle, et il mène des recherches appliquées pour développer de nouveaux répulsifs à moustiques et des appâts pour un commanditaire industriel. Dan travaille également comme consultant environnemental dans différents contextes et environnements éloignés.

Asim Renyard

Les bourses pour études graduées (M.Sc.)



Asim est étudiant à la maîtrise en lutte intégrée à l'Université Simon Fraser (SFU) dans le labo Gries. Asim a obtenu son baccalauréat (avec spécialisation) en biologie à SFU en 2016, et durant son baccalauréat, il a aussi participé à des cours de terrain orientés vers la recherche. Son mémoire s'intéresse à l'écologie

d'approvisionnement et de communication de la fourmi charpentière occidentale. Ses intérêts de recherche principaux sont d'identifier les phéromones utilisées durant les alarmes des fourmis et le comportement de suivi de piste, les indices sémio chimiques qu'elles exploitent durant l'approvisionnement et les moteurs du recrutement de sources de nourriture au niveau de la colonie. À l'extérieur de ses recherches, Asim est passionné d'enseignement et de mentorat des étudiants de premier cycle.

Postgraduate Student Awards, John H. Bordon Scholarship, Dr. Lloyd M. Dosdall Scholarship, Danks Scholarships, Graduate Research Travel Scholarships, Biological Survey of Canada Scholarship, Ed Becker Conference Travel Award

Cassandra Russell

Graduate Research Travel Scholarship (M.Sc.)



Cassandra is a Master's student at the University of Guelph in Environmental Sciences. Her research centers around integrated pest management, specifically in the monitoring and management of pepper weevil, *Anthonomus eugenii*. Current pepper weevil monitoring strategies are unreliable and often fail to detect pepper weevil before economic damage occurs. By researching alternative trap designs the chemical ecology of pepper weevil, Cassandra hopes to develop improved monitoring tools to be used in both field and greenhouse peppers.

Melanie Scallion

Graduate Research Travel Scholarship (Ph.D.) Postgraduate Student Awards (Ph.D.)



Melanie is a Ph.D. candidate in the Department of Biology at Carleton University in Ottawa, Ontario (Canada). Melanie began her M.Sc. at Carleton in 2016 and soon decided to fast-track into the Ph.D. program. Supervised by Dr. Jayne Yack, she studies sonic defenses of *Bombycoidea* caterpillars. She is investigating why only some species produce sound while others are "mute" by studying correlations between sonic defense and traits such as body size, coloration, and other defense mechanisms. Melanie's project uses a combination of bioacoustics, behavioral, morphological, and phylogenetic analyses to study the function and diversity of caterpillar defense sounds.

Catherine Scott

Danks Scholarships Postgraduate Student Awards (Ph.D.)



Catherine is a PhD candidate at the University of Toronto Scarborough in Maydianne Andrade's lab. She completed her BSc degree in mathematics at Queen's University and her MSc in biology at Simon Fraser University with Gerhard Gries. Catherine combines observational and experimental work in the field and laboratory to study the sexual behaviour and chemical ecology of the western black widow spider, *Latrodectus hesperus*. In addition to her work on black widows Catherine has collaborated on studies of the behavioural ecology of hobo and false widow spiders, social wasps, army ants, and insect-specialist birds.

Cassandra Russell

La bourse de voyage pour la recherche (M.Sc.)



Cassandra est étudiante à la maîtrise en sciences de l'environnement à l'Université de Guelph. Ses recherches portent sur la lutte intégrée, notamment sur le dépistage et la gestion du charançon du poivron, *Anthonomus eugenii*. Les stratégies actuelles de surveillance du charançon du poivron ne sont pas fiables, et ne permettent pas toujours de détecter le charançon du poivron avant que des dommages économiques ne se produisent. En étudiant des modèles alternatifs de pièges ainsi que l'écologie chimique du charançon du poivron, Cassandra souhaite développer des outils de surveillance améliorés pouvant être utilisés à la fois dans les cultures de poivrons en champ et en serre.

Melanie Scallion

La bourse de voyage pour la recherche (Ph.D.) Les bourses pour études graduées (Ph.D.)



Melanie Scallion est étudiante au doctorat au département de biologie de l'Université Carleton à Ottawa, Ontario (Canada). Melanie a débuté sa maîtrise à Carleton en 2016 et a rapidement décidé de faire un passage direct au doctorat. Supervisée par Dr Jayne Yack, elle étudie les défenses acoustiques des chenilles de la super-famille *Bombycoidea*. Elle cherche à savoir pourquoi seulement certaines espèces produisent des sons alors que d'autres sont « muettes » en étudiant les corrélations entre les défenses acoustiques et les traits tels que la taille du corps, la coloration et d'autres mécanismes de défense. Le projet de Melanie utilise une combinaison d'analyses bioacoustiques, comportementales, morphologiques et phylogénétique afin d'étudier la fonction et la diversité des défenses acoustiques des chenilles.

Catherine Scott

Les bourses Danks Les bourses pour études graduées (Ph.D.)



Catherine est étudiante au doctorat à l'Université de Toronto Scarborough dans le labo de Maydianne Andrade. Elle a terminé son baccalauréat en mathématique à l'Université Queen et sa maîtrise en biologie à l'Université Simon Fraser avec Gerhard Gries. Catherine combine des travaux d'observation et de comportement sur le terrain et au laboratoire pour étudier le comportement sexuel et l'écologie chimique de la veuve noire de l'Ouest, *Latrodectus hesperus*. En plus de ses travaux sur la veuve noire, elle a collaboré à des études sur l'écologie comportementale de la tégénaire des champs, la fausse veuve noire, de guêpes sociales, de fourmis légionnaires et d'oiseaux insectivores.

Postgraduate Student Awards, John H. Bordon Scholarship, Dr. Lloyd M. Dosdall Scholarship, Danks Scholarships, Graduate Research Travel Scholarships, Biological Survey of Canada Scholarship, Ed Becker Conference Travel Award

Anthony Zerafa

**Biological Survey of Canada Scholarship
Danks Scholarships
Graduate Research Travel Scholarship (M.Sc.)**



Anthony is a Biology M.Sc. student working jointly at the Redpath Museum and Lyman Entomological Museum of McGill University. He is passionate about Arctic science, and particularly the terrestrial arthropods that reside in this harsh environment. His Master's thesis looks at how weather conditions affect terrestrial

arthropod activity during the short summer season on Axel Heiberg Island, in the High Arctic of Nunavut Territory. This project represents the first time that terrestrial arthropods have been studied on Axel Heiberg Island, and also lays the foundations for a proposed long-term arthropod monitoring program (to work in conjunction with other long-term monitoring activities at the McGill Arctic Research Station), which Anthony hopes to pursue after his Master's.

Anthony Zerafa

**La bourse d'études supérieures de la Commission
biologique du Canada
Les bourses Danks
La bourse de voyage pour la recherche (M.Sc.)**



Anthony est étudiant à la maîtrise en biologie travaillant conjointement au Musée Redpath et au Musée entomologique Lyman de l'Université McGill. Il se passionne pour la science arctique et a un intérêt particulier pour les arthropodes terrestres qui vivent dans cet environnement hostile. Son mémoire de maîtrise porte sur

l'influence des conditions météorologiques sur l'activité des arthropodes terrestres pendant la courte saison estivale de l'île Axel Heiberg, dans l'Extrême-Arctique du Nunavut. Il s'agit de la première fois que les arthropodes terrestres sont étudiés sur cette île. Ce projet jette également les bases d'un programme de surveillance à long terme proposé pour les arthropodes (à travailler conjointement avec d'autres activités de surveillance à long terme à la station de recherche arctique de McGill) qu'Anthony espère poursuivre après sa maîtrise.

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FRIDAY, NOVEMBER 9 / VENDREDI 9 NOVEMBRE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
8:30 AM – 5:30 PM	AAFC Biological Control Working Group	Cheakamus, Fairmont Waterfront Hotel
3:30 PM – 8:30 PM	Invasive Insects Grand Challenges Summit	Waterfront Ballroom, Fairmont Waterfront Hotel
7:00 PM – 9:00 PM	CAMTech IAB Meeting Reception	Meeting Room 110, Convention Centre

SATURDAY, NOVEMBER 10 / SAMEDI 10 NOVEMBRE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
7:30 AM – 4:00 PM	Annual Review of Entomology Editorial Committee Meeting	Nootka Room, Fairmont Waterfront Hotel
7:30 AM – 5:30 PM	CAMTech IAB Full-Day Meeting	Meeting Room 110, Convention Centre
8:00 AM – 6:00 PM	Entomological Collections Network Meeting	Meeting Room 302/303/304/305, Convention Centre
8:00 AM – 5:15 PM	Invasive Insects Grand Challenges Summit	Waterfront Ballroom, Fairmont Waterfront Hotel
8:00 AM – 5:00 PM	The Working Group on Improving Microbial Control of Arthropod Pests	Oceanview Suite 2, Pan Pacific Hotel
10:00 AM – 6:00 PM	Registration and Information Center	Ballroom Lobby, Convention Centre
1:00 PM – 5:00 PM	NC-246 Summit on Western Bean Cutworm	Cheakamus, Fairmont Waterfront Hotel
2:00 PM – 2:30 PM	Moderator Training	Meeting Room 109, Convention Centre
3:00 PM – 6:00 PM	Presentation Preview Room (PPR)/Speaker Ready Room	Meeting Room 107/108, Convention Centre
3:00 PM – 3:30 PM	Student Competition Judges Training	Meeting Room 111/112, Convention Centre
3:30 PM – 6:30 PM	Council of Entomological Department Administrators (CEDA) Meeting	Malaspina Room, Fairmont Waterfront Hotel
6:00 PM – 9:00 PM	Entomological Collections Network Banquet	Meeting Room 301, Convention Centre
6:00 PM – 6:30 PM	Student Volunteer Training	Meeting Room 103/104, Convention Centre

SUNDAY, NOVEMBER 11 / DIMANCHE 11 NOVEMBRE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
6:00 AM – 8:30 AM	Sightseeing Fun Run/Walk Through the Streets of Vancouver	West Level 1 Foyer, Convention Centre
7:00 AM – 12:00 PM	Entomological Collections Network Meeting Day 2	Meeting Room 302/303/304/305, Convention Centre
7:00 AM – 9:00 AM	ESA Executive Committee Meeting	Fairmont Waterfront Hotel
7:00 AM – 7:30 AM	Moderator Training	Meeting Room 109, Convention Centre
7:00 AM – 6:00 PM	Presentation Preview Room (PPR)/Speaker Ready Room	Meeting Room 107/108, Convention Centre
7:00 AM – 9:00 PM	Registration and Information Center	Ballroom Lobby, Convention Centre
7:00 AM – 12:00 PM	Student Competition Judges Break Room	Meeting Room 103/104, Convention Centre
7:00 AM – 7:30 AM	Student Competition Judges Training	Meeting Room 111/112, Convention Centre
7:30 AM – 12:00 PM	CAMTech IAB Half-Day Meeting	Meeting Room 110, Convention Centre
7:30 AM – 1:00 PM	IRAC-US Meeting	Mackenzie II, Fairmont Waterfront Hotel
8:00 AM – 10:40 AM	MUVE Section Symposium: Novel Pest Control Strategy on the Horizon: Gene Drives and Transgenic Insects	Meeting Room 122, Convention Centre
8:00 AM – 11:55 AM	PBT Section Symposium: RNAi: New Traits, Field Performance and Safety	Meeting Room 212, Convention Centre
8:00 AM – 11:20 AM	P-IE Section Symposium: From Genes to Communities: Quantifying Diverse Responses of Pollinators to Multiple Anthropogenic Stressors	Meeting Room 111/112, Convention Centre
8:00 AM – 10:00 AM	P-IE Section Symposium: How Crop Diversification across Space and Time Influences Herbivory	Meeting Room 121, Convention Centre
8:00 AM – 12:05 PM	P-IE Section Symposium: Practical Applications of Research on Parasite Manipulation of Hosts and Vectors	Meeting Room 119/120, Convention Centre
8:00 AM – 10:00 AM	Member Symposium: Biological Control Agents in New Environments	Meeting Room 109, Convention Centre

SCHEDULE BY DATE & TIME / HORAIRE PAR DATE ET HEURE

SUNDAY, NOVEMBER 11 / DIMANCHE 11 NOVEMBRE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
8:00 AM – 11:55 AM	Member Symposium: Connecting Hemp and Insects: Where No Entomologist Has Gone Before!	Meeting Room 116/117, Convention Centre
8:00 AM – 11:45 AM	Member Symposium: Continued Challenges in Entomology from a Woman's Perspective	Meeting Room 118, Convention Centre
8:00 AM – 12:00 PM	Member Symposium: Genomic Approaches to Biosurveillance of Invasive Forest Insects	Meeting Room 213, Convention Centre
8:00 AM – 12:00 PM	Member Symposium: Rapid Evolution in Biological Control Systems: Implications for Safety and Effectiveness	Meeting Room 301, Convention Centre
8:00 AM – 12:10 PM	Organized Meeting: Current Advances in Acarology	Meeting Room 114/115, Convention Centre
8:00 AM – 8:10 AM	Undergraduate Student 3-min: All Sections	Meeting Room 201, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: MUVE, Biting Arthropods	Meeting Room 215/216, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: PBT, Vector Biology	Meeting Room 210, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, Biocontrol, Predators	Meeting Room 202, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, Chemical Ecology	Meeting Room 208/209, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, Ecology	Meeting Room 205, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, Forestry	Meeting Room 203, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, IPM, Field Crops 1	Meeting Room 220, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, Pollinators 1	Meeting Room 221/222, Convention Centre
8:00 AM – 10:20 AM	Undergrad 10-min: MUVE	Meeting Room 214, Convention Centre
8:00 AM – 9:10 AM	Undergrad 10-min: PBT	Meeting Room 206, Convention Centre
8:00 AM – 9:40 AM	Undergrad 10-min: P-IE 1	Meeting Room 207, Convention Centre
8:00 AM – 10:50 AM	10-min: MUVE, Vector Surveillance	Meeting Room 224, Convention Centre
8:00 AM – 3:00 PM	ESC Outgoing Board of Directors Meeting	Coal Harbour Suite, Pan Pacific Hotel
8:00 AM – 10:00 AM	Journal of Economic Entomology Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
8:20 AM – 9:20 AM	Graduate Student 3-min: All Sections, Session 1	Meeting Room 201, Convention Centre
9:00 AM – 10:00 AM	Grand Challenge in Entomology (GCAFE) Leadership Meeting	Cheakamus, Fairmont Waterfront Hotel
9:00 AM – 2:30 PM	Tour: Vancouver Foodie Tour	Ballroom Lobby, Convention Centre
9:30 AM – 10:25 AM	Graduate Student 3-min: All Sections, Session 2	Meeting Room 201, Convention Centre
10:00 AM – 12:00 PM	Journal of Medical Entomology Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
10:10 AM – 12:35 PM	Grad 10-min: MUVE	Meeting Room 215/216, Convention Centre
10:10 AM – 12:25 PM	Grad 10-min: PBT 1	Meeting Room 206, Convention Centre
10:10 AM – 12:35 PM	Grad 10-min: PBT 2	Meeting Room 210, Convention Centre
10:10 AM – 12:35 PM	Grad 10-min: P-IE, Biocontrol, General 1	Meeting Room 202, Convention Centre
10:10 AM – 12:25 PM	Grad 10-min: P-IE, Invasives and Tree Pests	Meeting Room 203, Convention Centre
10:10 AM – 12:15 PM	Grad 10-min: P-IE, IPM, Field Crops 2	Meeting Room 220, Convention Centre
10:10 AM – 12:35 PM	Grad 10-min: P-IE, Landscape	Meeting Room 205, Convention Centre
10:10 AM – 12:25 PM	Grad 10-min: P-IE, Pollinator Habitat	Meeting Room 221/222, Convention Centre
10:10 AM – 12:25 PM	Grad 10-min: P-IE, Spotted-Wing Drosophila	Meeting Room 208/209, Convention Centre
10:10 AM – 12:05 PM	Undergrad 10-min: P-IE 2	Meeting Room 207, Convention Centre
10:30 AM – 12:00 PM	Entomological Foundation Board of Directors Meeting	Mackenzie I, Fairmont Waterfront Hotel
10:30 AM – 12:30 PM	IOBC Governing Board Meeting	Douglas Boardroom, Fairmont Waterfront Hotel
10:35 AM – 12:45 PM	3-min: All Sections	Meeting Room 201, Convention Centre
11:00 AM – 11:02 AM	Remembrance Day: Act of Remembrance (2 minutes of silence)	All Locations
12:00 PM – 3:00 PM	Linnaean Games Preliminary Round	West Ballroom ABC, Convention Centre
12:15 PM – 1:15 PM	Lunch and Learn: Outreach and Educational Program Assessment and Evaluation	City Foyer (Level 2), Convention Centre
1:00 PM – 3:00 PM	Annals of the ESA Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
1:00 PM – 4:00 PM	NCSR Research Planning Meeting	Nootka Room, Fairmont Waterfront Hotel

SCHEDULE BY DATE & TIME / HORAIRE PAR DATE ET HEURE

SUNDAY, NOVEMBER 11 – CONTINUED / DIMANCHE 11 NOVEMBRE - SUITE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
1:00 PM – 1:30 PM	Student Volunteer Training	Meeting Room 103/104, Convention Centre
1:30 PM – 5:20 PM	MUVE Section Symposium: Crossing Borders in Research and Development of Insect Repellents	Meeting Room 109, Convention Centre
1:30 PM – 5:00 PM	PBT Section Symposium: RNAi: Mechanism of Action and Resistance to dsRNA	Meeting Room 212, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Greenhouse Insect Management: Lessons Learned from Research Collaborations (An ESA, ESC, and IOBC Symposium)	Meeting Room 203, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Larry Larson Graduate Student Award for Leadership in Applied Entomology: Celebrating 20 Years of Impacting Future Generations of Leaders in Applied Entomology	Meeting Room 204, Convention Centre
1:30 PM – 3:30 PM	Member Symposium: Novel Changes in Forest Ecosystems and Bark Beetles Due to Global Climatic Changes	Meeting Room 119/120, Convention Centre
1:30 PM – 4:35 PM	Member Symposium: Soil Mites: Minute Arthropods with a Monumental Role	Meeting Room 116/117, Convention Centre
1:30 PM – 5:20 PM	Member Symposium: Systematics, Biogeography, and Ecology of Cerambycidae and Buprestidae	Meeting Room 118, Convention Centre
1:30 PM – 5:30 PM	Organized Meeting: Americas Neuropterists Meeting	Meeting Room 210, Convention Centre
1:30 PM – 5:30 PM	Organized Meeting: International Society of Hymenopterists	Meeting Room 121, Convention Centre
1:30 PM – 4:30 PM	Organized Meeting: Orthopteroids: Small Orders, Big Ideas	Meeting Room 202, Convention Centre
1:30 PM – 5:30 PM	Organized Meeting: SOLA Scarab Workers	Meeting Room 302/303/304/305, Convention Centre
1:30 PM – 5:30 PM	Workshop: Breaking Down the Border between Readers and Writers: How to Improve Your Scientific Writing	Meeting Room 211, Convention Centre
1:30 PM – 5:00 PM	10-min: MUVE, Biology and Ecology of Disease Vectors	Meeting Room 220, Convention Centre
1:30 PM – 5:10 PM	10-min: MUVE, PBT, P-IE, Stored Product Pests	Meeting Room 214, Convention Centre
1:30 PM – 4:20 PM	10-min: MUVE, Vector Control	Meeting Room 215/216, Convention Centre
1:30 PM – 5:30 PM	10-min: PBT, Insecticides and Resistance	Meeting Room 221/222, Convention Centre
1:30 PM – 3:50 PM	10-min: PBT, Social Insects	Meeting Room 213, Convention Centre
1:30 PM – 5:10 PM	10-min: P-IE, Biocontrol, Parasitoids	Meeting Room 114/115, Convention Centre
1:30 PM – 5:20 PM	10-min: P-IE, Novel Tools and Products	Meeting Room 224, Convention Centre
1:30 PM – 5:20 PM	10-min: P-IE, Pollination	Meeting Room 111/112, Convention Centre
1:30 PM – 3:40 PM	10-min: P-IE, Resistance Management, Molecular and Cellular Biology	Meeting Room 122, Convention Centre
1:30 PM – 3:50 PM	10-min: SysEB, Behavior and Genetics	Meeting Room 206, Convention Centre
1:30 PM – 4:20 PM	10-min: SysEB, Biodiversity, Conservation, and Collections	Meeting Room 205, Convention Centre
1:30 PM – 3:30 PM	10-min: SysEB, Invasive Species and Biological Control	Meeting Room 207, Convention Centre
2:00 PM – 5:00 PM	Certification Board Meeting	Mackenzie I, Fairmont Waterfront Hotel
3:00 PM – 5:00 PM	Graduate Student Showcase	West Ballroom ABC, Convention Centre
3:00 PM – 5:00 PM	Environmental Entomology Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
3:30 PM – 5:30 PM	HexaSoTol Working Group	Mackenzie II, Fairmont Waterfront Hotel
4:30 PM – 5:20 PM	USDA - APHIS All Hands Meeting	Cheakamus, Fairmont Waterfront Hotel
5:30 PM – 7:30 PM	Opening Plenary Session with Keynote Speaker Randy Olson	West Ballroom ABC, Convention Centre
7:30 PM – 9:30 PM	Exhibit Hall	West Exhibit Hall A, Convention Centre
7:30 PM – 9:30 PM	Welcome Reception	West Exhibit Hall A, Convention Centre

SCHEDULE BY DATE & TIME / HORAIRE PAR DATE ET HEURE

MONDAY, NOVEMBER 12 / LUNDI 12 NOVEMBRE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
6:30 AM – 8:00 AM	Women in Entomology Breakfast	Ballroom Foyer, Convention Centre
7:00 AM – 7:30 AM	Moderator Training	Meeting Room 109, Convention Centre
7:00 AM – 6:00 PM	Presentation Preview Room (PPR)/Speaker Ready Room	Meeting Room 107/108, Convention Centre
7:00 AM – 5:00 PM	Registration and Information Center	Ballroom Lobby, Convention Centre
7:00 AM – 5:00 PM	Student Competition Judges Break Room	Meeting Room 103/104, Convention Centre
7:00 AM – 7:30 AM	Student Competition Judges Training	Meeting Room 111/112, Convention Centre
7:00 AM – 1:00 PM	The Coleopterists Society Executive Council Meeting	Oceanview Suite 2, Pan Pacific Hotel
8:00 AM – 10:45 AM	PBT Section Symposium: Gene Drive: 21st Century Genetic Control of Agricultural and Public Health Pests	Meeting Room 212, Convention Centre
8:00 AM – 10:45 AM	P-IE Section Symposium: From Researcher to Stakeholder: Using Extension to Cross Borders in a Changing World	Meeting Room 119/120, Convention Centre
8:00 AM – 12:00 PM	P-IE Section Symposium: Impact of Borders on Managing Insect Resistant Management	Meeting Room 116/117, Convention Centre
8:00 AM – 12:00 PM	P-IE Section Symposium: Monitoring and Managing Agricultural Insects Crossing Borders	Meeting Room 121, Convention Centre
8:00 AM – 12:00 PM	SysEB Section Symposium: Species Delimitation and Identification in the Age of Big Data and Artificial Intelligence: Molecular and Morphological Approaches	Meeting Room 114/115, Convention Centre
8:00 AM – 11:50 AM	Member Symposium: The Unseen World Beneath Our Feet: Biology and Management of Elateridae in a Changing World	Meeting Room 118, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: MUVE, Mosquitoes 1	Meeting Room 217/218/219, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: PBT, Bee Health	Meeting Room 210, Convention Centre
8:00 AM – 9:30 AM	Grad 10-min: P-IE, Behavior	Meeting Room 205, Convention Centre
8:00 AM – 9:50 AM	Grad 10-min: P-IE, Ecology and Conservation	Meeting Room 202, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, IPM, Field Crops 3	Meeting Room 213, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, IPM, Field Crops 4	Meeting Room 220, Convention Centre
8:00 AM – 10:10 AM	Grad 10-min: P-IE, Pollinator Health	Meeting Room 215/216, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: P-IE, Pollinators 2	Meeting Room 214, Convention Centre
8:00 AM – 9:50 AM	Grad 10-min: P-IE, Stink Bugs	Meeting Room 204, Convention Centre
8:00 AM – 10:20 AM	Grad 10-min: SysEB	Meeting Room 221/222, Convention Centre
8:00 AM – 9:50 AM	Grad 10-min: SysEB, Beetles	Meeting Room 301, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: SysEB, Morphology	Meeting Room 302/303, Convention Centre
8:00 AM – 9:50 AM	Grad 10-min: SysEB, Social Insects	Meeting Room 224, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: SysEB, Speciation	Meeting Room 304/305, Convention Centre
8:00 AM – 10:00 AM	Grad 10-min: SysEB, Wasps and Bees	Meeting Room 306, Convention Centre
8:00 AM – 10:00 AM	Journal of Insect Science Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
8:00 AM – 12:00 PM	Science Policy Fellows Training Workshop (invitation only)	Mackenzie I, Fairmont Waterfront Hotel
9:00 AM – 12:00 PM	Workshop: Story Circles Demo Day with Randy Olson	Meeting Room 201, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: MUVE 1	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: MUVE 2	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: PBT 1	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: PBT 2	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: P-IE, Bees	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: P-IE, Integrated Pest Management 1	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: P-IE, Integrated Pest Management 2	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: P-IE, Integrated Pest Management 3	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: P-IE, Integrated Pest Management 4 and Other	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: P-IE, Parasitoids and Other	West Exhibit Hall A, Convention Centre

MONDAY, NOVEMBER 12 – CONTINUED / LUNDI 12 NOVEMBRE - SUITE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
9:00 AM – 6:30 PM	Grad Poster: P-IE, Pollination and Parasitoids	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: SysEB 1	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: SysEB 2	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Poster: SysEB 3	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Undergrad Poster: MUVE	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Undergrad Poster: PBT	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Undergrad Poster: P-IE	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Undergrad Poster: SysEB 1	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Undergrad Poster: SysEB 2	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Virtual Poster: MUVE, PBT, P-IE, and SysEB	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Grad Virtual Poster: P-IE	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Undergrad Virtual Poster: MUVE, P-IE, and SysEB	West Exhibit Hall A, Convention Centre
9:00 AM – 5:00 PM	Exhibit Hall	West Exhibit Hall A, Convention Centre
10:00 AM – 12:00 PM	Journal of Integrated Pest Management Editorial Board	Malaspina Room, Fairmont Waterfront Hotel
10:10 AM – 12:30 PM	Grad 10-min: MUVE, Mosquitoes 2	Meeting Room 217/218/219, Convention Centre
10:10 AM – 12:20 PM	Grad 10-min: MUVE, Social Insects	Meeting Room 214, Convention Centre
10:10 AM – 12:00 PM	Grad 10-min: PBT, Crop Pests	Meeting Room 210, Convention Centre
10:10 AM – 12:20 PM	Grad 10-min: P-IE, Biocontrol, General 2	Meeting Room 202, Convention Centre
10:10 AM – 12:30 PM	Grad 10-min: P-IE, Biocontrol, Parasitoids	Meeting Room 205, Convention Centre
10:10 AM – 12:30 PM	Grad 10-min: P-IE, Host Plant Resistance and Preference	Meeting Room 213, Convention Centre
10:10 AM – 12:10 PM	Grad 10-min: P-IE, Turf and Horticulture	Meeting Room 204, Convention Centre
10:10 AM – 12:10 PM	Grad 10-min: P-IE, Vectors of Plant Diseases	Meeting Room 220, Convention Centre
10:10 AM – 12:20 PM	Grad 10-min: SysEB, Ants	Meeting Room 306, Convention Centre
10:10 AM – 12:30 PM	Grad 10-min: SysEB, Biodiversity	Meeting Room 224, Convention Centre
10:10 AM – 12:20 PM	Grad 10-min: SysEB, Evolution and Behavior	Meeting Room 304/305, Convention Centre
10:10 AM – 12:20 PM	Grad 10-min: SysEB, Phylogenetics	Meeting Room 302/303, Convention Centre
10:10 AM – 12:20 PM	Undergrad 10-min: SysEB	Meeting Room 301, Convention Centre
10:30 AM – 12:30 PM	MUVE Section Symposium: Combating Vector-Borne Disease During Disaster and Humanitarian Relief Efforts	Meeting Room 111/112, Convention Centre
11:00 AM – 1:00 PM	ARS Overseas Biological Control Meeting	Meeting Room 203, Convention Centre
12:00 PM – 2:00 PM	American Entomologist Focus Group #1	Malaspina Room, Fairmont Waterfront Hotel
12:00 PM – 2:00 PM	Archives of Insect Biochemistry and Physiology Editorial Board Meeting	Douglas Boardroom, Fairmont Waterfront Hotel
12:00 PM – 2:00 PM	Editorial Board Meeting, The Canadian Entomologist	Oceanview Suite 4, Pan Pacific Hotel
12:15 PM – 2:00 PM	Member Symposium: Frontiers in Molecular Trophic Interactions: Advancing Biodiversity Research	Meeting Room 118, Convention Centre
12:15 PM – 2:00 PM	Member Symposium: Functional Diversity of Arthropods	Meeting Room 121, Convention Centre
12:15 PM – 2:00 PM	Member Symposium: Multitrophic Interactions in a Changing World	Meeting Room 119/120, Convention Centre
12:30 PM – 1:30 PM	Lunch and Learn: Advocate Entomology! Learn How with the Science Policy Committee	Meeting Room 206, Convention Centre
12:30 PM – 1:30 PM	Lunch and Learn: Avoiding Pitfalls in Early Graduate School: Preparing Early on for the Job Market	Meeting Room 207, Convention Centre
12:30 PM – 1:30 PM	Lunch and Learn: Down with Publish or Perish! Nontraditional Careers in Entomology	Meeting Room 205, Convention Centre
12:30 PM – 1:30 PM	Lunch and Listen: What is the Future of ESA and Where Do I Belong?	West Ballroom ABC, Convention Centre
12:40 PM – 2:10 PM	10-min: PBT, Risk Assessment	Meeting Room 210, Convention Centre
12:45 PM – 1:45 PM	Lunch and Learn: An Image is Worth a Thousand Words: Science Visualization and Communication for Entomological Research	Meeting Room 201, Convention Centre

SCHEDULE BY DATE & TIME / HORAIRE PAR DATE ET HEURE

MONDAY, NOVEMBER 12 – CONTINUED / LUNDI 12 NOVEMBRE - SUITE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
1:30 PM – 5:30 PM	Organized Meeting: Highlights of Medical, Urban, and Veterinary Entomology & MUVE Business Meeting	Meeting Room 109/110, Convention Centre
1:30 PM – 3:00 PM	Science Policy Committee Meeting	Meeting Room 206, Convention Centre
1:30 PM – 5:00 PM	Tour: Vancouver's North Shore, Lynn Canyon & Capilano Salmon Hatchery	Ballroom Lobby, Convention Centre
2:00 PM – 3:00 PM	Committee on Common Names of Insects Meeting	Malaspina Room, Fairmont Waterfront Hotel
2:30 PM – 5:30 PM	Organized Meeting: Physiology, Biochemistry, and Toxicology (PBT) Section Meeting Networking Session	Meeting Room 208/209/City Foyer (Level 2), Convention Centre
2:30 PM – 5:30 PM	Organized Meeting: Plant-Insect Ecosystem (P-IE) Section Networking, Business, and Learning Session (All Welcome!)	Meeting Room 301/302/303/304/305, Convention Centre
2:30 PM – 5:30 PM	Organized Meeting: Systematics, Evolution, and Biodiversity (SysEB) Section Meeting	Meeting Room 211, Convention Centre
3:00 PM – 5:00 PM	Arthropod Management Tests Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
5:00 PM – 8:00 PM	ESBC Executive Committee Meeting	Oceanview Suite 4, Pan Pacific Hotel
5:30 PM – 6:30 PM	International Association of Black Entomologists (IABE) Annual Meeting	Meeting Room 111/112, Convention Centre
5:30 PM – 6:30 PM	Student Competition Poster Social Hour	West Exhibit Hall A, Convention Centre
6:00 PM – 7:30 PM	ESA Illinois Mixer	Coal Harbour Suite, Pan Pacific Hotel
6:30 PM – 8:30 PM	Prairie States Mixer - Colorado, Iowa, Kansas, Nebraska	Cypress Suite, Pan Pacific Hotel
6:30 PM – 8:30 PM	Purdue Entomology Mixer	Meeting Room 122, Convention Centre
7:00 PM – 9:00 PM	2018 Mid-Atlantic Mixer: University of Maryland, Virginia Tech, Rutgers, and University of Delaware	Waterfront B, Fairmont Waterfront Hotel
7:00 PM – 9:00 PM	Auburn, Arkansas, Clemson, Kentucky, and Tennessee Mixer	Nootka Room, Fairmont Waterfront Hotel
7:00 PM – 8:00 PM	North Central Branch Student Affairs Committee Bi-Annual Meeting	Douglas Boardroom, Fairmont Waterfront Hotel
7:00 PM – 9:00 PM	Penn State Mixer	Mackenzie II, Fairmont Waterfront Hotel
7:00 PM – 9:00 PM	PNW Mixer: Oregon State University, Montana State University, Washington State University and University of Idaho	Waterfront C, Fairmont Waterfront Hotel
7:00 PM – 9:00 PM	Texas A&M University, Oklahoma State University and Southwestern Branch Mixer	Waterfront A, Fairmont Waterfront Hotel
7:00 PM – 9:00 PM	University of California Mixer	Meeting Room 220, Convention Centre
7:00 PM – 9:00 PM	University of Florida, University of Georgia and NC State Joint Mixer	Meeting Room 221/222, Convention Centre
7:00 PM – 9:00 PM	University of Wisconsin Mixer	Meeting Room 201, Convention Centre
7:30 PM – 9:00 PM	Ohio State University Mixer	Mackenzie I, Fairmont Waterfront Hotel
8:00 PM – 10:00 PM	Cornell University Entomology Mixer-Reception	Malaspina Room, Fairmont Waterfront Hotel
8:00 PM – 10:00 PM	ESC Mixer	Oceanview Suite 1-3, Pan Pacific Hotel
8:00 PM – 10:00 PM	Minnesota Mixer	Cheakamus, Fairmont Waterfront Hotel

TUESDAY, NOVEMBER 13 / MARDI 13 NOVEMBRE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
7:00 AM – 9:30 AM	ESA and ESC Professional Awards Breakfast Featuring the Founders Memorial and Heritage Lectures	West Ballroom ABC, Convention Centre
7:00 AM – 8:00 AM	ARS All-Hands Meeting	Meeting Room 210, Convention Centre
7:00 AM – 7:30 AM	Moderator Training	Meeting Room 109, Convention Centre
7:00 AM – 6:00 PM	Presentation Preview Room (PPR)/Speaker Ready Room	Meeting 107/108, Convention Centre
7:00 AM – 5:00 PM	Registration and Information Center	Ballroom Lobby, Convention Centre
8:00 AM – 9:30 AM	Insect Systematics and Diversity Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
9:00 AM – 6:30 PM	Poster: MUVE, Vectors, Forensics, and Urban	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Poster: PBT, IPM, Ecology, and Social Insects	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Poster: P-IE, IPM, Behavior, and Biocontrol	West Exhibit Hall A, Convention Centre

TUESDAY, NOVEMBER 13 – CONTINUED / MARDI 13 NOVEMBRE - SUITE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
9:00 AM – 6:30 PM	Poster: SysEB, Ecology, Invasives, and Behavior	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Virtual Poster: MUVE	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Virtual Poster: PBT	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Virtual Poster: P-IE	West Exhibit Hall A, Convention Centre
9:00 AM – 6:30 PM	Virtual Poster: SysEB	West Exhibit Hall A, Convention Centre
9:00 AM – 5:00 PM	Exhibit Hall	West Exhibit Hall A, Convention Centre
9:30 AM – 12:30 PM	Program Symposium: Crossing Borders without Permission: Accidental Introduction of Biological Control Agents, a Significant Phenomenon with Risks, Benefits, and Policy Implications	Meeting Room 109/110, Convention Centre
9:30 AM – 12:30 PM	MUVE Section Symposium: Entomology without Borders: Tackling Insecticide Resistance through Science, Extension, and Collaboration	Meeting Room 224, Convention Centre
9:30 AM – 12:30 PM	MUVE Section Symposium: Mosquito-Microbe Interactions Beyond Vector-Pathogen	Meeting Room 121, Convention Centre
9:30 AM – 12:30 PM	MUVE Section Symposium: What Can We Learn About Vector-borne Diseases of Plants, Animals, and Humans From Talking to Each Other?	Meeting Room 118, Convention Centre
9:30 AM – 11:35 AM	P-IE Section Symposium: Crossing Borders: Global Collaborations to Combat Forest Insect Pests	Meeting Room 213, Convention Centre
9:30 AM – 12:00 PM	P-IE Section Symposium: Ecology and Evolution in Novel Species Interactions	Meeting Room 214, Convention Centre
9:30 AM – 12:30 PM	P-IE Section Symposium: The Gypsy Moth (<i>Lymantria dispar</i> L.) at 150: Contributions to the Development of Invasion Ecology	Meeting Room 215/216, Convention Centre
9:30 AM – 12:30 PM	SysEB Section Symposium: Evolutionary and Phylogenetic Morphology	Meeting Room 111/112, Convention Centre
9:30 AM – 12:25 PM	SysEB Section Symposium: Insects in 3D - Current Uses and Future Directions for High Resolution 3D Data	Meeting Room 119/120, Convention Centre
9:30 AM – 12:30 PM	SysEB Section Symposium: Latin American Entomology – Ecology & Biodiversity	Meeting Room 122, Convention Centre
9:30 AM – 12:15 PM	Member Symposium: Brown Marmorated Stink Bug, <i>Halyomorpha halys</i> , in Western North America: Status and Potential Harm to Agriculture	Meeting Room 217/218/219, Convention Centre
9:30 AM – 11:55 AM	Member Symposium: Density Dependence, Community Genetics, and Resistance Evolution	Meeting Room 116/117, Convention Centre
9:30 AM – 12:30 PM	Member Symposium: Ethics in Entomology: Considerations for Research and Policy	Meeting Room 206, Convention Centre
9:30 AM – 12:05 PM	Member Symposium: Forest Insect Genomics	Meeting Room 114/115, Convention Centre
9:30 AM – 12:25 PM	Member Symposium: Microbial Synergies and Interactions in Biocontrol Systems	Meeting Room 203, Convention Centre
9:30 AM – 12:30 PM	Member Symposium: Newly Established Exotic Pests: Transitioning from Emergency Response to IPM	Meeting Room 207, Convention Centre
9:30 AM – 12:05 PM	Member Symposium: The Dirt on Plant-Insect Interactions	Meeting Room 205, Convention Centre
9:30 AM – 12:00 PM	Member Symposium: The Value of Forests to Insect Pollinators	Meeting Room 202, Convention Centre
9:30 AM – 11:00 AM	10-min: MUVE, Forensic Entomology	Meeting Room 221/222, Convention Centre
9:30 AM – 12:10 PM	10-min: MUVE, Molecular Biology of Medical, Veterinary, and Urban Pests	Meeting Room 220, Convention Centre
9:30 AM – 12:20 PM	10-min: MUVE, Urban Pests: Bed Bugs, Cockroaches, and Others	Meeting Room 301, Convention Centre
9:30 AM – 12:30 PM	10-min: P-IE, Vector Control and Vectors of Plant Disease	Meeting Room 212, Convention Centre
9:30 AM – 11:50 AM	10-min: SysEB, Biodiversity, Evolution, and Conservation of Bees	Meeting Room 306, Convention Centre
9:30 AM – 11:50 AM	10-min: SysEB, Biodiversity, Systematics, and Morphology of Coleoptera	Meeting Room 304/305, Convention Centre
9:30 AM – 11:40 AM	10-min: SysEB, Evolution and Diversity of Odonata and Polyneoptera	Meeting Room 302/303, Convention Centre
9:30 AM – 11:30 AM	American Entomologist Editorial Board Meeting	Malaspina Room, Fairmont Waterfront Hotel
10:00 AM – 12:00 PM	Member Symposium: Entomologists Hooked on Fly Fishing	Meeting Room 204, Convention Centre

SCHEDULE BY DATE & TIME / HORAIRE PAR DATE ET HEURE

TUESDAY, NOVEMBER 13 – CONTINUED / MARDI 13 NOVEMBRE - SUITE

SCHEDULE BY DATE & TIME /
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TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
10:00 AM – 12:00 PM	Workshop: Creating Safe and Productive Environments for All Entomologists through Inclusive Leadership	Meeting Room 201, Convention Centre
10:00 AM – 11:00 AM	Awards and Honors Committee Meeting	Mackenzie I, Fairmont Waterfront Hotel
10:00 AM – 12:00 PM	Education and Outreach Committee Meeting	Cheakamus, Fairmont Waterfront Hotel
10:00 AM – 11:00 AM	ESA Committee on Diversity & Inclusion Meeting	Mackenzie II, Fairmont Waterfront Hotel
10:30 AM – 12:30 PM	Workshop: Extension Entomology Share Fair	West Exhibit Hall A, Convention Centre
11:00 AM – 12:00 PM	Awards and Honors Task Force Meeting	Mackenzie I, Fairmont Waterfront Hotel
11:00 AM – 12:00 PM	ESA Early Career Professionals Committee Meeting	Mackenzie II, Fairmont Waterfront Hotel
11:30 AM – 1:00 PM	ESBC AGM	Meeting Room 208/209, Convention Centre
12:00 PM – 2:00 PM	American Entomologist Focus Group #2	Meeting Room 103/104, Convention Centre
12:00 PM – 1:00 PM	ESA Past President's Luncheon	Oceanview Suite 4, Pan Pacific Hotel
12:15 PM – 1:15 PM	Lunch and Learn: Funding Opportunities at the National Science Foundation	City Foyer (Level 2), Convention Centre
12:15 PM – 1:15 PM	Lunch and Learn: Insect Pollinators and Real-World Science: Getting Undergraduates Excited about Insects	Meeting Room 302/303, Convention Centre
12:15 PM – 1:15 PM	Annual Meeting of the Society of Regulatory Entomologists	Meeting Room 202, Convention Centre
12:15 PM – 1:15 PM	ESA National Insect Photo Salon	Meeting Room 213, Convention Centre
12:30 PM – 1:30 PM	Lunch and Learn: Be a Better Peer Reviewer	Meeting Room 201, Convention Centre
12:30 PM – 2:30 PM	Entomological Foundation Board of Counselors Meeting	Cheakamus, Fairmont Waterfront Hotel
1:00 PM – 4:00 PM	Student Debates	West Ballroom ABC, Convention Centre
1:00 PM – 2:30 PM	ESC Gold Medal Address and Awards Ceremony	Meeting Room 211, Convention Centre
1:00 PM – 2:00 PM	ICE Council Meeting	Oceanview Suite 3, Pan Pacific Hotel
1:00 PM – 4:30 PM	Tour: Curatorial Tour of the Beaty Biodiversity Museum	Ballroom Lobby, Convention Centre
1:30 PM – 5:30 PM	Program Symposium: Citizen Science in a Changing World: Successes and Challenges Across Projects and Institutions	Meeting Room 217/218/219, Convention Centre
1:30 PM – 5:30 PM	Program Symposium: Undergraduate, Graduate Students, and Early Career Professionals: Preparing to Address the Grand Challenges Facing Entomology/Agriculture in a Changing Campus/Workplace Environment	Meeting Room 109/110, Convention Centre
1:30 PM – 5:30 PM	PBT Section Symposium: Juvenile Hormone: From Discovery to Applications	Meeting Room 208/209, Convention Centre
1:30 PM – 5:30 PM	P-IE Section Symposium: Environmental Risk Assessment of Genetically Modified Crops and Insects: Lessons Learned from the Past and Next Steps in a Changing World	Meeting Room 118, Convention Centre
1:30 PM – 5:30 PM	P-IE Section Symposium: Invasion Ecology, Population Dynamics and Sustainable Management of the Emerald Ash Borer	Meeting Room 111/112, Convention Centre
1:30 PM – 5:30 PM	P-IE Section Symposium: Let's Do Something! Implementing Collaborative Solutions for Pollinators in the Agricultural Landscape	Meeting Room 114/115, Convention Centre
1:30 PM – 5:15 PM	Member Symposium: 1st International Symposium on the Elateroidea	Meeting Room 207, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: A Changing World in Education: Creating Engaging Undergraduate Learning Experiences	Meeting Room 204, Convention Centre
1:30 PM – 5:25 PM	Member Symposium: Brain and Behaviour	Meeting Room 205, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Fifty Shades of Fuscus: An Intimate Look at Staphylinidae	Meeting Room 206, Convention Centre
1:30 PM – 5:15 PM	Member Symposium: Hosts, Strains, and Regulatory Challenges	Meeting Room 202, Convention Centre
1:30 PM – 5:10 PM	Member Symposium: Insect Ecology, Evolution, and Economics in the Plant Family Cucurbitaceae: Opportunities, Insights, and Challenges Presented By Insects (and Their Microbiomes)	Meeting Room 122, Convention Centre
1:30 PM – 5:05 PM	Member Symposium: Know Your Weevils, Fear No Weevil: Synthesizing Weevil Biology across Continents	Meeting Room 203, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Plant Metabolism in Plant-Herbivore Interactions: Crossing the Borders between Primary and Secondary Metabolism	Meeting Room 121, Convention Centre

TUESDAY, NOVEMBER 13 – CONTINUED / MARDI 13 NOVEMBRE - SUITE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
1:30 PM – 3:30 PM	Late-Breaking Symposium: The New US Exotick: <i>Haemaphysalis longicornis</i>	Meeting Room 119/120, Convention Centre
1:30 PM – 5:00 PM	Organized Meeting: SOGA Weevil Workers	Meeting Room 210, Convention Centre
1:30 PM – 4:50 PM	Organized Meeting: WERA 1021: Multi-State Research Collaborations Accelerate Solutions for Spotted-Wing <i>Drosophila (Drosophila suzukii)</i> Management	Meeting Room 116/117, Convention Centre
1:30 PM – 2:50 PM	10-min: MUVE, Urban Pests: Ants	Meeting Room 301, Convention Centre
1:30 PM – 4:10 PM	10-min: P-IE, Biocontrol, Pathogens and Predators	Meeting Room 215/216, Convention Centre
1:30 PM – 5:10 PM	10-min: P-IE, Chemical Ecology	Meeting Room 214, Convention Centre
1:30 PM – 3:40 PM	10-min: P-IE, Climate Effects and Climate Change	Meeting Room 213, Convention Centre
1:30 PM – 5:20 PM	10-min: P-IE, Invasive Species	Meeting Room 221/222, Convention Centre
1:30 PM – 5:30 PM	10-min: P-IE, IPM, Field Crops	Meeting Room 220, Convention Centre
1:30 PM – 5:20 PM	10-min: P-IE, IPM, Horticulture	Meeting Room 224, Convention Centre
1:30 PM – 4:40 PM	10-min: SysEB, Biodiversity, Systematics, and Morphology of Lepidoptera	Meeting Room 212, Convention Centre
1:30 PM – 5:20 PM	10-min: SysEB, Diversity, Evolution, and Biology of Ants	Meeting Room 306, Convention Centre
2:00 PM – 5:00 PM	Organized Meeting: IOBC NRS Meeting and Mixer	Meeting Room 304/305, Convention Centre
2:00 PM – 5:00 PM	Workshop: STEMbugs 2018 Stop-and-Share, Get-and-Go Workshop	West Exhibit Hall A, Convention Centre
2:00 PM – 4:00 PM	ACE Support Committee - Item Writing and Review	Nootka Room, Fairmont Waterfront Hotel
2:00 PM – 3:00 PM	Branch Leaders Meeting	Mackenzie I, Fairmont Waterfront Hotel
2:30 PM – 3:30 PM	ESC AGM	Meeting Room 211, Convention Centre
3:00 PM – 4:20 PM	10-min: MUVE, Structural Pests	Meeting Room 301, Convention Centre
3:00 PM – 4:30 PM	ESA Full Section Governing Council Meeting	Cheakamus, Fairmont Waterfront Hotel
3:00 PM – 6:00 PM	ESA Publications Council Meeting	Malaspina Room, Fairmont Waterfront Hotel
3:30 PM – 5:30 PM	Organized Meeting: International Branch Meeting	Meeting Room 302/303, Convention Centre
3:30 PM – 4:00 PM	ESC Incoming Board Meeting	Meeting Room 211, Convention Centre
3:40 PM – 5:20 PM	10-min: P-IE, Transgenic Crops	Meeting Room 213, Convention Centre
4:00 PM – 6:00 PM	ACE Public Health Support Committee	Nootka Room, Fairmont Waterfront Hotel
5:00 PM – 7:00 PM	Global Locust Initiative: Updates and Networking Event	Mackenzie II, Fairmont Waterfront Hotel
5:00 PM – 6:30 PM	Linnaean Games Final Round	West Ballroom ABC, Convention Centre
5:30 PM – 6:30 PM	Poster Social Hour	West Exhibit Hall A, Convention Centre
5:30 PM – 7:00 PM	Reception for the Invasion Ecology, Population Dynamics and Sustainable Management of the Emerald Ash Borer Symposium	Meeting Room 111/112, Convention Centre
6:00 PM – 10:00 PM	Organized Meeting: Korean Young Entomologists (KYE)	Meeting Room 221/222, Convention Centre
6:30 PM – 7:30 PM	ESA and ESC Student Awards Ceremony	West Ballroom ABC, Convention Centre
6:30 PM – 7:05 PM	Film Viewing: Highlights of Hidden Insect Worlds	Meeting Room 201, Convention Centre
7:00 PM – 9:00 PM	Organized Meeting: IUSSI North American Section Business Meeting	Meeting Room 220, Convention Centre
7:00 PM – 9:00 PM	Organized Meeting: North American Dipterists Society (NADS) Meeting	Meeting Room 215/216, Convention Centre
7:00 PM – 9:00 PM	Organized Meeting: Society of Overseas Nepalese Entomologists Meeting	Meeting Room 214, Convention Centre
7:00 PM – 9:30 PM	Area-wide Sugarcane Aphid Management Meeting	Meeting Room 103/104, Convention Centre
7:00 PM – 9:00 PM	Chalcidoidea Book Workshop	Meeting Room 212, Convention Centre
7:00 PM – 8:00 PM	Meeting of the Entomological Societies in Canada	Oceanview Suite 4, Pan Pacific Hotel
7:10 PM – 7:25 PM	Film Viewing: Behaviour and Development of the Medfly <i>Ceratitis capitata</i>	Meeting Room 201, Convention Centre
7:30 PM – 7:45 PM	Film Viewing: Behaviour and Development of the European Corn Borer <i>Ostrinia nubilalis</i>	Meeting Room 201, Convention Centre

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TUESDAY, NOVEMBER 13 – CONTINUED / MARDI 13 NOVEMBRE - SUITE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
7:45 PM – 8:00 PM	Film Viewing: Behaviour and Development of the Spotted-Wing <i>Drosophila Drosophila suzukii</i>	Meeting Room 201, Convention Centre
8:00 PM – 10:30 PM	Organized Meeting: The Coleopterists Society General Meeting	Meeting Room 217/218/219, Convention Centre
8:00 PM – 10:00 PM	Joint Presidential Reception	Cypress Suite, Pan Pacific Hotel
8:00 PM – 10:00 PM	Overseas Chinese Entomologists Association (OCEA) Meeting	Meeting Room 118, Convention Centre
8:00 PM – 11:00 PM	Student Reception	Steamworks Brew Pub
9:30 PM – 11:00 PM	Korean Young Entomologists (KYE) Mixer	Meeting Room 221/222, Convention Centre

WEDNESDAY, NOVEMBER 14 / MERCREDI 14 NOVEMBRE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
6:30 AM – 7:30 AM	Sunrise Yoga	Ballroom Foyer, Convention Centre
6:45 AM – 7:45 AM	PBT Final Business Meeting	Meeting Room 103/104, Convention Centre
7:00 AM – 8:00 AM	MUVE Final Business Meeting with Breakfast	Meeting Room 214, Convention Centre
7:00 AM – 8:00 AM	Open P-IE Section Governing Council and Member Feedback Session	Meeting Room 302/303, Convention Centre
7:00 AM – 12:00 PM	Presentation Preview Room (PPR)/Speaker Ready Room	Meeting Room 107/108, Convention Centre
7:00 AM – 12:00 PM	Registration and Information Center	Ballroom Lobby, Convention Centre
8:00 AM – 9:30 AM	Closing Plenary with Ryan Church	West Ballroom ABC, Convention Centre
9:00 AM – 2:00 PM	Poster: MUVE, Veterinary and General	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Poster: PBT, Resistance Management, Molecular, and Other	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Poster: P-IE, Pollinators, Ecology, and Other	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Poster: SysEB, Social Insects and Other	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Virtual Poster: MUVE	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Virtual Poster: PBT	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Virtual Poster: P-IE	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Virtual Poster: SysEB	West Exhibit Hall A, Convention Centre
9:00 AM – 2:00 PM	Exhibit Hall	West Exhibit Hall A, Convention Centre
9:30 AM – 12:30 PM	Program Symposium: Borderless Parasites, Borderless Pollinators: Broadening Our Understanding of Pollinator and Parasite Communities	Meeting Room 211, Convention Centre
9:30 AM – 11:40 AM	MUVE Section Symposium: Training the Next Generation of Vector Biologists	Meeting Room 109, Convention Centre
9:30 AM – 12:30 PM	MUVE Section Symposium: Predicting Vector-Borne Disease Spread in Changing Natural and Social Landscapes	Meeting Room 122, Convention Centre
9:30 AM – 12:30 PM	PBT Section Symposium: Teaching Insect Physiology in a Changing World: Crossing Borders Between Traditional and Integrative Pedagogy	Meeting Room 212, Convention Centre
9:30 AM – 12:30 PM	P-IE Section Symposium: A Changing World: Biotechnology and the Future of Pest Control	Meeting Room 118, Convention Centre
9:30 AM – 12:30 PM	P-IE Section Symposium: Bugging Insects: Methods and Applications of Sensor-Based Monitoring of Insect Colonies and Populations	Meeting Room 121, Convention Centre
9:30 AM – 12:30 PM	P-IE Section Symposium: Crossing International Borders: Foreign Exploration and Classical Biological Control of Invasive Pests	Meeting Room 114/115, Convention Centre
9:30 AM – 12:05 PM	P-IE Section Symposium: Current Research and Future Perspectives on Native and Invasive Buprestid Pests in North America and Europe	Meeting Room 111/112, Convention Centre
9:30 AM – 11:55 AM	P-IE Section Symposium: Stressors Across Space and Time: Energy Sources, Enemies, and Environmental Influences	Meeting Room 119/120, Convention Centre
9:30 AM – 11:45 AM	P-IE Student Section Symposium: Pollinator and Invasive Species Science Policy Field Tours: A Melting Pot of Efforts Promoting Protection of our Food Supply	Meeting Room 116/117, Convention Centre

WEDNESDAY, NOVEMBER 14 – CONTINUED / MERCREDI 14 NOVEMBRE - SUITE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
9:30 AM – 12:25 PM	Member Symposium: Biodiversity, Systematics, and Behavioral Research in Aquatic Entomology	Meeting Room 217/218/219, Convention Centre
9:30 AM – 12:45 PM	Member Symposium: Celebrating Michener's 100th and What the Next Decade of Melittology Brings	Meeting Room 207, Convention Centre
9:30 AM – 12:30 PM	Member Symposium: Climate Change: Shifts in the Geographical Ranges and Outbreak Dynamics of Forest Insect Pests and Impacts on Forest Health	Meeting Room 208/209, Convention Centre
9:30 AM – 12:15 PM	Member Symposium: Coastline Insects and Spiders: Living on the Land-Sea Border	Meeting Room 203, Convention Centre
9:30 AM – 12:45 PM	Member Symposium: Current Research on the Biology and Management of Insect Pests in Corn: Crossing Borders from Genes to Populations	Meeting Room 205, Convention Centre
9:30 AM – 12:30 PM	Member Symposium: Evolutionary Ecology of <i>Drosophila</i> -parasitoid Food Webs: From Molecules to Ecosystems	Meeting Room 202, Convention Centre
9:30 AM – 12:30 PM	Member Symposium: Identifying and Overcoming Challenges to Integrating Tree Chemistry into Our Understanding of Forest Insect Dynamics	Meeting Room 204, Convention Centre
9:30 AM – 12:30 PM	Member Symposium: Leveling the Playing Field: How Entomologists Can Work to Reduce Bias and Create Safe Workplaces	Meeting Room 215/216, Convention Centre
9:30 AM – 12:00 PM	Member Symposium: National Assessment of Invasive Species in Forests and Grasslands of the U.S.: Discussing the Current State of Invasive Species Science and Research in the U.S.	Meeting Room 206, Convention Centre
9:30 AM – 12:00 PM	Member Symposium: USDA's APHIS - PPQ Identifiers: The Vanguard of Defense Against Invasive Pests	Meeting Room 110, Convention Centre
9:30 AM – 11:30 AM	Organized Meeting: Developing International Consensus Towards Better Management of Invasive Arthropods: A Grand Challenge	Meeting Room 210, Convention Centre
9:30 AM – 12:10 PM	10-min: MUVE, Veterinary Pests	Meeting Room 301, Convention Centre
9:30 AM – 12:00 PM	10-min: P-IE, Apiculture	Meeting Room 224, Convention Centre
9:30 AM – 12:20 PM	10-min: P-IE, Behavior	Meeting Room 220, Convention Centre
9:30 AM – 12:10 PM	10-min: P-IE, Biocontrol, General	Meeting Room 213, Convention Centre
9:30 AM – 12:20 PM	10-min: P-IE, IPM, Forests and General	Meeting Room 214, Convention Centre
9:30 AM – 11:20 AM	10-min: SysEB, Diversity, Evolution, and Biology of Hemiptera	Meeting Room 304/305, Convention Centre
9:30 AM – 11:20 AM	10-min: SysEB, Systematics, Evolution, and Diversity of Hymenoptera	Meeting Room 302/303, Convention Centre
9:30 AM – 10:30 AM	Entomology 2019 Program Committee Meeting	Meeting Room 103/104, Convention Centre
10:00 AM – 4:00 PM	Tour: Mountain Discovery Tour	Ballroom Lobby, Convention Centre
10:30 AM – 12:00 PM	Lunch and Learn: Getting an up Close Look at Concept Artist Ryan Church's Art and Inspiration	West Ballroom ABC, Convention Centre
11:00 AM – 4:00 PM	ESA Governing Board & Certification Corporation Meeting	Meeting Room 201, Convention Centre
12:00 PM – 2:00 PM	American Entomologist Focus Group #3	Meeting Room 103/104, Convention Centre
12:00 PM – 1:00 PM	ESA Student Affairs Committee Meeting	Mackenzie II, Fairmont Waterfront Hotel
12:15 PM – 1:15 PM	Lunch and Learn: A Cross-Border Approach for Assessing the Risk of Pesticides to Bees in Canada and the U.S.	Meeting Room 306, Convention Centre
12:15 PM – 1:15 PM	Lunch and Learn: Breaking Down the Proverbial Wall: Using Effective Mentoring to Maximize Working Relationships	City Foyer (Level 2), Convention Centre
12:30 PM – 1:30 PM	Poster Social Hour	West Exhibit Hall A, Convention Centre
12:45 PM – 1:45 PM	Lunch and Learn: Certifications: What There Is and How It Helps	Meeting Room 221/222, Convention Centre
1:30 PM – 5:30 PM	Program Symposium: Crossing Borders for a Healthier Tomorrow: The Role of Entomology in the One Health Initiative	Meeting Room 109, Convention Centre
1:30 PM – 5:25 PM	Program Symposium: Insect Microbiomes: Traversing Disciplines to Understand and Manage Helpful and Harmful Hexapods	Meeting Room 211, Convention Centre
1:30 PM – 4:30 PM	MUVE Section Symposium: Arthropod Genomics and Molecular Biology: What's New!	Meeting Room 301, Convention Centre
1:30 PM – 5:10 PM	PBT Section Symposium: Social Insect Nutritional Ecology in a Changing World	Meeting Room 302/303, Convention Centre

SCHEDULE BY DATE & TIME / HORAIRE PAR DATE ET HEURE

WEDNESDAY, NOVEMBER 14 – CONTINUED / MERCREDI 14 NOVEMBRE - SUITE

SCHEDULE BY DATE & TIME /
HORAIRE PAR DATE ET HEURE

TIME/HEURE	SESSION/FUNCTION SESSION/ÉVÈNEMENT	LOCATION/LIEU
1:30 PM – 4:20 PM	P-IE Section Symposium: Crossing New Frontiers in Conservation Biological Control	Meeting Room 122, Convention Centre
1:30 PM – 4:10 PM	P-IE Section Symposium: Flight of Ideas: Various Methods for Monitoring Insect Movement across the Landscape	Meeting Room 114/115, Convention Centre
1:30 PM – 5:30 PM	P-IE Section Symposium: <i>Rhynchophorus</i> Weevil: A Global Threat Beyond Borders	Meeting Room 119/120, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Advances in Coccoidea Research: New Perspectives on Scale Insect and Mealybug Biology and Management	Meeting Room 210, Convention Centre
1:30 PM – 5:20 PM	Member Symposium: Aquatic Entomology without Borders: A Field That Brings Together All Branches of ESA	Meeting Room 111/112, Convention Centre
1:30 PM – 5:25 PM	Member Symposium: Communicating Effectively in Extension: Addressing New Expectations in the Learning Experience	Meeting Room 204, Convention Centre
1:30 PM – 5:00 PM	Member Symposium: Crossing Borders of Understanding: Sharing Your Science with the Public	Meeting Room 118, Convention Centre
1:30 PM – 5:25 PM	Member Symposium: Crossing Borders through Education and Outreach	Meeting Room 116/117, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Crossing Taxonomic Borders: Challenging Arachnological Traditions in North America	Meeting Room 202, Convention Centre
1:30 PM – 4:30 PM	Member Symposium: Crossing the Borders of Academia, Government, Industry, Extension, and Beyond: Careers in Entomology	Meeting Room 214, Convention Centre
1:30 PM – 4:30 PM	Member Symposium: Ecology and Management of Cereal Aphid Invasions, Crossing the Great Plains Borders from Mexico to Canada	Meeting Room 205, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: From Invertebrate Ecology to Evolutionary Biology: Celebrating the Achievements of Professor John R. Spence	Meeting Room 110, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Global Resistance to <i>Bt</i> Crops: Resistance Has No Borders	Meeting Room 220, Convention Centre
1:30 PM – 5:10 PM	Member Symposium: Management of Bark and Ambrosia Beetles with Semiochemicals	Meeting Room 224, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Sharing Ideas and Food: Stored Product Pest Control Across Interdisciplinary and Geographic Borders	Meeting Room 206, Convention Centre
1:30 PM – 4:00 PM	Member Symposium: The Crossroad Between Applied and Basic Research in the Study of Endemic and Invasive Insect Species: 6th Latin American/Hispanic Symposium	Meeting Room 213, Convention Centre
1:30 PM – 4:10 PM	Member Symposium: The Legacy of James McMurtry: Current Research in Phytoseiid Ecology	Meeting Room 203, Convention Centre
1:30 PM – 5:30 PM	Member Symposium: Understanding and Mitigating the Risks of Pesticide Exposure for Pollinators and Other Beneficial Insects	Meeting Room 121, Convention Centre
1:30 PM – 3:30 PM	Late-Breaking Symposium: Lincoln Brower, 1931 – 2018: Inspiring Scientist and Champion of Monarch Conservation	Meeting Room 306, Convention Centre
1:30 PM – 5:30 PM	Workshop: Exploiting the Dynamism of R Software to Help Entomologists Adapt to a Changing World: Crossing the Border from R Admirer to R User	Meeting Room 215/216, Convention Centre
1:30 PM – 4:10 PM	10-min: PBT, Genes, Genomes, and Genetics	Meeting Room 208/209, Convention Centre
1:30 PM – 4:30 PM	10-min: PBT, Miscellaneous	Meeting Room 304/305, Convention Centre
1:30 PM – 4:40 PM	10-min: PBT, Pheromones, Immunity, and Microbes	Meeting Room 207, Convention Centre
1:30 PM – 5:30 PM	10-min: P-IE, Ecology, General	Meeting Room 217/218/219, Convention Centre
1:30 PM – 4:50 PM	10-min: P-IE, Host Plant Resistance	Meeting Room 212, Convention Centre
2:30 PM – 3:30 PM	Systematics, Evolution, and Biodiversity (SysEB) Section Final Business Meeting	Meeting Room 103/104, Convention Centre
4:00 PM – 5:00 PM	6th Latin American/Hispanic Symposium Reception	Meeting Room 213, Convention Centre
4:40 PM – 5:40 PM	10-min: P-IE, Extension, Youth/Adult Education	Meeting Room 208/209, Convention Centre
5:15 PM – 6:00 PM	Early Career Professionals Mixer	Meeting Room 109, Convention Centre
5:30 PM – 6:30 PM	Global Resistance to <i>Bt</i> Crops: Resistance Has No Borders Reception	Meeting Room 220, Convention Centre

SUNDAY, NOVEMBER 11 / DIMANCHE 11 NOVEMBRE

SESSION/FUNCTION | SESSION/ÉVÈNEMENT

TIME/HEURE

LOCATION/LIEU

PLENARY / PLÉNIÈRE

Graduate Student Showcase	3:00 PM - 5:00 PM	West Ballroom ABC, Convention Centre
Opening Plenary Session with Keynote Speaker Randy Olson	5:30 PM - 7:30 PM	West Ballroom ABC, Convention Centre

SECTION SYMPOSIA / SYMPOSIUMS DE SECTIONS

MUVE Section Symposium: Novel Pest Control Strategy on the Horizon: Gene Drives and Transgenic Insects	8:00 AM - 10:40 AM	Meeting Room 122, Convention Centre
PBT Section Symposium: RNAi: New Traits, Field Performance and Safety	8:00 AM - 11:55 AM	Meeting Room 212, Convention Centre
P-IE Section Symposium: From Genes to Communities: Quantifying Diverse Responses of Pollinators to Multiple Anthropogenic Stressors	8:00 AM - 11:20 AM	Meeting Room 111/112, Convention Centre
P-IE Section Symposium: How Crop Diversification across Space and Time Influences Herbivory	8:00 AM - 10:00 AM	Meeting Room 121, Convention Centre
P-IE Section Symposium: Practical Applications of Research on Parasite Manipulation of Hosts and Vectors	8:00 AM - 12:05 PM	Meeting Room 119/120, Convention Centre
MUVE Section Symposium: Crossing Borders in Research and Development of Insect Repellents	1:30 PM - 5:20 PM	Meeting Room 109, Convention Centre
PBT Section Symposium: RNAi: Mechanism of Action and Resistance to dsRNA	1:30 PM - 5:00 PM	Meeting Room 212, Convention Centre

MEMBER SYMPOSIA / SYMPOSIUMS DES MEMBRES

Biological Control Agents in New Environments	8:00 AM - 10:00 AM	Meeting Room 109, Convention Centre
Connecting Hemp and Insects: Where No Entomologist Has Gone Before!	8:00 AM - 11:55 AM	Meeting Room 116/117, Convention Centre
Continued Challenges in Entomology from a Woman's Perspective	8:00 AM - 11:45 AM	Meeting Room 118, Convention Centre
Genomic Approaches to Biosurveillance of Invasive Forest Insects	8:00 AM - 12:00 PM	Meeting Room 213, Convention Centre
Rapid Evolution in Biological Control Systems: Implications for Safety and Effectiveness	8:00 AM - 12:00 PM	Meeting Room 301, Convention Centre
Greenhouse Insect Management: Lessons Learned from Research Collaborations (An ESA, ESC, and IOBC Symposium)	1:30 PM - 5:30 PM	Meeting Room 203, Convention Centre
Larry Larson Graduate Student Award for Leadership in Applied Entomology: Celebrating 20 Years of Impacting Future Generations of Leaders in Applied Entomology	1:30 PM - 5:30 PM	Meeting Room 204, Convention Centre
Novel Changes in Forest Ecosystems and Bark Beetles Due to Global Climatic Changes	1:30 PM - 3:30 PM	Meeting Room 119/120, Convention Centre
Soil Mites: Minute Arthropods with a Monumental Role	1:30 PM - 4:35 PM	Meeting Room 116/117, Convention Centre
Systematics, Biogeography, and Ecology of Cerambycidae and Buprestidae	1:30 PM - 5:20 PM	Meeting Room 118, Convention Centre

ORGANIZED MEETINGS / RÉUNIONS ORGANISÉES

Current Advances in Acarology	8:00 AM - 12:10 PM	Meeting Room 114/115, Convention Centre
Americas Neuropterists Meeting	1:30 PM - 5:30 PM	Meeting Room 210, Convention Centre
International Society of Hymenopterists	1:30 PM - 5:30 PM	Meeting Room 121, Convention Centre
Orthopteroids: Small Orders, Big Ideas	1:30 PM - 4:30 PM	Meeting Room 202, Convention Centre
SOLA Scarab Workers	1:30 PM - 5:30 PM	Meeting Room 302/303/304/305, Convention Centre

WORKSHOPS / ATELIERS

Breaking Down the Border between Readers and Writers: How to Improve Your Scientific Writing	1:30 PM - 5:30 PM	Meeting Room 211, Convention Centre
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LUNCH AND LEARNS / ATELIERS-MIDIS

Outreach and Educational Program Assessment and Evaluation	12:15 PM - 1:15 PM	City Foyer (Level 2), Convention Centre
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SCHEDULE BY SCIENTIFIC PROGRAM / PAR PROGRAMME SCIENTIFIQUE

STUDENT 3-MIN PRESENTATION COMPETITION / COMPÉTITION ÉTUDIANTE DES PRÉSENTATIONS DE 3 MINUTES

Undergraduate Student 3-min: All Sections	8:00 AM - 8:10 AM	Meeting Room 201, Convention Centre
Graduate Student 3-min: All Sections, Session 1	8:20 AM - 9:20 AM	Meeting Room 201, Convention Centre
Graduate Student 3-min: All Sections, Session 2	9:30 AM - 10:25 AM	Meeting Room 201, Convention Centre

3-MIN PRESENTATIONS / PRÉSENTATIONS DE 3 MINUTES

3-min: All Sections	10:35 AM - 12:45 PM	Meeting Room 201, Convention Centre
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STUDENT 10-MIN PAPER COMPETITION / COMPÉTITION ÉTUDIANTE DES PRÉSENTATIONS DE 10 MINUTES

Grad 10-min: MUVE, Biting Arthropods	8:00 AM - 10:00 AM	Meeting Room 215/216, Convention Centre
Grad 10-min: PBT, Vector Biology	8:00 AM - 10:00 AM	Meeting Room 210, Convention Centre
Grad 10-min: P-IE, Biocontrol, Predators	8:00 AM - 10:00 AM	Meeting Room 202, Convention Centre
Grad 10-min: P-IE, Chemical Ecology	8:00 AM - 10:00 AM	Meeting Room 208/209, Convention Centre
Grad 10-min: P-IE, Ecology	8:00 AM - 10:00 AM	Meeting Room 205, Convention Centre
Grad 10-min: P-IE, Forestry	8:00 AM - 10:00 AM	Meeting Room 203, Convention Centre
Grad 10-min: P-IE, IPM, Field Crops 1	8:00 AM - 10:00 AM	Meeting Room 220, Convention Centre
Grad 10-min: P-IE, Pollinators 1	8:00 AM - 10:00 AM	Meeting Room 221/222, Convention Centre
Undergrad 10-min: MUVE	8:00 AM - 10:20 AM	Meeting Room 214, Convention Centre
Undergrad 10-min: PBT	8:00 AM - 9:10 AM	Meeting Room 206, Convention Centre
Undergrad 10-min: P-IE 1	8:00 AM - 9:40 AM	Meeting Room 207, Convention Centre
Grad 10-min: MUVE	10:10 AM - 12:35 PM	Meeting Room 215/216, Convention Centre
Grad 10-min: PBT 1	10:10 AM - 12:25 PM	Meeting Room 206, Convention Centre
Grad 10-min: PBT 2	10:10 AM - 12:35 PM	Meeting Room 210, Convention Centre
Grad 10-min: P-IE, Biocontrol, General 1	10:10 AM - 12:35 PM	Meeting Room 202, Convention Centre
Grad 10-min: P-IE, Invasives and Tree Pests	10:10 AM - 12:25 PM	Meeting Room 203, Convention Centre
Grad 10-min: P-IE, IPM, Field Crops 2	10:10 AM - 12:15 PM	Meeting Room 220, Convention Centre
Grad 10-min: P-IE, Landscape	10:10 AM - 12:35 PM	Meeting Room 205, Convention Centre
Grad 10-min: P-IE, Pollinator Habitat	10:10 AM - 12:25 PM	Meeting Room 221/222, Convention Centre
Grad 10-min: P-IE, Spotted-Wing Drosophila	10:10 AM - 12:25 PM	Meeting Room 208/209, Convention Centre
Undergrad 10-min: P-IE 2	10:10 AM - 12:05 PM	Meeting Room 207, Convention Centre

10-MIN PAPERS / PRÉSENTATIONS DE 10 MINUTES

10-min: MUVE, Vector Surveillance	8:00 AM - 10:50 AM	Meeting Room 224, Convention Centre
10-min: MUVE, Biology and Ecology of Disease Vectors	1:30 PM - 5:00 PM	Meeting Room 220, Convention Centre
10-min: MUVE, PBT, P-IE, Stored Product Pests	1:30 PM - 5:10 PM	Meeting Room 214, Convention Centre
10-min: MUVE, Vector Control	1:30 PM - 4:20 PM	Meeting Room 215/216, Convention Centre
10-min: PBT, Insecticides and Resistance	1:30 PM - 5:30 PM	Meeting Room 221/222, Convention Centre
10-min: PBT, Social Insects	1:30 PM - 3:50 PM	Meeting Room 213, Convention Centre
10-min: P-IE, Biocontrol, Parasitoids	1:30 PM - 5:10 PM	Meeting Room 114/115, Convention Centre
10-min: P-IE, Novel Tools and Products	1:30 PM - 5:20 PM	Meeting Room 224, Convention Centre
10-min: P-IE, Pollination	1:30 PM - 5:20 PM	Meeting Room 111/112, Convention Centre
10-min: P-IE, Resistance Management, Molecular and Cellular Biology	1:30 PM - 3:40 PM	Meeting Room 122, Convention Centre
10-min: SysEB, Behavior and Genetics	1:30 PM - 3:50 PM	Meeting Room 206, Convention Centre
10-min: SysEB, Biodiversity, Conservation, and Collections	1:30 PM - 4:20 PM	Meeting Room 205, Convention Centre
10-min: SysEB, Invasive Species and Biological Control	1:30 PM - 3:30 PM	Meeting Room 207, Convention Centre

DAILY SCHEDULE BY SCIENTIFIC PROGRAM / HORAIRE QUOTIDIEN PAR PROGRAMME SCIENTIFIQUE

Grad 10-min: P-IE, Stink Bugs	8:00 AM - 9:50 AM	Meeting Room 204, Convention Centre
Grad 10-min: SysEB	8:00 AM - 10:20 AM	Meeting Room 221/222, Convention Centre
Grad 10-min: SysEB, Beetles	8:00 AM - 9:50 AM	Meeting Room 301, Convention Centre
Grad 10-min: SysEB, Morphology	8:00 AM - 10:00 AM	Meeting Room 302/303, Convention Centre
Grad 10-min: SysEB, Social Insects	8:00 AM - 9:50 AM	Meeting Room 224, Convention Centre
Grad 10-min: SysEB, Speciation	8:00 AM - 10:00 AM	Meeting Room 304/305, Convention Centre
Grad 10-min: SysEB, Wasps and Bees	8:00 AM - 10:00 AM	Meeting Room 306, Convention Centre
Grad 10-min: MUVE, Mosquitoes 2	10:10 AM - 12:30 PM	Meeting Room 217/218/219, Convention Centre
Grad 10-min: MUVE, Social Insects	10:10 AM - 12:20 PM	Meeting Room 214, Convention Centre
Grad 10-min: PBT, Crop Pests	10:10 AM - 12:00 PM	Meeting Room 210, Convention Centre
Grad 10-min: P-IE, Biocontrol, General 2	10:10 AM - 12:20 PM	Meeting Room 202, Convention Centre
Grad 10-min: P-IE, Biocontrol, Parasitoids	10:10 AM - 12:30 PM	Meeting Room 205, Convention Centre
Grad 10-min: P-IE, Host Plant Resistance and Preference	10:10 AM - 12:30 PM	Meeting Room 213, Convention Centre
Grad 10-min: P-IE, Turf and Horticulture	10:10 AM - 12:10 PM	Meeting Room 204, Convention Centre
Grad 10-min: P-IE, Vectors of Plant Diseases	10:10 AM - 12:10 PM	Meeting Room 220, Convention Centre
Grad 10-min: SysEB, Ants	10:10 AM - 12:20 PM	Meeting Room 306, Convention Centre
Grad 10-min: SysEB, Biodiversity	10:10 AM - 12:30 PM	Meeting Room 224, Convention Centre
Grad 10-min: SysEB, Evolution and Behavior	10:10 AM - 12:20 PM	Meeting Room 304/305, Convention Centre
Grad 10-min: SysEB, Phylogenetics	10:10 AM - 12:20 PM	Meeting Room 302/303, Convention Centre
Undergrad 10-min: SysEB	10:10 AM - 12:20 PM	Meeting Room 301, Convention Centre

10-MIN PAPERS / PRÉSENTATIONS DE 10 MINUTES

10-min: PBT, Risk Assessment	12:40 PM - 2:10 PM	Meeting Room 210, Convention Centre
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STUDENT POSTER COMPETITION / COMPÉTITION ÉTUDIANTE D'AFFICHES

Grad Poster: MUVE 1	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: MUVE 2	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: PBT 1	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: PBT 2	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: P-IE, Bees	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: P-IE, Integrated Pest Management 1	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: P-IE, Integrated Pest Management 2	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: P-IE, Integrated Pest Management 3	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: P-IE, Integrated Pest Management 4 and Other	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: P-IE, Parasitoids and Other	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: P-IE, Pollination and Parasitoids	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: SysEB 1	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: SysEB 2	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Poster: SysEB 3	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Undergrad Poster: MUVE	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Undergrad Poster: PBT	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Undergrad Poster: P-IE	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Undergrad Poster: SysEB 1	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Undergrad Poster: SysEB 2	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre

STUDENT VIRTUAL POSTER COMPETITION / COMPÉTITION ÉTUDIANTE D'AFFICHES VIRTUELLES

Grad Virtual Poster: MUVE, PBT, P-IE, and SysEB	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Grad Virtual Poster: P-IE	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Undergrad Virtual Poster: MUVE, P-IE, and SysEB	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre

TUESDAY, NOVEMBER 13 / MARDI 13 NOVEMBRE

SESSION/FUNCTION SESSION/ÉVÈNEMENT	TIME/HEURE	LOCATION/LIEU
PLENARY / PLÉNIÈRE		
ESA and ESC Professional Awards Breakfast Featuring the Founders Memorial and Heritage Lectures	7:00 AM - 9:30 AM	West Ballroom ABC, Convention Centre
Student Debates	1:00 PM - 4:00 PM	West Ballroom ABC, Convention Centre
ESA and ESC Student Awards Ceremony	6:30 PM - 7:30 PM	West Ballroom ABC, Convention Centre
PROGRAM SYMPOSIA / SYMPOSIUMS DE PROGRAMMES		
Crossing Borders without Permission: Accidental Introduction of Biological Control Agents, a Significant Phenomenon with Risks, Benefits, and Policy Implications	9:30 AM - 12:30 PM	Meeting Room 109/110, Convention Centre
Citizen Science in a Changing World: Successes and Challenges Across Projects and Institutions	1:30 PM - 5:30 PM	Meeting Room 217/218/219, Convention Centre
Undergraduate, Graduate Students, and Early Career Professionals: Preparing to Address the Grand Challenges Facing Entomology/Agriculture in a Changing Campus/Workplace Environment	1:30 PM - 5:30 PM	Meeting Room 109/110, Convention Centre
SECTION SYMPOSIA / SYMPOSIUMS DE SECTIONS		
MUVE Section Symposium: Entomology without Borders: Tackling Insecticide Resistance through Science, Extension, and Collaboration	9:30 AM - 12:30 PM	Meeting Room 224, Convention Centre
MUVE Section Symposium: Mosquito-Microbe Interactions Beyond Vector-Pathogen	9:30 AM - 12:30 PM	Meeting Room 121, Convention Centre
MUVE Section Symposium: What Can We Learn About Vector-borne Diseases of Plants, Animals, and Humans From Talking to Each Other?	9:30 AM - 12:30 PM	Meeting Room 118, Convention Centre
P-IE Section Symposium: Crossing Borders: Global Collaborations to Combat Forest Insect Pests	9:30 AM - 11:35 AM	Meeting Room 213, Convention Centre
P-IE Section Symposium: Ecology and Evolution in Novel Species Interactions	9:30 AM - 12:00 PM	Meeting Room 214, Convention Centre
P-IE Section Symposium: The Gypsy Moth (<i>Lymantria dispar</i> L.) at 150: Contributions to the Development of Invasion Ecology	9:30 AM - 12:30 PM	Meeting Room 215/216, Convention Centre
SysEB Section Symposium: Evolutionary and Phylogenetic Morphology	9:30 AM - 12:30 PM	Meeting Room 111/112, Convention Centre
SysEB Section Symposium: Insects in 3D - Current Uses and Future Directions for High Resolution 3D Data	9:30 AM - 12:25 PM	Meeting Room 119/120, Convention Centre
SysEB Section Symposium: Latin American Entomology – Ecology & Biodiversity	9:30 AM - 12:30 PM	Meeting Room 122, Convention Centre
PBT Section Symposium: Juvenile Hormone: From Discovery to Applications	1:30 PM - 5:30 PM	Meeting Room 208/209, Convention Centre
P-IE Section Symposium: Environmental Risk Assessment of Genetically Modified Crops and Insects: Lessons Learned from the Past and Next Steps in a Changing World	1:30 PM - 5:30 PM	Meeting Room 118, Convention Centre
P-IE Section Symposium: Invasion Ecology, Population Dynamics and Sustainable Management of the Emerald Ash Borer	1:30 PM - 5:30 PM	Meeting Room 111/112, Convention Centre
P-IE Section Symposium: Let's Do Something! Implementing Collaborative Solutions for Pollinators in the Agricultural Landscape	1:30 PM - 5:30 PM	Meeting Room 114/115, Convention Centre
MEMBER SYMPOSIA / SYMPOSIUMS DES MEMBRES		
Brown Marmorated Stink Bug, <i>Halymorpha halys</i> , in Western North America: Status and Potential Harm to Agriculture	9:30 AM - 12:15 PM	Meeting Room 217/218/219, Convention Centre
Density Dependence, Community Genetics, and Resistance Evolution	9:30 AM - 11:55 AM	Meeting Room 116/117, Convention Centre
Ethics in Entomology: Considerations for Research and Policy	9:30 AM - 12:30 PM	Meeting Room 206, Convention Centre
Forest Insect Genomics	9:30 AM - 12:05 PM	Meeting Room 114/115, Convention Centre
Microbial Synergies and Interactions in Biocontrol Systems	9:30 AM - 12:25 PM	Meeting Room 203, Convention Centre
Newly Established Exotic Pests: Transitioning from Emergency Response to IPM	9:30 AM - 12:30 PM	Meeting Room 207, Convention Centre

SCHEDULE BY SCIENTIFIC PROGRAM / PAR PROGRAMME SCIENTIFIQUE

DAILY SCHEDULE BY SCIENTIFIC PROGRAM / HORAIRE QUOTIDIEN PAR PROGRAMME SCIENTIFIQUE

The Dirt on Plant-Insect Interactions	9:30 AM - 12:05 PM	Meeting Room 205, Convention Centre
The Value of Forests to Insect Pollinators	9:30 AM - 12:00 PM	Meeting Room 202, Convention Centre
Entomologists Hooked on Fly Fishing	10:00 AM - 12:00 PM	Meeting Room 204, Convention Centre
1st International Symposium on the Elateroidea	1:30 PM - 5:15 PM	Meeting Room 207, Convention Centre
A Changing World in Education: Creating Engaging Undergraduate Learning Experiences	1:30 PM - 5:30 PM	Meeting Room 204, Convention Centre
Brain and Behaviour	1:30 PM - 5:25 PM	Meeting Room 205, Convention Centre
Fifty Shades of Fuscus: An Intimate Look at Staphylinidae	1:30 PM - 5:30 PM	Meeting Room 206, Convention Centre
Hosts, Strains, and Regulatory Challenges	1:30 PM - 5:15 PM	Meeting Room 202, Convention Centre
Insect Ecology, Evolution, and Economics in the Plant Family Cucurbitaceae: Opportunities, Insights, and Challenges Presented By Insects (and Their Microbiomes)	1:30 PM - 5:10 PM	Meeting Room 122, Convention Centre
Know Your Weevils, Fear No Weevil: Synthesizing Weevil Biology across Continents	1:30 PM - 5:05 PM	Meeting Room 203, Convention Centre
Plant Metabolism in Plant-Herbivore Interactions: Crossing the Borders between Primary and Secondary Metabolism	1:30 PM - 5:30 PM	Meeting Room 121, Convention Centre
Late-Breaking Symposium: The New US Exotick: <i>Haemaphysalis longicornis</i>	1:30 PM - 3:30 PM	Meeting Room 119/120, Convention Centre

ORGANIZED MEETINGS / RÉUNIONS ORGANISÉES

SOGA Weevil Workers	1:30 PM - 5:00 PM	Meeting Room 210, Convention Centre
WERA 1021: Multi-State Research Collaborations Accelerate Solutions for Spotted-Wing Drosophila (<i>Drosophila suzukii</i>) Management	1:30 PM - 4:50 PM	Meeting Room 116/117, Convention Centre
IOBC NRS Meeting and Mixer	2:00 PM - 5:00 PM	Meeting Room 304/305, Convention Centre
International Branch Meeting	3:30 PM - 5:30 PM	Meeting Room 302/303, Convention Centre
Korean Young Entomologists (KYE)	6:00 PM - 10:00 PM	Meeting Room 221/222, Convention Centre
IUSSI North American Section Business Meeting	7:00 PM - 9:00 PM	Meeting Room 220, Convention Centre
North American Dipterists Society (NADS) Meeting	7:00 PM - 9:00 PM	Meeting Room 215/216, Convention Centre
Society of Overseas Nepalese Entomologists Meeting	7:00 PM - 9:00 PM	Meeting Room 214, Convention Centre
The Coleopterists Society General Meeting	8:00 PM - 10:30 PM	Meeting Room 217/218/219, Convention Centre

WORKSHOPS / ATELIERS

Creating Safe and Productive Environments for All Entomologists through Inclusive Leadership	10:00 AM - 12:00 PM	Meeting Room 201, Convention Centre
Extension Entomology Share Fair	10:30 AM - 12:30 PM	West Exhibit Hall A, Convention Centre
STEMbugs 2018 Stop-and-Share, Get-and-Go Workshop	2:00 PM - 5:00 PM	West Exhibit Hall A, Convention Centre

LUNCH AND LEARNS / ATELIERS-MIDIS

Funding Opportunities at the National Science Foundation	12:15 PM - 1:15 PM	City Foyer (Level 2), Convention Centre
Insect Pollinators and Real-World Science: Getting Undergraduates Excited about Insects	12:15 PM - 1:15 PM	Meeting Room 302/303, Convention Centre
Be a Better Peer Reviewer	12:30 PM - 1:30 PM	Meeting Room 201, Convention Centre

10-MIN PAPERS / PRÉSENTATIONS DE 10 MINUTES

10-min: MUVE, Forensic Entomology	9:30 AM - 11:00 AM	Meeting Room 221/222, Convention Centre
10-min: MUVE, Molecular Biology of Medical, Veterinary, and Urban Pests	9:30 AM - 12:10 PM	Meeting Room 220, Convention Centre
10-min: MUVE, Urban Pests: Bed Bugs, Cockroaches, and Others	9:30 AM - 12:20 PM	Meeting Room 301, Convention Centre
10-min: P-IE, Vector Control and Vectors of Plant Disease	9:30 AM - 12:30 PM	Meeting Room 212, Convention Centre
10-min: SysEB, Biodiversity, Evolution, and Conservation of Bees	9:30 AM - 11:50 AM	Meeting Room 306, Convention Centre
10-min: SysEB, Biodiversity, Systematics, and Morphology of Coleoptera	9:30 AM - 11:50 AM	Meeting Room 304/305, Convention Centre
10-min: SysEB, Evolution and Diversity of Odonata and Polyneoptera	9:30 AM - 11:40 AM	Meeting Room 302/303, Convention Centre
10-min: MUVE, Urban Pests: Ants	1:30 PM - 2:50 PM	Meeting Room 301, Convention Centre
10-min: P-IE, Biocontrol, Pathogens and Predators	1:30 PM - 4:10 PM	Meeting Room 215/216, Convention Centre

DAILY SCHEDULE BY SCIENTIFIC PROGRAM / HORAIRE QUOTIDIEN PAR PROGRAMME SCIENTIFIQUE

10-min: P-IE, Chemical Ecology	1:30 PM - 5:10 PM	Meeting Room 214, Convention Centre
10-min: P-IE, Climate Effects and Climate Change	1:30 PM - 3:40 PM	Meeting Room 213, Convention Centre
10-min: P-IE, Invasive Species	1:30 PM - 5:20 PM	Meeting Room 221/222, Convention Centre
10-min: P-IE, IPM, Field Crops	1:30 PM - 5:30 PM	Meeting Room 220, Convention Centre
10-min: P-IE, IPM, Horticulture	1:30 PM - 5:20 PM	Meeting Room 224, Convention Centre
10-min: SysEB, Biodiversity, Systematics, and Morphology of Lepidoptera	1:30 PM - 4:40 PM	Meeting Room 212, Convention Centre
10-min: SysEB, Diversity, Evolution, and Biology of Ants	1:30 PM - 5:20 PM	Meeting Room 306, Convention Centre
10-min: MUVE, Structural Pests	3:00 PM - 4:20 PM	Meeting Room 301, Convention Centre
10-min: P-IE, Transgenic Crops	3:40 PM - 5:20 PM	Meeting Room 213, Convention Centre

POSTERS / AFFICHES

Poster: MUVE, Vectors, Forensics, and Urban	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Poster: PBT, IPM, Ecology, and Social Insects	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Poster: P-IE, IPM, Behavior, and Biocontrol	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Poster: SysEB, Ecology, Invasives, and Behavior	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre

VIRTUAL POSTERS / AFFICHES VIRTUELLES

Virtual Poster: MUVE	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Virtual Poster: PBT	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Virtual Poster: P-IE	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre
Virtual Poster: SysEB	9:00 AM - 6:30 PM	West Exhibit Hall A, Convention Centre

WEDNESDAY, NOVEMBER 14 / MERCREDI 14 NOVEMBRE

SESSION/FUNCTION SESSION/ÉVÈNEMENT	TIME/HEURE	LOCATION/LIEU
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PLENARY / PLÉNIÈRE

Closing Plenary with Ryan Church	8:00 AM - 9:30 AM	West Ballroom ABC, Convention Centre
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PROGRAM SYMPOSIA / SYMPOSIUMS DE PROGRAMMES

Borderless Parasites, Borderless Pollinators: Broadening Our Understanding of Pollinator and Parasite Communities	9:30 AM - 12:30 PM	Meeting Room 211, Convention Centre
Crossing Borders for a Healthier Tomorrow: The Role of Entomology in the One Health Initiative	1:30 PM - 5:30 PM	Meeting Room 109, Convention Centre
Insect Microbiomes: Traversing Disciplines to Understand and Manage Helpful and Harmful Hexapods	1:30 PM - 5:25 PM	Meeting Room 211, Convention Centre

SECTION SYMPOSIA / SYMPOSIUMS DE SECTIONS

MUVE Section Symposium: Training the Next Generation of Vector Biologists	9:30 AM - 11:40 AM	Meeting Room 109, Convention Centre
MUVE Section Symposium: Predicting Vector-Borne Disease Spread in Changing Natural and Social Landscapes	9:30 AM - 12:30 PM	Meeting Room 122, Convention Centre
PBT Section Symposium: Teaching Insect Physiology in a Changing World: Crossing Borders Between Traditional and Integrative Pedagogy	9:30 AM - 12:30 PM	Meeting Room 212, Convention Centre
P-IE Section Symposium: A Changing World: Biotechnology and the Future of Pest Control	9:30 AM - 12:30 PM	Meeting Room 118, Convention Centre
P-IE Section Symposium: Bugging Insects: Methods and Applications of Sensor-Based Monitoring of Insect Colonies and Populations	9:30 AM - 12:30 PM	Meeting Room 121, Convention Centre
P-IE Section Symposium: Crossing International Borders: Foreign Exploration and Classical Biological Control of Invasive Pests	9:30 AM - 12:30 PM	Meeting Room 114/115, Convention Centre
P-IE Section Symposium: Current Research and Future Perspectives on Native and Invasive Buprestid Pests in North America and Europe	9:30 AM - 12:05 PM	Meeting Room 111/112, Convention Centre
P-IE Section Symposium: Stressors Across Space and Time: Energy Sources, Enemies, and Environmental Influences	9:30 AM - 11:55 AM	Meeting Room 119/120, Convention Centre
P-IE Student Section Symposium: Pollinator and Invasive Species Science Policy Field Tours: A Melting Pot of Efforts Promoting Protection of our Food Supply	9:30 AM - 11:45 AM	Meeting Room 116/117, Convention Centre

DAILY SCHEDULE BY SCIENTIFIC PROGRAM / HORAIRE QUOTIDIEN PAR PROGRAMME SCIENTIFIQUE

MUVE Section Symposium: Arthropod Genomics and Molecular Biology: What's New!	1:30 PM - 4:30 PM	Meeting Room 301, Convention Centre
PBT Section Symposium: Social Insect Nutritional Ecology in a Changing World	1:30 PM - 5:10 PM	Meeting Room 302/303, Convention Centre
P-IE Section Symposium: Crossing New Frontiers in Conservation Biological Control	1:30 PM - 4:20 PM	Meeting Room 122, Convention Centre
P-IE Section Symposium: Flight of Ideas: Various Methods for Monitoring Insect Movement across the Landscape	1:30 PM - 4:10 PM	Meeting Room 114/115, Convention Centre
P-IE Section Symposium: <i>Rhynchophorus</i> Weevil: A Global Threat Beyond Borders	1:30 PM - 5:30 PM	Meeting Room 119/120, Convention Centre
MEMBER SYMPOSIA / SYMPOSIUMS DES MEMBRES		
Biodiversity, Systematics, and Behavioral Research in Aquatic Entomology	9:30 AM - 12:25 PM	Meeting Room 217/218/219, Convention Centre
Celebrating Michener's 100th and What the Next Decade of Melittology Brings	9:30 AM - 12:45 PM	Meeting Room 207, Convention Centre
Climate Change: Shifts in the Geographical Ranges and Outbreak Dynamics of Forest Insect Pests and Impacts on Forest Health	9:30 AM - 12:30 PM	Meeting Room 208/209, Convention Centre
Coastline Insects and Spiders: Living on the Land-Sea Border	9:30 AM - 12:15 PM	Meeting Room 203, Convention Centre
Current Research on the Biology and Management of Insect Pests in Corn: Crossing Borders from Genes to Populations	9:30 AM - 12:45 PM	Meeting Room 205, Convention Centre
Evolutionary Ecology of <i>Drosophila</i> -parasitoid Food Webs: From Molecules to Ecosystems	9:30 AM - 12:30 PM	Meeting Room 202, Convention Centre
Identifying and Overcoming Challenges to Integrating Tree Chemistry into Our Understanding of Forest Insect Dynamics	9:30 AM - 12:30 PM	Meeting Room 204, Convention Centre
Leveling the Playing Field: How Entomologists Can Work to Reduce Bias and Create Safe Workplaces	9:30 AM - 12:30 PM	Meeting Room 215/216, Convention Centre
National Assessment of Invasive Species in Forests and Grasslands of the U.S.: Discussing the Current State of Invasive Species Science and Research in the U.S.	9:30 AM - 12:00 PM	Meeting Room 206, Convention Centre
USDA's APHIS - PPK Identifiers: The Vanguard of Defense Against Invasive Pests	9:30 AM - 12:00 PM	Meeting Room 110, Convention Centre
Advances in Coccoidea Research: New Perspectives on Scale Insect and Mealybug Biology and Management	1:30 PM - 5:30 PM	Meeting Room 210, Convention Centre
Aquatic Entomology without Borders: A Field That Brings Together All Branches of ESA	1:30 PM - 5:20 PM	Meeting Room 111/112, Convention Centre
Communicating Effectively in Extension: Addressing New Expectations in the Learning Experience	1:30 PM - 5:25 PM	Meeting Room 204, Convention Centre
Crossing Borders of Understanding: Sharing Your Science with the Public	1:30 PM - 5:00 PM	Meeting Room 118, Convention Centre
Crossing Borders through Education and Outreach	1:30 PM - 5:25 PM	Meeting Room 116/117, Convention Centre
Crossing Taxonomic Borders: Challenging Arachnological Traditions in North America	1:30 PM - 5:30 PM	Meeting Room 202, Convention Centre
Crossing the Borders of Academia, Government, Industry, Extension, and Beyond: Careers in Entomology	1:30 PM - 4:30 PM	Meeting Room 214, Convention Centre
Ecology and Management of Cereal Aphid Invasions, Crossing the Great Plains Borders from Mexico to Canada	1:30 PM - 4:30 PM	Meeting Room 205, Convention Centre
From Invertebrate Ecology to Evolutionary Biology: Celebrating the Achievements of Professor John R. Spence	1:30 PM - 5:30 PM	Meeting Room 110, Convention Centre
Global Resistance to <i>Bt</i> Crops: Resistance Has No Borders	1:30 PM - 5:30 PM	Meeting Room 220, Convention Centre
Management of Bark and Ambrosia Beetles with Semiochemicals	1:30 PM - 5:10 PM	Meeting Room 224, Convention Centre
Sharing Ideas and Food: Stored Product Pest Control Across Interdisciplinary and Geographic Borders	1:30 PM - 5:30 PM	Meeting Room 206, Convention Centre
The Crossroad Between Applied and Basic Research in the Study of Endemic and Invasive Insect Species: 6th Latin American/Hispanic Symposium	1:30 PM - 4:00 PM	Meeting Room 213, Convention Centre
The Legacy of James McMurtry: Current Research in Phytoseiid Ecology	1:30 PM - 4:10 PM	Meeting Room 203, Convention Centre

DAILY SCHEDULE BY SCIENTIFIC PROGRAM / HORAIRE QUOTIDIEN PAR PROGRAMME SCIENTIFIQUE

Understanding and Mitigating the Risks of Pesticide Exposure for Pollinators and Other Beneficial Insects	1:30 PM - 5:30 PM	Meeting Room 121, Convention Centre
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Late-Breaking Symposium: Lincoln Brower, 1931 – 2018: Inspiring Scientist and Champion of Monarch Conservation	1:30 PM - 3:30 PM	Meeting Room 306, Convention Centre
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ORGANIZED MEETINGS / RÉUNIONS ORGANISÉES

Developing International Consensus Towards Better Management of Invasive Arthropods: A Grand Challenge	9:30 AM - 11:30 AM	Meeting Room 210, Convention Centre
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WORKSHOPS / ATELIERS

Exploiting the Dynamism of R Software to Help Entomologists Adapt to a Changing World: Crossing the Border from R Admirer to R User	1:30 PM - 5:30 PM	Meeting Room 215/216, Convention Centre
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LUNCH AND LEARNS / ATELIERS-MIDIS

Getting an up Close Look at Concept Artist Ryan Church's Art and Inspiration	10:30 AM - 12:00 PM	West Ballroom ABC, Convention Centre
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A Cross-Border Approach for Assessing the Risk of Pesticides to Bees in Canada and the U.S.	12:15 PM - 1:15 PM	Meeting Room 306, Convention Centre
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Breaking Down the Proverbial Wall: Using Effective Mentoring to Maximize Working Relationships	12:15 PM - 1:15 PM	City Foyer (Level 2), Convention Centre
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Certifications: What There Is and How It Helps	12:45 PM - 1:45 PM	Meeting Room 221/222, Convention Centre
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10-MIN PAPERS / PRÉSENTATIONS DE 10 MINUTES

10-min: MUVE, Veterinary Pests	9:30 AM - 12:10 PM	Meeting Room 301, Convention Centre
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10-min: P-IE, Apiculture	9:30 AM - 12:00 PM	Meeting Room 224, Convention Centre
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10-min: P-IE, Behavior	9:30 AM - 12:20 PM	Meeting Room 220, Convention Centre
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10-min: P-IE, Biocontrol, General	9:30 AM - 12:10 PM	Meeting Room 213, Convention Centre
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10-min: P-IE, IPM, Forests and General	9:30 AM - 12:20 PM	Meeting Room 214, Convention Centre
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10-min: SysEB, Diversity, Evolution, and Biology of Hemiptera	9:30 AM - 11:20 AM	Meeting Room 304/305, Convention Centre
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10-min: SysEB, Systematics, Evolution, and Diversity of Hymenoptera	9:30 AM - 11:20 AM	Meeting Room 302/303, Convention Centre
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10-min: PBT, Genes, Genomes, and Genetics	1:30 PM - 4:10 PM	Meeting Room 208/209, Convention Centre
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10-min: PBT, Miscellaneous	1:30 PM - 4:30 PM	Meeting Room 304/305, Convention Centre
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10-min: PBT, Pheromones, Immunity, and Microbes	1:30 PM - 4:40 PM	Meeting Room 207, Convention Centre
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10-min: P-IE, Ecology, General	1:30 PM - 5:30 PM	Meeting Room 217/218/219, Convention Centre
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10-min: P-IE, Host Plant Resistance	1:30 PM - 4:50 PM	Meeting Room 212, Convention Centre
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10-min: P-IE, Extension, Youth/Adult Education	4:40 PM - 5:40 PM	Meeting Room 208/209, Convention Centre
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POSTERS / AFFICHES

Poster: MUVE, Veterinary and General	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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Poster: PBT, Resistance Management, Molecular, and Other	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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Poster: P-IE, Pollinators, Ecology, and Other	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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Poster: SysEB, Social Insects and Other	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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VIRTUAL POSTERS / AFFICHES VIRTUELLES

Virtual Poster: MUVE	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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Virtual Poster: PBT	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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Virtual Poster: P-IE	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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Virtual Poster: SysEB	9:00 AM - 2:00 PM	West Exhibit Hall A, Convention Centre
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Presentations: Oral and Poster Displays

SUNDAY, NOVEMBER 11 • MORNING

MUVE Section Symposium: Novel Pest Control Strategy on the Horizon: Gene Drives and Transgenic Insects

Meeting Room 122 (Convention Centre)

Moderator and Organizer: Bo Zhao, Bayer CropScience, Morrisville, NC

8:00 Welcoming remarks

8:05 **0001** Gene drive for population replacement: Keeping it simple. Georg Oberhofer¹, Tobin Ivy² and **Bruce A. Hay** (haybruce@caltech.edu)², ¹Georg August Univ., Göttingen, Germany, ²California Institute of Technology, Pasadena, CA

8:20 **0002** Lessons from Medea: What can we learn from naturally occurring selfish genetic elements? **Marcé Lorenzen** (marce_lorenzen@ncsu.edu), Nathaniel Grubbs, Nicole Gutzmann, William Klobasa, Fu-Chyun Chu and Lauren Slayton, North Carolina State Univ., Raleigh, NC

8:35 **0003** Robust, safe, and reversible gene drive. **Floyd Reed** (floydre@hawaii.edu)¹, Jolene Sutton² and Jai Denton³, ¹Univ. of Hawai'i, Honolulu, HI, ²Univ. of Hawai'i, Hilo, HI, ³Okinawa Institute of Science and Technology, Kunigami-gun, Japan

8:50 **0004** Can CRISPR gene drive succeed in natural populations? **Jackson Chamber** (jc3248@cornell.edu), Andrew G. Clark and Philipp Messer, Cornell Univ., Ithaca, NY

9:05 Break

9:20 **0005** Pathway to deployment of gene drive mosquitoes as a potential biocontrol tool for elimination of malaria in sub-Saharan Africa. **David O'Brochta** (dobrocht@umd.edu), Foundation for the National Institutes of Health, North Bethesda, MD

9:50 **0006** Economic issues to consider for gene drives. **Paul D. Mitchell** (pdmitchell@wisc.edu)¹, Zachary Brown², Michael Jones², Neil McRoberts³, Jason Delborne² and Johanna Elsensohn², ¹Univ. of Wisconsin, Madison, WI, ²North Carolina State Univ., Raleigh, NC, ³Univ. of California, Davis, CA

10:05 **0007** The future of gene editing in agriculture. **Peter Jensen** (peter.d.jensen@monsanto.com), Monsanto Company, St. Louis, MO

10:20 **0008** MGDrive: A simulation framework for gene drive in spatially-explicit mosquito populations and its application to threshold-dependent systems. Hector M. Sanchez, Sean L. Wu, Jared Bennett and **John Marshall** (john.marshall@berkeley.edu), Univ. of California, Berkeley, CA

10:35 Concluding remarks

PBT Section Symposium: RNAi: New Traits, Field Performance and Safety

Meeting Room 212 (Convention Centre)

Moderators and Organizers: William Moar¹, Ana Vélez² and Elane Fishilevich³, ¹Monsanto Company, St. Louis, MO, ²Univ. of Nebraska, Lincoln, NE, ³Dow AgroSciences, Indianapolis, IN

8:00 Introductory remarks

8:05 **0009** Control of western corn rootworm (*Diabrotica virgifera virgifera* LeConte) reproduction through plant-mediated RNA interference. Xiping Niu¹, **Adane Kassa** (adane.kassa@pioneer.com)¹, Xu Hu¹, Jon Robeson¹, Mollie McMahon¹, Nina Richtman¹, Joe Steimel¹, Bliss Kernodle², Virginia Crane¹, Gary Sandahl¹, Julie Ritland¹, James Presnail³, Albert Lu¹ and Gusui Wu¹, ¹Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA, ²Iowa State Univ., Ames, IA, ³Calyxt, New Brighton, MN

8:20 **0010** Development of RNAi methods to control stink bugs. **Jeff Howell** (jeff.howell@uky.edu), Mogilicherla Kanakachari and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

8:35 **0011** Enabling the RNA revolution; Cell-free dsRNA production. **Thais B. Rodrigues** (trodrigues@greenlightbio.com)¹, Drew Cunningham², Karthikeyan Ramachandriya², Briday Maxwell³ and James Abshire², ¹Greenlight Biosciences, St. Louis, MO, ²Greenlight Biosciences, Medford, MA, ³Greenlight Biosciences, Research Triangle Park, NC

8:50 **0012** The design and use of self-forming RNAi nanoparticles with programmable multi-modal surfaces to improve crop protection. **Todd Hauser** (thauser@trilliumag.com) and Paul Olivier, Trillium Agriculture, Seattle, WA

9:05 **0013** Reducing psyllid vectors and bacterial pathogens: RNA suppression technologies. **Wayne Hunter** (wayne.hunter@ars.usda.gov)¹, Andres Mojca², Godfrey Miles³, Thomson Paris³, Jackie Metz⁴, Michael Boyle⁵, Greg McCollum¹, Sidney Altman⁶, Veenu Aishwarya⁷ and Kirsten Pelz-Stelinski², ¹USDA - ARS, Fort Pierce, FL, ²Univ. of Florida, Lake Alfred, FL, ³Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL, ⁴AUM LifeTech, Inc., Fort Pierce, FL, ⁵Smithsonian Marine Station, Fort Pierce, FL, ⁶Yale Univ., New Haven, CT, ⁷AUM LifeTech, Inc., Philadelphia, PA

9:20 **0014** Developing a biorational integrated RNAi mosquito control program. **Molly Duman Scheel** (mscheel@nd.edu)¹, Keshava Mysore², Limb Hapairai¹, Na Wei², Azad Mohammed³ and David Severson², ¹Indiana Univ. School of Medicine, South Bend, IN, ²Univ. of Notre Dame, South Bend, IN, ³The Univ. of the West Indies, St. Augustine, Trinidad and Tobago

9:35 Break

9:45 **0015** Efficacy and off-target effects of insecticidal dsRNAs for the control of flea beetles in canola cropping systems. **Steve Whyard** (steve.whyard@umanitoba.ca), Aditi Singh, Suresh Desai, Michael Becker, Tharshinidevy Nagalingam, Dafna Schultz and Mark Belmonte, Univ. of Manitoba, Winnipeg, MB, Canada

10:00 **0016** Controlling insect pests with RNA-based biocontrol: Coleopterans and beyond. **Geert Plaetinck** (geert.plaetinck@syngenta.com)¹, Sebastien Patiny¹, Matthew Bramlett¹, Wendy Maddelein², Yann Naudet¹, Oliver Duncan², Pascale Feldman² and Michael Bean², ¹Syngenta Ghent Innovation Center, Zwijnaarde, Belgium, ²Syngenta, Zwijnaarde, Belgium

10:15 **0017** Using RNAi against *Varroa*, a major pest of honey bee. **Alex Inberg** (alex.inberg@monsanto.com), Monsanto Company, Chesterfield, MO

10:30 **0018** Mammalian safety for agricultural applications of dsRNA. **Jay Petrick** (jay.s.petrick@monsanto.com), Monsanto Company, Chesterfield, MO

10:45 **0019** Assessing the non-target effects of RNAi-based insecticides. **Jörg Romeis** (joerg.romeis@agroscope.admin.ch), Agroscope, Zürich, Switzerland

SUNDAY, NOVEMBER 11 /
DIMANCHE 11 NOVEMBRE

11:00 Remembrance Day: Act of Remembrance
(2 minutes of silence)

11:02 **0020** Characterizing the environmental safety of DvSSJ1, an RNAi trait controlling western corn rootworm. **Chad Boeckman** (chad.boeckman@pioneer.com), Bin Cong, Jeremy Barnes, Chris Linderblood, Taylor Olson, Kristine Sturtz, Anita Unger, Rachel Woods and Jiaming Yin, Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

11:17 Discussion

P-IE Section Symposium: From Genes to Communities: Quantifying Diverse Responses of Pollinators to Multiple Anthropogenic Stressors

Meeting Room 111/112 (Convention Centre)

Moderators and Organizers: Daniel Cariveau¹ and Margarita López-Urbe², ¹Univ. of Minnesota, St. Paul, MN, ²Pennsylvania State Univ., University Park, PA

8:00 **0021** Biogeography and functional genetics of thermal tolerance across latitude and elevation in a widespread bumble bee. **Meaghan Pimsler** (mpimsler@ua.edu)¹, Kennan Oyen², James Herndon³, Michael Dillon², James Strange⁴ and Jeffrey Lozier¹, ¹Univ. of Alabama, Tuscaloosa, AL, ²Univ. of Wyoming, Laramie, WY, ³Utah State Univ., Logan, UT, ⁴USDA - ARS, Logan, UT

8:15 **0022** Understanding mechanisms of differential tolerance to deformed wing infection in honey bees. **Michael Simone-Finstrom** (michael.simonefinstrom@ars.usda.gov), USDA - ARS, Baton Rouge, LA

8:30 **0023** Colonization by solitary bees is driven by connectivity and habitat shape in a fragmented landscape. **Sean Griffin** (sgriffin108@gmail.com) and Nick Haddad, Michigan State Univ., Hickory Corners, MI

8:45 **0024** Tracking the health of feral honey bees in Pennsylvania. **Chauncy Hinshaw** (crh54@psu.edu), Katy Evans, Christina M. Grozinger, Cristina Rosa and Margarita López-Urbe, Pennsylvania State Univ., University Park, PA

9:00 **0025** A trait-based approach to understanding disease transmission in plant-pollinator networks. **Scott McArt** (shm33@cornell.edu)¹, Stephen Ellner¹, Chris Myers¹, Quinn McFrederick², Lauren Truitt³, Peter Graystock¹, Ashley Fersch¹ and Paige Muniz¹, ¹Cornell Univ., Ithaca, NY, ²Univ. of California, Riverside, CA, ³National Institutes of Health, Bethesda, MD

9:30 Break

9:45 **0026** Pollinator responses to habitat loss and sustainability-oriented land management practices. **Elinor Lichtenberg** (elichten@utexas.edu)¹, David Crowder², Ivan Milosavljević³, Shalene Jha¹ and Jaclyn Heiser¹, ¹Univ. of Texas, Austin, TX, ²Washington State Univ., Pullman, WA, ³Univ. of California, Riverside, CA

10:00 **0027** How Michigan agricultural landscapes provide pollen for enhanced honey bee colony performance. **Gabriela Quinlan** (quinlang@msu.edu)¹, Meghan Milbrath¹, Clint Otto², Matthew Smart³, Deborah Iwanowicz⁴, R. Scott Cornman⁵ and Rufus Isaacs¹, ¹Michigan State Univ., East Lansing, MI, ²US Geological Survey, Jamestown, ND, ³US Geological Survey, Lincoln, NE, ⁴US Geological Survey, Charleston, WV, ⁵USDA - ARS, Beltsville, MD

10:15 **0028** Species traits uniquely determine interaction flexibility across different network scales. **Lauren Ponisio** (lponisio@ucr.edu) and Marilia Gaiarsa, Univ. of California, Riverside, CA

10:30 **0029** Bee health: From genes to landscapes. **Christina Grozinger** (cmg25@psu.edu), Pennsylvania State Univ., University Park, PA

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0030** Understanding bee health in midwestern row crop agriculture: Insights from an intensified landscape. **Adam Dolezal** (adolezal@illinois.edu)¹, Ashley St. Clair², Ge Zhang², Harmen P. Hendriksma², Erin Hodgson², Amy Toth² and Matthew O'Neal², ¹Univ. of Illinois, Champaign, IL, ²Iowa State Univ., Ames, IA

P-IE Section Symposium: How Crop Diversification across Space and Time Influences Herbivory

Meeting Room 121 (Convention Centre)

Moderators and Organizers: Randa Jabbour¹, Kathryn Ingerslew² and David Gonthier³, ¹Univ. of Wyoming, Laramie, WY, ²Purdue Univ., West Lafayette, IN, ³Univ. of Kentucky, Lexington, KY, ⁴Univ. of California, Berkeley, CA

8:00 Welcoming remarks

8:00 **0031** Global agrobiodiversity of cucurbit crop plants and their insect associates. **Lori Shapiro** (lori.r.shapiro@gmail.com)¹, Robert Dunn¹ and Margarita López-Urbe², ¹North Carolina State Univ., Raleigh, NC, ²Pennsylvania State Univ., University Park, PA

8:15 **0032** Phylogenetic farming: Can evolutionary history inform crop rotation? **Ian Kaplan** (ikaplan@purdue.edu) and Kathryn Ingerslew, Purdue Univ., West Lafayette, IN

8:30 **0033** The phylogenetic diversification of agriculture for pest and pathogen suppression. **David Gonthier** (djgo227@g.uky.edu), Univ. of Kentucky, Lexington, KY

8:45 **0034** Aromatic intercrops for pest disruption in berries – host finding, herbivore performance, and predation. **Chelsea Gowton** (cgowton@mail.ubc.ca)¹, Audrey Debonnel² and Juli Carrillo¹, ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²AgroSup Dijon, Dijon, France

9:00 **0035** Impacts of cover crop use on arthropod populations and host choice in vegetables. **Rebecca Schmidt-Jeffris** (rschmi3@clemsun.edu), Clemson Univ., Charleston, SC

9:15 **0036** Combining no-till and IPM to increase diversity and conservation biological control in field crop production. **John Tooker** (tookerp@psu.edu), Pennsylvania State Univ., University Park, PA

9:30 **0037** Landscape-scale floral resources: Implications for natural enemies, pests, and pollinators. **Aaron Iverson** (iverson@cornell.edu)¹, Allyson Evans¹, Heather Grab¹, Ricardo Perez-Alvarez¹, Scott McArt¹, Jon Fisher² and Alison Power¹, ¹Cornell Univ., Ithaca, NY, ²The Nature Conservancy, Arlington, VA

9:45 **0038** Mechanisms of landscape structure effects on pest control in agricultural landscapes: Timing and movement of natural enemies into crops. **Alejandro Costamagna** (ale.costamagna@umanitoba.ca), Univ. of Manitoba, Winnipeg, MB, Canada

P-IE Section Symposium: Practical Applications of Research on Parasite Manipulation of Hosts and Vectors

Meeting Room 119/120 (Convention Centre)

Moderators and Organizers: Kerry Mauck¹, Sanford D. Eigenbrode² and Quentin Chesnais¹, ¹Univ. of California, Riverside, CA, ²Univ. of Idaho, Moscow, ID

- 8:00 Introductory remarks
- 8:05 **0039** Plant virus effects on the host breadth of vectors: Implications for virus spread. **Sanford D. Eigenbrode** (sanforde@uidaho.edu)¹, Richard Gomulkiewicz² and Seth Davis³, ¹Univ. of Idaho, Moscow, ID, ²Washington State Univ., Pullman, WA, ³Colorado State Univ., Fort Collins, CO
- 8:20 **0040** Ethylene signaling mediates potyvirus spread by aphid vectors. **Aurelie Bak** (abak@ufl.edu)¹, MacKenzie F. Patton² and Clare Casteel¹, ¹Univ. of California, Davis, CA, ²Univ. of Texas, Tyler, TX
- 8:35 **0041** A plant virus drastically increases the mobility and survival of starving aphid vectors. **Stéphane Blanc** (stephane.blanc@inra.fr)¹, Michel Yvon¹ and Yannis Michalakakis², ¹INRA, Montpellier, France, ²CNRS - UMR, Montpellier, France
- 8:50 **0042** Biofilm blockage of the flea's foregut mediates flea-borne plague transmission. **Viveka Vadyvaloo** (vvadyvaloo@wsu.edu), Washington State Univ., Pullman, WA
- 9:05 **0043** Don't go into the light: Pathogen manipulation of vector behavior and disease surveillance. **Emily McDermott** (emily.g.mcdermott.ctr@mail.mil)¹, Christie Mayo² and Bradley Mullens³, ¹Walter Reed Army Institute of Research, Silver Spring, MD, ²Colorado State Univ., Fort Collins, CO, ³Univ. of California, Riverside, CA
- 9:20 **0044** Response of phytopathogen vectors to infection-induced plant volatiles: From academic research to practical applications. **Xavier Martini** (xmartini@ufl.edu)¹ and Lukasz Stelinski², ¹Univ. of Florida, Quincy, FL, ²Univ. of Florida, Lake Alfred, FL
- 9:35 **0045** The influence of climate change on vector behavior: Models and experiments on the spread of *Xylella fastidiosa*. **Adam Zeilinger** (arz@berkeley.edu)¹, Matt Daugherty², Celia Del Cid¹, Rodrigo Krugner³ and Rodrigo P. P. Almeida¹, ¹Univ. of California, Berkeley, CA, ²Univ. of California, Riverside, CA, ³USDA - ARS, Parlier, CA
- 9:50 Break
- 10:00 **0046** Field evidence for manipulation of vector host choice by the human malaria parasite, *Plasmodium falciparum*, with important epidemiological consequences. **Thierry Lefèvre** (thierry.lefevre@ird.fr)¹, Amelie Vantaux², Frank Yao³, Domonbabele Hien⁴, Edwige Guissou⁴, Karine Moulins⁴, Ben Roche⁴, Frederic Thomas⁴, Anna Cohuet⁴ and Kounbobr Dabire³, ¹Univ. de Montpellier, Montpellier, France, ²Institut Pasteur du Cambodge, Phnom Penh, Cambodia, ³Institut de Recherche en Sciences de la Santé, Bobo-Dioulasso, Burkina Faso, ⁴Institut de recherche pour le développement, Montpellier, France
- 10:30 **0047** Role of the mosquito immune system in altered fitness and behavioral phenotypes. **Johanna Ohm** (jro182@psu.edu)¹, Lauren Cator², Courtney Murdock³, Matthew Thomas¹, William Nelson⁴, Andrew Read¹, Jose Pietri⁵, Edwin Lewis⁶ and Shirley Luckhart⁶, ¹Pennsylvania State Univ., University Park, PA, ²Imperial College of London, London, United Kingdom, ³Univ. of Georgia, Athens, GA, ⁴Queen's Univ., Kingston, ON, Canada, ⁵Apex Bait Technologies, Inc., Santa Clara, CA, ⁶Univ. of Idaho, Moscow, ID
- 10:45 **0048** Effect of host plant species, whitefly genotype, and virus infection status on feeding behavior of *Bemisia tabaci*. Milan Milenovic¹, **Everlyne Wosula** (e.wosula@cgjar.org)¹, Carmelo Rapisarda² and James Legg¹, ¹International Institute of Tropical Agriculture, Dar es Salaam, Tanzania, ²Univ. of Catania, Catania, Italy

- 11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)
- 11:02 **0049** Temporal limitations on host and vector manipulation by plant viruses. **Quentin Chesnais** (quentin.chesnais@ucr.edu), Ian Wright, Jaimie Kenney, Jordan Rolsma and Kerry Mauck, Univ. of California, Riverside, CA
- 11:17 **0050** When host manipulation goes wrong: Non-vector insect impairs fitness of plant virus. **Yesenia Ithai Ángeles-López** (yiangela@ncsu.edu)^{1,2}, Rafael Francisco Rivera-Bustamante² and Martin Heil², ¹North Carolina State Univ., Raleigh, NC, ²Cinvestav Unidad Irapuato, Irapuato, Mexico
- 11:32 **0051** Presentation withdrawn
- 11:47 Concluding remarks

Member Symposium: Biological Control Agents in New Environments

Meeting Room 109 (Convention Centre)

Moderators and Organizers: Julia Mlynarek and Roselyne Labbe, Agriculture and Agri-Food Canada, Harrow, ON, Canada

- 8:00 Welcoming remarks
- 8:05 **0052** Attack by resident natural enemies on *Bagrada* bug eggs in northern and central California. **Brian Hogg** (brian.hogg@ars.usda.gov)¹, Ian Grettenberger² and Charles Pickett³, ¹USDA - ARS, Albany, CA, ²Univ. of California, Davis, CA, ³California Dept. of Food and Agriculture, Sacramento, CA
- 8:20 **0053** Urbanization filters lady beetle composition and functional trait distributions in parks across greater Santiago, Chile. **Audrey Grez** (agrez@uchile.cl)¹, Tania Zaviezo², Mary Gardiner³ and Alberto Alaniz¹, ¹Univ. de Chile, Santiago, Chile, ²Pontificia Univ. Católica, Santiago, Chile, ³The Ohio State Univ., Columbus, OH
- 8:35 **0054** Progress and challenges of biological control of spotted-wing drosophila using parasitoids. **Xingeng Wang** (xggwang@ucanr.edu)¹, Kent Daane¹, Antonio Biondi², Evelyne Hougardy², Kim Hoelmer³, Matthew Buffington⁴, Massimo Giorgini⁵, Emilio Guerrieri⁵, Brian Hogg⁶ and Keith Hopper³, ¹Univ. of California, Parlier, CA, ²Univ. of California, Berkeley, CA, ³USDA - ARS, Newark, DE, ⁴USDA - ARS, Washington, DC, ⁵National Research Council, Portici, Italy, ⁶USDA - ARS, Albany, CA
- 8:50 **0055** Adding value to an agricultural insect pest monitoring program in western Canada. **Owen Olfert** (owen.olfert@agr.gc.ca)¹, Meghan Vankosky¹ and Jennifer Otani², ¹Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ²Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada
- 9:05 **0056** Incorporating economics into the choice of classical biological control programs for legacy pests. **Karen Jetter** (jetter@primal.ucdavis.edu)¹ and Mark Hoddle², ¹Agricultural Issues Center, Davis, CA, ²Univ. of California, Riverside, CA
- 9:20 **0057** Biological control agents: Invasive species or valuable solutions? **Judith H. Myers** (myers@zoology.ubc.ca)¹ and Jenny Cory², ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada
- 9:35 Discussion
- 9:50 Concluding remarks

Member Symposium: Connecting Hemp and Insects: Where No Entomologist Has Gone Before!

Meeting Room 116/117 (Convention Centre)

Moderators and Organizers: Kadie Britt¹, Amanda Skidmore², Marguerite Bolt³, Melissa Schreiner⁴ and Cody, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²Univ. of Kentucky, Lexington, KY, ³Purdue Univ., West Lafayette, IN, ⁴Colorado State Univ., Fort Collins, CO, ⁵Univ. of Tennessee, Knoxville, TN

8:00 Welcoming remarks

8:05 **0058** Defining the insect pest management needs of a “new” crop: Industrial hemp. **Whitney Cranshaw** (whitney.cranshaw@colostate.edu), Colorado State Univ., Fort Collins, CO

8:35 **0059** Industrial hemp as a multipurpose crop for the Canadian prairies. Jan Slaski¹ and **Kenneth Fry** (kfray@oldscollge.ca)², ¹InnoTech Alberta, Vegreville, AB, Canada, ²Olds College, Olds, AB, Canada

8:50 **0060** Insects affecting hemp grown in the high plains/Rocky Mountain region. **Melissa Schreiner** (mschreiner1108@gmail.com) and Whitney Cranshaw, Colorado State Univ., Fort Collins, CO

9:05 **0061** Evaluating insect pest pressure on industrial hemp in Virginia. **Kadie Britt** (kadiebritt@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:20 **0062** Influence of weed pressure on hemp-arthropod interactions. **Marguerite Bolt** (mbolt@purdue.edu), Leah Sandler, Janna Beckerman, Kevin Gibson and John Couture, Purdue Univ., West Lafayette, IN

9:35 **0063** Four years of hemp in Tennessee and the insects we’ve encountered. **Cody Seals** (wseals@utk.edu) and Jerome F. Grant, Univ. of Tennessee, Knoxville, TN

9:50 **0064** What is with all the buzzing? Exploring bee diversity in industrial hemp. **Colton O’Brien** (coltobrien@gmail.com) and Arathi Seshadri, Colorado State Univ., Fort Collins, CO

10:05 Break

10:20 **0065** Kentucky hemp. **David Williams** (dwilliam@uky.edu), Univ. of Kentucky, Jackson, KY

10:35 **0066** Phytochemical diversity in industrial hemp: Synergies in defense against an array of natural enemies. **Ericka Kay** (ekay@nevada.unr.edu), Lee A. Dyer, Matthew L. Forister, Lora Richards, Christopher Jeffrey, Glenn Miller and Alex English, Univ. of Nevada, Reno, NV

10:45 **0067** Using pesticide residue detections in *Cannabis* products to reverse engineer identification of pest problems. **Allan Felsot** (afelsot@wsu.edu), Washington State Univ., Richland, WA

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0068** Hemp plant pathogens. **Janna Beckerman** (jbeckerm@purdue.edu), Purdue Univ., West Lafayette, IN

11:17 **0069** *Cannabis* as a companion crop and botanical pesticide: The evidence base, and lack thereof. **John McPartland** (mcptritt@myfairpoint.net), Univ. of Vermont, Middlebury, VT

11:32 **0070** Integrating hyperspectral data into hemp management. **John Couture** (couture@purdue.edu), Marguerite Bolt and Janna Beckerman, Purdue Univ., West Lafayette, IN

Member Symposium: Continued Challenges in Entomology from a Woman’s Perspective

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Juliana Rangel¹, Raul F. Medina¹ and Andrea Lucky², ¹Texas A&M Univ., College Station, TX, ²Univ. of Florida, Gainesville, FL

8:00 Introductory remarks

8:05 **0071** Female dominated societies: From ants to entomology. **Corrie Moreau** (cmoreau@fieldmuseum.org), Field Museum of Natural History, Chicago, IL

8:20 **0072** A journey in entomology, agriculture, and public health: 1973-2018. **Gloria McCutcheon** (gmccutcheon@claffin.edu), Claflin Univ., Orangeburg, SC

8:35 **0073** We (really) can do it! Encouraging and supporting women in entomology and agriculture. **Laura Higgins** (laura.higgins@pioneer.com), Pioneer Hi-Bred International, Inc., Johnston, IA

8:50 **0074** Preaching beyond the converted: Actions required of men to advance gender equity in entomology. **Terry McGlynn** (terry.mcglynn@gmail.com), California State Univ., Carson, CA; Natural History Museum, Los Angeles, CA

9:05 **0075** The communication that divides us. **Martha Hunter** (mhunter@ag.arizona.edu), Univ. of Arizona, Tucson, AZ

9:20 **0076** Challenges to diversity in entomology. **Joyce Parker** (joyce.parker@nifa.usda.gov), USDA - NIFA, Washington, DC

9:35 Break

9:45 **0077** Be yourself and other strategies for succeeding in what you love. **Jennifer Thaler** (jst37@cornell.edu), Cornell Univ., Ithaca, NY

10:00 **0078** Meanderings and musings of a Latina in agricultural entomology. **Yasmin Cardoza** (yasmin.cardoza@bayer.com), Bayer CropScience, Morrisville, NC

10:15 **0079** Women in extension: Challenges, rewards and the #MeToo movement. **Julie Peterson** (julie.peterson@unl.edu)¹, Jody Green², Erin Hodgson³, Katelyn Kesheimer⁴, Judy Wu-Smart² and Sarah Zukoff⁵, ¹Univ. of Nebraska, North Platte, NE, ²Univ. of Nebraska, Lincoln, NE, ³Iowa State Univ., Ames, IA, ⁴Texas A&M Univ., Lubbock, TX, ⁵Kansas State Univ., Manhattan, KS

10:30 **0080** Crafting important leadership skills for future career success. **Cindy Simpson** (simpson@awis.org), Association for Women in Science, Washington, DC

10:45 **0081** From the biological control lab to the feminist march: Struggles and actions to build a more just environment for women involved in agroecology. **Helda Morales** (hmmorales@ecosur.mx), El Colegio de la Frontera Sur, Chiapas, Mexico

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0082** Women in academia: Building self-confidence and promoting ourselves. **S. Patricia Stock** (spstock@email.arizona.edu), Univ. of Arizona, Tucson, AZ

11:17 Panel discussion

11:32 Concluding remarks

SUNDAY, NOVEMBER 11 /
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Member Symposium: Genomic Approaches to Biosurveillance of Invasive Forest Insects

Meeting Room 213 (Convention Centre)

Moderators and Organizers: Gwylim Blackburn and Sandrine Picq, Natural Resources Canada, Québec City, QC, Canada

8:00 Introductory remarks

8:05 **0083** BioSurveillance of alien forest enemies: The BioSAFE initiative. **Richard Hamelin** (richard.hamelin@ubc.ca), Univ. Laval, Québec City, QC, Canada; Univ. of British Columbia, Vancouver, BC, Canada8:35 **0084** Presentation withdrawn8:50 **0085** Understanding the mechanisms underlying the success of forest insect pests, a genomics-aided approach.**Christopher Keeling** (ckeeling@me.com), Natural Resources Canada, Québec City, QC, Canada9:05 **0086** Microsatellites and DNA barcodes as gateways to genomics for biosurveillance of forest insect pests. **Nathan Havill** (nphavill@fs.fed.us)¹, Ryan Garrick², Jeremy Andersen³ and Joseph Elkinton³, ¹USDA - Forest Service, Hamden, CT, ²Univ. of Mississippi, Univ., MS, ³Univ. of Massachusetts, Amherst, MA9:20 **0087** A universal genomic framework for species identification and source determination for invasive pests. **Julian Dupuis** (jrdupuis@hawaii.edu)^{1,2}, Daniel Rubinoff¹ and Scott Geib², ¹Univ. of Hawai'i, Honolulu, HI, ²USDA - ARS, Hilo, HI9:35 **0088** The importance of molecular characterization of co-invasion by microbial symbionts in invasive arthropod populations. **Jeff Garnas** (jeff.garnas@unh.edu), Univ. of New Hampshire, Durham, NH

9:50 Break

10:00 **0089** Application of environmental DNA to survey for agricultural pests. **Rafael E. Valentin** (raf.e.valentin@gmail.com)¹, Dina M. Fonseca¹, Anne Nielsen², Tracy C. Leskey³ and Julie Lockwood¹, ¹Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, ²Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, ³USDA - ARS, Kearneysville, WV10:15 **0090** Using next-generation sequencing to study the genomic effects of hybridization among populations of the invasive forest pest the winter moth (*Operophtera brumata*) and its native congener the Bruce spanworm (*O. bruceata*). **Jeremy Andersen** (jandersen@berkeley.edu)¹, Nathan Havill² and Joseph Elkinton¹, ¹Univ. of Massachusetts, Amherst, MA, ²USDA - Forest Service, Hamden, CT10:30 **0091** Identification of the geographic origin of gypsy moth (*Lymantria dispar*, Erebidae) intercepted in the U.S. using genomic amplicon data. **Yunke Wu** (yunke.wu@aphis.usda.gov)¹ and Steven Bogdanowicz², ¹USDA - APHIS, Buzzards Bay, MA, ²Cornell Univ., Ithaca, NY10:45 **0092** Characterizing invasion-relevant overwintering physiology in the Asian longhorn beetle – an “-omics” approach. **Alex Torson** (atorson@uwyo.ca)¹, Amanda Roe², Daniel Doucet², Lauren Des Marteaux³, Susan Bowman² and Brent Sinclair³, ¹Western Univ., London, ON, Canada, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada, ³Univ. of Western Ontario, London, ON, Canada

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0093** Tracking mountain pine beetle: From genomics to management. **Jasmine Janes** (jasmine.janes@gmail.com)^{1,2}, Stephen Trevo³ and Felix Sperling³, ¹Univ. of New England, Armidale, Australia, ²Vancouver Island Univ., Nanaimo, BC, Canada, ³Univ. of Alberta, Edmonton, AB, Canada

11:17 Panel discussion

11:47 Concluding remarks

Member Symposium: Rapid Evolution in Biological Control Systems: Implications for Safety and Effectiveness

Meeting Room 301 (Convention Centre)

Moderators and Organizers: Monte Mattsson¹, Ruth Hufbauer² and Peter McEvoy¹, ¹Oregon State Univ., Corvallis, OR, ²Colorado State Univ., Fort Collins, CO8:00 **0094** Introduction. **Ruth Hufbauer** (hufbauer@colostate.edu)¹, Monte Mattsson² and Peter McEvoy², ¹Colorado State Univ., Fort Collins, CO, ²Oregon State Univ., Corvallis, OR8:15 **0095** The impact of pathogen diversity on the evolution of resistance in microbial insecticides. **Jenny Cory** (jennifer_cory@sfu.ca), Simon Fraser Univ., Burnaby, BC, Canada8:30 **0096** Invasive plant evolution and biocontrol efficacy - what we know so far. **Risa Sargent** (rsargent@uottawa.ca)¹ and Michael Stastny², ¹Univ. of Ottawa, Ottawa, ON, Canada, ²Natural Resources Canada, Fredericton, NB, Canada8:45 **0097** Rapid evolution and weed biocontrol: A New Zealand perspective. **Quentin Paynter** (paynterq@landcareresearch.co.nz), Landcare Research, Auckland, New Zealand9:00 **0098** Genetics and evolution of host specificity in aphid parasitoids. **Keith Hopper** (khopper@udel.edu)¹, Kristen Kuhn¹, Alisha Johnson¹, Li Qiyun², Randall Wisser³, Shawn Polson⁴, Sara Oppenheim⁵, James Woolley⁶, John M. Heraty⁷, Vladimir Gokhman⁸, George Heimpel⁹, David Voetglin¹⁰, Kathryn Lanier³, Joshua Rhoades¹, Robert Kondos¹, Dominique Coutinot¹¹, Guy Mercadier¹², Marie Roche¹¹ and Nathalie Ramualde¹¹, ¹USDA - ARS, Newark, DE, ²Jilin Academy of Agricultural Sciences, Changchun, China, ³Univ. of Delaware, Newark, DE, ⁴Delaware Biotechnology Institute, Newark, DE, ⁵American Museum of Natural History, New York, NY, ⁶Texas A&M Univ., College Station, TX, ⁷Univ. of California, Riverside, CA, ⁸Moscow State Univ., Moscow, Russian Federation, ⁹Univ. of Minnesota, St. Paul, MN, ¹⁰Illinois Natural History Survey, Champaign, IL, ¹¹USDA - ARS, Montferrier-sur-Lez, France, ¹²USDA - ARS, Montpellier, France9:15 **0099** The role of genomes in advancing biocontrol research. **Kim Ferguson** (kim.ferguson@wur.nl) and Bart Pannebakker, Wageningen Univ. and Research Centre, Wageningen, Netherlands9:30 **0100** Neoclassical biological control – speeding the integration of irruptive populations into resident communities. **Scott P. Carroll** (spcarroll@ucdavis.edu)¹ and Johannes Leroux², ¹Univ. of California, Davis, CA, ²Stellenbosch Univ., Stellenbosch, South Africa9:45 **0101** Darwin's parsnips: Rapid coevolution between an invasive weed and a specialist caterpillar. **May Berenbaum** (maybe@illinois.edu), Univ. of Illinois, Champaign, IL

10:00 Break

10:15 **0102** 30 years of fluctuating biotic and abiotic selection on the cinnabar moth, *Tyria jacobaeae*. **Monte Mattsson** (mattsson@oregonstate.edu) and Peter McEvoy, Oregon State Univ., Corvallis, OR

10:30 **0103** A model for understanding phenological mis-match and adaptation in introduced insects that are cued by photoperiod. **Fritzi Grevstad** (fritzi.grevstad@science.oregonstate.edu)¹, Tyson Wepprich¹, Leonard Coop¹ and Dan Bean², ¹Oregon State Univ., Corvallis, OR, ²Colorado Dept. of Agriculture, Palisade, CO

10:45 **0104** Rapid evolution of photoperiod cues across a latitudinal gradient allows expansion from two generations per season to six in the biocontrol agent *Diorhabda carinulata*. **Dan Bean** (dan.bean@state.co.us)¹, Tyson Wepprich², Fritzi Grevstad², Tom Dudley³ and Leonard Coop², ¹Colorado Dept. of Agriculture, Palisade, CO, ²Oregon State Univ., Corvallis, OR, ³Univ. of California, Santa Barbara, CA

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0105** Evolutionary dynamics along pushed expansion fronts. **Elodie Vercken** (elodie.vercken@inra.fr)¹, Aline Bertin¹, Eric Lombaert¹, Vincent Calcagno¹ and Ludovic Mailleret^{1,2}, ¹INRA, Sophia Antipolis, France, ²INRIA, Sophia Antipolis, France

11:17 **0106** Contrasting rapid evolutionary processes in a classical weed biological control system. **Marianna Szücs** (szucsma@msu.edu)^{1,2}, Urs Schnaffer³, Brittany Teller⁴, Jeffrey L. Littlefield⁵ and Ruth Hufbauer², ¹Michigan State Univ., East Lansing, MI, ²Colorado State Univ., Fort Collins, CO, ³Centre for Agriculture and Biosciences International, Delémont, Switzerland, ⁴Pennsylvania State Univ., University Park, PA, ⁵Montana State Univ., Bozeman, MT

11:32 **0107** Characterizing hybridization in the tamarisk leaf beetle. **Elynn Bitume** (elynn.bitume@ars.usda.gov)¹, Amanda Stahlke², Dan Bean³, Patrick Moran¹, Paul Hohenloe² and Ruth Hufbauer⁴, ¹USDA - ARS, Albany, CA, ²Univ. of Idaho, Moscow, ID, ³Colorado Dept. of Agriculture, Palisade, CO, ⁴Colorado State Univ., Fort Collins, CO

11:47 Discussion

Organized Meeting: Current Advances in Acarology

Meeting Room 114/115 (Convention Centre)

Moderators and Organizers: Daniel Carrillo¹ and Ronald Ochoa², ¹Univ. of Florida, Homestead, FL, ²USDA - ARS, Beltsville, MD

8:00 **0108** A survey of soil mite diversity in a Madrean pine-oak woodland in southeast Sonora, México. **Sofía González Salazar** (sofia_gs@hotmail.es)¹ and Jay Taylor², ¹Univ. de Sonora, Hermosillo, Mexico, ²Arizona State Univ., Tempe, AZ

8:15 **0109** Companion plants and *Amblyseius swirskii* for biological control in zucchini squash in Florida. **Lorena Lopez** (lorelopezq.257@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

8:30 **0110** A new interpretation of the functional morphology of *Uroactinia* sp. (Uropodina: Uroactinidae) based on advanced microscopic techniques. **Orlando Combata-Heredia** (combataheredia.1@buckeyemail.osu.edu) and Hans Klompen, The Ohio State Univ., Columbus, OH

8:45 **0111** *Varroa*: A paradigm shift on what and where they feed. **Samuel Ramsey** (insectious@gmail.com)¹, Gary R. Bauchan², Connor Gulbranson², Joseph Mowery², Dennis vanEngelsdorp¹ and Ronald Ochoa², ¹Univ. of Maryland, College Park, MD, ²USDA - ARS, Beltsville, MD

9:00 **0112** The effect of entomopathogenic fungus *Beauveria bassiana* on behaviour of 3 species of predatory mites *Amblyseius swirskii*, *Neoseiulus cucumeris* and *Stratiolaelaps scimitus*. **Gongyu Lin** (gongyu.biocontrol@gmail.com)¹, Sean-

Anthony Paolo¹, Gary R. Bauchan², Ronald Ochoa², Silvia Todorova³ and Jacques Brodeur¹, ¹Univ. de Montréal, Montréal, QC, Canada, ²USDA - ARS, Beltsville, MD, ³Anatis Bioprotection, Inc., Saint-Jacques-le-Mineur, QC, Canada

9:15 **0113** Phylogenetic relationships within the genus *Brevipalpus* using molecular data. **Alejandra Fuentes** (alejandra.fuentes01@utrgv.edu)¹, Ronald Ochoa², Jenny Beard³, Gabriel Otero-Colina⁴, Gary R. Bauchan² and W. Braswell⁵, ¹Univ. of Texas, Edinburg, TX, ²USDA - ARS, Beltsville, MD, ³Queensland Museum, South Brisbane, Australia, ⁴Colegio de Postgraduados, Montecillo, Mexico, ⁵USDA - ARS, Edinburg, TX

SD0114 Phoretic association of *Brevipalpus* mites with *Anastrepha ludens* (MFF). **Kusy Zorzosa** (kusy.zorzosa01@utrgv.edu)¹, Alejandra Fuentes¹, W. Braswell² and Alexis Racelis¹, ¹Univ. of Texas, Edinburg, TX, ²USDA - ARS, Edinburg, TX

9:30 Break and poster session

9:45 **0115** Detection of the lychee erionose mite, *Aceria litchii* (Keifer) (Acari: Eriophyidae) in Florida, USA. **Daniel Carrillo** (dancar@ufl.edu)¹, Alexandra Revynthi², Luisa Cruz¹, Gary R. Bauchan³, Ronald Ochoa³, Amy L. Roda⁴, Rita E. Duncan¹ and Samuel Bolton⁵, ¹Univ. of Florida, Homestead, FL, ²Univ. of Amsterdam, Amsterdam, Netherlands, ³USDA - ARS, Beltsville, MD, ⁴USDA - APHIS, Miami, FL, ⁵Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

10:00 **0116** The role of colony social form on mite diversity associated with the red imported fire ant. **Kaitlin U. Campbell** (uppstrka@miamioh.edu) and Lisa Kelly, Univ. of North Carolina, Pembroke, NC

10:15 **0117** Lindquist et al. 1979 revisited: Knowledge status and taxonomic gaps on the acarine diversity in Canada. Fred Beaulieu¹, **Wayne Knee** (kneew@agr.gc.ca)¹, Victoria Nowell¹, Marla Schwarzfeld¹, Zoë Lindo², Valerie Behan-Pelletier¹, Lisa Lumley³, Monica Young⁴, Ian Smith¹, Heather C. Proctor⁵, Sergey Mironov⁶, Terry Galloway⁷, David E. Walter³ and Evert E. Lindquist¹, ¹Agriculture and Agri-Food Canada, Ottawa, ON, Canada, ²Western Univ., London, ON, Canada, ³Royal Alberta Museum, Edmonton, AB, Canada, ⁴Univ. of Guelph, Guelph, ON, Canada, ⁵Univ. of Alberta, Edmonton, AB, Canada, ⁶Russian Academy of Sciences, Saint Petersburg, Russian Federation, ⁷Univ. of Manitoba, Winnipeg, MB, Canada

10:30 **0118** Revision of the genus *Raoiella* (Acariformes: Tenuipalpidae). **Jenny Beard** (jenny.beard@qm.qld.gov.au)¹, Ronald Ochoa², Gary R. Bauchan², Chris Pooley² and Ashley P. G. Dowling³, ¹Queensland Museum, South Brisbane, Australia, ²USDA - ARS, Beltsville, MD, ³Univ. of Arkansas, Fayetteville, AR

10:45 **0119** *Metatarsonemus* (Acariformes: Tarsonemidae): A paradox genus. André Silva Guimarães Sousa¹, Jose Rezende², Antonio Lofego³, Anibal Oliveira⁴, Gary R. Bauchan⁵, Connor Gulbranson⁵ and **Ronald Ochoa** (ron.ochoa@ars.usda.gov)⁵, ¹Univ. Estadual de Santa Cruz, Ilhéus, Brazil, ²Univ. Estadual Paulista, São Paulo, Brazil, ³Univ. Estadual Paulista, São José do Rio Preto, Brazil, ⁴Univ. Estadual de Santa Cruz, Santa Cruz, Brazil, ⁵USDA - ARS, Beltsville, MD

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0120** Confocal microscopy and 3D models of mites (Acariformes-Parasitiformes). **Connor J. Gulbranson** (connor.gulbranson@ars.usda.gov), Joseph Mowery, Chris Pooley, Ronald Ochoa and Gary R. Bauchan, USDA - ARS, Beltsville, MD

11:17 **0121** What's the deal with *Micruracarus*? An investigation of the phylogenetic history of North American water mites in the genus *Arrenurus* (Subgenus: *Micruracarus*). **Rachel Shoop** (r.k.shoop@gmail.com)¹, Bruce Smith¹, Shahan Derkarabetian², Marshal Hedin¹ and Andrew J. Bohonak¹, ¹San Diego State Univ., San Diego, CA, ²Harvard Univ., Cambridge, MA

11:32 **0122** Phytosanitary irradiation and rearing of *Brevipalpus yothersi*. **Scott W. Weihman** (scott.w.weihman@aphis.usda.gov), Andrea Beam and Woodward Bailey, USDA - APHIS, Miami, FL

11:47 **SP0123** What makes *Tetranychus evansi* populations invasive? **Maria Navajas** (maria.navajas@inra.fr), INRA, Montferrier Sur Lez, France

11:57 **SP0124** Investigating the phylogenetic relationships and population genetic structure among US populations of *Dermacentor variabilis* using a NGS approach. **Paula Lado** (ladohenaise.1@osu.edu) and Hans Klompen, The Ohio State Univ., Columbus, OH

Undergraduate Student 3-min: All Sections

Meeting Room 201 (Convention Centre)

Moderators: Chris MacQuarrie¹ and Cheryle O'Donnell², ¹Natural Resources Canada, Sault Ste. Marie, ON, Canada, ²USDA - APHIS, Beltsville, MD

Due to the rapid speed of delivery, specific times are not listed for individual talks in this section. Each talk will be limited to a total of 3 minutes; talks will be given in sequential order as listed below starting at 8:00 AM with no pauses for no-show presenters.

8:00 AM – 8:10 AM

0125 Impacts of environmental stress on pheromone communication. **Emma Jensen** (133522j@acadiau.ca), Acadia Univ., Wolfville, NS, Canada

0126 How plastic mulch influences photoperiod and emergence patterns of swede midge, *Contarinia nasturtii* (Diptera: Cecidomyiidae), an invasive insect pest of *Brassicacae*. **Emma Schoeppner** (eschoepp@uvm.edu) and Yolanda Chen, Univ. of Vermont, Burlington, VT

0127 The curious case of the Hessian fly—my experiences of working with wheat-Hessian fly interaction. **Daria Brown** (dbrown69@broncos.uncfsu.edu) and Jordan O'Neal, Fayetteville State Univ., Fayetteville, NC

Graduate Student 3-min: All Sections, Session 1

Meeting Room 201 (Convention Centre)

Moderators: Chris MacQuarrie¹ and Cheryle O'Donnell², ¹Natural Resources Canada, Sault Ste. Marie, ON, Canada, ²USDA - APHIS, Beltsville, MD

Due to the rapid speed of delivery, specific times are not listed for individual talks in this section. Each talk will be limited to a total of 3 minutes; talks will be given in sequential order as listed below starting at 8:20 AM with no pauses for no-show presenters.

8:20 AM – 9:20 AM

0128 Fight the Bite: An elementary school education campaign to combat container-mosquitoes. **Casey Parker** (caseyparker@ufl.edu)¹, C. Roxanne Connelly², Sebastian Galindo³ and Anthony Andenoro³, ¹Univ. of Florida, Vero Beach, FL, ²Centers for Disease Control and Prevention, Fort Collins, CO, ³Univ. of Florida, Gainesville, FL

0129 Understanding complex larval habitats and the microbiome in *Aedes albopictus*. **Amanda Tokash-Peters** (amanda.peters001@umb.edu), Univ. of Massachusetts, Boston, MA

0130 Sequence analysis of mitochondrial COI gene fragment from Culicinae mosquito species. **Navneet Rai** (knavneet207@gmail.com), Devinder Sidhu and Navpreet Gill, Punjabi Univ., Patiala, India

0131 Low knock down resistance (*kdr*) frequency in *Anopheles gambiae* s.s. and no *kdr* allele in *Culex pipien quinquefasciatus* resistant to DDT and deltamethrin in Kosofe, Lagos State. **Ifeoluwa Fagbohun** (fagbohunife@gmail.com)¹, Emmanuel Idowu¹, Olubunmi Otubanjo¹, Taiwo Awolola² and Tolulope Oyeniyi³, ¹Univ. of Lagos, Lagos, Nigeria, ²The Nigerian Institute of Medical Research, Lagos, Nigeria, ³Nigeria Institute of Medical Research, Lagos, Nigeria

0132 Regional variation in life history traits of Brazilian *Nyssorhynchus darlingi* in response to temperature. **Virginia Chu** (virgchu@gmail.com), Wadsworth Center, Slingerlands, NY

0133 Single-unit recording of sensilla within the Haller's organ of *Ixodes scapularis*. **Tanya Josek** (tanyajosek@gmail.com)¹, Zainulabeuddin Syed² and Marianne Alleyne¹, ¹Univ. of Illinois, Champaign, IL, ²Univ. of Kentucky, Lexington, KY

0134 *Diatraea saccharalis* (Lepidoptera: Crambidae) larvae exposed to a non-lethal concentration of *Bacillus thuringiensis* Berliner are immune activated but still susceptible to the parasitoid *Cotesia flavipes* (Hymenoptera: Braconidae). **Ciro Pedro Pinto** (cpedroea@gmail.com), Emiliano Azevedo, Camila Cardoso, Fabricio Fernandes, Ana Letícia dos Santos, Guilherme Rossi and Ricardo Antônio Polanczyk, Univ. Estadual Paulista, Jaboticabal, Brazil

0135 Experimental in-field assay of host choice: Testing the specificity of *Philornis downsi* parasitoids in mainland Ecuador using a pairing field technique. **Ismael Ramirez** (ramir238@umn.edu)¹, Martin Quiroga², Charlotte Causton³ and George Heimpel¹, ¹Univ. of Minnesota, St. Paul, MN, ²Univ. Nacional del Litoral, Esperanza, Argentina, ³Charles Darwin Foundation for the Galapagos Islands, Galapagos Islands, Ecuador

0136 Observations of the behavior of a new hymenopteran parasitoid and its bark beetle host. **David Honsberger** (dnh8@hawaii.edu), Univ. of Hawai'i, Honolulu, HI

0137 Spatio-temporal dynamics of native insect pollinator communities in sagebrush-steppe. **Ashley Rohde** (a.t.rohde@hotmail.com), US Geological Survey, Boise, ID; USDA - ARS, Logan, UT

0138 Passive and active restoration effects on plant-pollinator-*Misumena vatia* interactions. **Lindsey Kemmerling** (kemmerl4@msu.edu)^{1,2}, Sean Griffin¹ and Nick Haddad¹, ¹Michigan State Univ., Hickory Corners, MI, ²North Carolina State Univ., Raleigh, NC

0139 Pollination ecology and morphology of Venus flytrap in sites of varying time since last fire. **Laura Hamon** (lehamon@ncsu.edu), Elsa Youngsteadt, Rebecca E. Irwin and Clyde E. Sorenson, North Carolina State Univ., Raleigh, NC

0140 *Wolbachia* skews social and life history traits and reproductive investment in pharaoh ants. **Rohini Singh** (srohini@sas.upenn.edu) and Timothy A. Linksvayer, Univ. of Pennsylvania, Philadelphia, PA

0141 Evaluation of non-pesticide baits for the management of ants (Formicidae) in household. **Aysha Zahid** (aysha.zahid001@gmail.com), Sohail Ahmed, Abdul Mateen and Muhammad Jalal Arif, Univ. of Agriculture, Faisalabad, Pakistan

0142 Cellular immune responses in the worker larvae and pupae of the Asian weaver ant, *Oecophylla smaragdina* (Fabricius, 1775). **Sheeja C. C.** (sheejacc@cukerala.ac.in) and Divya Lekha, Central Univ. of Kerala, Kasargod, India

0143 Oscillators of gyne emergence: An agent based model of reproductive behavior for ant colonies. **Kit Martin** (kitmartin@u.northwestern.edu)¹ and Corrie Moreau², ¹Northwestern Univ., Evanston, IL, ²Field Museum of Natural History, Chicago, IL

0144 An examination of viral transmission among social bees in different landscapes. **Tugce Karacoban** (vetkaracoban@gmail.com), Univ. of Nebraska, Lincoln, NE

0145 Islands in the desert for cavity-nesting bees and wasps: Ecology, diversity, and conservation at oases of Baja California peninsula. **Armando Falcón-Brindis** (abrindis@pg.cibnor.mx), Ricardo Rodríguez and María Jiménez, Centro de Investigaciones Biológicas del Noroeste, La Paz, Mexico

0146 Colony growth and wood consumption rates of incipient colonies of two invasive *Coptotermes* species and their hybrids. **Jayshree Patel** (jayshree.patel@ufl.edu), Thomas Chouvenec and Nan-Yao Su, Univ. of Florida, Davie, FL

0147 CO₂ induced changes in plant-insect interactions. **Kyu Ha** (mdrhyh207@hotmail.com) and Juli Carrillo, The Univ. of British Columbia, Vancouver, BC, Canada

Graduate Student 3-min: All Sections, Session 2

Meeting Room 201 (Convention Centre)

Moderators: Chris MacQuarrie¹ and Cheryle O'Donnell², ¹Natural Resources Canada, Sault Ste. Marie, ON, Canada, ²USDA - APHIS, Beltsville, MD

Due to the rapid speed of delivery, specific times are not listed for individual talks in this section. Each talk will be limited to a total of 3 minutes; talks will be given in sequential order as listed below starting at 9:30 AM with no pauses for no-show presenters.

9:30 AM – 10:25 AM

0148 Attractiveness of food baits to the melon fruit fly, *Bactrocera cucurbitae* (Coquillett) (Diptera: Tephritidae). **Mubashar Iqbal** (mubashariqbal2635@gmail.com), Univ. of Agriculture, Faisalabad, Pakistan

0149 House flies: Manure, microbes, and melons! **Jessica Thomson** (jessiel@ksu.edu)¹, Ludek Zurek¹ and Dana Nayduch², ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS

0150 Evaluation of SPLAT for managing spotted-wing drosophila, *Drosophila suzukii* (Matsumura), in blueberries. **Gabrielle LaTora** (ag.latora@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

0151 Improved monitoring of pepper weevil (*Anthonomus eugenii*) using semiochemicals. **Cassandra Russell** (rcassie@uoguelph.ca)¹, Roselyne Labbé² and Rebecca Hallett¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Agriculture and Agri-Food Canada, Harrow, ON, Canada

0152 Developing consumer safe pest management methods using entomopathogens on soybeans. **Jocelyn Simmons** (jasimmons@umes.edu), Ebony Jenkins and Simon Zebelo, Univ. of Maryland, Princess Anne, MD

0153 Conspecific induced resistance in rice, *Oryza sativa*. **Emily Kraus** (ekraus@agcenter.lsu.edu) and Mike Stout, Louisiana State Univ., Baton Rouge, LA

0154 Facilitating large-scale bio-surveillance in a changing world: Monitoring urban trees with street view imagery and deep neural networks. **Stefanie Lumnitz** (stefanie.lumnitz@ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

0155 Do soldier beetles (*Chauliognathus* spp.) have a role in the battle against agricultural pests? **Katlyn Catron** (kcatron@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

0156 Population dynamics of natural enemies attacking aphids using open wheat field survey. Misbah Perven, Mateen Nawaz, Bushra Ramzan, Ishrat Faiz, **Abid Ali** (abid_ento74@yahoo.com), Shahid Majeed, Muhammad Gogi and Muhammad Arshad, Univ. of Agriculture, Faisalabad, Pakistan

0157 Examining the transcriptional effects of prolonged bat-call exposure in the brain of the fall armyworm moth (*Spodoptera frugiperda*). **Scott Cinel** (cinel1@ufl.edu) and Akito Kawahara, Univ. of Florida, Gainesville, FL

0158 Male antenna morphology and its effect on scramble competition in false garden mantids. **Anuradhi Jayaweera** (anu.jayaweera@mq.edu.au) and Katherine L. Barry, Macquarie Univ., Sydney, Australia

0159 Host-associated microbiomes of cicadas. **Diler Haji** (diler3.dh@gmail.com), Univ. of Connecticut, Storrs, CT

0160 Integrating species-specific genetic traits into predictions of forest invasive species distributions under changing climate. **Vivek Srivastava** (vivek.srivastava@ubc.ca)¹, Serge Fenet² and Verena Griess¹, ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Univ. of Lyon, Villeurbanne Cedex, France

0161 Breathing new life into Quaternary insect collections: How recent methodological advances enable more diverse studies for paleontologists and neontologists. **Anna Holden** (aholden@amnh.org), American Museum of Natural History, Los Angeles, CA

0162 Molecular phylogeny of sea-skaters (*Halobates* Eschscholtz, 1822), relationship between Halobatini and Metrocorini, and a catalogue of the subfamily Halobatinae (Hemiptera: Heteroptera: Gerridae). **Cristian Roman Palacios** (cromanpa94@email.arizona.edu), Univ. of Arizona, Tucson, AZ

0163 What bluebirds eat: Examining insect prey preferences of the eastern bluebird (*Sialia sialis*). **Ashley Kennedy** (kennedy@udel.edu), Univ. of Delaware, Wilmington, DE

Grad 10-min: MUVE, Biting Arthropods

Meeting Room 215/216 (Convention Centre)

Moderators: Alvaro Romero, New Mexico State Univ., Las Cruces, NM

8:00 **0164** Optimizing the off-host production of cat fleas, *Ctenocephalides felis*, using a membrane-based feeding system. **Brittany Blakely** (brittanyb@nmsu.edu) and Alvaro Romero, New Mexico State Univ., Las Cruces, NM

8:10 **0165** A comparative evaluation of questing height between populations of *Ixodes scapularis* in the northern and southern United States. **Mackenzie Tietjen** (kenzietietjen@tamu.edu)¹, Maria Esteve-Gassent¹, Andrew Li² and Raul F. Medina¹, ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, Beltsville, MD

8:20 **0166** Patterns and mechanisms of Lyme disease exposure risk in Acadia National Park. **Sara McBride** (sara.mcbride1@maine.edu) and Allison Gardner, Univ. of Maine, Orono, ME

8:30 **0167** Gut bacterial community of the lone star tick (*Amblyomma americanum*). **Paulina Maldonado-Ruiz** (pdmaldonado@ksu.edu), Yoonseong Park and Ludek Zurek, Kansas State Univ., Manhattan, KS

8:40 **0168** Evaluating factors influencing *Dermacentor* tick density in eastern Washington. **Justin Donahue** (jdonahue7193@gmail.com) and Krisztian Magori, Eastern Washington Univ., Cheney, WA

8:50 **0169** The response of the bed bug (*Cimex lectularius*) to temperature using a track-sphere device. **Raymond Berry III** (rayberry@nmsu.edu), John Agnew and Alvaro Romero, New Mexico State Univ., Las Cruces, NM

9:00 **0170** Behavior meets physiology: How bed bugs respond to lethal heat exposure. **Aaron Ashbrook** (aashbroo@purdue.edu), Michael Scharf, Gary Bennett and Ameya Gondhalekar, Purdue Univ., West Lafayette, IN

9:10 **0171** Molecular barcoding and niche modeling analysis of horse flies in the southeastern United States. **Travis Davis** (tdavi113@vols.utk.edu), Univ. of Tennessee, Knoxville, TN

9:20 **0172** Differential expression of chemosensory genes in the proboscis of the sibling species *Anopheles (An.) coluzzii* and *An. quadriannulatus*. **Zachary Popkin-Hall** (zpopkinh@tamu.edu) and Michel A. Slotman, Texas A&M Univ., College Station, TX

9:30 **0173** Influence of larval nutrients on adult stoichiometry and vector competence for Zika virus in the mosquito species *Aedes aegypti*. **Catherine Dean** (catherine.dean@usm.edu)¹, Andrew Paige², Shawna Bellamy², Donald Yee¹ and Barry Alto², ¹The Univ. of Southern Mississippi, Hattiesburg, MS, ²Univ. of Florida, Vero Beach, FL

9:40 **0174** The effect of larval diets and temperature regimes on mass production and performance of sterile male *Aedes aegypti* (Diptera: Culicidae). **Hadian Iman Sasmita** (sasmitahadian6@gmail.com)^{1,2}, Kok-Boon Neoh¹ and Wu-Chun Tu¹, ¹National Chung Hsing Univ., Taichung, Taiwan, ²National Nuclear Energy Agency, Jakarta, Indonesia

9:50 **0175** Inward rectifier potassium (Kir) channels are critical for salivary gland function and blood feeding of the lone star tick, *Amblyomma americanum*. **Zhilin Li** (zhilin.li@agcenter.lsu.edu) and Daniel Swale, Louisiana State Univ., Baton Rouge, LA

Grad 10-min: PBT, Vector Biology

Meeting Room 210 (Convention Centre)

Moderator: Carl Lowenberger, Simon Fraser Univ., Burnaby, BC, Canada

8:00 **0176** Reproductive defects of microbe-free *Aedes aegypti* mosquitoes. **Ruby Harrison** (reh21923@uga.edu), Mark Brown and Michael Strand, Univ. of Georgia, Athens, GA

8:10 **0177** The effect of high environmental ammonia on ammonia transporter expression and function in the osmoregulatory organs of *Aedes aegypti* larvae. **Andrea Durant** (adurant@yorku.ca) and Andrew Donini, York Univ., Toronto, ON, Canada

8:20 **0178** Do anoxia pre-treatments improve sterile male performance after irradiation in *Aedes aegypti*? **Dylan Tussey** (dtussey@ufl.edu)¹, Robert Aldridge², Kenneth J. Linthicum² and Dan Hahn¹, ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Gainesville, FL

8:30 **0179** Creation of visually-impaired mutants using CRISPR-Cas9 in the yellow fever mosquito *Aedes aegypti*. **Andrew Guinness** (aguinnes@nd.edu), Joseph Tang, Ryan Engert, Kaitlyn Dawson, Michelle Whaley and Joseph O'Tousa, Univ. of Notre Dame, South Bend, IN

8:40 **0180** Circadian regulation of olfactory behavior in *Aedes aegypti* mosquitoes. **Diane Eilerts** (deilerts@vt.edu), Elizabeth Bose, Morgen VanderGiessen, Kyera Broxton and Clement Vinauger, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

8:50 **0181** Complement-like proteins (TEPs) are involved in the periostial hemocyte aggregation response of the mosquito *Anopheles gambiae*. **Yan Yan** (yan.yan@vanderbilt.edu) and Julian F. Hillyer, Vanderbilt Univ., Nashville, TN

9:00 **0182** Evaluation of Aib and PEG-polymer insect kinin analogs on mosquito and tick GPCRs identifies potent new pest management tools with enhanced biostability and bioavailability. **Caixing Xiong** (xiongcaixing@tamu.edu)¹, Krzysztof Kaczmarek², Janusz Kaczmarek², Patricia Pietrantonio¹ and Ronald Nachman³, ¹Texas A&M Univ., College Station, TX, ²Lodz Univ. of Technology, Lodz, Poland, ³USDA - ARS, College Station, TX

9:10 **0183** Determination of tick repellency by monoterpenoids and their parent oils. **Colin Wong** (cwong1@iastate.edu), Jacob Johnson, Kylie Crystal, Mark Sutija, Richard Martin and Joel R. Coats, Iowa State Univ., Ames, IA

9:20 **0184** The IMD-pathway controls antimicrobial-peptide expression in the fat body of *Rhodnius prolixus*. **Nicolas Salcedo-Porras** (nsalcedo@sfu.ca)¹, Pedro Oliveira², Alessandra Guarneri³ and Carl Lowenberger¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Univ. Federal do Rio de Janeiro, Rio de Janeiro, Brazil, ³Fundação Oswaldo Cruz, Belo Horizonte, Brazil

9:30 **0185** Nutritional effects on host defence induced by *Serratia marcescens* in *Batrocera tryoni*. **Hue Dinh** (thi-thanh-hue.dinh@hdr.mq.edu.au), Macquarie Univ., Sydney, Australia

9:40 **0186** Structural components and infection in *Microplitis demolitor* bracovirus virions. **Michael Arvin** (michaelarvin.nl@gmail.com), Michael Strand and Gaelen Burke, Univ. of Georgia, Athens, GA

9:50 **0187** The control region of begomoviruses determines its replication in insect vectors. **Yu-Meng Wang** (wangyumeng1121@126.com), Ya-Zhou He, Wen-Ze He, Shu-Sheng Liu and Xiao-Wei Wang, Zhejiang Univ., Hangzhou, China

Grad 10-min: P-IE, Biocontrol, Predators

Meeting Room 202 (Convention Centre)

Moderators: Nicholas Larson¹ and Oscar Liburd², ¹USDA - ARS, Beltsville, MD, ²Univ. of Florida, Gainesville, FL

8:00 **0188** Impact assessment of predatory beetle, *Laricobius nigrinus* (Coleoptera: Derodontidae), on hemlock woolly adelgid (Hemiptera: Adelgidae) in the eastern U.S. **Carrie S. Jubb** (cjubb@vt.edu)¹, Albert Mayfield², Gregory J. Wiggins³, Jerome F. Grant³, Joseph Elkinton⁴, Thomas McAvoy¹, Jeffrey Lombardo⁵, Bryan Mudder² and Scott Salom¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²USDA - Forest Service, Asheville, NC, ³Univ. of Tennessee, Knoxville, TN, ⁴Univ. of Massachusetts, Amherst, MA, ⁵Utica College, Utica, NY

8:10 **0189** Cold hardiness of *Calophya latiforceps* and *Calophya terebinthifolii* adults, potential biological control agents of Brazilian peppertree. **Patricia Prade** (prade@ufl.edu)¹, Emily Gaskin¹, Carey Minter¹ and James Cuda², ¹Univ. of Florida, Fort Pierce, FL, ²Univ. of Florida, Gainesville, FL

8:20 **0190** The significance of natural predators and sterile insect technique (SIT) on Queensland fruit fly pest control. **Darshana Rathnayake** (darshana.rathnayake@mq.edu.au), Elizabeth Lowe, Polychronis Rempoulakis and Marie Herberstein, Macquarie Univ., Sydney, Australia

8:30 **0191** Spatial partitioning of natural enemies of kudzu bugs (Hemiptera: Plataspidae) in soybean. **Anthony Greene** (adg2@clermson.edu)¹, Francis Reay-Jones², Brandon Peoples³ and Jeremy Greene¹, ¹Clemson Univ., Blackville, SC, ²Clemson Univ., Florence, SC, ³Clemson Univ., Clemson, SC

8:40 **0192** Efficacy of two predatory mites (*Neoseiulus fallacis* and *Phytoseiulus persimilis*) in controlling two-spotted spider mite (*Tetranychus urticae*) on strawberry grown under low tunnels in New York. **Samantha Willden** (saw326@cornell.edu) and Gregory Loeb, Cornell Univ., Geneva, NY

8:50 **0193** Are generalist predators important mortality factors for the cereal leaf beetle, *Oulema melanopus* (L.) (Coleoptera: Chrysomelidae)? Field, laboratory, and molecular evidence. **Arash Kheirodin** (kheiroda@myumanitoba.ca)¹, Héctor Cárcamo², Barbara Sharanowski³ and Alejandro Costamagna¹, ¹Univ. of Manitoba, Winnipeg, MB, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ³Univ. of Central Florida, Orlando, FL

9:00 **0194** The use of cultural and biological control strategies for management of key pests in organic squash. **Marice Lopez** (mlopez90@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

9:10 **0195** Can we predict the range of a prospective biological control agent of weeds in a novel environment using demographic modelling? **Benno Augustinus** (b.augustinus@cabi.org)^{1,2}, Damie Pak³, Yan Sun¹, Sandra Citterio⁴, Rodolfo Gentili⁴, Ottar Bjornstad³, Heinz Müller-Schärer¹ and Urs Schaffner², ¹Univ. of Fribourg, Fribourg, Switzerland, ²CABI, Delémont, Switzerland, ³Pennsylvania State Univ., University Park, PA, ⁴Univ. Milano-Bicocca, Milano, Italy

9:20 **0196** A historical analysis and assessment of the mass rearing of *Laricobius* spp. (Coleoptera: Derodontidae), biological control agents for hemlock woolly adelgid (Hemiptera: Adelgidae). **Jeremiah Foley** (folejr@vt.edu), Carrie S. Jubb and Scott Salom, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:30 **0197** Role of entomopathogenic nematodes for the management of wireworms (Coleoptera: Elateridae). **Ramandeep Sandhi** (ramandeepkaurandhi@montana.edu) and Gadi V. P. Reddy, Montana State Univ., Conrad, MT

9:40 **0198** Determining miticide selectivity to reduce biological control disruption in strawberry. **Paul Bergeron** (peberge@g.clemson.edu)¹ and Rebecca Schmidt-Jeffris², ¹Clemson Univ., Clemson, SC, ²Clemson Univ., Charleston, SC

9:50 **0199** Biological control of sugarcane aphid, *Melanaphis sacchari*, using buckwheat and methyl salicylate. **Nathan Mercer** (nhmercer13@gmail.com), Ric Bessin and John Obrycki, Univ. of Kentucky, Lexington, KY

Grad 10-min: P-IE, Chemical Ecology

Meeting Room 208/209 (Convention Centre)

Moderators: Betsy Beers¹ and Hailey Shanovich², ¹Washington State Univ., Wenatchee, WA, ²Univ. of Minnesota, St. Paul, MN

8:00 **0200** Identifying attractive cranberry volatile chemicals for cranberry fruitworm (*Acrobasis vaccinii*) and sparganothis fruitworm (*Sparganothis sulfureana*). **Bonnie Ohler** (bjoehler@wisc.edu) and Christelle Guédot, Univ. of Wisconsin, Madison, WI

8:10 **0201** Understanding individual variance in context: A comparison of reared and wild-caught *Heliconius* butterfly chemical profiles. **Colin Morrison** (crmorrison@utexas.edu)^{1,2} and W. O. McMillan², ¹Univ. of Texas, Austin, TX, ²Smithsonian Tropical Research Institute, Gamboa, Panama

8:20 **0202** Come together (over me): Aggregation pheromones and floral volatiles in striped cucumber beetle mass trapping. **Christie Shee** (cshee@purdue.edu)¹, Hui Zhu², Zsofia Szendrei³ and Ian Kaplan¹, ¹Purdue Univ., West Lafayette, IN, ²Northeast Normal Univ., Changchun, China, ³Michigan State Univ., East Lansing, MI

8:30 **0203** Identification and comparison of chemosensory genes in the antennal transcriptome of *Eucryptorrhynchus scrobiculatus* and *E. brandti* fed on *Ailanthus altissima*. **Xiaojuan Wen** (wenxj1016@126.com), Qian Wang, Peng Gao and Junbao Wen, Beijing Forestry Univ., Beijing, China

8:40 **0204** Fungal alcohols modify the attraction of *Pityophthorus juglandis*, the primary vector of thousand cankers disease, to pheromone-baited traps. **Matthew W. Ethington** (methingt@purdue.edu) and Matthew Ginzel, Purdue Univ., West Lafayette, IN

8:50 **0205** Evaluation and improvement of trapping for the invasive beech leaf mining weevil, *Orchestes fagi* (L.), in Nova Scotia, Canada. **Joel Goodwin** (joelgoodwin@acadiau.ca)¹, Simon Pawlowski¹, Peter Mayo², Peter Silk², Jon Sweeney² and Kirk Hillier¹, ¹Acadia Univ., Wolfville, NS, Canada, ²Natural Resources Canada, Fredericton, NB, Canada

9:00 **0206** Can volatile emissions and herbivore host-plant selection be affected by fungal spores on cotton seed? **Cody Gale** (ccg2809@gmail.com)¹, Charles Suh², Zoey Kramer¹, Christine Madamba¹, Michael Kolomiets¹ and Gregory Sword¹, ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, College Station, TX

9:10 **0207** Herbivorous caterpillars have evolved three effectors to alter green leaf volatile emission. **Anne Jones** (acj152@psu.edu)¹, Irmgard Seidl-Adams¹, Jürgen Engelberth² and James Tumlinson¹, ¹Pennsylvania State Univ., University Park, PA, ²Univ. of Texas, San Antonio, TX

9:20 **0208** *exo-brevicomin* as a synergist for southern pine beetle pheromone in southeastern United States. **Holly L. Munro** (hmunro@uga.edu)¹, Brian T. Sullivan², Brittany F. Barnes¹, Cristian Montes¹, John T. Nowak³, Caterina Villari¹ and Kamal J. K. Gandhi¹, ¹Univ. of Georgia, Athens, GA, ²USDA - Forest Service, Pineville, LA, ³USDA - Forest Service, Asheville, NC

9:30 **0209** Ecological fitting of emerald ash borer to novel hosts: Host plant chemistry, adult preference, and volatile attraction. **Donnie L. Peterson** (peterson.143@wright.edu)¹, James Tumlinson², Katalin Böröczky³ and Don Cipollini¹, ¹Wright State Univ., Dayton, OH, ²Pennsylvania State Univ., University Park, PA, ³Cornell Univ., Ithaca, NY

9:40 **0210** Nerolidol-mediated rendezvous of dynastid beetles in long melon flowers. **Arodi Favaris** (arodi@usp.br)¹, Amanda Túler¹, Weliton Silva¹, Walter Leaf² and José Mauricio Bento¹, ¹Univ. de São Paulo, Piracicaba, Brazil, ²Univ. of California, Davis, CA

9:50 **0211** The effect of clubroot disease infection on bertha armyworm, *Mamestra configurata* Walker (Lepidoptera: Noctuidae) on canola. **Chaminda De Silva Weeraddana** (weeradda@ualberta.ca), Victor Manolii, Stephen Strelkov and Maya Evenden, Univ. of Alberta, Edmonton, AB, Canada

Grad 10-min: P-IE, Ecology

Meeting Room 205 (Convention Centre)

Moderators: Michael Culy¹ and Sanford D. Eigenbrode², ¹Sipcam Agro USA, Inc., Carmel, IN, ²Univ. of Idaho, Moscow, ID8:00 **0212** Contrasting effects of daytime and nighttime warming: A case study with lady beetles. **Cori Speights** (cjs815@msstate.edu), Angus Catchot and Brandon Barton, Mississippi State Univ., Mississippi State, MS8:10 **0213** Influence of urban soil legacies on tomato plant growth and herbivore performance: Implications for urban agroecosystem sustainability. **Emily Trejo Sybolt** (trejosypolt.1@osu.edu)¹, Larry Phelan² and Mary Gardiner¹, ¹The Ohio State Univ., Columbus, OH, ²The Ohio State Univ., Wooster, OH8:20 **0214** Effects of organic reduced-tillage cropping systems on epigeal arthropods. **Karly Regan** (kjr5470@psu.edu), Christina Mullen and Mary Barbercheck, Pennsylvania State Univ., University Park, PA8:30 **0215** Arthropod community composition in current and projected agricultural systems in the inland Pacific Northwest. **Jessica Kalin** (kali0912@vandals.uidaho.edu) and Sanford D. Eigenbrode, Univ. of Idaho, Moscow, ID8:40 **0216** The responses of new emerged adult of *Cnaphalocrocis medinalis* (Lepidoptera: Pyralidae) to lack of nectariferous plants. **Jiawen Guo** (2016202022@njau.edu.cn) and Baoping Zhai, Nanjing Agricultural Univ., Nanjing, China8:50 **0217** Termite carbon-cycling in flux vessels: Can FACE-wood be used as a stable isotope tracer? **Angela Myer** (nynaeve1@uga.edu) and Brian T. Forschler, Univ. of Georgia, Athens, GA9:00 **0218** Evaluating the efficacy of two tracking methods, a portable harmonic radar system and a fluorescent marking system in detection of *Riptortus pedestris* (Hemiptera: Alydidae). **Jung-Wook Kho** (jw.luke.kho@gmail.com), Minhyung Jung and Doo-Hyung Lee, Gachon Univ., Seongnam, South Korea9:10 **0219** Does varying protein:carbohydrate ratios in the diet of *Lymantria dispar* (gypsy moth) effect its ability to detoxify tannins? **Cindy Perkovich** (cthoma16@kent.edu) and David Ward, Kent State Univ., North Canton, OH9:20 **0220** Understanding how plant niche preference is related to morphology, mechanics of motorization, musculature of external genitalia, and egg laying behavior in female *Neohydatothrips variabilis* in soybean leaves. **Asifa Hameed** (akh5405@psu.edu), Edwin Rajotte, Cristina Rosa and István Mikó, Pennsylvania State Univ., University Park, PA9:30 **0221** Influence of host plant species and plant nutrition on preference and performance in armyworm and cutworm pests (Lepidoptera: Noctuidae). **Ronald Batallas** (batallas@ualberta.ca) and Maya Evenden, Univ. of Alberta, Edmonton, AB, Canada9:40 **0222** The impact of climate change on the overwinter boundary of oriental armyworm (*Mythimna separata*). **Xijie Li** (njlixj@163.com) and Baoping Zhai, Nanjing Agricultural Univ., Nanjing, China9:50 **0223** How accurate are laboratory bioassays in predicting post-release host selection behavior? Weevil find out! **Jessica Fung** (jfung@uidaho.edu)¹, Karuna Nepal¹, Urs Schaffner², Sanford D. Eigenbrode¹ and Mark Schwarzaender¹, ¹Univ. of Idaho, Moscow, ID, ²CABI, Delémont, Switzerland**Grad 10-min: P-IE, Forestry**

Meeting Room 203 (Convention Centre)

Moderators: Alina Avanesyan¹ and Michael Brewer², ¹Univ. of Maryland, College Park, MD, ²Texas A&M AgriLife Research, Corpus Christi, TX8:00 **0224** *Ophiostoma montium* provides a higher ergosterol concentration to mountain pine beetle compared to *Grosmannia clavigera* and *Leptographium longiclavatum* in jack pine phloem. **Sydne Guevara-Rozo** (sydne@ualberta.ca), Altaf Hussain, Rahmatollah Rajabzadeh, Jennifer Klutsch, Jonathan Cale and Nadir Erbilgin, Univ. of Alberta, Edmonton, AB, Canada8:10 **0225** Are residual mature lodgepole pine trees prone to attacks by insects under varied stand mortality caused by mountain pine beetle in Alberta? **Shiyang Zhao** (shiyang1@ualberta.ca) and Nadir Erbilgin, Univ. of Alberta, Edmonton, AB, Canada8:20 **0226** Southern pine beetle (*Dendroctonus frontalis*) success and community dynamics in Long Island, New York. **Caroline Kanaskie** (carolinekanaskie@gmail.com)¹, Kevin Dodds², Fred Stephen³ and Jeff Garnas¹, ¹Univ. of New Hampshire, Durham, NH, ²USDA - Forest Service, Durham, NH, ³Univ. of Arkansas, Fayetteville, AR8:30 **0227** Mass attack dynamics of mountain pine beetle, *Dendroctonus ponderosae* Hopkins, in its expanded range. **Antonia Musso** (musso@ualberta.ca)¹, Victor Shegelski¹, Allan Carroll² and Maya Evenden¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²The Univ. of British Columbia, Vancouver, BC, Canada8:40 **0228** Effects of biochar on forest invertebrates in a post-harvest site in the Stanislaus National Forest, California. **Stacey Rice** (rice1381@vandals.uidaho.edu)¹, Stephen Cook¹, Luc Leblanc¹ and Deborah Page-Dumroese², ¹Univ. of Idaho, Moscow, ID, ²USDA - Forest Service, Moscow, ID8:50 **0229** Does tree species origin explain patterns of herbivory in an inner-city urban forest? **Christopher Riley** (riley.595@osu.edu) and Mary Gardiner, The Ohio State Univ., Columbus, OH9:00 **0230** The gut microbiota associated of *Nasutitermes nigriceps* in forest plots with different land-use change. **Julissa Ocampo-Castillo** (jisscm@gmail.com) and Nancy Calderón-Cortés, Univ. Nacional Autónoma de México, Morelia, Mexico9:10 **0231** Presentation withdrawn9:20 **0232** Top-down effects of tree location on insect herbivory in the urban forest. **Lawrence Long** (lclong2@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC9:30 **0233** Associational protection and potential non-target effects of systemic insecticide treatments against emerald ash borer. **Dora Mwangola** (mwang022@umn.edu) and Brian Aukema, Univ. of Minnesota, St. Paul, MN9:40 **0234** Occurrence model of the first instar of *Ricania shantungensis*. **Sunghoon Baek** (bsh0627@snu.ac.kr) and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea9:50 **0235** Control of *Eucryptorrhynchus scrobiculatus* (Coleoptera: Cuculionidae), a major pest of *Ailanthus altissima* (Sapindales: Simaroubaceae), using a modified square trap net. **Kailang Yang** (yangk0423@163.com), Xiaojian Wen, Yuan Ren and Junbao Wen, Beijing Forestry Univ., Beijing, China

Grad 10-min: P-IE, IPM, Field Crops 1

Meeting Room 220 (Convention Centre)

Moderators: Angelita Acebes-Doria¹ and Diane G. Alston², ¹Univ. of Georgia, Tifton, GA, ²Utah State Univ., Logan, UT

8:00 **0236** Influence of landscape composition and environmental factors on the spatial and temporal abundance of tarnished plant bug (*Lygus lineolaris*) populations in Virginia. **Seth Dorman** (sjdorman@vt.edu)¹, Roger Schurch² and Sally Taylor¹, ¹Virginia Polytechnic Institute and State Univ., Suffolk, VA, ²Virginia Polytechnic Institute and State Univ., Blacksburg, VA

8:10 **0237** Effect of *Bt* Cry51Aa2 on tarnished plant bug in cotton. **Scott Graham** (scott.graham@utk.edu) and Scott Stewart, Univ. of Tennessee, Jackson, TN

8:20 **0238** Pathogenicity and transmission of cotton seed and boll rotting bacteria vectored by the verde plant bug. **James Glover** (james.glover@ag.tamu.edu)¹, Michael Brewer¹, Thomas Isakeit² and Enrique Medrano³, ¹Texas A&M AgriLife Research, Corpus Christi, TX, ²Texas A&M Univ., College Station, TX, ³USDA - ARS, College Station, TX

8:30 **0239** Spatial relationships of cotton fleahopper and verde plant bug: Implications for management. **Isaac Esquivel** (iesqu002@tamu.edu)¹, Michael Brewer² and Robert Coulson¹, ¹Texas A&M Univ., College Station, TX, ²Texas A&M AgriLife Research, Corpus Christi, TX

8:40 **0240** Does silicon accumulation affect the interactions between an aboveground pest and a belowground pest on corn? **Duncan Brown** (dbrow@udel.edu) and Ivan Hiltbold, Univ. of Delaware, Newark, DE

8:50 **0241** Landscape level contributions of corn in mixed production systems for *Helicoverpa zea* populations. **Tyler Towles** (tt305@entomology.msstate.edu)¹, Angus Catchot¹, Jeff Gore², Don Cook², Michael Caprio¹ and Christopher Daves³, ¹Mississippi State Univ., Mississippi State, MS, ²Mississippi State Univ., Stoneville, MS, ³Monsanto Company, Coila, MS

9:00 **0242** Corn rootworm (*Diabrotica* spp.) nodal injury and yield loss: Early indications of resistance development to *Bt*-RW traits. **Edwin Benkert III** (benke017@umn.edu) and Ken Ostlie, Univ. of Minnesota, St. Paul, MN

9:10 **0243** Effect of mate availability and sugar sources on soybean podworm, *Helicoverpa zea* (Lepidoptera: Noctuidae), fecundity. **Stephen Losey** (slosey88@ksu.edu) and Brian McCornack, Kansas State Univ., Manhattan, KS

9:20 **0244** Do neonicotinoid seed treatments affect arthropod communities in grain crops? **Aditi Dubey** (aditid26@gmail.com), Galen Dively, Margaret Lewis and Kelly Hamby, Univ. of Maryland, College Park, MD

9:30 **0245** Biology and parasitism of *Dectes texanus* in soybeans in western and central Kentucky. **Izabela Gomes** (izabela.gomes@uky.edu)¹, Raul T. Villanueva², Ric Bessin¹, John Obrycki¹, Yaziri Gonzalez² and Rocio Davila², ¹Univ. of Kentucky, Lexington, KY, ²Univ. of Kentucky, Princeton, KY

9:40 **0246** Managing caterpillar pests in Mississippi peanut. **Brittany Lipsey** (bse37@msstate.edu)¹, Jeff Gore², Angus Catchot¹, Jason Sarver¹, Don Cook² and Jason Bond², ¹Mississippi State Univ., Mississippi State, MS, ²Mississippi State Univ., Stoneville, MS

9:50 **0247** Development of a sequential binomial sampling protocol for scouting sugarcane aphid, *Melanaphis sacchari* Zehntner, in sorghum. **Jessica Lindenmayer** (jpavlu@ostatemail.okstate.edu)¹, Kris Giles¹, Ali Zarrabi¹, Allen Knutson², Robert Bowling³, Nick Seiter⁴, Sebe Brown⁵, Brian McCornack⁶, Norman Elliott⁷ and Tom Royer¹, ¹Oklahoma State Univ., Stillwater, OK, ²Texas A&M Univ., Dallas, TX, ³Texas A&M Univ., Corpus Christi, TX, ⁴Univ. of Illinois, Champaign, IL, ⁵Louisiana State Univ., Winnsboro, LA, ⁶Kansas State Univ., Manhattan, KS, ⁷USDA - ARS, Stillwater, OK

Grad 10-min: P-IE, Pollinators 1

Meeting Room 221/222 (Convention Centre)

Moderators: Theresa Pitts-Singer¹ and Megha Parajulee², ¹USDA - ARS, Logan, UT, ²Texas A&M Univ., Lubbock, TX

8:00 **0248** The native bees (Hymenoptera: Apoidea: Anthophila) of coastal dune environments of Florida. **Anthony Abbate** (abbata08@gmail.com)¹, Joshua Campbell², Chase Kimmel³ and William Kern¹, ¹Univ. of Florida, Davie, FL, ²Univ. of Florida, Gainesville, FL, ³Florida Museum of Natural History, Gainesville, FL

8:10 **0249** Presentation withdrawn

8:20 **0250** Complementary use of forest and meadows by bumble bees revealed via genetic mark-recapture. **John Mola** (johnmmola@gmail.com), Sean O'Rourke, Michael Miller and Neal M. Williams, Univ. of California, Davis, CA

8:30 **0251** Artificial domicile use by bumble bees in Alberta and Ontario. **Sarah Johnson** (sajohnsonecol@gmail.com)^{1,2} and Hayley Tompkins³, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Wildlife Preservation Canada, Guelph, ON, Canada, ³Univ. of Guelph, Guelph, ON, Canada

8:40 **0252** Do midwestern hover flies (Diptera: Syrphidae) migrate during the fall? **C. Scott Clem** (carlc2@illinois.edu) and Alexandra Harmon-Threatt, Univ. of Illinois, Champaign, IL

8:50 **0253** The white-shouldered bumble bee (*Bombus appositus*) is the predominate nesting bumble bee in above-ground nest boxes placed in the subalpine forests of northern Utah. **James Herndon** (james.herndon85@gmail.com)¹, Karen Kapheim¹, Amber Tripodi² and James Strange², ¹Utah State Univ., Logan, UT, ²USDA - ARS, Logan, UT

9:00 **0254** Examining affects of bumble bee nutritional history at the developmental and proximate time scale. **Natalie Fischer** (nfisc001@ucr.edu) and S. Hollis Woodard, Univ. of California, Riverside, CA

9:10 **0255** Occupancy modeling and monitoring protocols for eastern bumble bees (Hymenoptera: Apidae), particularly *Bombus affinis*, along roadsides. **Michelle Boone** (boon0086@umn.edu), Elaine Evans and Daniel Cariveau, Univ. of Minnesota, St. Paul, MN

9:20 **0256** Sharing the throne: Polygynous honey bee (*Apis mellifera*) colonies. **James Withrow** (jmwithro@ncsu.edu) and David Tarpy, North Carolina State Univ., Raleigh, NC

9:30 **0257** Presentation withdrawn

9:40 **0258** Building better urban bee habitats. **Katherine Turo** (kjtodd91@gmail.com) and Mary Gardiner, The Ohio State Univ., Columbus, OH

9:50 **0259** Impacts of landscape diversity on pollinators and crop yield in apple. **Leah Blechschmidt** (blehsc@uoguelph.ca)¹, Hannah Fraser² and Nigel Raine¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Ontario Ministry of Agriculture, Food and Rural Affairs, Guelph, ON, Canada

Undergrad 10-min: MUVE

Meeting Room 214 (Convention Centre)

Moderators: Gerhard Gries¹ and Aaron Tarone², ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Texas A&M Univ., College Station, TX8:00 **0260** Native mosquito's vulnerability to predation is reduced in the presence of invasive mosquito. **Alexis Beckermann** (lexiebeckermann@gmail.com)^{1,2}, Katie Westby³, Solny Adalsteinsson³ and Kim Medley³, ¹Southeast Missouri State Univ., Cape Girardeau, MO, ²Tyson Research Center, Eureka, MO, ³Washington Univ., Eureka, MO8:10 **0261** Probing and feeding behavior of *Aedes aegypti* and *Aedes albopictus*. **Briana Vargas** (briana.vargas01@utrgv.edu), Robert Gilkerson and Christopher Vitek, Univ. of Texas, Edinburg, TX8:20 **0262** Differential hatch rates of *Aedes albopictus* eggs inoculated with common bacterial species. **Claire Dust** (cedust2@illinois.edu), Allison Parker and Brian F. Allan, Univ. of Illinois, Champaign, IL8:30 **0263** Plant essential oils express synergism for spatially repelling mosquitoes. **Max Almond** (malmond@sfu.ca), Dan Peach, Regine Gries and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada8:40 **0264** The effects of larval density on the success of the mosquito species *Culex quinquefasciatus* and *Aedes aegypti*. **Jaclyn Everly** (jaclyn.everly@usm.edu) and Donald Yee, The Univ. of Southern Mississippi, Hattiesburg, MS8:50 **0265** Identifying cocirculating hemoparasites in the West Nile virus system. **Dayvion Adams** (ajadams968@tamu.edu)¹, Andrew Golnar¹, Matthew Medeiros² and Gabriel Hamer¹, ¹Texas A&M Univ., College Station, TX, ²Univ. of Hawai'i, Honolulu, HI9:00 **0266** Evaluating the ability of mineral oil to effectively deliver compounds aimed at reducing horn fly (Diptera: Muscidae) populations on cattle. **Ramon Zepeda** (rz@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM9:10 **0267** Using high dose insecticide exposures to separate permethrin resistant and susceptible horn fly (Diptera: Muscidae) populations. **Derek Cospser** (dcospser@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM9:20 **0268** Olfaction in ticks: Physiological and behavioural investigation of tick response to essential oils for the development of new repellent products for human protection. **Samantha Macpherson** (133207m@acadiau.ca), Nicoletta Faraone and Kirk Hillier, Acadia Univ., Wolfville, NS, Canada9:30 **0269** Beyond the it'sy bitsy spider: Using spiders in outreach education. **Breanna Lyle** (bl334@msstate.edu), Mississippi State Univ., Mississippi State, MS9:40 **0270** Wrapped up in love: Inter- and intra-sexual functions of web reduction behaviour by courting male false black widow spiders. **Jamie-Lynne Varney** (jamie_varney@sfu.ca), Andreas Fischer, Xiang Hao Goh and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada9:50 **0271** Love for silk untangled: Female cobweb spiders choose webs based on physical and chemical cues. **Emmanuel Hung** (eshung@sfu.ca), Andreas Fischer and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada10:00 **0272** Do multiple species of ants sense and behaviorally respond to each other's trail pheromones? **Jaime Chalissery** (jchaliss@sfu.ca), Danielle Hoefele, Asim Renyard, Regine Gries and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada10:10 **0273** Transcript-based sex determination for forensic entomology. **Michelle Jonika** (michelle19@tamu.edu)¹, Ashleigh Faris², Carl Hjelmén¹ and Aaron Tarone¹, ¹Texas A&M Univ., College Station, TX, ²Texas A&M Univ., Corpus Christi, TX**Undergrad 10-min: PBT**

Meeting Room 206 (Convention Centre)

Moderator: Jonas King, Mississippi State Univ., Mississippi State, MS8:00 **0274** Floral ultraviolet cues affect foraging behaviour of *Culex* mosquitoes. **Elton Ko** (eltonk@sfu.ca), Dan Peach, Gerhard Gries and Adam Blake, Simon Fraser Univ., Burnaby, BC, Canada8:10 **0275** Transcriptomic effects of varying carbon:nitrogen ratio in *Aedes aegypti*. **Austin Drury** (ald557@msstate.edu)¹, Catherine Dean², Travis van Warmerdam¹, Donald Yee² and Jonas G. King¹, ¹Mississippi State Univ., Mississippi State, MS, ²The Univ. of Southern Mississippi, Hattiesburg, MS8:20 **0276** Analysis of His-7 corazonin expression patterns in the Central American locust, *Schistocerca gregaria*, using RNA interference. **Samantha Franklin** (srfranklin@tamu.edu), Bert Foquet and Hojun Song, Texas A&M Univ., College Station, TX8:30 **0277** Analysis of phase-related behavior in the locust *Schistocerca gregaria* (Orthoptera: Acrididae: Cyrtacanthacridinae). **Drew Little** (drewlittle@tamu.edu), Bert Foquet and Hojun Song, Texas A&M Univ., College Station, TX8:40 **0278** Sublethal effects of neonicotinoids on nesting in the alfalfa leafcutter bee (*Megachile rotundata*). **Michala Palmersheim** (michala.palmersheim@ndus.edu)¹, Mia Park¹, Bryan Helm¹, Julia Bowsher¹ and Joseph P. Rinehart², ¹North Dakota State Univ., Fargo, ND, ²USDA - ARS, Fargo, ND8:50 **0279** Are Oregon insecticide labels clear as to their environmental hazards to *Apis mellifera*? **Matthew Bucy** (bucyma@oregonstate.edu)¹, Rose Kachadoorian² and Andony Melathopoulos¹, ¹Oregon State Univ., Corvallis, OR, ²Oregon Dept. of Agriculture, Salem, OR9:00 **0280** Behavioral effects of juvenile hormone on the worker caste of the red imported fire ant, *Solenopsis invicta*. **Franchesca Rodriguez** (d4sh1ngdr4gongfly@gmail.com), Texas A&M Univ., Bellville, TX**Undergrad 10-min: P-IE 1**

Meeting Room 207 (Convention Centre)

Moderators: Lina Bernaola¹ and Sandipa Gautam², ¹Louisiana State Univ., Baton Rouge, LA, ²Univ. of California, Riverside, CA8:00 **0281** Effects of fungal endophytes on the olfactory responses of stink bugs. **Zoey Kramer** (zoeykayyy@tamu.edu)¹, Cody Gale¹, Gregory Sword¹, Michael V. Kolomiets¹ and Charles Suh², ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, College Station, TX8:10 **0282** Fungal seed treatment effects defensive volatile responses to herbivory in cotton. **Christine Madamba** (christinemadamba@gmail.com)¹, Zoey Kramer¹, Cody Gale¹, Gregory Sword¹, Michael Kolomiets¹ and Charles Suh², ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, College Station, TX8:20 **0283** Sex difference in pollen consumption in Diptera: Calliphoridae. **Betty Hernandez** (bettynicole.hernandez@gmail.com), Pierre Lau, Aaron Tarone and Juliana Rangel, Texas A&M Univ., College Station, TX

8:30 **0284** *Streptomyces* bacterial volatiles as a potential repellent to fruit pest *Drosophila suzukii*. **Adam Discher** (130856d@acadiu.ca)¹, Catherine Little² and Kirk Hillier¹, ¹Acadia Univ., Wolfville, NS, Canada, ²Memorial Univ. of Newfoundland, St. John's, NF, Canada

8:40 **0285** Effects of host species on the biotic potential of the Asian parasitoid wasp, *Trissolcus japonicus*. **Emmaline Gates** (gatesemm@msu.edu), Paul Botch and Ernest Delfosse, Michigan State Univ., East Lansing, MI

8:50 **0286** Effects of sleep disruption on host parasitism rates for *Trissolcus euschisti* and *Telenomus podisi*. **Kennedy Bolstad** (kennedybolstad@gmail.com)¹, Emily Grove² and Paul Abram³, ¹Univ. of Victoria, Victoria, BC, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada, ³Agriculture and Agri-Food Canada, Agassiz, BC, Canada

9:00 **0287** Demonstration of a sleep-like state in the parasitoid wasps *Trissolcus euschisti* and *Telenomus podisi*. **Emily Grove** (egrove@sfu.ca)¹, Kennedy Bolstad², Jason Thiessen² and Paul Abram³, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Univ. of Victoria, Victoria, BC, Canada, ³Agriculture and Agri-Food Canada, Agassiz, BC, Canada

9:10 **0288** Parasitoid attraction varies in response to *Spodoptera frugiperda* developmental stages feeding on maize. **Ryan O'Briant** (rpo28@cornell.edu)¹, Tim Luttermoser¹, Andre Kessler¹, Charles Midega², Zeyaur Khan² and Katja Poveda¹, ¹Cornell Univ., Ithaca, NY, ²International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya

9:20 **0289** Development of a magnetic-based system for detecting queen honey bee death. **Anthony Dermody** (atd216@ufl.edu)¹, Stephen Berkner¹, Barukh Rohde¹, Perry Jetter¹, Richard Mankin² and Charles Stuhl², ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Gainesville, FL

9:30 **0290** Effects of floral resource availability on body size in three bee species. **Arabelle Osicky** (aco48@cornell.edu), Heather Grab, Aaron Iverson and Katja Poveda, Cornell Univ., Ithaca, NY

10-min: MUVE, Vector Surveillance

Meeting Room 224 (Convention Centre)

Moderators: Shaun Dergousoff¹ and Stacey Vigil², ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²Univ. of Georgia, Athens, GA

8:00 **0291** Monitoring *Culicoides* (Diptera: Ceratopogonidae) spp. in a forested habitat within the Piedmont Region of Georgia: Seasonal variation and species composition. **Stacey Vigil** (svigil@uga.edu) and Mark Ruder, Univ. of Georgia, Athens, GA

8:10 **0292** Spatiotemporal dynamics of *Ixodes scapularis*, *Borrelia burgdorferi* infection, and Lyme disease incidence in Connecticut: What can we learn from longitudinal passive surveillance data? **Eliza Little** (eliza.little@ct.gov)¹, John F. Anderson¹, Lars Eisen², Rebecca Eisen², Kirby Stafford III¹ and Goudarz Molaei¹, ¹Connecticut Agricultural Experiment Station, New Haven, CT, ²Centers for Disease Control and Prevention, Fort Collins, CO

8:20 **0293** Historical biodiversity of tick communities in Pennsylvania (1900-2017). Damie Pak, Steven Jacobs and **Joyce Sakamoto** (jms1198@psu.edu), Pennsylvania State Univ., University Park, PA

8:30 **0294** Tick winter survival and establishment of *Amblyomma americanum* in New England. **Kirby Stafford III** (kirby.stafford@ct.gov)¹, Scott Williams¹, Megan Linske², Charles Lubelczyk³ and Margaret Welch³, ¹Connecticut Agricultural Experiment Station, New Haven, CT, ²Center for Vector Biology and Zoonotic Diseases, New Haven, CT, ³Maine Medical Center Research Institute, Scarborough, ME

8:40 **0295** Utilizing human and sentinel tick surveillance data to understand increased Lyme disease reporting, West Virginia 2013-2016. **Eric J. Dotseth** (eric.j.dotseth@wv.gov)¹, Miguella Mark-Carew¹, Jessica Shiltz¹ and Brian Hendricks², ¹West Virginia Dept. of Health and Human Resources, Charleston, WV, ²West Virginia Univ., Morgantown, WV

8:50 **0296** Species composition and activities pattern of sand flies in Dir Districts, Khyber Pakhtunkhwa, Pakistan. **Khurshaid Khan** (khurshaidkhan@awakum.edu.pk), Abdul Wali Khan Univ. Mardan, Peshawar, Pakistan

9:00 **0297** Ecosystems and spatiotemporal mosquito-borne disease models across a gradient of urbanization. **Mark Myer** (myer.mark@epa.gov) and John Johnston, US Environmental Protection Agency, Athens, GA

9:10 Break

9:20 **0298** Mosquito surveillance and insecticide resistance along the US/Mexico border. **Heather Hernandez** (heather.hernandez01@utrgv.edu)¹, Whitney Qualls² and Christopher Vitek¹, ¹Univ. of Texas, Edinburg, TX, ²Texas Dept. of State Health Services, Austin, TX

9:30 **0299** Invasive mosquito surveillance preparedness in southern Québec, Canada: Using surrogate species to refine detection of accidental introduction of exotic *Aedes* species (Diptera: Culicidae). Anne-Marie Lowe¹, **Karl Forest-Berard** (karl.forest-berard@inspq.qc.ca)², Richard Trudel², Ernest Lo², Philippe Gamache², Matthieu Tandonnet², Serge-Olivier Kotchi³, Patrick Leighton⁴, Antonia Dibernardo⁵, L. Robbin Lindsay⁵ and Antoinette Ludwig³, ¹Public Health Agency of Canada, Montréal, QC, Canada, ²Institut national de sante publique du Québec, Montréal, QC, Canada, ³Public Health Agency of Canada, Saint-Hyacinthe, QC, Canada, ⁴Univ. de Montréal, Saint-Hyacinthe, QC, Canada, ⁵Public Health Agency of Canada, Winnipeg, MB, Canada

9:40 **0300** Mosquito (Diptera: Culicidae) diversity patterns across an urban landscape in Puerto Rico. **Nicole Scavo** (nicole.scavo@usm.edu), Nicole Mackey and Donald Yee, The Univ. of Southern Mississippi, Hattiesburg, MS

9:50 **0301** Presentation withdrawn

10:00 **0302** Larval *Aedes albopictus* populations along an urban to rural gradient in Saint Louis, MO: Are abundance patterns related to differences in artificial larval habitat quality by land-use type? **Katie Westby** (kwestby@wustl.edu), Solny Adalsteinsson, Elizabeth Biro and Kim Medley, Washington Univ., Eureka, MO

10:10 **0303** Investigation of localized variations in container-breeding *Aedes* and environmental predictors in a La Crosse virus endemic region (Knox County, Tennessee). **R. D. Rowe** (rrowe5@vols.utk.edu)¹, A. Odoi¹, Abelardo C. Moncayo², D. J. Paulsen¹ and Rebecca Trout Fryxell¹, ¹Univ. of Tennessee, Knoxville, TN, ²Tennessee Dept. of Health, Nashville, TN

10:20 **0304** Challenges and collaboration opportunities for public health entomology in the US affiliated Pacific Islands. **Grayson Brown** (graysonb@pihoa.org)¹, Wilson Mackwelung² and Aileen Benavente³, ¹Pacific Island Health Officers Association, Hagatna, Guam, ²Bureau of Environmental Health, Lelu Kosrae, Micronesia (Federated States of), ³Bureau of Environmental Health, Garapan Saipan, Northern Mariana Islands

10:30 **0305** Seasonal abundance and larval habitat characterization of mosquitoes in urban areas of Lagos State, Nigeria. **Ifeoluwa Fagbohun** (fagbohunife@gmail.com), Emmanuel Idowu and Olubunmi Otubanjo, Univ. of Lagos, Lagos, Nigeria

10:40 **0306** *Anaplasma bovis* in populations of the Rocky Mountain wood tick, *Dermacentor andersoni* (Acari: Ixodidae), from western Canada. Neil Chilton¹, **Shaun Dergousoff** (shaun.dergousoff@agr.gc.ca)² and Tim Lysyk³, ¹Univ. of Saskatchewan, Saskatoon, SK, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ³Retired, Lethbridge, AB, Canada

Grad 10-min: MUVE

Meeting Room 215/216 (Convention Centre)

Moderators: Jeffery Tomberlin¹ and Regine Gries², ¹Texas A&M Univ., College Station, TX, ²Simon Fraser Univ., Burnaby, BC, Canada

10:10 **0307** Acceptance of entomophagy amongst Canadians. **Didier Marquis** (didier.marquis@concordia.ca)¹, Louise Hénault-Ethier^{2,3}, Médhavi Dussault⁴, Jordan LeBel¹ and Grant Vandenberg³, ¹Concordia Univ., Montréal, QC, Canada, ²David Suzuki Foundation, Montréal, QC, Canada, ³Univ. Laval, Québec City, QC, Canada, ⁴Univ. de Sherbrooke, Sherbrooke, QC, Canada

10:20 **0308** Insecticide resistance development in the filth fly pupal parasitoid, *Spalangia cameroni* (Hymenoptera: Pteromalidae) using laboratory selections. **Vincent Maiquez** (vm935@csus.edu)¹, Jimmy Pitzer¹ and Christopher Geden², ¹California State Univ., Sacramento, CA, ²USDA - ARS, Gainesville, FL

10:30 **0309** Succession of forensically important insects on decomposing pig carcasses in Minnesota. **Correy Hildebrand** (dukes021@umn.edu) and Robin Thomson, Univ. of Minnesota, St. Paul, MN

10:40 **0310** Investigation of the seasonal variation of the larval stages of Diptera present during decomposition in southeast Texas. **Bethany Walker** (bah029@shsu.edu) and Sibyl Bucheli, Sam Houston State Univ., Huntsville, TX

10:50 **0311** Presentation withdrawn

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0312** Identification of the sex pheromone of the female false black widow spider, *Steatoda grossa* (Theridiidae, Araneae). **Andreas Fischer** (afischer@sfu.ca), Regine Gries, Santosh Alamsetti, Emmanuel Hung, Weiwu Ren and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada

11:12 **0313** Comparison of spray patterns from selected hand-held compression sprayers. **Felicia Williams** (fw59499@uga.edu) and Brian Forschler, Univ. of Georgia, Athens, GA

11:22 **0314** Alternative fumigants for key stored product pests: Screening and efficacy studies. **Jacqueline Maille** (jmaille@ksu.edu)¹, M. Wes Schilling², Peter Edde³ and Thomas Phillips¹, ¹Kansas State Univ., Manhattan, KS, ²Mississippi State Univ., Mississippi State, MS, ³Altria Client Services, Inc., Richmond, VA

11:32 **0315** Development of a rapid assay for the detection of phosphine resistance in the lesser grain borer, *Rhyzopertha dominica* (F.) (Coleoptera: Bostrichidae). **Edwin Afful** (eddafful@ksu.edu) and Thomas Phillips, Kansas State Univ., Manhattan, KS

11:42 **0316** Presentation withdrawn

11:52 **0317** Critical thermal maxima of the larval stadia of two forensically important blow fly species, *Chrysomya ruffifacies* (Macquart) and *Cochliomyia macellaria* (Fabricius) (Diptera: Calliphoridae). **Lauren Beebe** (laurenejbeebe@gmail.com), Texas A&M Univ., College Station, TX

12:02 **0318** To feed or not to feed: Screening house flies for physiological resistance to insecticides, the flaw of traditional screening practices. **Caleb Hubbard** (chubb001@ucr.edu) and Alec Gerry, Univ. of California, Riverside, CA

12:12 **0319** Organic farms conserve dung beetles capable of disrupting fly vectors of foodborne pathogens. **Matthew Jones** (matthew.s.jones@wsu.edu)¹, David Headrick², David Crowder¹ and William Snyder¹, ¹Washington State Univ., Pullman, WA, ²California Polytechnic State Univ., San Luis Obispo, CA

12:22 **0320** Developing integrated pest management strategies to control mold mites *Tyrophagus putrescentiae* (Schränk) (Sarcoptiformes: Acaridae). **Naomi Manu** (nmanu30@ksu.edu)¹, M. Wes Schilling², Jacqueline Maille¹ and Thomas Phillips¹, ¹Kansas State Univ., Manhattan, KS, ²Mississippi State Univ., Mississippi State, MS

Grad 10-min: PBT 1

Meeting Room 206 (Convention Centre)

Moderator: Kendra Greenlee, North Dakota State Univ., Fargo, ND

10:10 **0321** Insulin signaling during diapause: Expression of target insulin pathway genes in overwintering *Megachile rotundata*. **Lizzette Cambron** (liz.cambron@ndsu.edu)¹, George Yocum² and Kendra Greenlee¹, ¹North Dakota State Univ., Fargo, ND, ²USDA - ARS, Fargo, ND

10:20 **0322** Inter-kingdom signaling: Symbiotic yeasts produce semiochemicals that attract their yellowjacket hosts. **Tamara Babcock** (tamara_lynn@outlook.com)¹, John Borden², Regine Gries¹, Cassandra Carroll¹, Jean-Pierre Lafontaine³, Margo Moore¹ and Gerhard Gries¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²JHB Consulting, Burnaby, BC, Canada, ³Formerly of Scotts Canada Ltd., Delta, BC, Canada

10:30 **0323** Density-dependent phase polyphenism in a phylogenetic framework: Insights from behavioral, morphological, and molecular data in a locust and related non-swarming grasshoppers (Orthoptera: Acrididae: Cyrtacanthacridinae). **Bert Foquet** (bertfoquet@tamu.edu) and Hojun Song, Texas A&M Univ., College Station, TX

10:40 **0324** RNA interference in the small hive beetle. **Steve Reyna** (smreyna@ncsu.edu) and Marcé Lorenzen, North Carolina State Univ., Raleigh, NC

10:50 **0325** Diamide modulation of the ryanodine receptor in a beneficial and pest species. **Jennifer Williams** (jwilliams90@huskers.unl.edu)¹, Daniel Swale² and Troy Anderson¹, ¹Univ. of Nebraska, Lincoln, NE, ²Louisiana State Univ., Baton Rouge, LA

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0326** Neonicotinoids undermine thermal biology of *Bombus terrestris*. **Nick Howe** (njh563@bham.ac.uk), Emily Owen, Jeff Bale and Scott Hayward, Univ. of Birmingham, Birmingham, United Kingdom

11:12 **0327** How can life adapt to global warming and pollution: The answer may lie with *Cicindela haemorrhagica* in Yellowstone National Park. **Kelly Willemssens** (kelly_willemssens@hotmail.com), Univ. of Nebraska, Lincoln, NE

SUNDAY, NOVEMBER 11 / DIMANCHE 11 NOVEMBRE

11:22 **0328** Investigations into the mechanism of polarized light sensitivity in *Pieris rapae*. **Adam Blake** (adam@ajblake.info)¹, Shelby Kwok¹, Gina Hahn¹, Xudong Qiu², Kentaro Arikawa³ and Gerhard Gries¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Univ. of Texas M.D. Anderson Cancer Center, Houston, TX, ³The Graduate Univ. for Advanced Studies, Hayama, Japan

11:32 **0329** Evaluating the effects of RNA interference for emerald ash borer suppression on non-target organisms. **Flavia Pampolini** (flavia.pampolini@uky.edu) and Lynne Rieske-Kinney, Univ. of Kentucky, Lexington, KY

11:42 **0330** Neonicotinoids in the environment: A step towards solving the mass-balance equation. **Sarah McTish** (stm5283@psu.edu)¹, Kyle Elkin², Heather Karsten¹ and John Tooker¹, ¹Pennsylvania State Univ., University Park, PA, ²USDA - ARS, University Park, PA

11:52 **0331** Double-stranded RNA uptake in western corn rootworm and the role of endocytic transmembrane receptors. **Molly Darlington** (mdarlington@unl.edu)¹, Ana Vélez¹ and Elane Fishilevich², ¹Univ. of Nebraska, Lincoln, NE, ²Alnylam, Cambridge, MA

12:02 **0332** Sublethal impacts of novaluron on *Lygus lineolaris* (Palisot de Beauvois). **Beverly Catchot** (bdc12@msstate.edu)¹, Fred Musser¹, Jeff Gore², Natraj Krishnan¹, Ryan L. Jackson³, Don Cook², Angus Catchot¹, Scott Stewart⁴, Gus Lorenz⁵, Sebe Brown⁶ and Nick Seiter⁷, ¹Mississippi State Univ., Mississippi State, MS, ²Mississippi State Univ., Stoneville, MS, ³Syngenta, Carrolton, MS, ⁴Univ. of Tennessee, Jackson, TN, ⁵Univ. of Arkansas, Lonoke, AR, ⁶Louisiana State Univ., Winnsboro, LA, ⁷Univ. of Illinois, Champaign, IL

12:12 **0333** Gene expression changes in response to field-to-lab environmental transition in *Linepithema humile*. **Mathew Dittmann** (madittmann1@gmail.com), Purdue Univ., West Lafayette, IN

Grad 10-min: PBT 2

Meeting Room 210 (Convention Centre)

Moderator: Paul Fields, Agriculture and Agri-Food Canada, Winnipeg, MB, Canada

10:10 **0334** Transcriptome analysis of *Steltzoviella insularis* (Staudinger) pheromone gland revealed candidate genes with putative functions in pheromone production, transport and degradation. **Yuchao Yang** (yangyc68@126.com), Beijing Forestry Univ., Beijing, China

10:20 **0335** Histone deacetylases regulate growth and development in the red flour beetle, *Tribolium castaneum* (Herbst). **Smitha George** (smitha.george@uky.edu) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

10:30 **0336** Functional and pharmacological characterization of sodium channels from the brown planthopper (*Nilaparvata lugens*). **Huahua Sun** (sunhuahua1268@gmail.com)^{1,2}, Ke Dong² and Zewen Liu¹, ¹Nanjing Agricultural Univ., Nanjing, China, ²Michigan State Univ., East Lansing, MI

10:40 **0337** Survival of flat grain beetles at cold temperatures: Understanding the effect of acclimation on survival of different life stages. **Lavanya Ganesan** (lavanyazoe@gmail.com)¹ and Paul Fields², ¹Univ. of Manitoba, Winnipeg, MB, Canada, ²Agriculture and Agri-Food Canada, Winnipeg, MB, Canada

10:50 **0338** Induction and termination of diapause in the quarantine insect *Trogoderma granarium* (khapra beetle). **Sunil Shivananjappa** (sunil.s@uleth.ca)^{1,2}, Robert Laird², Kevin Floate¹ and Paul Fields³, ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²Univ. of Lethbridge, Lethbridge, AB, Canada, ³Agriculture and Agri-Food Canada, Winnipeg, MB, Canada

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0339** Cold tolerance metabolites in overwintering adult mountain pine beetles. **Kirsten Thompson** (kthompso@unbc.ca), Dezeno P. W. Huber and Brent W. Murray, Univ. of Northern British Columbia, Prince George, BC, Canada

11:12 **0340** Investigating the control of *Aethina tumida* through pharmacological characterization of known and novel acetylcholinesterase (AChE) inhibitors. **Morgan Roth** (mroth11@vt.edu), Paul R. Carlier, Haibo Li, James M. Wilson and Aaron Gross, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:22 **0341** Membrane potential patterns associated with gut stem and mature cells in the caterpillar tobacco budworm, *Heliothis virescens*. **Richard Melton** (rdmelto@g.clemson.edu), Jessie Parker and Matthew Turnbull, Clemson Univ., Clemson, SC

11:32 **0342** Biochemical and transcriptome characterization of the cellulolytic system in *Thermobia domestica* for identification of novel enzymes with industrial applications. **Ratnasri Pothula** (rmallipe@vols.utk.edu)¹, Brian Johnson², William Klingeman¹, Margaret Staton¹ and Juan-Luis Jurat-Fuentes¹, ¹Univ. of Tennessee, Knoxville, TN, ²Univ. of California, Davis, CA

11:42 **0343** Multidimensional approach to formulating a specialized diet for northern corn rootworm larvae. **Man Huynh** (mphd32@mail.missouri.edu)¹, Bruce Hibbard², Stephen L. Lapointe³, Randall P. Niedz³, Bryan French⁴, Adriano Pereira¹, Debbie Finke¹, Kent S. Shelby² and Thomas Coudron², ¹Univ. of Missouri, Columbia, MO, ²USDA - ARS, Columbia, MO, ³USDA - ARS, Fort Pierce, FL, ⁴USDA - ARS, Brookings, SD

11:52 **0344** Age-stage, two-sex life tables of western flower thrips, *Frankliniella occidentalis* (Thysanoptera: Thripidae) at different temperature and relative humidity deviation range. **Young-gyun Park** (insect1141@snu.ac.kr), Sunghoon Baek, Min-Jung Kim, Kyusoon Kim and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

12:02 **0345** Bioassays reveal mechanism underlying phage-infected bacterial symbiont-mediated protection in the pea aphid. **Jayce W. Brandt** (jayce@uga.edu), Germain Chevignon, Kerry M. Oliver and Michael Strand, Univ. of Georgia, Athens, GA

12:12 **0346** Understanding how water stress affects spider mite resistance in maize. **Gunbharpur Gill** (gunn.gill@usu.edu)¹, Huyen Bui², Richard Clark² and Ricardo A. Ramirez¹, ¹Utah State Univ., Logan, UT, ²Univ. of Utah, Salt Lake City, UT

12:22 **0347** Presentation withdrawn

Grad 10-min: P-IE, Biocontrol, General 1

Meeting Room 202 (Convention Centre)

Moderators: Dalton Ludwick¹ and Rachel Mallinger², ¹Virginia Polytechnic Institute and State Univ., Kearneysville, WV, ²Univ. of Florida, Gainesville, FL

10:10 **0348** Local and landscape factors drive arthropod assembly in agricultural landscapes. **Aleksandra Dolezal** (adolezal@uoguelph.ca), Ellen Esch and Andrew MacDougall, Univ. of Guelph, Guelph, ON, Canada

10:20 **0349** Interactions between cover crops and novel organic herbicides to improve conservation biocontrol of arthropods and weeds in no-till tomato. **Danielle Lewis** (dglewis@clmson.edu), Clemson Univ., Charleston, SC

10:30 **0350** Slugs and bugs: Effects of conservation farming on slug natural enemies in field crops. **Kirsten Brichler** (kbrichle@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

10:40 **0351** Does establishment of native pocket prairies influence the conservation value of urban vacant lots for lady beetles? **Denisha Parker** (parker.1052@osu.edu) and Mary Gardiner, The Ohio State Univ., Columbus, OH

10:50 **0352** Impact of cover crop planting and termination date on pests and beneficial insects in cover crop to corn transitions. **Gabriela Inveninato Carmona** (gabiinveninato@gmail.com) and Anthony J. McMechan, Univ. of Nebraska, Lincoln, NE

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0353** Presentation withdrawn

11:12 **0354** Effects of landscape structure and climate variability on beneficial insect diversity in agronomic crops of Utah. **Morgan Christman** (morgan.christman@aggiemail.usu.edu), Lori R. Spears, Emily Burchfield and Ricardo A. Ramirez, Utah State Univ., Logan, UT

11:22 **0355** Native or non-native: Evaluating natural enemy communities of native and non-native residential landscapes. **Sarah Parsons** (separson@ncsu.edu) and Steven D. Frank, North Carolina State Univ., Raleigh, NC

11:32 **0356** Floral abundance and richness drive beneficial arthropod conservation and biological control on golf courses. **Rebecca Perry** (rperry@ufl.edu), Grace Cope, Nicole Benda and Adam Dale, Univ. of Florida, Gainesville, FL

11:42 **0357** Ecologically intensified farms in East Africa maintain successful pest control over time. **Tim Luttermoser** (tjl235@cornell.edu)¹, Charles Midega², Zeyaur Khan² and Katja Poveda¹, ¹Cornell Univ., Ithaca, NY, ²International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya

11:52 **0358** Can cover crops serve as a bridge for beneficial insects in watermelon production systems? **Paige Hickman** (phickma@email.uark.edu)¹, Jackie Lee², Amanda McWhirt² and Michael Brown², ¹Univ. of Arkansas, Fayetteville, AR, ²Univ. of Arkansas, Little Rock, AR

12:02 **0359** Forage crop biodiversity to reduce pest abundances and increase arthropod predation. **Julie Baniszewski** (jxb585@psu.edu), Amanda Burton, Armen Kemanian, Greg Roth and John Tooker, Pennsylvania State Univ., University Park, PA

12:12 **0360** Influence of vacant lot habitat design and landscape context on spider community assembly. **Yvan Delgado de la Flor** (delgadodelaflor.1@osu.edu) and Mary Gardiner, The Ohio State Univ., Columbus, OH

12:22 **0361** Effect of nonnative vegetation on carabid beetle community composition in urban forests. **J. Christina Mitchell** (jcmitch5@ncsu.edu)¹, Steven Frank¹ and Vincent D'Amico², ¹North Carolina State Univ., Raleigh, NC, ²USDA - Forest Service, Newark, DE

Grad 10-min: P-IE, Invasives and Tree Pests

Meeting Room 203 (Convention Centre)

Moderators: Teresia Nyoike¹ and Bridget O'Neill², ¹BASF Corporation, Research Triangle Park, NC, ²DuPont Crop Protection, Wilmington, DE

10:10 **0362** Characterization of sooty molds associated with *Lycorma delicatula* (White) over time and plant species. **Mariam Taleb** (mbt28@psu.edu) and Julie Urban, Pennsylvania State Univ., University Park, PA

10:20 **0363** The development of barcoding of different species of planthoppers (Hemiptera: Fulgoroidea). **Alessandra Humphries** (allyhump@me.com)¹ and Brian Bahder², ¹Univ. of Florida, Davie, FL, ²Univ. of Florida, Fort Lauderdale, FL

10:30 **0364** How has invasive species, *Metcalfa pruinosa* (Hemiptera: Flatidae), spread so quickly in Korea? **Min-Jung Kim** (2017-24294@snu.ac.kr) and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

10:40 **0365** Cities boost invasive species development and survival. **Kristi Backe** (kbacke@ncsu.edu)¹, Jérôme Rousselet², Steven Frank¹ and Alain Roques², ¹North Carolina State Univ., Raleigh, NC, ²INRA, Orléans, France

10:50 **0366** Contributions to risk assessment for *Bagrada hilaris* to Florida. **Sage Thompson** (sagemthompson@ufl.edu), Morgan Pinkerton, Amanda Hodges and Norman Leppla, Univ. of Florida, Gainesville, FL

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0367** Novel methods for rearing the *Bagrada* bug, *Bagrada hilaris*. **Morgan Pinkerton** (morgan0402@ufl.edu), Amanda Hodges and Norman Leppla, Univ. of Florida, Gainesville, FL

11:12 **0368** Collaborative investigation of the lily leaf beetle (*Liloceris lili*) in Washington State. **Maggie Freeman** (mfreeman@agr.wa.gov)¹, Chris Looney¹, Todd Murray², Brant Carman³ and David Crowder², ¹Washington State Dept. of Agriculture, Olympia, WA, ²Washington State Univ., Pullman, WA, ³Washington State Dept. of Agriculture, Yakima, WA

11:22 **0369** Oviposition preference and potential alternate hosts of *Anthonomus eugenii* in southern Ontario. **D. Catalina Fernández** (catalina.fernandez@canada.ca)^{1,2}, Sherah L. VanLaerhoven¹ and Roselyne Labbé², ¹Univ. of Windsor, Windsor, ON, Canada, ²Agriculture and Agri-Food Canada, Harrow, ON, Canada

11:32 **0370** Quantifying the effects of planting urban oaks outside their natural geographic range. **Ian McAreavy** (lcmcareav@ncsu.edu) and Steven Frank, North Carolina State Univ., Raleigh, NC

11:42 **0371** Degree-day based models for forecasting the occurrence of adult *Conogethes punctiferalis* (Lepidoptera: Crambidae) in chestnut production area. **Kyusoon Kim** (ploto1122@snu.ac.kr), Sunghoon Baek and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

11:52 **0372** Evaluation of alternative materials for plum curculio management in peaches. **Tzu-Chin Liu** (jean2036@uga.edu) and Brett Blaauw, Univ. of Georgia, Athens, GA

12:02 **0373** Optimizing monitoring plans for cat-facing pests of Florida peaches. **Cory Penca** (cpenca@ufl.edu) and Amanda Hodges, Univ. of Florida, Gainesville, FL

12:12 **0374** Olive pests in Florida: A survey of arthropods in north central Florida olive groves. **Eleanor Phillips** (eleanorphillips@ufl.edu)¹, Sandra A. Allan² and Jennifer Gillett-Kaufman¹, ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Gainesville, FL

Grad 10-min: P-IE, IPM, Field Crops 2

Meeting Room 220 (Convention Centre)

Moderators: Greg Hodges¹ and Alana Jacobson², ¹Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ²Auburn Univ., Auburn, AL

10:10 **0375** Are hybrid rice cultivars more tolerant to root injury by rice water weevils than conventional inbred rice cultivars?

James Michael Villegas (jamesvillegas12@gmail.com)¹, Nick Bateman², Gus Lorenz³, Jeff Gore⁴, Michael (Mo) Way⁵, Blake Wilson¹ and Mike Stout¹, ¹Louisiana State Univ., Baton Rouge, LA, ²Univ. of Arkansas Division of Agriculture, Stuttgart, AR, ³Univ. of Arkansas, Lonoke, AR, ⁴Mississippi State Univ., Stoneville, MS, ⁵Texas A&M AgriLife Research, Beaumont, TX

10:20 **0376** Integration of chemical and cultural control methods for the control of *Lissorhoptrus oryzophilus* (Coleoptera: Curculionidae) and lepidopteran stem borers in Louisiana rice.

Megan Mulcahy (mmulca2@lsu.edu), Blake Wilson and Thomas Reagan, Louisiana State Univ., Baton Rouge, LA

10:30 **0377** Boll weevil (*Anthonomus grandis grandis* Boheman) population genomics as a tool for monitoring and areawide management. **Tyler Raszick** (tjraszick@gmail.com)¹, Charles Suh², Raul Ruiz-Arce³ and Gregory Sword¹, ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, College Station, TX, ³USDA - APHIS, Edinburg, TX

10:40 **0378** Monitoring wheat midge in the north: Comparing commercially available monitoring tools. **Amanda Jorgensen** (amjorgen@ualberta.ca)¹, Jennifer Otani², Regine Gries³ and Maya Evenden¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ³Simon Fraser Univ., Burnaby, BC, Canada

10:50 **0379** Aphid and barley yellow dwarf management in wheat. **Clay Perkins** (clamperk@vols.utk.edu), Scott Stewart and Heather Kelly, Univ. of Tennessee, Jackson, TN

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0380** Effects of crop type and canopy cover on wheat midge (*Sitodiplosis mosellana*) and assemblages of ground beetles (Coleoptera: Carabidae) in the Peace River region. **Shelby Dufton** (shelby.dufton@uleth.ca)¹, Jennifer Otani², Kevin Floate³, Robert Laird¹ and Owen Olfert⁴, ¹Univ. of Lethbridge, Lethbridge, AB, Canada, ²Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ³Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ⁴Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

11:12 **0381** Evaluation of insecticide efficacy and damage by *Oebalus pugnax* (Hemiptera: Pentatomidae) on barley. **Yaziri Gonzalez** (yazgonzalez17@uky.edu)¹, Raul T. Villanueva¹ and Ric Bessin², ¹Univ. of Kentucky, Princeton, KY, ²Univ. of Kentucky, Lexington, KY

11:22 **0382** Impacts of agronomic practices on *Lygus* (Hemiptera: Miridae) in quinoa. **Elisabeth Oeller** (elisabeth.oeller@wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

11:32 **0383** Detecting sugarcane aphid (*Melanaphis sacchari*) infestation in grain sorghum (*Sorghum bicolor*) using leaf spectral response. **Grace Craigie** (craigieg@ksu.edu) and Brian McCornack, Kansas State Univ., Manhattan, KS

11:42 **0384** Integrating lab and field data in the establishment of a pheromone-based action threshold for the Swede midge (*Contarinia nasturtii* Kieffer) in canola (*Brassica napus* L.). **Matthew Muzzatti** (muzzattm@uoguelph.ca)¹, Boyd Mori², Arthur Schaafsma³ and Rebecca Hallett¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ³Univ. of Guelph, Ridgetown, ON, Canada

11:52 **0385** Comparison of tally-based thresholds and density-based thresholds for sugarcane aphid management. **John Gordy** (john.gordy@ag.tamu.edu)¹, Michael Brewer² and Michael (Mo) Way³, ¹Texas A&M Univ., Rosenberg, TX, ²Texas A&M AgriLife Research, Corpus Christi, TX, ³Texas A&M AgriLife Research, Beaumont, TX

12:02 **0386** Can aboveground potato leafhopper (*Empoasca fabae*) feeding disrupt belowground nitrogen fixation in alfalfa? **Morgan Thompson** (mthomps1@terpmail.umd.edu) and Bill Lamp, Univ. of Maryland, College Park, MD

Grad 10-min: P-IE, Landscape

Meeting Room 205 (Convention Centre)

Moderators: Lamar Buckelew¹ and Fred Musser², ¹FMC Agricultural Solutions, Davenport, IA, ²Mississippi State Univ., Mississippi State, MS

10:10 **0387** Effect of landscape on movement of Japanese beetles into vineyards across southern Wisconsin. **Jacob Henden** (jlhenden@wisc.edu) and Christelle Guédot, Univ. of Wisconsin, Madison, WI

10:20 **0388** Landscape-mediated changes in predation risk trigger phenotypic trait variation among populations of the Colorado potato beetle. **Ricardo Perez-Alvarez** (mrp245@cornell.edu)¹, Natasha Tigreros², Jennifer Thaler¹ and Katja Poveda¹, ¹Cornell Univ., Ithaca, NY, ²Univ. of Arizona, Tucson, AZ

10:30 **0389** Effects of impervious surface in the landscape on overwintering survival of evergreen bagworm. **Sujan Dawadi** (sdawadi@purdue.edu) and Clifford Sadof, Purdue Univ., West Lafayette, IN

10:40 **0390** Western corn rootworm abundance, injury to maize, and resistance to Cry3Bb1 in the local landscape of previous problem fields. **Coy St. Clair** (cstclair@iastate.edu)¹, Graham P. Head² and Aaron Gassmann¹, ¹Iowa State Univ., Ames, IA, ²Monsanto Company, St. Louis, MO

10:50 **0391** Landscape ecology of the wheat stem sawfly and its natural enemies in Nebraska. **Bethany Bergstrom** (bbergstrom4@unl.edu)¹, Gary Hein¹ and Jeffrey Bradshaw², ¹Univ. of Nebraska, Lincoln, NE, ²Univ. of Nebraska, Scottsbluff, NE

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0392** What drives the spatial distribution of adult mosquitoes? Mark-recapture experiments and landscape-level modeling of adult mosquitoes in Winnipeg, Manitoba. **Martine Balcaen** (martine.e.balcaen@gmail.com) and Richard Westwood, The Univ. of Winnipeg, Winnipeg, MB, Canada

11:12 **0393** Bottom-up vs. top-down mediated effects of temperature and rainfall on population dynamics of the Ranchman's tiger moth (*Arctia virginialis*). **Adam Pepi** (aapepi@ucdavis.edu), Patrick Grof-Tisza, Marcel Holyoak and Richard Karban, Univ. of California, Davis, CA

11:22 **0394** Distribution and abundance of parasitoids of the swede midge, *Contarinia nasturtii*, in Ontario. **Charles-Etienne Ferland** (cferland@uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada

11:32 **0395** Does prey diversity of foraging *Cerceris fumipennis* reflect surrounding habitat? **Marie Hallinen** (halli154@umn.edu)¹, Jennifer Schultz¹, Christopher Mallet², Jennifer Burlington², Jon Osthus² and Brian Aukema¹, ¹Univ. of Minnesota, St. Paul, MN, ²Minnesota Dept. of Agriculture, St. Paul, MN

11:42 **0396** When and where: Building a population dynamics model to understand outbreaks of an invasive midge. **Jenny Liu** (liu31@uoguelph.ca)¹, Boyd Mori², Ross Weiss², Owen Olfert², Jonathan Newman¹ and Rebecca Hallett¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

11:52 **0397** Raindrops keep falling on some eggs: The impact of rainfall on diamondback moth eggs on different leaf surfaces. **Md. Mahbubur Rahman** (md.rahman1@uq.net.au), Michael J. Furlong and Myron Zalucki, Univ. of Queensland, Brisbane, Australia

12:02 **0398** Two galling insects: Competition and facilitation across spatial scales. **Theresa Barosh** (theresa.barosh@colostate.edu) and Paul Ode, Colorado State Univ., Fort Collins, CO

12:12 **0399** Land-use intensity and aphid natural enemies in Paysandú, Uruguay. **Sara Emery** (semery@berkeley.edu)¹, Mattias Jonsson², Adela Ribeiro³ and Nicholas Mills¹, ¹Univ. of California, Berkeley, CA, ²Swedish Univ. of Agricultural Sciences, Uppsala, Sweden, ³Univ. de la República, Paysandú, Uruguay

12:22 **0400** When a superpest fails: Ecological and evolutionary factors mitigating Colorado potato beetle adaptation to insecticides. **Michael S. Crossley** (mccrossley3@gmail.com)¹, Zachary Cohen¹, Benjamin Pelissie¹, Silvia Rondon², David J. Hawthorne³, Yolanda Chen⁴ and Andrei Alyokhin⁵, ¹Univ. of Wisconsin, Madison, WI, ²Oregon State Univ., Hermiston, OR, ³Univ. of Maryland, College Park, MD, ⁴Univ. of Vermont, Burlington, VT, ⁵Univ. of Maine, Orono, ME

Grad 10-min: P-IE, Pollinator Habitat

Meeting Room 221/222 (Convention Centre)

Moderators: Don Henne¹ and Ayman Mostafa², ¹Lakehead Univ., Thunder Bay, ON, Canada, ²Univ. of Arizona, Phoenix, AZ

10:10 **0401** Do conservation reserve program pollinator plantings support diverse and abundant native bee communities? **Alexandra Morpew** (alexandra.r.morpew@gmail.com)¹, Mary Liz Jameson¹, Gregory Houseman¹, William Jensen² and Molly Reichenborn¹, ¹Wichita State Univ., Wichita, KS, ²Emporia State Univ., Emporia, KS

10:20 **0402** What influences honey bee (*Apis mellifera*) recruitment to prairie flowers in the upper Midwest? **Morgan Carr-Markell** (carrm163@umn.edu) and Marla Spivak, Univ. of Minnesota, St. Paul, MN

10:30 **0403** Wild bee community response to landscape-scale urbanization and local-scale floral resource availability at urban farms and community gardens in southeast Michigan. **Caleb Wilson** (cwilson2@oakland.edu) and Mary Jamieson, Oakland Univ., Rochester, MI

10:40 **0404** Floral plantings in agroecosystems: Implementing ecological intensification to conserve pollinators and promote biological control of pests. **Eric Middleton** (middl145@umn.edu), Univ. of Minnesota, Minneapolis, MN

10:50 **0405** Evaluating prairie restoration success using plant-pollinator network analysis. **Julia Brokaw** (julia.n.brokaw@gmail.com)¹, Elisabeth Anderson², Lauren Gedlinske², Logan Rowe², Jason Gibbs³, Thomas Wood² and Rufus Isaacs², ¹Univ. of Minnesota, St. Paul, MN, ²Michigan State Univ., East Lansing, MI, ³Univ. of Manitoba, Winnipeg, MB, Canada

11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)

11:02 **0406** Associations between moth pollinators and common garden plants. **Nicole Wonderlin** (wonder1@msu.edu) and Peter White, Michigan State Univ., East Lansing, MI

11:12 **0407** Can alternative flower resources mitigate negative effects of neonicotinoids on the reproductive success of wild bees? **Felix Klaus** (felix.klaus@uni-goettingen.de), Ingo Grass and Teja Tschardt, Georg August Univ., Göttingen, Germany

11:22 **0408** Field design can enhance cross-pollination by wild bees in strawberry (*Fragaria x ananassa*) crops. **Gail MacInnis** (gail.macinnis@mail.mcgill.ca)¹, Jessica Forrest² and Christopher Buddle¹, ¹McGill Univ., Ste-Anne-de-Bellevue, QC, Canada, ²Univ. of Ottawa, Ottawa, ON, Canada

11:32 **0409** Pollinator refuges and ticks in eastern Virginia and Maryland. **Christopher McCullough** (ctmccull@vt.edu) and Megan E. O'Rourke, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:42 **0410** Do prairies provide enhanced forage for the honey bee *Apis mellifera* (Hymenoptera: Apidae) in an intensively cultivated landscape? **Ge Zhang** (gezhang@iastate.edu)¹, Adam Dolezal², Lisa A. Schulte¹, Amy Toth¹ and Matthew O'Neal¹, ¹Iowa State Univ., Ames, IA, ²Univ. of Illinois, Champaign, IL

11:52 **0411** Does the seeding of wildflower patches on Nebraska roadsides improve wild bee habitat? **Kayla A. Mollet** (kayla.mollet@huskers.unl.edu), Judy Wu-Smart, Walter Schacht and Jon Soper, Univ. of Nebraska, Lincoln, NE

12:02 **0412** Competitive effects, resource overlap, and floral preference among native and introduced honey bees. **Chet Bhatta** (bhattachet@ku.edu) and Deborah Smith, The Univ. of Kansas, Lawrence, KS

12:12 **0413** An oasis in the desert: Evaluating contour buffer strips within agricultural fields as habitat for native bees in Iowa. **Morgan Mackert** (mmackert@iastate.edu) and Mary Harris, Iowa State Univ., Ames, IA

Grad 10-min: P-IE, Spotted-Wing Drosophila

Meeting Room 208/209 (Convention Centre)

Moderators: Lily Calderwood¹ and Chris Hedstrom², ¹Univ. of Maine, Orono, ME, ²Oregon Dept. of Agriculture, Salem, OR

10:10 **0414** Lethal and sub-lethal effects of ozonated water on the invasive fruit pest, *Drosophila suzukii*. **Benjamin Savage** (savagebe@msu.edu) and Matt Grieshop, Michigan State Univ., East Lansing, MI

10:20 **0415** Susceptibility of Wisconsin tart cherries (*Prunus cerasus*) to spotted-wing drosophila (*Drosophila suzukii*) and survey of native natural enemies. **Matthew Kamiyama** (mkamiyama@wisc.edu) and Christelle Guédot, Univ. of Wisconsin, Madison, WI

10:30 **0416** Landscape influences on spotted-wing drosophila (*Drosophila suzukii*) in northcentral Kentucky. **Ryan Kuesel** (r.kuesel@uky.edu) and David Gonthier, Univ. of Kentucky, Lexington, KY

10:40 **0417** Does size matter? Using body measurements to differentiate *Drosophila suzukii* seasonal morphs. **Anh K. Tran** (aktran@umn.edu)¹, Mark Asplen² and William D. Hutchison¹, ¹Univ. of Minnesota, St. Paul, MN, ²Metropolitan State Univ., St. Paul, MN

- 10:50 **0418** *Drosophila suzukii* in wine grapes: Phenology and varietal resistance in a Minnesota breeding program. **Dominique Ebbenga** (ebbe0031@umn.edu), Eric C. Burkness, Matthew Clark and William D. Hutchison, Univ. of Minnesota, St. Paul, MN
- 11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)
- 11:02 **0419** Interactions of olfaction and vision for *Drosophila suzukii*. **Grant Bolton** (gbc4@mail.missouri.edu)¹, Bruce Barrett¹ and Jaime Pinero², ¹Univ. of Missouri, Columbia, MO, ²Univ. of Massachusetts, Amherst, MA
- 11:12 **0420** The potential of natural enemies for control of the invasive *Drosophila suzukii*. **Phanie Bonneau** (phanie.bonneau.1@ulaval.ca)¹, Valérie Fournier¹, Justin Renkema² and Annabelle Firlej³, ¹Univ. Laval, Québec City, QC, Canada, ²Univ. of Florida, Wimauma, FL, ³Institut de recherche et de développement en agroenvironnement, Saint-Bruno-de-Montarville, QC, Canada
- 11:22 **0421** Biorational insecticide evaluation for *Drosophila suzukii* management in small fruits. **Lindsay Iglesias** (lei7@cornell.edu)¹ and Oscar Liburd², ¹Cornell Univ., Geneva, NY, ²Univ. of Florida, Gainesville, FL
- 11:32 **0422** Evaluating the effects of environmental factors and farm management practice on *Drosophila suzukii* abundance in blueberry orchards of southeast Georgia. **Clarence Green** (clarence.green25@uga.edu)¹, Patricia Moore¹, Michael Toews² and Ashfaq Sial¹, ¹Univ. of Georgia, Athens, GA, ²Univ. of Georgia, Tifton, GA
- 11:42 **0423** Monitoring for insecticide resistance in spotted-wing drosophila (*Drosophila suzukii*) in Georgia. **Nathan Spaulding** (nathan.spaulding@uga.edu) and Ashfaq Sial, Univ. of Georgia, Athens, GA
- 11:52 **0424** Impact of insecticide treatments on immature life stages of *Drosophila suzukii* (Matsumura). **Jamal Hunter** (jhunter7stallions@gmail.com) and Ashfaq Sial, Univ. of Georgia, Athens, GA
- 12:02 **0425** Reducing spotted-wing drosophila reproductive habitat by composting fruit wastes. **Holly Hooper** (hooperho@msu.edu) and Matthew Grieshop, Michigan State Univ., East Lansing, MI
- 12:12 **0426** Associations between *Drosophila suzukii* and fruit-rot fungi in fall red raspberries. **Margaret Lewis** (mlewis@umd.edu) and Kelly Hamby, Univ. of Maryland, College Park, MD

- 10:40 **0430** Evaluation of the effects of cover crops on the infestation rate, feeding damage, and pupal development of western bean cutworm (*Striacosta albicosta*) in field corn. **Ethan Hoffart** (hoffartethan@gmail.com)¹, Katharine Swoboda Bhattarai² and Julie Peterson², ¹Univ. of Nebraska, Hastings, NE, ²Univ. of Nebraska, North Platte, NE
- 10:50 **0431** Sweet choices: Honeydew sugar preferences in the western carpenter ant, *Camponotus modoc*. **Jan Lee** (leejanl@sfu.ca), Asim Renyard, Regine Gries and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada
- 11:00 Remembrance Day: Act of Remembrance (2 minutes of silence)
- 11:02 **0432** Attraction of the western carpenter ant, *Camponotus modoc*, to aphid honeydew odorants. **Ashley Munoz** (amunoz@sfu.ca), Asim Renyard, Regine Gries, Santosh Kumar and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada
- 11:12 **0433** A microcontroller-based acoustic trap for southern and tawny mole crickets in Florida. **Stephen Berkner** (sberkner18@gmail.com)¹, Anthony Dermody¹, Barukh Rohde¹, Richard Mankin² and Adam Dale¹, ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Gainesville, FL

- 11:22 **0434** Development of an acoustic recording device for stored grain insects. **Ethan Jetter** (ejetter19@gmail.com)¹, Barukh Rohde¹ and Richard Mankin², ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Gainesville, FL

- 11:32 **0435** Hypersensitive response by Brazilian peppertree to *Calophya* spp. feeding. **Rachel Watson** (rachelw2525@gmail.com)¹, Sara Astudillo², Patricia Prade², Carey Minter² and James Cuda¹, ¹Univ. of Florida, Gainesville, FL, ²Univ. of Florida, Fort Pierce, FL

- 11:42 **0436** Predator populations of potato leafhoppers on resistant and non-resistant alfalfa. **Kenneth Koeplinger** (kmk5683@psu.edu), Sarah McTish and John Tooker, Pennsylvania State Univ., University Park, PA

- 11:52 **0437** Effects of inert granite dust on *Lilium* spp. volatile emissions and herbivory response of the lily leaf beetle, *Lilioceris lili* (Scopoli) (Coleoptera: Chrysomelidae). **Megan MacIsaac** (131232m@acadiu.ca), Nicoletta Faraone and Kirk Hillier, Acadia Univ., Wolfville, NS, Canada

3-min: All Sections

Meeting Room 201 (Convention Centre)

Moderators: Bill Riel¹ and Surendra Dara², ¹Natural Resources Canada, Victoria, BC, Canada, ²Univ. of California Cooperative Extension, San Luis Obispo, CA

Due to the rapid speed of delivery, specific times are not listed for individual talks in this section. Each talk will be limited to a total of 3 minutes; talks will be given in sequential order as listed below starting at 10:35 AM with no pauses for no-show presenters.

10:35 AM – 12:45 PM

0438 *Anopheles gambiae*, vecteur majeur du paludisme à Logbessou, zone péri-urbaine de Douala (Cameroun). **NGO Hondt Etoile** (etoileetoile10@yahoo.fr), Univ. of Douala, Douala, Cameroon

0439 Relative insecticidal efficacy of three spatial repellents against *Aedes aegypti*. **Yuan Shen** (sarayshen@163.com)¹, Yuan Shen¹, Rui-De Xue² and Christopher Bibbs², ¹Wuxi Center for Disease Control and Prevention, Wuxi, China, ²Anastasia Mosquito Control District, St. Augustine, FL

Undergrad 10-min: P-IE 2

Meeting Room 207 (Convention Centre)

Moderators: Kaitlin Chapman¹ and Regina Karin Cruzado Gutierrez², ¹Univ. of Nebraska, Lincoln, NE, ²Univ. of Idaho, Aberdeen, ID

10:10 **0427** Effects of golf course pollinator conservation habitats on ground-dwelling arthropod communities. **Grace Cope** (gracecameron@ufl.edu), Rebecca Perry, Nicole B. Benda and Adam Dale, Univ. of Florida, Gainesville, FL

10:20 **0428** Behavioral responses of *Tribolium castaneum* and *Rhyzopertha dominica* to commercially available multi-species lures and assessment of dose dependency in wind tunnel and release-recapture assays. **Matt Hamblin** (mkhamblin@ksu.edu)¹ and Rob Morrison², ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS

10:30 **0429** Impact of heat stress on interaction between wheat resistance genes and Hessian fly biotypes. **Jordan O'Neal** (joneal@uncfsu.edu), Daria Brown, Jiazheng Yuan and Lieceng Zhu, Fayetteville State Univ., Fayetteville, NC

0440 PCR-based bloodmeal analysis of *Aedes aegypti* and *Culex quinquefasciatus* mosquitoes in St. George Parish, Grenada. **Daniel Fitzpatrick** (dfitzpat@sgu.edu), Lindsey Hattaway, Andy Hsueh, Maria Ramos-Nino and Sonia Cheetham, St. George's Univ., True Blue, Grenada

0441 Males of *Culex pipiens* respond to photoperiod and influence seasonal differences in female reproductive physiology. **Megan Meuti** (meuti.1@osu.edu), The Ohio State Univ., Columbus, OH

0442 Reproduction control of *Aedes aegypti* via Notch signaling pathway. **Shin-Hong Shiao** (shshiao@ntu.edu.tw), National Taiwan Univ., Taipei, Taiwan

0443 Bioecology study of *Anopheles barbirostris*, a vector of *Brugia timori* in paddy field area of Pondok Village, West Umbu Raturunggay District, Central Sumba Regency, Indonesia. **Tri Baskoro Tunggal Satoto** (tribaskoro@ugm.ac.id)¹ and Soleman Landi², ¹Univ. Gadjah Mada, Yogyakarta, Indonesia, ²State Health Polytechnic of Kupang, Kupang, Indonesia

0444 Engaging undergraduate STEM minorities in entomological research in Malaysian Borneo. **Robin Verble** (robin.verble@ttu.edu)¹, Sarah Fritts² and Tigga Kingston¹, ¹Texas Tech Univ., Lubbock, TX, ²Texas State Univ., San Marcos, TX

0445 Presentation withdrawn

Remembrance Day: Act of Remembrance (2 minutes of silence)

10-minute Break #1

0446 How do you teach entomology to 520 students at once? **Craig J. Coates** (c-coates@tamu.edu), Texas A&M Univ., College Station, TX

0447 20-year changes in abundance and richness of North American ant communities: A nonlinear response to temperature. **Karl Roeder** (karoeder@ou.edu)¹, Jelena Bujan², Michael Weiser¹ and Michael Kaspari¹, ¹Univ. of Oklahoma, Norman, OK, ²Univ. of Louisville, Louisville, KY

0448 Presentation withdrawn

0449 Elevated temperature reduces differential plant secondary metabolite sequestration by two aphid species. Eva Medina¹, James Den Uyl¹, Maria Mullins¹ and **Emily Mooney** (emooney@uccs.edu)^{1,2}, ¹Univ. of Colorado, Colorado Springs, CO, ²Rocky Mountain Biological Laboratory, Crested Butte, CO

0450 The role of symbiotic micorbes in insect invasions. **Min Lu** (lumin@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

0451 A review of the abdominal tubercles in Lepidoptera. **Ricardo Castro-Torres** (castro.ricardo@colpos.mx)¹, Celina Llanderal-Cázares¹, Jesús Romero-Nápoles¹, Héctor González-Hernández¹, David Cibrián-Tovar² and Julio Rojas-León³, ¹Colegio de Postgraduados, Texcoco, Mexico, ²Univ. Autónoma Chapingo, Chapingo, Mexico, ³El Colegio de la Frontera Sur, Tapachula, Mexico

0452 Investigating mutualisms in invasive insect pests. **Jocelyn R. Holt** (holtjocelyn@tamu.edu) and Raul F. Medina, Texas A&M Univ., College Station, TX

0453 Semiochemical pollination enhancement: Improving crop yields and honeybee hive health. **Joey Palomera** (joey.palomera@iscatech.com), Agenor Mafrá-Neto, Rodrigo Silva, William Urrutia and Jesse Saroli, ISCA Technologies, Inc., Riverside, CA

10-minute Break #2

0454 Bees in the city: Benefits of urban prairies for pollinators. **Mia Park** (mia.park@ndsu.edu)¹, Vincent Oliveras², Joseph P. Rinehart³, Julia Bowsher¹ and Kendra Greenlee¹, ¹North Dakota State Univ., Fargo, ND, ²Univ. of Idaho, Moscow, ID, ³USDA - ARS, Fargo, ND

0455 Bee pollination highly improves oil quality in sunflower. Carina Silva, Wesley Godoy and **Denise Alves** (daalves@usp.br), Univ. de São Paulo, Piracicaba, Brazil

0456 Bee Inspired Evaluation (BIE) algorithms lead to faster and optimal decision making by diverse organizations. Molly Sturgis and **Marianne Alleyne** (vanlaarh@illinois.edu), Univ. of Illinois, Champaign, IL

0457 Expanding the range of the parasitoid wasp, *Trissolcus japonicus*, (Hymenoptera: Scelionidae) in New York State. **Peter Jentsch** (pj5@cornell.edu)¹ and Arthur Agnello², ¹Cornell Univ., Highland, NY, ²Cornell Univ., Geneva, NY

0458 Identifying climatically suitable areas for the coexistence of the Asian citrus psyllid, *Diaphorina citri* (Hemiptera: Liviidae) and its parasitoid, *Tamarixia radiata* (Hymenoptera: Eulophidae), using a fuzzy logic-based index. **Adriano Garcia** (adrianogomesgarcia@gmail.com) and José Parra, Univ. de São Paulo, Piracicaba, Brazil

0459 A “neo” take on an old problem: Stimulation of spider mite populations with neonicotinoid insecticides. **Richard Hilton** (richard.hilton@oregonstate.edu), Oregon State Univ., Central Point, OR

0460 First US releases of *Hypena opulenta*, a biological agent of swallow-worts (*Vincetoxicum spp.*). **Lisa Tewksbury** (lisat@uri.edu) and Alana Russell, Univ. of Rhode Island, Kingston, RI

0461 Presentation withdrawn

0462 Potential use of sugar-based adjuvant to enhance field efficacy of foliar applied entomopathogenic fungus. **Ki Kim** (ki@pacificaggroup.com) and Lena Craft, Florida Ag Research, Thonotosassa, FL

0463 Selectivity of insecticides to *Cotesia flavipes* (Cameron, 1891) (Hymenoptera: Braconidae). **Thais Matioli** (thaisf.matioli@usp.br), Inana Schutze and Pedro Yamamoto, Univ. de São Paulo, Piracicaba, Brazil

10-minute Break #3

0464 Preference and consumption of *Diaphorina citri* (Hemiptera: Liviidae) in citrus seedlings treated with different concentrations of kaolin. **Inana Schutze** (inana.schutze@usp.br) and Pedro Yamamoto, Univ. de São Paulo, Piracicaba, Brazil

0465 CBB Repel, an effective long-lasting repellent system for the coffee berry borer, *Hypothenemus hampei* (Coleoptera: Curculionidae). **Rafael Borges** (rafael@isca.com.br)¹, Rodrigo Silva², Augusto Melo³, Camillia Borges¹, Jesse Saroli² and Agenor Mafrá-Neto², ¹ISCA Tecnologias Ltda, Ijuí, Brazil, ²ISCA Technologies, Inc., Riverside, CA, ³Fazenda Pedreira, Cabo Verde, Brazil

0466 ACTTRA Plutella: A semiochemical attractant for diamondback moth, *Plutella xylostella* (Lepidoptera: Plutellidae). **Rodrigo Silva** (rodrigo.silva@iscatech.com)¹, Juan Delgado², Rafael Borges³, William Urrutia¹, Joey Palomera¹ and Agenor Mafrá-Neto¹, ¹ISCA Technologies, Inc., Riverside, CA, ²NOVUS, Celaya, Mexico, ³ISCA Tecnologias Ltda, Ijuí, Brazil

0467 SPLAT Verb: A semiochemical-based strategy for managing pine beetles at the individual pine and small stand level. **Agenor Mafrá-Neto** (agenor1@iscatech.com)¹, Christopher J. Fetting², Robert A. Progar³, Lia Spiegel³, Steve Munson⁴, William Urrutia¹, Revilee Lake¹, Rodrigo Silva¹, Jesse Saroli¹ and Carmem Bernardi¹, ¹ISCA Technologies, Inc., Riverside, CA, ²USDA - Forest Service, Davis, CA, ³USDA - Forest Service, La Grande, OR, ⁴USDA - Forest Service, Ogden, UT

0468 Semiochemical repellent strategies for South America palm weevil (*Rhynchophorus palmarum*) and other beetle pests. **Jesse Saroli** (jessesaroli@iscatech.com)¹, Mark Hoddle², Thomas M. Perring², Carmem Bernardi¹, Rodrigo Silva¹, Francisco Zorzenon³, William Urrutia¹ and Agenor Mafrá-Neto¹, ¹ISCA Technologies, Inc., Riverside, CA, ²Univ. of California, Riverside, CA, ³Instituto Biológico, São Paulo, Brazil

0469 Inscalis™ insecticide and Velifer™ insecticide: Integrated whitefly management using chemical and biological tools. **Jennifer Browning** (jennifer.browning@basf.com), BASF Corporation, Research Triangle Park, NC

0470 Thrips attractant: An effective tank mix based attract-and-kill system for *Thrips spp.* **William Urrutia** (william.urrutia@iscatech.com)¹, Rodrigo Silva¹, Rafael Borges², Ruben Machota³ and Agenor Mafrá-Neto¹, ¹ISCA Technologies, Inc., Riverside, CA, ²ISCA Tecnologias Ltda, Ijuí, Brazil, ³Embrapa Uva e Vinho, RS, Brazil

2:35 **0475** Public health value of spatial repellents: Updates from a clinical trial. **Nicole L. Achee** (nachee@nd.edu), Univ. of Notre Dame, South Bend, IN

2:50 **0476** Effective use of repellents in pest management. **Agenor Mafrá-Neto** (president@iscatech.com), ISCA Technologies, Inc., Riverside, CA

3:05 **0477** Bed bug repellency: How to save your luggage. **Emily Kuhns** (emilyhkuhns@gmail.com) and Robert Bedoukian, Bedoukian Research, Inc., Danbury, CT

3:20 Break

3:35 **0478** Community-guided development of a user-applied clothing repellent formulation for arbovirus protection. Thomas Ant, James Logan, Gloria-Isabel Jaramillo and **Robert Jones** (robert.jones@lshrm.ac.uk), London School of Hygiene and Tropical Medicine, London, United Kingdom

3:50 **0479** Use of an attractant in spatial repellency testing. **Joel R. Coats** (jcoats@iastate.edu), Iowa State Univ., Ames, IA

4:05 **0480** Sand fly, *Phlebotomus papatasi*, repellency by components of essential oils conditionally exempt from EPA registration as minimum risk pesticide products under 40 CFR 152.25 (f). **Kevin B. Temeyer** (kevin.temeyer@ars.usda.gov), Adalberto A. Pérez de León, Kristie Schlechte and Mary Huerta, USDA - ARS, Kerrville, TX

4:20 **0481** Tarsal proteomes of biting flies: Insights for repellent discovery. **Robert Renthal** (robert.renthal@utsa.edu)¹ and Adalberto A. Pérez de León², ¹Univ. of Texas, San Antonio, TX, ²USDA - ARS, Kerrville, TX

4:35 **0482** Attraction and effectiveness of four commercial ovitraps for *Aedes aegypti* and *Aedes albopictus*. **John Smith** (docmx8@gmail.com), Taylor Thrall and Cami Adams, Florida State Univ., Panama City, FL

4:50 **0483** Update on insecticide-treated clothing for military and civilian use. **Ulrich Bernier** (uli.bernier@ars.usda.gov), USDA - ARS, Gainesville, FL

5:05 **0484** Repellency activity of several plant-derived essential oils against bed bugs. **Alvaro Romero** (aromero2@nmsu.edu), New Mexico State Univ., Las Cruces, NM

SUNDAY, NOVEMBER 11 • AFTERNOON

Lunch and Learn: Outreach and Educational Program Assessment and Evaluation

City Foyer (Level 2) (Convention Centre)

Moderator and Organizer: Kristine Callis-Duehl, East Carolina Univ., Greenville, NC

12:15 PM - 1:15 PM

MUVE Section Symposium: Crossing Borders in Research and Development of Insect Repellents

Meeting Room 109 (Convention Centre)

Moderator and Organizer: Mustapha Debboun, Harris County Public Health, Houston, TX

1:30 Welcoming remarks

1:35 **0471** Novel screens and chemistry in the search for new repellents. **Jeffrey Bloomquist** (jbquist@epi.ufl.edu)¹, Shiyao Jiang¹, Maia Tsikolia¹ and Liu Yang^{1,2}, ¹Univ. of Florida, Gainesville, FL, ²Auburn Univ., Auburn, AL

1:50 **0472** Relationship between insecticide resistance and repellency, featuring the German cockroach. **Arthur G. Appel** (appelag@auburn.edu), Xiaoyan Wu and Marla J. Eva, Auburn Univ., Auburn, AL

2:05 **0473** Keeping repellents topical: Development of long-lasting PMD (eucalyptus) formulations for personal use. Scott P. Carroll¹, Jenella Loye¹, **Jeffrey Venturino** (jeff@carroll-loye.com)² and John Davies³, ¹Univ. of California, Davis, CA, ²Carroll-Loye Biological Research, Davis, CA, ³Neo-Innova Healthcare Ltd, Thames, United Kingdom

2:20 **0474** Save researchers from mosquito bites! Novel test method to evaluate skin applied repellents without humans. **Linda-Lou O'Connor** (lindalouffy@gmail.com), Anthony Sosa, Kavita Sharma and Tom Mascari, SC Johnson & Son, Inc., Racine, WI

PBT Section Symposium: RNAi: Mechanism of Action and Resistance to dsRNA

Meeting Room 212 (Convention Centre)

Moderators and Organizers: Elane Fishilevich¹, Ana Vélez², William Moar³ and Subba Reddy Palli⁴, ¹Dow AgroSciences, Indianapolis, IN, ²Univ. of Nebraska, Lincoln, NE, ³Monsanto Company, St. Louis, MO, ⁴Univ. of Kentucky, Lexington, KY

1:30 Introductory remarks

1:35 **0485** Mechanism of resistance to dsRNA in Colorado potato beetle. **Swati Mishra** (smishra8@vols.utk.edu)¹, James Dee¹, William Moar², Jodie Beattie² and Juan-Luis Jurat-Fuentes¹, ¹Univ. of Tennessee, Knoxville, TN, ²Monsanto Company, St. Louis, MO

1:50 **0486** Development of resistance to RNAi in western corn rootworm, *Diabrotica virgifera virgifera*. **Amit Sethi** (amit.sethi@pioneer.com)¹, Jian-Zhou (Joe) Zhao², Matt Wihlm¹, Ashley Miles², Erick Hernandez-Chacon¹ and Dianna Gillespie², ¹DuPont Pioneer, Johnston, IA, ²Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

2:05 **0487** Determining the DvSnf7 dsRNA resistance allele frequency in western corn rootworm using F1 and F2 screens. **Chitvan Khajuria** (chitvan.khajuria@monsanto.com)¹, Lex Flagel², Kaylee Miller¹, William Moar¹, Cara Vazquez³, Anilkumar Gowda², Thomas Clark¹ and Graham P. Head¹, ¹Monsanto Company, St. Louis, MO, ²Monsanto Company, Chesterfield, MO, ³Monsanto Company, Waterman, IL

2:20 **0488** Using adult WCR to monitor susceptibility of field populations to RNAi. **Matthew Welter** (mjwelter@huskers.unl.edu)¹, Lance Meinke¹, Chitvan Khajuria², William Moar² and Ana Vélez¹, ¹Univ. of Nebraska, Lincoln, NE, ²Monsanto Company, St. Louis, MO

2:35 **0489** Persistent RNAi response and fitness impact of downregulation of RNAi pathway genes in western corn rootworm. **Ke Wu** (kewu@ufl.edu)¹, Caitlin Taylor¹, Elane Fishilevich², Ken Narva³ and Blair Siegfried¹, ¹Univ. of Florida, Gainesville, FL, ²Alnylam, Cambridge, MA, ³Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

2:50 **0490** RNAi: Revisiting lethal genes, off-target effects and selectivity issues. **Sonja Mehlhorn** (sonjagabriele.mehlhorn.ext@bayer.com)^{1,2}, Gregor Bucher², Julie Ulrich^{1,2}, Sven Geibel¹ and Ralf Nauen¹, ¹Bayer CropScience AG, Monheim, Germany, ²Univ. of Göttingen, Göttingen, Germany

3:05 Break

3:20 **0491** New insights into dsRNA uptake. **Guy Smaghe** (guy.smaghe@ugent.be), Ghent Univ., Ghent, Belgium

3:35 **0492** Determinants of RNAi efficiency in Coleopteran insects. **June-Sun Yoon** (june.yoon@uky.edu), Dhandapani Gurusamy and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

3:50 **0493** Mechanisms affecting RNAi efficiency in insects. **Kun Yan Zhu** (kzhu@ksu.edu)¹, Anastasia Cooper¹, Huifang Song², Jianzhen Zhang² and Kristopher Silver¹, ¹Kansas State Univ., Manhattan, KS, ²Shanxi Univ., Taiyuan, China

4:05 **0494** How do dsRNases affect insect RNAi efficiency? **Jianzhen Zhang** (zjz@sxu.edu.cn)¹, Huifang Song¹, Enbo Ma¹ and Kun Yan Zhu², ¹Shanxi Univ., Taiyuan, China, ²Kansas State Univ., Manhattan, KS

4:20 **0495** A nuclease specific to lepidopteran insects suppresses RNAi. **Ruobing Guan** (guanruobing@sibs.ac.cn) and Xuexia Miao, Chinese Academy of Sciences, Shanghai, China

4:35 Discussion

Member Symposium: Greenhouse Insect Management: Lessons Learned from Research Collaborations (An ESA, ESC, and IOBC Symposium)

Meeting Room 203 (Convention Centre)

Moderators and Organizers: Luis Cañas¹, Erfan Vafaie², Rose Buitenhuis³ and Roselyne Labbe⁴, ¹The Ohio State Univ., Wooster, OH, ²Texas A&M Univ., Overton, TX, ³Vineland Research and Innovation Centre, Vineland Station, ON, Canada, ⁴Agriculture and Agri-Food Canada, Harrow, ON, Canada

1:30 Welcoming remarks

1:35 **0496** Investigating tritrophic interactions of aphid biological control on *Calibrachoa* spp. **John P. Sanderson** (jps3@cornell.edu), Liza White and Priscilla Thompson, Cornell Univ., Ithaca, NY

1:50 **0497** Efficacy of the parasitoid *Jaliscoa hunteri* for the suppression of the pepper weevil, *Anthonomus eugenii* on greenhouse pepper crops. **Roselyne Labbe** (roselyne.labbe@agr.gc.ca), Dana Gagnier, Catalina Fernandez and Rebecca Rizzato, Agriculture and Agri-Food Canada, Harrow, ON, Canada

2:05 **0498** Filling the pollinator protection Venn diagram for greenhouse crops. **Cristi L. Palmer** (clpalmer@njaes.rutgers.edu)¹, James A. Bethke², Christine Casey³, Juang-Hong Chong⁴, Richard Cowles⁵, Daniel Gilrein⁶, Christina Grozinger⁷, Harland Patch⁷, Daniel Potter⁸, David Smitley⁹ and Kimberly Stoner¹⁰, ¹Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, ²Univ. of California Cooperative Extension, San Diego, CA, ³Univ. of California, Davis, CA, ⁴Clemson Univ., Clemson, SC, ⁵Connecticut Agricultural Experiment Station, Windsor, CT, ⁶Cornell Cooperative Extension, Riverhead, NY, ⁷Pennsylvania State Univ., University Park, PA, ⁸Univ. of Kentucky, Lexington, KY, ⁹Michigan State Univ., East Lansing, MI, ¹⁰Connecticut Agricultural Experiment Station, New Haven, CT

2:20 **0499** Effect of growing medium type on survival of fungus gnat, *Bradysia* sp. nr. *coprophila* (Diptera: Sciaridae), larvae and predation by rove beetle, *Dalotia coriaria* (Coleoptera: Staphylinidae) adults. **Nathan Herrick** (nherrick@ksu.edu) and Ray Cloyd, Kansas State Univ., Manhattan, KS

2:35 Break

2:50 **0500** Effect of new IPM tools on greenhouse pests. **Luis Cañas** (canas.4@osu.edu), Nuris Acosta and Carlos Esquivel, The Ohio State Univ., Wooster, OH

3:05 **0501** Banker plants for control of green peach aphid in Oklahoma floriculture. **Eric Rebek** (eric.rebek@okstate.edu)¹ and Tracey Payton Miller², ¹Oklahoma State Univ., Stillwater, OK, ²Langston Univ., Langston, OK

3:20 **0502** How researchers help growers improve pest management practices. **Suzanne Wainwright** (buglady@bugladyconsulting.com), Buglady Consulting, Slatington, PA

3:35 **0503** Are predatory mites efficient vectors for entomopathogenic fungi to their prey? A comparative study. **Gongyu Lin** (gongyu.biocontrol@gmail.com)¹, Sean-Anthony Paolo¹, Silvia Todorova² and Jacques Brodeur¹, ¹Univ. de Montréal, Montréal, QC, Canada, ²Anatis Bioprotection, Inc., Saint-Jacques-le-Mineur, QC, Canada

3:50 Break

4:05 **0504** Effective use of Cyclanilprole-insecticides in floriculture and nursery crops. **Carlos Bogran** (cbogran@ohp.com), OHP Inc, College Station, TX

4:20 **0505** A raging insect below the soil line - IPM options for root mealybug, *Rhizoecus* sp., in production nurseries. **Brian Kunkel** (bakunkel@udel.edu)¹, Stanton Gill², Tom Ilvento¹ and Suzanne Klick³, ¹Univ. of Delaware, Newark, DE, ²Univ. of Maryland, Ellicott City, MD, ³Central Maryland Research and Education Center, Ellicott City, MD

4:35 **0506** Using transgenic plants as greenhouse trap crops: Prospects and lessons learned. **Ian Scott** (ian.scott@agr.gc.ca)¹, Abdelali Hannoufa¹, S. Hughes¹, W. Laur², Tim McDowell¹ and Justin Renaud¹, ¹Agriculture and Agri-Food Canada, London, ON, Canada, ²Univ. of Western Ontario, London, ON, Canada

4:50 **0507** The use of *Isaria fumosorosea* for the control of *Bemisia tabaci* in greenhouse tomatoes and the effect on predatory mite *Amblyseius cucumeris*. **Rogelio Trabanino** (rtrabanino@zamorano.edu), Escuela Agrícola Panamericana, Tegucigalpa, Honduras

5:05 **0508** Starting clean floriculture crops by treating cuttings with dips or sprays. **David Smitley** (smitley@msu.edu)¹ and Rose Buitenhuis², ¹Michigan State Univ., East Lansing, MI, ²Vineland Research and Innovation Centre, Vineland Station, ON, Canada

5:20 **SP0509** Biological management of whiteflies in tomato: Lessons from greenhouse to open field. **Philip Stansly** (tetofox91@hotmail.com)¹, Jose Castillo¹ and Amy L. Roda², ¹Univ. of Florida, Immokalee, FL, ²USDA - APHIS, Miami, FL

Member Symposium: Larry Larson Graduate Student Award for Leadership in Applied Entomology: Celebrating 20 Years of Impacting Future Generations of Leaders in Applied Entomology

Meeting Room 204 (Convention Centre)

Moderators and Organizers: Amanda Jacobson and Luis Gomez, Dow AgroSciences, Indianapolis, IN

1:30 Welcoming remarks

1:35 **0510** The Larry Larson Graduate Student Award for Leadership in Applied Entomology: 20 years of impacting future leaders in applied entomology. **Michael Culy** (mculy@sipcamagro.com)¹ and Melissa Siebert², ¹Sipcam Agro USA, Inc., Carmel, IN, ²Dow AgroSciences, Greenville, MS

1:50 **0511** Perspectives on a career in both academia and industry from the first Larry Larson Award winner. **Thomas Clark** (thomas.l.clark@monsanto.com), Monsanto Company, St. Louis, MO

2:05 **0512** Management of invasive insects: The rise of applied entomology in the United States. **Patrick Tobin** (pctobin@uw.edu), Univ. of Washington, Seattle, WA

2:20 **0513** How time flies: Potential impacts 18 years after my award. **David Held** (dwh0004@auburn.edu), Auburn Univ., Auburn, AL

2:35 **0514** My path through applied entomology, from gene discovery through commercialization. **Pete L. Clark** (pete.clark@genective.com), Genective, Weldon, IL

2:50 **0515** An urban entomologist's dilemma: Which pest or disease vector do you control first? **James Austin** (james.austin@basf.com), BASF Corporation, Research Triangle Park, NC

3:05 **0516** From a small family farm to Corteva Agriscience: The journey to becoming an industry entomologist. **Joshua Temple** (joshua.h.temple@dupont.com), Corteva Agriscience, Agriculture Division of DowDuPont, Bradenton, FL

3:20 Break

3:35 **0517** From academia to a startup ag production company. **Cheri Abraham** (cheri.abraham@uscitrus.com), US Citrus, LLC, Hargill, TX

3:50 **0518** Protect and defend. **Alysha Do** (alysha.m.do.mil@mail.mil), US Air Force, Eielson Air Force Base, AK

4:05 **0519** Pollen nation: Crafting a career in applied bee research. **Natalie Boyle** (natalie.boyle@ars.usda.gov), USDA - ARS, Logan, UT

4:20 **0520** Larry Larson's impact on an urban entomologist. **Zachary DeVries** (zcdevrie@ncsu.edu), North Carolina State Univ., Raleigh, NC

4:35 **0521** What are other past winners currently doing? Luis Gomez¹, **Amanda Jacobson** (ajjacobson@dow.com)¹ and Ashley Leach², ¹Dow AgroSciences, Indianapolis, IN, ²Cornell Univ., Geneva, NY

5:05 Concluding remarks

5:10 Reception

Member Symposium: Novel Changes in Forest Ecosystems and Bark Beetles Due to Global Climatic Changes

Meeting Room 119/120 (Convention Centre)

Moderators and Organizers: Kamal Gandhi¹ and Richard Hofstetter², ¹Univ. of Georgia, Athens, GA, ²Northern Arizona Univ., Flagstaff, AZ

1:30 Welcoming remarks

1:30 **0522** Links between a changing climate and outbreaks of eastern larch beetle, *Dendroctonus simplex*. **Brian Aukema** (brianaukema@umn.edu) and Fraser R. McKee, Univ. of Minnesota, St. Paul, MN

1:45 **0523** The southern pine beetle: An old pest in new places and old places. **Matthew Ayres** (matthew.p.ayres@dartmouth.edu)¹, Jeffrey Lombardo², Jessica Cancelliere³, Carissa Aoki¹, Kevin J. Dodds⁴ and Kenneth Clark⁵, ¹Dartmouth College, Hanover, NH, ²Utica College, Utica, NY, ³New York State Dept. of Environmental Conservation, Delmar, NY, ⁴USDA - Forest Service, Durham, NH, ⁵USDA - Forest Service, New Lisbon, NJ

2:00 **0524** Potential influences of changing climate on mountain pine beetle performance. **Barbara J. Bentz** (bbentz@fs.fed.us), USDA - Forest Service, Logan, UT

2:15 **0525** Factoring the pine host into mountain pine beetle range expansion. **Janice E. K. Cooke** (janice.cooke@ualberta.ca)¹, Elizabeth Mahon², Colleen Fortier¹, Cathy Cullingham¹, Rhiannon Peery¹, L. Irina Zaharia³ and David Coltman¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²The Univ. of British Columbia, Vancouver, BC, Canada, ³National Research Council, Saskatoon, SK, Canada

2:30 Break

2:45 **0526** Comparison of phytochemicals between historical and novel hosts justifies host range explanation by mountain pine beetle. **Nadir Erbilgin** (nadir.erbilgin@afne.ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

3:00 **0527** Effects of climate on bark beetle communities: Does temperature affect mite and fungal symbionts? **Richard Hofstetter** (rich.hofstetter@nau.edu)¹, Sneha Vissa¹, Barbara J. Bentz² and David Soderberg², ¹Northern Arizona Univ., Flagstaff, AZ, ²USDA - Forest Service, Logan, UT

3:15 **0528** Global change and invasion potential of bark beetles. **Deepa S. Pureswaran** (deepa.pureswaran@nrcan-rncan.gc.ca)¹, Rylee Isitt², Bjorn Okland³, Paal Krokene³, Jon Sweeney⁴ and Stephen Heard², ¹Natural Resources Canada, Québec City, QC, Canada, ²Univ. of New Brunswick, Fredericton, NB, Canada, ³Norwegian Institute of Bioeconomy Research, Ås, Norway, ⁴Natural Resources Canada, Fredericton, NB, Canada

3:30 Concluding remarks

Member Symposium: Soil Mites: Minute Arthropods with a Monumental Role

Meeting Room 116/117 (Convention Centre)

Moderators and Organizers: Zoë Lindo¹, Samuel Bolton² and Monica Farfan³, ¹Western Univ., London, ON, Canada, ²Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ³Clemson Univ., Charleston, SC

1:30 Introductory remarks

1:35 **0529** Oribatid mite diversity across a heterogeneous landscape of trembling aspen, fescue grassland and invasive smooth brome plant communities. **Lisa Lumley** (lisa.lumley@hotmail.com), Ashley Thorsen, Victoria Giacobbo and Tyler Cobb, Royal Alberta Museum, Edmonton, AB, Canada

1:50 **0530** The rutellum: The Swiss Army knife of endostigmatid mites. **Samuel Bolton** (samuel.bolton@freshfromflorida.com)¹, Gary R. Bauchan² and Ronald Ochoa², ¹Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ²USDA - ARS, Beltsville, MD

2:05 **0531** Exploring the diversity of Canadian mites with DNA barcodes. **Monica Young** (myoung02@uoguelph.ca)¹, Jeremy deWaard¹, Heather C. Proctor² and Paul Hebert¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Univ. of Alberta, Edmonton, AB, Canada

2:20 **0532** Does warming alter top-down and bottom-up trophic cascades in a soil acarine predator-prey system? **Carlos Barreto** (cbarreto@uwo.ca) and Zoë Lindo, Western Univ., London, ON, Canada

2:35 **0533** Chemical ecology of oribatid mites - a model system to understand patterns and mechanisms in complex food webs. **Adrian Brueckner** (adrian.brueckner@gmail.com), California Institute of Technology, Pasadena, CA

2:50 **0534** Mites on camel crickets (Orthoptera: Rhaphidophoridae): A survey in Bankhead National Forest, Alabama. **Kelsey L. Cline** (kic015@uark.edu), Ray Fisher and Ashley P. G. Dowling, Univ. of Arkansas, Fayetteville, AR

3:05 Intermission

3:20 **0535** Biodiversity and systematics of predatory soil mites (Acari: Bdelloidea: Cunaxidae) in Canada. **Victoria Nowell** (victoria.nowell@agr.gc.ca) and Marla Schwarzfeld, Agriculture and Agri-Food Canada, Ottawa, ON, Canada

3:35 **0536** The impact of warming on two trophic levels in microarthropod communities. **Matthew Meehan** (mmeehan5@uwo.ca), Jordan Kutsec, Matthew Turnbull and Zoë Lindo, Western Univ., London, ON, Canada

3:50 **0537** Phylogenomes and 3D models: New approaches to velvet mite systematics. **Ray Fisher** (jrfisher@uark.edu) and Ashley P. G. Dowling, Univ. of Arkansas, Fayetteville, AR

4:05 **0538** Metabarcoding soil mite communities. **Marla Schwarzfeld** (marla.schwarzfeld@agr.gc.ca) and Victoria Nowell, Agriculture and Agri-Food Canada, Ottawa, ON, Canada

4:20 **0539** Soil invertebrate indicators of land reclamation success. **Stephanie Chute-Ibsen** (sibsen@ualberta.ca) and M. Anne Naeth, Univ. of Alberta, Edmonton, AB, Canada

Member Symposium: Systematics, Biogeography, and Ecology of Cerambycidae and Buprestidae

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Eugenio Nearn¹ and Ann M. Ray², ¹USDA - APHIS, Washington, DC, ²Univ. of Illinois, Champaign, IL

1:30 Welcoming remarks

1:35 **0540** Status report: Host-plant associations of neotropical cerambycid beetles. **Amy Berkov** (aberkov@ccny.cuny.edu) and Ryan Dinanauth, City College of New York, New York, NY

1:50 **0541** Biogeographic drivers of Cerambycidae and Curculionidae diversity in Peru and French Guiana. **Timmy Eng** (timmy224@gmail.com)¹, Joyce Fassbender² and Amy Berkov¹, ¹City College of New York, New York, NY, ²Florida Gulf Coast Univ., Fort Myers, FL

2:05 **0542** Cladistic and biogeographic analysis of *Periboeum* Thomson, 1864 (Coleoptera: Cerambycidae). **Francisco De L. Nascimento** (eribnascimento@gmail.com)¹ and José Ricardo Mermudes², ¹Univ. de São Paulo, São Paulo, Brazil, ²Univ. Federal do Rio de Janeiro, Rio de Janeiro, Brazil

2:20 **0543** Investigating the visual systems of *Cerceris fumipennis* wasps and their Buprestidae prey: An indicator of coevolution. **Jordan Yacoub** (jordan.yacoub@bobcats.gcsu.edu)¹, Caroline Fowler¹ and Nathan Lord², ¹Georgia College, Milledgeville, GA, ²Louisiana State Univ., Baton Rouge, LA

2:35 Break

2:50 **0544** Investigations of nerve morphology in Buprestidae: An indicator of prey preference by *Cerceris fumipennis* wasps. **Caroline Fowler** (caroline.fowler@bobcats.gcsu.edu)¹, Jordan Yacoub¹ and Nathan Lord², ¹Georgia College, Milledgeville, GA, ²Louisiana State Univ., Baton Rouge, LA

3:05 **0545** Dealing with diversity: Systematics lessons provided by *Monoctonus* and relatives. **Patrick Gorring** (psg7@cornell.edu) and Brian D. Farrell, Harvard Univ., Cambridge, MA

3:20 **0546** A light shines in the darkness: 13 years of ultra-violet light trapping and biodiversity of longhorned beetles. **Jeffrey Bradshaw** (jbradshaw2@unl.edu)¹ and Marlin Rice², ¹Univ. of Nebraska, Scottsbluff, NE, ²Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

3:35 **0547** Form matters? Morphological and morphometric characters exploration to solve phylogenetic relationships of the genus *Strangalidium* Giesbert (Coleoptera: Cerambycidae). **Nayeli Gutiérrez** (nayelensis@gmail.com)¹ and Felipe Noguera², ¹Univ. Nacional Autónoma de México, Ciudad de México, Mexico, ²Estación de Biología Chamela, San Patricio, Mexico

3:50 Break

4:05 **0548** Molecular systematic assessment of the tribal classification of Lamiinae (Cerambycidae). **Diego de Santana Souza** (diegosantanasouza@hotmail.com)¹, Luciane Marinoni², Marcela Monné¹ and Jesús Gómez-Zurita³, ¹Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil, ²Univ. Federal do Paraná, Curitiba, Brazil, ³Univ. Pompeu Fabra, Barcelona, Spain

4:20 **0549** Evolution of sexual size dimorphism in longhorned beetles (Coleoptera: Cerambycidae). **Rowan French** (rffrench@ualberta.ca) and Felix Sperling, Univ. of Alberta, Edmonton, AB, Canada

4:35 **0550** Field evaluation of lures for monitoring and control of the velvet longhorned beetle, *Trichoferus campestris*. **Ann Ray** (raya6@xavier.edu)¹, Joseph Francese², Yunfan Zou³, Roy Bower¹, Kristopher Watson⁵, Sindhu Krishnankutty^{1,2} and Jocelyn G. Milla³, ¹Xavier Univ., Cincinnati, OH, ²USDA - APHIS, Buzzards Bay, MA, ³Univ. of California, Riverside, CA, ⁴Utah Dept. of Agriculture and Food, Salt Lake City, UT

4:50 **0551** Current projects in Cerambycidae (Coleoptera). **Eugenio Nearn** (eugenio.h.nearn@aphis.usda.gov), USDA - APHIS, Washington, DC

5:05 Concluding remarks

Organized Meeting: Americas Neuropterists Meeting

Meeting Room 210 (Convention Centre)

Moderators and Organizers: Fernando Acevedo¹, Atilano Contreras-Ramos¹ and John Oswald², ¹Univ. Nacional Autónoma de México, Ciudad de México, Mexico, ²Texas A&M Univ., College Station, TX

SUNDAY, NOVEMBER 11 / DIMANCHE 11 NOVEMBRE

- 1:30 Welcoming remarks
- 1:35 **0552** Parallel speciation in a green lacewing: Convergent song evolution between continents. **Charles Henry** (charles.henry@uconn.edu), Univ. of Connecticut, Storrs, CT
- 2:05 **0553** Beyond the barcode: Using SNPs to genetically identify morphologically cryptic green lacewings (Neuroptera: *Chrysoperla carnea*-group). **Elizabeth Wade** (elizabeth.wade@post03.curry.edu), Curry College, Milton, MA
- 2:20 **0554** Recovering evolutionary history of the *Chrysoperla carnea* species group. **Katherine Taylor** (katherine.l.taylor@uconn.edu), Univ. of Connecticut, Storrs, CT
- 2:35 **0555** *Sensilla* and other tegumentary structures in antlion larvae. **Fernando Acevedo** (facevedoramos@gmail.com), Univ. Nacional Autónoma de México, Ciudad de México, Mexico
- 2:50 **0556** Towards a systematic revision of the mantidfly subfamily Symphrasinae (Neuroptera: Mantispidae). Adrian Ardila-Camacho and **Atilano Contreras-Ramo** (acontreras@ib.unam.mx), Univ. Nacional Autónoma de México, Ciudad de México, Mexico
- 3:05 Break
- 3:20 **0557** A first morphological approach on the genus *Myrmeleon* phylogeny. **Roberto López-García** (rologar87@gmail.com), Univ. Nacional Autónoma de México, Ciudad de México, Mexico
- 3:35 **0558** Chrysopidae associated to *Citrus aurantifolia* Christm. (Swingle) in Tecomán, Colima, Mexico. **Mariza Sarmiento-Cordero** (marizilla@hotmail.com)¹, Beatriz Rodríguez-Velez² and Atilano Contreras-Ramos³, ¹Univ. de Guadalajara, Jalisco, Mexico, ²Centro Nacional de Referencia de Control Biológico, Tecomán, Mexico, ³Univ. Nacional Autónoma de México, Ciudad de México, Mexico
- 3:50 **0559** Adult dispersal capability and persistence in *Brachynemurus abdominalis* (Say) and *Euptilon ornatum* (Drury) (Insecta: Neuroptera). **Samuel Howard** (howardsamuel@tamu.edu), Texas A&M Univ., College Station, TX
- 4:05 **0560** Advances in the study of the diversity of Neuroptera in an altitudinal gradient in Volcán Tacaná, Chiapas, Mexico. **Rodolfo Cancino-López** (cancinorodolfo@gmail.com), Univ. Nacional Autónoma de México, Ciudad de México, Mexico
- 4:20 **0561** Checklist of the Neuroptera of Mexico. **Atilano Contreras-Ramos** (acontreras@ib.unam.mx)¹, Fernando Acevedo¹, Yesenia Marquez-López², Rodolfo Cancino-López¹, Roberto López-García¹, Adrian Ardila-Camacho¹, Mariza A. Sarmiento-Cordero³ and John D. Oswald⁴, ¹Univ. Nacional Autónoma de México, Ciudad de México, Mexico, ²Univ. Autónoma Metropolitana-Iztapalapa, Mexico, Mexico, ³Centro Nacional de Referencia de Control Biológico, Tecomán, Mexico, ⁴Texas A&M Univ., College Station, TX
- 4:35 **0562** The Lacewing Digital Library: World Neuropterida faunas initiative. **John Oswald** (j-oswald@tamu.edu), Texas A&M Univ., College Station, TX
- 5:05 Concluding remarks

Organized Meeting: International Society of Hymenopterists

Meeting Room 121 (Convention Centre)

Moderators and Organizers: Natalie Dale-Skey¹, Andrew Polaszek¹ and Barbara Sharanowski², ¹Natural History Museum, London, United Kingdom, ²Univ. of Central Florida, Orlando, FL

- 1:30 Introductory remarks

- 1:40 **0563** Why are entomologists sitting on the conservation sidelines? Insects and People (IPSIO.org): Efforts to end the silence on habitat loss in Madagascar. **Brian L. Fisher** (bfisher@calacademy.org), California Academy of Sciences, San Francisco, CA
- 2:25 **0564** Phylogenomics of Platygastridae (Hymenoptera: Proctotrupomorpha). **Zachary Lahey** (lahey.18@osu.edu), Huayan Chen and Norman Johnson, The Ohio State Univ., Columbus, OH
- 2:40 **0565** DNA barcoding as a tool for species discovery and documentation in the superfamily Ichneumonoidea. **Sarah Meierotto** (s.meierotto@uky.edu) and Michael J. Sharkey, Univ. of Kentucky, Lexington, KY
- 2:55 **0566** Diversity of Ophioninae (Hymenoptera: Ichneumonidae) in California and the inclusion of new taxa into a subfamily phylogenetic re-analysis. **Rachel Behm** (behmrachel@yahoo.com) and Katja Seltmann, Univ. of California, Santa Barbara, CA
- 3:10 Break
- 3:25 Panel discussion
- 4:10 Concluding remarks
- 4:15 ISH business in brief
- 4:40 ISH social

Organized Meeting: Orthopteroids: Small Orders, Big Ideas

Meeting Room 202 (Convention Centre)

Moderators and Organizers: Bert Foquet¹, Derek Woller² and Hojun Song¹, ¹Texas A&M Univ., College Station, TX, ²USDA - APHIS, Phoenix, AZ

- 1:30 **0567** Orthoptera in ecological foodwebs and crop systems, over 50 years: Analysis of annual data on abundance, hatching, weather, climate, and seasonal patterns in Alberta, Canada. **Dan Johnson** (dan.johnson@uleth.ca), Seyer Meyhoff and Celeste Barnes, Univ. of Lethbridge, Lethbridge, AB, Canada
- 1:45 **0568** Do specialized orthopteroid herbivores co-speciate with their host plant? **Timothy K. O'Connor** (tim.oconnor8@gmail.com)¹, Robert Laport² and Noah Whiteman¹, ¹Univ. of California, Berkeley, CA, ²Rhodes College, Memphis, TN
- 2:00 **0569** Defining the nutritional landscape of grasshopper communities in Eastern Australia. **Douglas Lawton** (ddlawton@asu.edu)¹, Marion Le Gall¹, Cathy Waters² and Arianne Cease¹, ¹Arizona State Univ., Tempe, AZ, ²Orange Agricultural Institute, Orange, Australia
- 2:15 **0570** The genetic basis of physiological niche conservatism in ice crawlers (Grylloblatta). **Sean Schoville** (sean.schoville@wisc.edu), Univ. of Wisconsin, Madison, WI
- 2:30 **0571** Cretaceous fossils shed light on the evolution of Tridactyloidea (Orthoptera: Caelifera). **Nathalie Baena-Bejarano** (ntbaena@gmail.com) and Sam W. Heads, Univ. of Illinois, Champaign, IL

- 2:45 **0572** Life in the frozen lane: *Gryllus veletis* as an emerging model for insect freeze tolerance. **Jantina Toxopeus** (jtoxopeu@uwo.ca)^{1,2} and Brent Sinclair², ¹Univ. of Colorado, Denver, CO, ²Univ. of Western Ontario, London, ON, Canada

- 3:00 Break

3:15 **0573** The evolution of aggressive behaviour and weaponry in North American field crickets. **Kevin Judge** (judgek3@macewan.ca)^{1,2}, Briana Smith², Shawna Ohlmann³, Alexandria Kellington³ and William Cade², ¹Grant MacEwan Univ., Edmonton, AB, Canada, ²Univ. of Lethbridge, Lethbridge, AB, Canada, ³MacEwan Univ., Edmonton, AB, Canada

3:30 **0574** Innovation and adaptive loss of a novel sensory organ during evolutionary transitions among ecological niches in a praying mantis lineage. **Sydney Brannoch** (sbrannoch@case.edu)¹, Julian Katzke², Evan Economo³, Yuri Kato⁴, Ajay Narendra⁴ and Gavin J. Svenson¹, ¹Cleveland Museum of Natural History, Cleveland, OH, ²Case Western Reserve Univ., Cleveland, OH, ³Okinawa Institute of Science and Technology, Okinawa, Japan, ⁴Macquarie Univ., Sydney, Australia

3:45 **0575** Effects of community composition on Orthoptera. **Laurel Symes** (laurel.symes@dartmouth.edu), Sharon Martinson and Hannah ter Hofstede, Dartmouth College, Hanover, NH

4:00 **0576** The acoustic world of the three cousins: Crickets, humpback-crickets, and katydids. **Fernando Montealegre-Z** (fmontealegrez@lincoln.ac.uk), Univ. of Lincoln, Lincoln, United Kingdom

Organized Meeting: SOLA Scarab Workers

Meeting Room 302/303/304/305 (Convention Centre)

Moderator and Organizer: Andrew B. T. Smith, Canadian Museum of Nature, Ottawa, ON, Canada

1:30 Introductory remarks

1:35 **0577** Tar pit scarabs: Keeping the ball rolling on late ice age to modern studies. **Anna Holden** (aholden@amnh.org), American Museum of Natural History, Los Angeles, CA

1:55 **0578** Towards a comprehensive revision of *Leucothyreus* – coping with an unexpected species richness in a neotropical leaf chafer genus (Scarabaeidae: Rutelinae: Geniatiini). **Matthias Seidel** (seidelma@natur.cuni.cz), Charles Univ., Prague, Czech Republic

2:15 **0579** An introduction to *Paulosawaya* (Scarabaeidae: Melolonthinae: Macroductylini). **Reese J. Worthington** (rworthing@go.olemiss.edu), Univ. of Mississippi, Univ., MS

2:35 **0580** Genomic assessment of population structure and effective population size of western Hercules beetle, *Dynastes granti* (Coleoptera, Scarabaeidae). **Jen-Pan Huang** (jhuang@fieldmuseum.org), Field Museum of Natural History, Chicago, IL

2:55 **0581** Recuration of the scarab beetles at the Field Museum of Natural History. **Crystal Maier** (cmaier@fieldmuseum.org), Field Museum of Natural History, Chicago, IL

3:15 Break

3:35 **0582** Whose poos do Ohio's dung beetles choose? A study on food preference. **Nicole Gunter** (ngunter@cmnh.org)¹ and Tammy Starr², ¹Cleveland Museum of Natural History, Cleveland, OH, ²Texas A&M Univ., College Station, TX

3:55 **0583** The importance of dung beetles for intensively managed pasture production. **Paul Manning** (paul.manning@dal.ca), Dalhousie Univ., Truro, NS, Canada

4:15 **0584** Little bugs on the prairie: The influence of prairie management strategy on ecological service providing beetles in the tall grass prairie ecosystem. Alanna Shaw and **Reid Miller** (millerrb@myumanitoba.ca), Univ. of Manitoba, Winnipeg, MB, Canada

4:35 **0585** Metagenomic mitogenome assembly from dung beetle intestinal content total DNA identifies mammalian fauna. **Iain Barr** (i.barr@uea.ac.uk)¹, Conrad Gillett², Andrew Johnson³ and Jiri Hulcr³, ¹Univ. of East Anglia, Norwich, United Kingdom, ²Univ. of Hawai'i, Honolulu, HI, ³Univ. of Florida, Gainesville, FL

4:55 Discussion

Workshop: Breaking Down the Border between Readers and Writers: How to Improve Your Scientific Writing

Meeting Room 211 (Convention Centre)

Moderators and Organizers: Rebecca Schmidt-Jeffris¹, Rob Morrison² and Stephen Heard³, ¹Clemson Univ., Charleston, SC, ²USDA - ARS, Manhattan, KS, ³Univ. of New Brunswick, Fredericton, NB, Canada

1:30 PM - 5:30 PM

10-min: MUVE, Biology and Ecology of Disease Vectors

Meeting Room 220 (Convention Centre)

Moderators: Alyssa Snellgrove¹ and Philip Kaufman², ¹Centers for Disease Control and Prevention, Atlanta, GA, ²Univ. of Florida, Gainesville, FL

1:30 **0586** Seasonality of dog heartworm infection in Florida mosquitoes. **Phillip Kaufman** (pkaufman@ufl.edu), Chris J. Holderman, Noor Abdeslamad, Nicole Abruzzo and Peter DiGennaro, Univ. of Florida, Gainesville, FL

1:40 **0587** Additional blood-feeding after *Plasmodium* infection reduces malaria parasite survival in the mosquito host. Hyeogsun Kwon, Rebekah Reynolds and **Ryan Smith** (smithr@iastate.edu), Iowa State Univ., Ames, IA

1:50 **0588** Missing pieces of the malaria prediction jigsaw puzzle: Major knowledge gaps in the neotropical vector *Anopheles darlingi*. **Jan Conn** (jan.conn@health.ny.gov), New York State Dept. of Health, Slingerlands, NY

2:00 **0589** Transmission of arboviruses by mosquito vectors to live vertebrate hosts is underestimated by *in vitro* assays. **Andrea Gloria-Soria** (andrea.gloria-soria@ct.gov), Douglas Brackney and Philip Armstrong, The Connecticut Agricultural Experiment Station, New Haven, CT

2:10 **0590** Town mosquito, country mosquito: Competitive interactions between the dengue vectors *Aedes aegypti* and *Ae. mediiovittatus* in Puerto Rico. **Donald Yee** (donald.yee@usm.edu)¹, Nicole Mackey¹, Joseph Nelsen¹ and Rachel Rogers², ¹The Univ. of Southern Mississippi, Hattiesburg, MS, ²Univ. of Southern Mississippi, Hattiesburg, MS

2:20 **0591** Visual-olfactory integration in the disease vector mosquito *Aedes aegypti*. **Clement Vinauger** (vinauger@vt.edu)¹, Lauren Locke², Kennedy Tobin², Michael Dickinson³, Adrienne Fairhall², Omar Akbari⁴ and Jeff Riffell², ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²Univ. of Washington, Seattle, WA, ³California Institute of Technology, Pasadena, CA, ⁴Univ. of California, San Diego, CA

2:30 **0592** Ecological and spatiotemporal dynamics of mosquito vector populations in tire systems. **Jennifer Breaux** (jbreaux@nola.gov), Mohamed Sallam and Claudia Riegel, New Orleans Mosquito, Termite and Rodent Control Board, New Orleans, LA

2:40 Break

2:50 **0593** Mosquito populations at the university of Port Harcourt teaching hospital: A threat to caregivers and patients in Nigeria. **Aline Noutcha** (naemekeu@yahoo.com)¹ and Chidinma Anaba², ¹Univ. of Port Harcourt, Rivers State, Nigeria, ²Univ. of Port Harcourt, Choba, Nigeria

3:00 **0594** Seminal fluid proteins reduce the likelihood of harmonic convergence in the mosquito *Aedes aegypti*. **Garrett League** (gpl47@cornell.edu), Lindsay Baxter, Mariana Wolfner and Laura Harrington, Cornell Univ., Ithaca, NY

3:10 **0595** *Aedes* density or vector-host contact (VHC) ratios: Ecological niche modeling approach in understanding spatio-temporal distribution of *Aedes* vectors in the City of New Orleans, LA, USA. **Mohamed Sallam** (mfsallam@nola.gov)¹, Brendan Carter² and Claudia Riegel¹, ¹New Orleans Mosquito, Termite and Rodent Control Board, New Orleans, LA, ²Tulane Univ., New Orleans, LA

3:20 **0596** Fitness cost in field *Aedes aegypti* population: Resilience of the wild for adaptation in the nature. **Lee-Jin Bong** (bongleejin@yahoo.com)¹, Kok-Boon Neoh² and Wu-Chun Tu², ¹National Health Research Institute, Zhunan, Taiwan, ²National Chung Hsing Univ., Taichung, Taiwan

3:30 **0597** Tracking of malaria vectors using stable isotopes to measure the contribution of aestivation to dry season persistence. **Roy Faiman** (roy.faiman@nih.gov)¹, Adama Dao², Alpha Yaro², Moussa Diallo², Zana Sanogo³, Samake Djibril², Yossi Ousmane², Gabriel Hamer⁴, Christine France⁵ and Tovi Lehmann¹, ¹National Institutes of Health, Rockville, MD, ²International Center for Excellence in Research, Bamako, Mali, ³Malaria Research and Training Center, Bamako, Mali, ⁴Texas A&M Univ., College Station, TX, ⁵Smithsonian Institution, Suitland, MD

3:40 **0598** Presentation withdrawn

3:50 **0599** Successful establishment of local *Wolbachia* wAlbB in *Aedes aegypti* population to suppress dengue transmission in Pakistan. **Nusrat Jahan** (dr.nusratjahan@gcu.edu.pk)¹ and Muhammad Sarwar², ¹Government College Univ., Lahore, Pakistan, ²Government Postgraduate College, Pattoki, Pakistan

4:00 Break

4:10 **0600** *Culex quinquefasciatus* (Diptera: Culicidae) from Florida transmitted Zika virus. **Chelsea T. Smartt** (ctsmart@ufl.edu) and Dongyoung Shin, Univ. of Florida, Vero Beach, FL

4:20 **0601** Morphometric comparison of dispersal capability in *Trypanosoma cruzi* infected and uninfected Triatomines (Hemiptera: Reduviidae). **Jillian Wormington** (jillianwormington@gmail.com), Rachel Curtis-Robles, Gabriel Hamer and Sarah Hamer, Texas A&M Univ., College Station, TX

4:30 **0602** Vector role of cockroach (*Periplaneta americana*) in protozoa, helminthes and pathogens of enteric origin. **Muhammad Mazhar Ayaz** (mazharayaz@bzu.edu.pk), Muhammad Mudasser Nazir, Mubashir Aziz and Ahsan Sattar Sheikh, Bahauddin Zakariya Univ., Multan, Pakistan

4:40 **0603** Prevalence of *Borrelia burgdorferi*, *Anaplasma phagocytophilum*, and *Babesia microti* in the blacklegged tick, *Ixodes scapularis*, collected during the day and night. **Xia Lee** (xlee1@wisc.edu) and Susan Paskewitz, Univ. of Wisconsin, Madison, WI

4:50 **0604** Detection of *Anaplasma platys* in *Rhipicephalus sanguineus* from Arizona, United States and subsequent transovarial transmission. **Alyssa Snellgrove** (xlp2@cdc.gov), Shelby Ford, Inna Krapiunaya, Kris Hartzler and Michael Levin, Centers for Disease Control and Prevention, Atlanta, GA

10-min: MUVE, PBT, P-IE, Stored Product Pests

Meeting Room 214 (Convention Centre)

Moderators: Alison Gerken¹ and Edmond L. Bonjour², ¹USDA - ARS, Manhattan, KS, ²Oklahoma State Univ., Stillwater, OK

1:30 **0605** Potential of three indigenous plants extracts for the control of *Tribolium castaneum* (Herbst) and *Rhyzopertha dominica* (Fab.). **Qurban Ali** (qurban_ent@yahoo.com)¹, Mansoor ul Hasan², Habib ur Rehman², Muhammad Umar Qasim¹ and Hafiz Usman Shakir³, ¹Ayub Agricultural Research Institute, Faisalabad, Pakistan, ²Univ. of Agriculture, Faisalabad, Pakistan, ³Dept. of Pest Warning and Quality Control of Pesticides, Lahore, Pakistan

1:40 **0606** Efficacy of *Metarhizium anisopliae* alone and in combination with diatomaceous earth against *Trogoderma granarium* (Everts) and *Tribolium castaneum* (Herbst). **Mansoor ul Hasan** (mansoorsahi2000@yahoo.com)¹, Qurban Ali², Umar Anwar Awan¹, Habib ur Rehman¹ and Najuf Awais Anjum², ¹Univ. of Agriculture, Faisalabad, Pakistan, ²Ayub Agricultural Research Institute, Faisalabad, Pakistan

1:50 **0607** Comparative efficacy of some plant extracts and a bacterial derived insecticide against *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae). **Habib ur Rehman** (habib.ento@gmail.com)¹, Mansoor ul Hasan¹, Qurban Ali², Saima Mirza¹, Faizan Amjad¹ and Muhammad Faisal¹, ¹Univ. of Agriculture, Faisalabad, Pakistan, ²Ayub Agricultural Research Institute, Faisalabad, Pakistan

2:00 **0608** High quality genomic resources for post-harvest pests. **Erin Scully** (erin.scully@ars.usda.gov), USDA - ARS, Manhattan, KS

2:10 Break

2:20 **0609** Efficacy of two plant powders, *Rubus fruticosus* and *Valeriana jatamansi* against granary weevil, *Sitophilus granarius* (L.) and changes in the enzyme activities. **Shabir Ahmed** (shabirsaki@gmail.com), Hazara Univ., Mansehra, Pakistan

2:30 **0610** Fumigant insecticidal bioactivities of ozone gas (O₃) towards *Tribolium castaneum* and *Cryptolestes ferrugineus*. **Shahzad Saleem** (shahzadsaleem@ciitsahiwal.edu.pk), COMSATS Institute of Information Technology, Sahiwal, Pakistan

2:40 **0611** Ultrasound effects on adult *Tribolium confusum* (confused flour beetle). **Francoise Favi** (ffavi@vsu.edu)¹, Charles Cantrell² and Ronald Bowen¹, ¹Virginia State Univ., Petersburg, VA, ²USDA - ARS, Univ., MS

2:50 **0612** Evaluation of progeny of *Callosobruchus maculatus* (F.) (Coleoptera: Chrysomelidae) to infest four types of stored pulses. **Nosheen Jehajo** (nosheenjehajo@gmail.com), Univ. of Sindh Jamshoro, Hyderabad, Pakistan

3:00 **0613** *In vivo* insecticidal activity of diatomaceous earth alone and in combination with K-Obiol against *Tribolium castaneum* (Herbst.) (Coleoptera: Tenebrionidae) on stored wheat. **Muhammad Asrar** (asraragri@gmail.com)¹, Waqas Wakil², Muhammad Gogi², Syed Husains¹ and Khizar Samiulla¹, ¹Government College Univ., Lahore, Pakistan, ²Univ. of Agriculture, Faisalabad, Pakistan

3:10 **0614** Repellent activity of plant essential oils against rice weevil, *Sitophilus oryzae* (Coleoptera: Curculionidae). **Shahbaz Ahmad** (shahbaz.iags@pu.edu.pk), Univ. of the Punjab, Lahore, Pakistan

3:20 **0615** A new reduced risk insecticide for stored grains. **Edmond L. Bonjour** (edmond.bonjour@okstate.edu) and George Opit, Oklahoma State Univ., Stillwater, OK

3:30 **0616** Temperature effects on biological traits of *Cadra cautella* (Lepidoptera: Pyralidae) reared on Khodari date fruits. **Waleed Alwaneen** (alwaneen@kacst.edu.sa)¹, Mureed Husain², Khalid Mehmood², Khawaja Rasool², Muhammad Tufail² and Abdulrahman Aldawood², ¹King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia, ²King Saud Univ., Riyadh, Saudi Arabia

3:40 **0617** Ecological variation impact on the susceptibility of *Callosobruchus maculatus* populations to insecticide in southwest Nigeria. **Olajire Gbaje** (gbajejire@yahoo.com), Jeremiah Olatokunbo, Oseido Ali and Seun Oladipupo, Federal Univ. of Technology, Akure, Nigeria

3:50 **0618** Influence of temperature on residual efficacy of aerosol insecticidal treatment against two dermestids (Coleoptera: Dermestidae). **Srinivas Lanka** (slanka@ksu.edu)¹, Frank Arthur², James Campbell² and Kun Yan Zhu¹, ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS

4:00 Break

4:10 **0619** Influence of population densities and diets on the development of *Tribolium castaneum* and *Oryzaephilus surinamensis*. **Muhammad Sagheer** (sagheersharif@yahoo.com)¹, Saqib Waqas¹, Mansoor ul Hasan¹, Qurban Ali², Kazam Ali³ and Habib ur Rehman¹, ¹Univ. of Agriculture, Faisalabad, Pakistan, ²Ayub Agricultural Research Institute, Faisalabad, Pakistan, ³Agriculture College of Bahauddin Zakariya Univ., Layyah, Pakistan

4:20 **0620** Identifying pathways for sustainable mealworm farming in cities by upcycling mushroom production waste in a circular economy urban agriculture network. **Louise Hénault-Ethier** (lhenault-ethier@davidsuzuki.org)^{1,2}, Didier Marquis³, Nathalie Le François⁴, Stéphane Labelle⁴, Marc Fournier⁵, Eric Lucas⁵, Étienne Normandin⁶, Satoshi Ikeda³, Marie-Hélène Deschamps² and Grant Vandenberg², ¹David Suzuki Foundation, Montréal, QC, Canada, ²Univ. Laval, Québec City, QC, Canada, ³Concordia Univ., Montréal, QC, Canada, ⁴Biodôme de Montréal, Montréal, QC, Canada, ⁵Univ. du Québec, Montréal, QC, Canada, ⁶Univ. de Montréal, Montréal, QC, Canada

4:30 **0621** The insecticide resistance in the lesser mealworm, darkling beetles. **Jingjing Xu** (jingjing@apexbait.com) and Dangsheng Liang, Apex Bait Technologies, Inc., Santa Clara, CA

4:40 **0622** Spatial variability in trap captures of *Plodia interpunctella* and *Trogoderma variabile* In and around a flour mill. **Alison Gerken** (alison.gerken@ars.usda.gov) and James Campbell, USDA - ARS, Manhattan, KS

4:50 **0623** Management of pulse beetle, *Callosobruchus chinensis* L. (Coleoptera: Bruchidae) by using synergistic aptness of entomopathogenic fungi and bacteria. **Farid Shaheen** (shaheen@uair.edu.pk)¹ and Mureed Husain², ¹Pir Mehr Ali Shah Arid Agriculture Univ., Rawalpindi, Pakistan, ²King Saud Univ., Riyadh, Saudi Arabia

5:00 **0624** Preference, exploitation, trade and factors affecting the production of *Elaphrodes lactea* Gaede (1932) (Lepidoptera: Notodontidae), an edible caterpillar in the Miombo forest in Lubumbashi, Haut – Katanga, Democratic Republic of Congo. **S. Niassy** (sniassy@icipe.org), International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya

10-min: MUVE, Vector Control

Meeting Room 215/216 (Convention Centre)

Moderators: Mary Sorensen¹ and Daniel Kline², ¹Placer Mosquito and Vector Control District, Roseville, CA, ²USDA - ARS, Gainesville, FL

1:30 **0625** Investigating use of an automated mosquito-counting trap to inform timing of aerial applications for adult mosquito control. **Mary Sorensen** (marys@placermosquito.org), Jake Hartle, Mario Boisvert and Joel Buettner, Placer Mosquito and Vector Control District, Roseville, CA

1:40 **0626** Insecticide resistance in malaria vectors along the Thailand-Myanmar border. **Victor Chaumeau** (victor@shoklo-unit.com)^{1,2,3,4}, Dominique Cerqueira³, John Zadrozny⁵, Praphan Kittiphanakun¹, Chiara Andolina^{1,2}, Theeraphap Chareonviriyaphap⁵, François Nosten^{1,2} and Vincent Corbel³, ¹Mahidol Univ., Mae Sot, Thailand, ²Univ. of Oxford, Oxford, United Kingdom, ³Institut de recherche pour le développement, Montpellier, France, ⁴Centre hospitalier universitaire de Montpellier, Montpellier, France, ⁵Kasetsart Univ., Bangkok, Thailand

1:50 **0627** Susceptibility and irritability of adult malaria vectors against insecticides used in the indoor residual sprays in Muzaffargarh District, Pakistan: A field survey. **Saleem Rana** (smrmp@gmail.com)¹, Ejaz Khan², Aashifa Yaqoob², Asma Latif³ and Mudassar Abbasi², ¹Contech School of Public Health, Lahore, Pakistan, ²Health Services Academy, Islamabad, Pakistan, ³Lahore College for Women Univ., Lahore, Pakistan

2:00 **0628** Innovative solution to a complex problem: Non-chemical bed net alternative to LLINs for effective resistant mosquitoes control in Africa. **Chouaibou Mouhamadou** (cmouham@ncsu.edu), R. Mitchell III, Andre West, M. McCord, Charles Apperson and Michael Roe, North Carolina State Univ., Raleigh, NC

2:10 **0629** Vectrax and SPLAT BAC: A Multi-species semiochemical-based integrated strategy for improved control of vector mosquitoes. **Jesse Saroli** (jesse.saroli@iscatech.com)¹, Agenor Mafrá-Neto¹, Teun Dekker², Rodrigo Silva¹, Woodbridge Foster³, Graham White⁴, William Urrutia¹, Leonard Mboera⁵ and Elison Kemibala⁵, ¹ISCA Technologies, Inc., Riverside, CA, ²Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, ³The Ohio State Univ., Columbus, OH, ⁴USDA - ARS, Gainesville, FL, ⁵National Institute for Medical Research, Dar-es-Salaam, Tanzania

2:20 **0630** Status of insecticide resistance and factors involved among mosquito vectors (Diptera; Insecta) in Pakistan. **Muhammad Oneeb** (muhammad.oneeb@uvas.edu.pk)¹, Amna Chudhary¹, Huma Naeem¹ and Muhammad Mudassar Nazir², ¹Univ. of Veterinary and Animal Sciences, Lahore, Pakistan, ²Bahauddin Zakariya Univ., Multan, Pakistan

2:30 **0631** A game changer for vector control: Volcanic rock to a novel mechanical (non-chemical) residual spray for mosquito control. **R. M. Roe** (michael_roe@ncsu.edu)¹, J. Marcel Deguenon¹, R. Mitchell III¹, A. Dhammi¹, Charles Apperson¹, J. Strider¹, J. Zhu¹, G. Cave¹, M. McCord¹, Q. Shi¹, D. Stewart², R. Azondékon³, F. Agossa³, J. Ahoga³, B. N'dombidje³, R. Anagonou³, G. Padonou³ and M. Akogbéto³, ¹North Carolina State Univ., Raleigh, NC, ²Imerys, Roswell, GA, ³Centre de Recherche Entomologique, Cotonou, Benin

2:40 Break

2:50 **0632** Updated methods for the production process of the mosquito assassin, *Toxorhynchites rutilus*, for use as biocontrol agent against container breeding pest mosquitoes in Harris County, Texas. **Anita Schiller** (aschiller@hcp4.net), Harris County Precinct 4, Spring, TX

3:00 **0633** Status of DDT and pyrethroid resistance and absence of *kdr* mutation in Indian *Aedes albopictus*. **Neera Kapoor** (neerakapoor@ignou.ac.in), Indira Gandhi National Open Univ., New Delhi, India

3:10 **0634** Insecticidal activities of plant extracts and oils against larvae and adults of *Aedes aegypti* (L.). **Tahira Riasat** (tahirariasat@yahoo.com), Government College Univ., Lahore, Pakistan

3:20 **0635** Microbial and plant derived compounds against *Aedes aegypti* (Diptera: Culicidae). **Kumudini M. Meepagala** (kmeepaga@olemiss.edu)¹, Alden Estep² and James J. Becnel³, ¹USDA - ARS, Univ., MS, ²Univ. of Florida, Gainesville, FL, ³USDA - ARS, Gainesville, FL

3:30 **0636** Behavioural and Insecticidal actions of the crude essential oils of *Piper guineense* against the southern house mosquito, *Culex quinquefasciatus*. **Joy Anogwih** (janogwih@ufl.edu)¹ and Melissa Boersma², ¹Univ. of Florida, Vero Beach, FL, ²Auburn Univ., Auburn, AL

3:40 **0637** Mosquito exposure to fungi: Initial evidence of ovipositional preferences and reduced fecundity. **Lina Flor-Weiler** (lina.weiler@ars.usda.gov), Ephantus Muturi, Jose Luis Ramirez, Bruce W. Zilkowski and Alejandro Rooney, USDA - ARS, Peoria, IL

3:50 **0638** Evaluation of passive emanators of transfluthrin to protect humans and livestock from biting arthropods. **Daniel Kline** (dan.kline@ars.usda.gov), USDA - ARS, Gainesville, FL

4:00 **0639** Report of molecular analysis of *Anopheles* mosquitoes from African indoor residual spraying project in Nasarawa state using polymerase chain reaction assay. **Georgina Mwansat** (georginamwansat@gmail.com), Univ. of Jos, Jos, Nigeria

4:10 **0640** Presentation withdrawn

10-min: PBT, Insecticides and Resistance

Meeting Room 221/222 (Convention Centre)

Moderators: Yasmine Farhan¹ and Amit Sethi², ¹Univ. of Guelph, Ridgetown, ON, Canada, ²Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

1:30 **0641** Melon fly (Diptera: Tephritidae) resistance to a spinosad protein bait spray and alternatives for resistance management in Hawai'i. Roger Vargas¹, **Ronald Mau** (maur@ctahr.hawaii.edu)², Steven Souder¹, Colby Maeda¹ and Ju-Chun Hsu³, ¹USDA - ARS, Hilo, HI, ²Univ. of Hawai'i, Honolulu, HI, ³National Taiwan Univ., Taipei, Taiwan

1:40 **0642** Use of entomopathogenic fungi for control of rice pests in Sindh Pakistan. **Santosh Kumar** (drsantosharshi@gmail.com)¹ and Riffat Sultana², ¹Sindh Agriculture Univ., Tandojam, Pakistan, ²Univ. of Sindh, Jamshoro, Pakistan

1:50 **0643** Rock dust product for managing Acarine pests: Spider mites on grape vines as a case study. **Nicoletta Faraone** (nicoletta.faraone@acadiu.ca), Robin Browne and Kirk Hillier, Acadia Univ., Wolfville, NS, Canada

2:00 **0644** The study of plant extracts as insecticides to deal with the Jassid (*Amrasca biguttula biguttula* (Ishida)) population on the egg plant (*Solanum melongena* L.) crop. **Muhammad Ali** (ali.klasra@gmail.com) and Muhammad Ashfaq, Univ. of the Punjab, Lahore, Pakistan

2:10 **0645** Effect of foliar applications of systemic induced elicitor and botanicals to manage citrus leaf miner (*Phyllocnistis citrella* Stainton) damages in rough lemon nurseries. **Sohail Akhtar** (sohailakhtar4all@yahoo.com) and Fatima Ilyas, The Islamia Univ. of Bahawalpur, Bahawalpur, Pakistan

2:20 **0646** Efficacy of some biorational insecticides against *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) under laboratory and greenhouse conditions in Kuwait. **Mustapha Jallow** (mjallow@kisar.edu.kw) and Mohammed Albaho, Kuwait Institute for Scientific Research, Kuwait, Kuwait

2:30 **0647** Natural product inspired - Synthetic spinosyn mimics. **Thomas Sparks** (tcsparks@dow.com), David Demeter, Annette Brown, Kristy Bryan and Natalie Giampietro, Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

2:40 **0648** Identification and risk assessment of spinosad resistance in a California population of *Drosophila suzukii*. **Brian Gress** (bgress@ucdavis.edu) and Frank Zalom, Univ. of California, Davis, CA

2:50 **0649** Study of the effect of RNA interference as a narrow-spectrum biomolecular tool for control of subspecies of gypsy moth (*Lymantria dispar*). **Saikat Kumar Ghosh** (saikat.ghosh@ars.usda.gov)¹, Robert L. Harrison¹, Melody A. Keena² and Dawn Gunderson-Rindal¹, ¹USDA - ARS, Beltsville, MD, ²USDA - Forest Service, Hamden, CT

3:00 **0650** RNAi-based silencing of vitellogenin gene: A promising approach for the control of red palm weevil. **Muhammad Tufail** (mtufail@ksu.edu.sa), Khalid Mehmood, Mureed Husain, Khawaja Rasool and Abdulrahman Aldawood, King Saud Univ., Riyadh, Saudi Arabia

3:10 **0651** RNA interference provides hope for managing the invasive emerald ash borer: Current status and challenges. **Ramya Shanivarsanthe Leelesh** (ramya.sl1989@gmail.com) and Lynne Rieske-Kinney, Univ. of Kentucky, Lexington, KY

3:20 **0652** Susceptibility of different instars of *Striacosta albicosta* (Lepidoptera: Noctuidae) to Vip3Aa, a *Bacillus thuringiensis* protein. **Yasmine Farhan** (yfarhan@uoguelph.ca), Jocelyn Smith and Arthur Schaafsma, Univ. of Guelph, Ridgetown, ON, Canada

3:30 Break

3:40 **0653** Baseline susceptibility to Cry1F endotoxin in *Spodoptera frugiperda* populations collected from Mexico. **Desmi Chandrasena** (dichandrasena@dow.com)¹, Chad Boeckman¹, Ninfa Felix², J. Concepcion Rodriguez² and Nicholas Storer⁴, ¹Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA, ²Corteva Agriscience, Agriculture Division of DowDuPont, Zapopan, Mexico, ³Colegio de Postgraduados, Montecillo, Mexico, ⁴Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

3:50 **0654** CRISPR/Cas-mediated gene editing of ATP binding cassette transporter type-A3 in *Spodoptera frugiperda* results in high resistance to Cry2Ab-like protein. **Deirdre Kapka-Kitzman** (deirdre.kapka@pioneer.com), John Mathis, Catherine Clark, Jean Dyer, Jian-Zhou (Joe) Zhao, Amit Sethi and Mark Nelson, Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

4:00 **0655** The block of inward-rectifying potassium channels in insects by flonicamid. **Jianya Su** (sjy@njau.edu.cn), Nanjing Agricultural Univ., Nanjing, China

4:10 **0656** Detection of resistance of brinjal shoot and fruit borer (BSFB), *Leucinodes orbonalis* Guenee (Pyralidae: Lepidoptera) to diamide and its cross resistance to other compounds. **Mahbuba Jahan** (jahan-bau@bau.edu.bd)¹, Khandakar Islam¹, Mahbub Rahman² and Md. Atique Rahman², ¹Bangladesh Agricultural Univ., Mymensingh, Bangladesh, ²Syngenta Bangladesh Ltd., Dhaka, Bangladesh

4:20 **0657** Sensitivity of codling moth (*Cydia pomonella* L.) to some insecticides in Moroccan orchards. **Salma El Iraqui** (iraquisalma@gmail.com)¹, Ahmed EL Bakkali¹ and M'hammed Hmimina², ¹INRA, Meknès, Morocco, ²Institut Agronomique et vétérinaire Hassan II, Rabat, Morocco

4:30 **0658** Genetic basis of flubendiamide resistance in *Helicoverpa armigera* (Lepidoptera: Noctuidae). **Dyrson Abbade Neto** (neto_abbade@hotmail.com), Rogerio Pereira, Igor Pereira, Douglas Amado, Sandy Spinelli, Mariana Durigan and Celso Omoto, Univ. de São Paulo, Piracicaba, Brazil

4:40 **0659** Toxicity of indoxacarb, methomyl, spinetoram and spinosad to *Helicoverpa armigera* and *H. zea*. **Fernando Rodrigues da Silva** (f.rodriguesdas@ufl.edu)¹, Dario Trujillo², Odelei Bernardi³, Jose Verle Rodrigues², Daniel Carrillo¹ and Woodward Bailey⁴, ¹Univ. of Florida, Homestead, FL, ²Univ. de Puerto Rico, San Juan, PR, ³Federal Univ. of Santa Maria, Santa Maria, Brazil, ⁴USDA - APHIS, Miami, FL

4:50 **0660** Toxicity of fipronil and emamectin benzoate and their mixtures against *Spodoptera littoralis* (Boisd) with relation to GABA content. **Mohamed Kandil** (makandeel2003@yahoo.com)¹, Eman Fouad², Yasmin Abel-Mobdy¹ and Dalia El-Hafny², ¹Cairo Univ., Giza, Egypt, ²Agricultural Research Center, Giza, Egypt

5:00 **0661** Evidence that CYP-mediated resistance in *Aedes aegypti* is due to a *trans* regulatory factor. Leticia Smith¹, Rakshit Tyagi¹, Shinji Kasai² and **Jeff Scott** (jgs5@cornell.edu)¹, ¹Cornell Univ., Ithaca, NY, ²National Institute of Infectious Diseases, Tokyo, Japan

5:10 **0662** Diagnostic dose assays for the detection and monitoring of resistance in adults from *Listronotus maculicollis* (Coleoptera: Curculionidae) populations. **Olga Kostromytska** (kolgaent@sebs.rutgers.edu), Albrecht Koppenhöfer and Shaohui Wu, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

5:20 **0663** Sequencing of pooled individuals reveals a selective sweep delimited by a nonsynonymous point mutation associated with pyrethroid resistance in the navel orangeworm, *Amyelois transitella* (Lepidoptera: Pyralidae). **Mark Demkovich** (mdemkov3@illinois.edu), Bernarda Calla, Hugh M. Robertson and May Berenbaum, Univ. of Illinois, Champaign, IL

10-min: PBT, Social Insects

Meeting Room 213 (Convention Centre)

Moderators: Alexandra Sebastien¹ and Carlos Ortiz², ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Univ. de Puerto Rico, San Juan, PR

1:30 **0664** Designing an RNAi bioassay for invasive ant control. **Margaret Allen** (meg.allen@ars.usda.gov), USDA - ARS, Stoneville, MS

1:40 **0665** The role of vitellogenins in the worker caste of the red imported fire ant (*Solenopsis invicta*). **Cecilia Tamborindoguy** (ctamborindoguy@tamu.edu) and Chloé Hawkings, Texas A&M Univ., College Station, TX

1:50 **0666** Honey bee breeding programs using proteomic markers: Alternative preservation methods to facilitate sample collection and promote collaboration with beekeepers. **Alexandra Sébastien** (alexandra.sebastien12@gmail.com)¹, Nonno Hasegawa², Corie Rooyackers², Karina Nielsen¹, Nikolay Stoyanov¹, Bradford Vinson¹ and Leonard Foster¹, ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Univ. of Guelph, Guelph, ON, Canada

2:00 **0667** Honey bees benefit from the U.S. Conservation Reserve Program (CRP): Critical colony-level traits enhanced by CRP landscapes. **Vincent Ricigliano** (vincent.ricigliano@ars.usda.gov)¹, William Meikle¹, Patrick Maes², Brendon Mott¹ and Kirk E. Anderson¹, ¹USDA - ARS, Tucson, AZ, ²Carl Hayden Bee Research Center, Tucson, AZ

2:10 **0668** Environmental factors can alter the honey bee gut microbiome. **Jenifer Walke** (jwalke@ewu.edu)^{1,2}, Shelby Fettig¹, Richard D. Fell² and Lisa Belden², ¹Eastern Washington Univ., Cheney, WA, ²Virginia Polytechnic Institute and State Univ., Blacksburg, VA

2:20 **0669** Behavior of honey bees foraging on nectar containing ethanol. **Fanfan Noel** (fanfan.noel@upr.edu)¹, Tugrul Giray¹, Jose Agosto¹, Yves Le Conte², Michael De Jesús Soto¹ and Luz A. Sanchez Lopez¹, ¹Univ. de Puerto Rico, San Juan, PR, ²INRA, Avignon, France

2:30 **0670** Octopaminergic innervation of the Dufour's gland in the honeybee. **Margarita Orlova** (margaritaor@gmail.com), Arizona State Univ., Tempe, AZ

2:40 Break

2:50 **0671** Honey bee foraging specialization for flower type and time of day. **Carlos Ortiz-Alvarado** (cortiz3515@gmail.com)¹, Sarah Markland², Jordan Twombly-Ellis³, Claudia Cordero Martinez¹, Sebastian Silva Echeandia¹, Jose Agosto¹ and Tugrul Giray¹, ¹Univ. de Puerto Rico, San Juan, PR, ²Oklahoma State Univ. College of Arts and Sciences, Tulsa, OK, ³Cornell Univ., Ithaca, NY

3:00 **0672** Genomic comparison of bee populations on Puerto Rico before and after hurricanes Irma and Maria. **Jose Marcelino** (jmar06@gmail.com)¹, Kiran Donthu², Rosanna Giordano², Aixa Ramirez Lluch¹, Charles Cuff¹, Yarira Ortiz-Alvarado¹, Carlos Ortiz-Alvarado¹, Catalina Rodriguez Alemany¹, Cesar Ramirez³, Shirley Cruz³, Fanfan Noel¹, Ísada Cordero-Ford¹, Stephanie Cardona¹, Janpierre Aleman-Rios¹, Sebastian Silva Echeandia¹, Tilden Aponte¹ and Tugrul Giray¹, ¹Univ. de Puerto Rico, San Juan, PR, ²KYB Inc., Carolina, PR, ³Dept. de Agricultura de Puerto Rico, San Juan, PR

3:10 **0673** Gentle-Africanized bees in Puerto Rico retain the ability to enter a wintering-like state in response to environmental stress. **Stephanie Feliciano** (stephanie.feliciano2@upr.edu)¹, Mehmet Ali Döke¹, Tugrul Giray¹, Christina Grozinger², Jose Agosto-Rivera¹, Remi Megret¹, Ísada Cordero-Ford¹, Janpierre Aleman-Rios¹ and Claudia Cordero-Martínez¹, ¹Univ. de Puerto Rico, San Juan, PR, ²Pennsylvania State Univ., University Park, PA

3:20 **0674** Video-based monitoring of honey bee behaviors at the hive entrance reveals distinct chronotypes in *Apis mellifera*. **Isada Claudio-Ford** (isada.claudio@upr.edu)¹, Claudia Cordero-Martínez², Jonathan Aleman-Rios², Alberto Prado³, Célia Bordier³, Cedric Alaux³, Yves Le Conte³, Edgar Acuña⁴, Remi Megret², Tugrul Giray² and Jose Agosto-Rivera², ¹Univ. de Puerto Rico, Bayamon, PR, ²Univ. de Puerto Rico, San Juan, PR, ³INRA, Avignon, France, ⁴Univ. de Puerto Rico, Mayagüez, PR

3:30 **0675** Bees stay up late: Analyzing locomotor activity to study circadian rhythm of two species of the nocturnal bee genus *Megalopta* (Halictidae). **Erin Krichilsky** (ek525@cornell.edu)¹, Callum Kingwell², Adam Smith³ and William Wcislo¹, ¹Smithsonian Tropical Research Institute, Panama City, Panama, ²Cornell Univ., Ithaca, NY, ³George Washington Univ., Washington, DC

3:40 **0676** Epigenetic dynamics of honey bee development under lethal viral infections. **Hongmei Li-Byarlay** (hli-byarlay@centralstate.edu)¹, Humberto F. Boncristiani², Micheline Strand³, David Taryp⁴ and Olav Rueppell², ¹Central State Univ., Wilberforce, OH, ²Univ. of North Carolina, Greensboro, NC, ³US Army, Research Triangle Park, NC, ⁴North Carolina State Univ., Raleigh, NC

10-min: P-IE, Biocontrol, Parasitoids

Meeting Room 114/115 (Convention Centre)

Moderators: Mary Cornelius¹ and Esameldin Kabbashi², ¹USDA - ARS, Beltsville, MD, ²National Food Research Center, Khartoum North, Sudan

1:30 **0677** Effect of a flowering border on egg parasitism and predation and adult parasitism rates on two squash bug species *Anasa tristis* and *Anasa armigera* in squash fields in Maryland. **Mary Cornelius** (mary.cornelius@ars.usda.gov), USDA - ARS, Beltsville, MD

1:40 **0678** Using external management as a strategy for the biological control of *Diaphorina citri* (Hemiptera: Liviidae). **José Postali Parra** (jrpparra@usp.br)¹, Alexandre Diniz¹, Adriano Garcia¹, Carolina Reigada², Jaci Vieira¹ and Gustavo Alves¹, ¹Univ. de São Paulo, Piracicaba, Brazil, ²Federal Univ. of São Carlos, São Carlos, Brazil

1:50 **0679** The potential of *Anastatus bifasciatus* for biological control of the brown marmorated stink bug in Europe. **Judith Stahl** (j.stahl@cabi.org)^{1,2}, Dirk Babendreier¹, Tara Garipey³, Leo Beukeboom⁴ and Tim Haye¹, ¹CABI, Delémont, Switzerland, ²Univ. Bremen, Bremen, Germany, ³Agriculture and Agri-Food Canada, London, ON, Canada, ⁴Univ. of Groningen, Groningen, Netherlands

2:00 **0680** Comparison of biological control of the brown marmorated stink bug among habitat types: Sentinel egg mass assessment of parasitoid and predator impact under different pest management systems. **Emily Ogburn** (emily_ogburn@ncsu.edu) and Jim Walgenbach, North Carolina State Univ., Mills River, NC

2:10 **0681** Reproduction of *Ooencyrtus* sp. nr. *telenomicida* (Hymenoptera: Encyrtidae) on alternate hosts compared with on its main host *Bagrada hilaris* (Heteroptera: Pentatomidae). **Nancy Power** (npowe001@ucr.edu), Fatemeh Ganjisaaffar and Thomas M. Perring, Univ. of California, Riverside, CA

2:20 **0682** Parasitism of the cassava mealybug by *Anagyrs lopezi* in Vietnam and Cambodia. **Keiji Takasu** (takasu@brs.kyushu-u.ac.jp)¹, Tuan Dat Nguyen¹, Layheng Sam¹, Kazunori Matsuo¹ and Sophary Khin², ¹Kyushu Univ., Fukuoka, Japan, ²Univ. of Battambang, Battambang, Cambodia

2:30 **0683** Selectivity of ready-mix insecticide formulations used in soybean on *Trichogramma pretiosum*. **Daniel Barbosa** (daniel.passarelli.barbosa@usp.br), Ana Clara Paiva, Fernando lost Filho and Pedro Yamamoto, Univ. de São Paulo, Piracicaba, Brazil

2:40 **0684** Attraction of parasitoids to volatile organic compound lures in ash trees infested with the ash leaf coneroller, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae). Sarah McPike and **Maya Evenden** (mevenden@ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

2:50 Break

3:00 **0685** Shedding light on *Oobius agrili* Zhang and Huang (Hymenoptera: Encyrtidae): Critical day length for photoperiod-induced diapause in the introduced egg parasitoid of emerald ash borer. **Toby R. Petrice** (petrice@msu.edu)^{1,2}, Leah S. Bauer², Therese Poland² and Forrest Ravlin¹, ¹Michigan State Univ., East Lansing, MI, ²USDA - Forest Service, Lansing, MI

3:10 **0686** Molecular detection method developed to track the koinobiont larval parasitoid *Apanteles opuntiarum* (Hymenoptera: Braconidae) imported from Argentina to control *Cactoblastis cactorum* (Lepidoptera: Pyralidae). **Mrittunjai Srivastava** (mrittunjai.srivastava@freshfromflorida.com), Pratibha Srivastava, Danielle Wolaver, Eric Rohrig, Amy Howe and Leroy Whilby, Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

3:20 **0687** Effects of fresh vs. frozen *Halyomorpha halys* egg masses on recognition and usage by *Trissolcus japonicus*: Implications for sentinel monitoring efforts. **Dalton Ludwick** (daltonludwick@gmail.com)¹ and Tracy C. Leskey², ¹Virginia Polytechnic Institute and State Univ., Kearneysville, WV, ²USDA - ARS, Kearneysville, WV

3:30 **0688** Impact of the rearing host on ovipositional preference of the *Bagrada hilaris* egg parasitoid, *Ooencyrtus* sp. near *telenomicida* (Hymenoptera: Encyrtidae). **Fatemeh Ganjisaaffar** (fatemeh.ganjisaaffar@email.ucr.edu), Nancy Power and Thomas M. Perring, Univ. of California, Riverside, CA

3:40 **0689** Presentation withdrawn

3:50 **0690** Predation and parasitism of egg masses of the brown marmorated stink bug in conventional and organic farmscapes in the southeastern United States. **Glynn Tillman** (glynn.tillman@ars.usda.gov)¹, Michael Toews², Ted Cottrell³, Brett Blaauw⁴, Ashfaq Sial⁴, Rammohan Rao Balusu⁵, G. David Buntin⁶ and Shimat Joseph⁶, ¹USDA - ARS, Tifton, GA, ²Univ. of Georgia, Tifton, GA, ³USDA - ARS, Byron, GA, ⁴Univ. of Georgia, Athens, GA, ⁵Auburn Univ., Auburn, AL, ⁶Univ. of Georgia, Griffin, GA

4:00 **0691** Biological control of the brown marmorated stink bug in eastern Washington. **Joshua Milnes** (joshua.milnes@wsu.edu) and Betsy Beers, Washington State Univ., Wenatchee, WA

4:10 Break

4:20 **0692** Multiparasitism with *Trichogramma dendrolimi* on egg of Chinese oak silkworm, *Antheraea pernyi*, enhanced emergence of *Trichogramma ostriniae*. **Lian-Sheng Zang** (lsz0415@163.com)¹ and Xiangbing Yang², ¹Jilin Agricultural Univ., Changchun, China, ²Univ. of California, Salinas, CA

4:30 **0693** A promising biological agent to control the carrot weevil. **Annie-Ève Gagnon** (annie-eve.gagnon@canada.ca), Benjamin Mimee, Guy Boivin and Guy Bélair, Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada

4:40 **0694** Establishment of *Tetrastichus setifer* Thomson (Hymenoptera: Eulophidae), a parasitoid of the lily leaf beetle (Coleoptera: Chrysomelidae), in Alberta, Canada. **Kenneth Fry** (kfry@oldscollge.ca), Olds College, Olds, AB, Canada

4:50 **0695** Reported natural enemies of some food crop insect pests in North Kordofan and the climatological effect on *Eurytoma* sp. **Esameldin Kabbashi** (esameldinkabbashi@gmail.com), National Food Research Center, Khartoum North, Sudan

5:00 **0696** Within-host tachinid parasitoid density affects parasitoid body size and allometry. **Jerome Wilson** (keatonwilson@email.arizona.edu), Laura Ruiz and Goggy Davidowitz, Univ. of Arizona, Tucson, AZ

10-min: P-IE, Novel Tools and Products

Meeting Room 224 (Convention Centre)

Moderators: Siddharth Tiwari and Jennifer Browning, BASF Corporation, Research Triangle Park, NC

1:30 **0697** Inscalis™ insecticide: A new and potent management tool for Asian citrus psyllid. **Siddharth Tiwari** (siddharth.tiwari@basf.com), Teresia Nyoiike, Joe Stout, Steve Broscious, Tommy Wofford and Joel Johnson, BASF Corporation, Research Triangle Park, NC

1:40 **0698** Finding a needle in a haystack – computational discovery of novel insecticidal toxins within big data. **Lisa Meihls** (lisa.meihls@evogene.com)¹, Or Rotem² and Basia Vinocur², ¹Evogene, Inc., St. Louis, MO, ²Evogene Ltd., Park Rehovot, Israel

1:50 **0699** A computational tool to predict the population dynamics of fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae) (J.E. Smith), in crop areas. **Adriano Garcia** (adrianogomesgarcia@gmail.com)¹, Cláudia Ferreira², Wesley Godoy¹ and Robert L. Meagher³, ¹Univ. de São Paulo, Piracicaba, Brazil, ²Univ. Estadual Paulista, Botucatu, Brazil, ³USDA - ARS, Gainesville, FL

2:00 **0700** 3RIVE 3D® platform: The next generation for in-furrow crop pest protection. **Lamar Buckelew** (lamar.buckelew@fmc.com)¹, Rick Ekins², Robert Hooten³ and Hector E. Portillo⁴, ¹FMC Agricultural Solutions, Davenport, IA, ²FMC Agricultural Solutions, Philadelphia, PA, ³FMC Agricultural Solutions, Kansas City, MO, ⁴FMC Agricultural Solutions, Newark, DE

2:10 **0701** Detecting insects from the sky: Satellites to drones. **Yong-Lak Park** (yopark@mail.wvu.edu)¹, Bo Yoon Seo², Srikanth Gururajan¹ and Richard M. Turcotte³, ¹West Virginia Univ., Morgantown, WV, ²National Institute of Agricultural Sciences, Wanju-gun, South Korea, ³USDA - Forest Service, Morgantown, WV

2:20 **0702** Management of arthropod pests with UV-C irradiation. **Brent Short** (brent.short@ars.usda.gov)¹, Makaila Emery², Wojciech Janisiewicz¹, Fumiomi Takeda¹ and Tracy C. Leskey¹, ¹USDA - ARS, Kearneysville, WV, ²Shepherd Univ., Shepherdstown, WV

2:30 **0703** Isoclast™ Active: A review of North America uses in specialty and row crops. **Shine Taylor** (james.e.taylor-1@dupont.com), Corteva Agriscience, Agriculture Division of DowDuPont, Bradenton, FL

2:40 **0704** Anamed, an effective long-lasting protein attract and kill system for tephritid fruit flies. **Ruben Machota Jr.** (ruben_soad@yahoo.com.br)¹, Ligia Bortoli², Rodrigo Silva³, Rafael Borges², Revilee Lake³, William Urrutia³ and Agenor Mafra-Neto³, ¹Embrapa Grape & Wine, Bento Gonçalves, Brazil, ²ISCA Tecnologias Ltda, Ijuí, Brazil, ³ISCA Technologies, Inc., Riverside, CA

2:50 Break

3:00 **0705** A mating disruption formulation for control of the row crop pest fall armyworm (*Spodoptera frugiperda*). **Rodrigo Silva** (rodrigo.silva@iscatech.com)¹, Agenor Mafra-Neto¹, Rafael Borges², Revilee Lake¹, Jesse Saroli¹ and William Urrutia¹, ¹ISCA Technologies, Inc., Riverside, CA, ²ISCA Tecnologias Ltda, Ijuí, Brazil

3:10 **0706** Noctovi: A sprayable attract and kill product for noctuid moth pests. **Rafael Borges** (rafael@isca.com.br)¹, Sérgio Chidi², Márcio Fernandes Peixoto³, Rodrigo Silva⁴, Camillia Borges¹, William Urrutia⁴, Jesse Saroli⁴ and Agenor Mafra-Neto⁴, ¹ISCA Tecnologias Ltda, Ijuí, Brazil, ²Arysta LifeScience, São Paulo, Brazil, ³Instituto Federal Goiano, Setor Sul, Brazil, ⁴ISCA Technologies, Inc., Riverside, CA

3:20 **0707** SPLAT SWD: A semiochemical attract and kill formulation for spotted-wing drosophila, *Drosophila suzukii*. **William Urrutia** (william.urrutia@iscatech.com)¹, Cesar Rodriguez², Jimmy Klick³, Michael Seagraves⁴, Johnattan Cumplido⁵, Robert Holdcraft², Rafael Borges⁶, Rodrigo Silva¹ and Agenor Mafra-Neto¹, ¹ISCA Technologies, Inc., Riverside, CA, ²Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, ³Driscoll's, Oxnard, CA, ⁴Driscoll's, Watsonville, CA, ⁵Univ. Nacional Autónoma de México, Ciudad de México, Mexico, ⁶ISCA Tecnologias Ltda, Ijuí, Brazil

3:30 **0708** Use of 3D technology in advancement of Asian citrus psyllid trapping. **Shweta Sharma** (shweta.sharma@freshfromflorida.com), Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

3:40 **0709** Assessing the safety of a dsRNA targeting the Colorado potato beetle clathrin gene to the predator *Chrysoperla carnea*. **Salvatore Arpaia** (salvatore.arpaia@enea.it)¹, Olivier Christiaens², Isabella Urru¹ and Guy Smagghe², ¹Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rotondella, Italy, ²Ghent Univ., Ghent, Belgium

3:50 **0710** Squish 'em or leave 'em: Assessing the potential risk of exotic pests. **Leslie Newton** (leslie.p.newton@aphis.usda.gov), USDA - APHIS, Raleigh, NC

4:00 **0711** Inscalis™ insecticide: A management tool for aphids and whiteflies on vegetable crops. **Teresia Nyoike** (teresia.nyoike@basf.com), Tommy Wofford and Steve Broscius, BASF Corporation, Research Triangle Park, NC

4:10 **0712** Effectiveness of automated trapping for western bean cutworm (*Striacosta albicosta*) management. **Scott Williams** (scott.williams@dtm.com), Chad Aeschliman, David Daniels and Johnny Park, DTN, West Lafayette, IN

4:20 Break

4:30 **0713** Pathogenicity of three different biopesticides against black cutworm, *Agrotis ipsilon* (Lepidoptera: Noctuidae). **Muhammad Ayyub** (mbilalayub@gmail.com)¹, Ahmad Nawaz¹, Muhammad Arif¹, Douglas Richmond² and Robert Behle³, ¹Univ. of Agriculture, Faisalabad, Pakistan, ²Purdue Univ., West Lafayette, IN, ³USDA - ARS, Peoria, IL

4:40 **0714** Assessment of soybean plants' susceptibility to *Bemisia tabaci* using remote sensing. **Fernando Iost Filho** (fernandohost@gmail.com)¹, Ana Clara Paiva¹, Pedro Barros¹, David Rosalen² and Pedro Yamamoto¹, ¹Univ. de São Paulo, Piracicaba, Brazil, ²Univ. Estadual Paulista, Jaboticabal, Brazil

4:50 **0715** Flonicamid: Biological properties against the green peach aphid *Myzus persicae* and safety to beneficial organisms. **Takayuki Kashima** (t-kashima@iskweb.co.jp)¹, Mitsugu Iwasa¹, Chiaki Takeda¹, Shigeru Mitani¹ and Masayuki Morita², ¹Ishihara Sangyo Kaisha, Ltd., Kusatsu, Japan, ²Ishihara Sangyo Kaisha, Ltd., Osaka, Japan

5:00 **0716** Inscalis™ insecticide: A new tool for whitefly management in ornamentals. **Jennifer Browning** (jennifer.browning@basf.com), BASF Corporation, Research Triangle Park, NC

5:10 **0717** Versys™ insecticide: A novel insecticide for management of piercing-sucking pests in pome fruit. **Lindsey Goudis** (lindsey.goudis@basf.com)¹, Jessica Rush¹, Wayne Barton¹ and Daniel O'Byrne², ¹BASF Canada, Mississauga, ON, Canada, ²BASF Corporation, Research Triangle Park, NC

10-min: P-IE, Pollination

Meeting Room 111/112 (Convention Centre)

Moderators: Sarah Cusser¹, and Christelle Guédot², ¹Michigan State Univ., Hickory Corners, MI, ²Univ. of Wisconsin, Madison, WI

1:30 **0718** Presentation withdrawn

1:40 **0719** Effect of hive placement as a function of surrounding landscape on honeybee visitation to a native fruit crop. **Christelle Guédot** (guedot@wisc.edu)¹, Aídee Guzman², Hannah Gaines-Day¹, Abby Lois¹ and Shawn Steffan³, ¹Univ. of Wisconsin, Madison, WI, ²Univ. of California, Berkeley, CA, ³USDA - ARS, Madison, WI

1:50 **0720** Annual cover crops for managed and wild bees: Optimal plant mixtures depend on pollinator enhancement goals. **Rachel Mallinger** (rachel.mallinger@ufl.edu)¹, Jarrad Prasifka² and Jose Franco³, ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Fargo, ND, ³USDA - ARS, Mandan, ND

2:00 **0721** Unique bee communities within vacant lots and urban farms result from variation in surrounding urbanization intensity. **Frances S. Sivakoff** (sivakoff.3@osu.edu), Scott Prajzner and Mary Gardiner, The Ohio State Univ., Columbus, OH

2:10 **0722** Evaluating wildflower strips for supporting alfalfa leafcutting bees on alfalfa seed farms. **Casey Delphia** (casey.delphia@montana.edu), Kevin M. O'Neill and Laura A. Burkle, Montana State Univ., Bozeman, MT

2:20 **0723** Roadsides and pollinators: How mowing frequency impacts forage resources and flower-visiting insects. **Jaret Daniels** (jdaniels@flmnh.ufl.edu), Chase Kimmel and Jonathan Bremer, Florida Museum of Natural History, Gainesville, FL

2:30 **0724** Monitoring changes in native bee communities in Michigan, with a focus on agricultural landscapes. **Kelsey Graham** (kelsey.katherine.graham@gmail.com)¹, Jason Gibbs² and Rufus Isaacs¹, ¹Michigan State Univ., East Lansing, MI, ²Univ. of Manitoba, Winnipeg, MB, Canada

2:40 **0725** Local management and landscape drivers of bee functional guilds in pigeon pea crop in Kenya. **Mark Otieno** (mmarkotieno@gmail.com), Univ. of Embu, Embu, Kenya

2:50 Break

3:00 **0726** Apple pollination by moths in Arkansas. **Stephen Robertson** (smr020@email.uark.edu), Ashley P. G. Dowling, Neelendra Joshi and Erica Westerman, Univ. of Arkansas, Fayetteville, AR

3:10 **0727** Floral reward chemistry and bumble bee foraging behavior. **Anne Leonard** (anneleonard@unr.edu), Felicity Muth and Jacob Francis, Univ. of Nevada, Reno, NV

3:20 **0728** Pollen as food for adult bees: Comparison across species and flower-specialization levels. **Heidi Dobson** (dobsonhe@whitman.edu), Whitman College, Walla Walla, WA

3:30 **0729** Designing pollinator plantings that maximize service while minimizing pest risk to crops. **Tina Harrison** (tinaharrison09@gmail.com)¹, Kimiora Ward¹, Ola Lundin² and Neal M. Williams¹, ¹Univ. of California, Davis, CA, ²Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

3:40 **0730** Plant-pollinator networks of the Oak Savanna: The influence of community composition on network structure. **Tyler Kelly** (ttkelly@sfu.ca) and Elizabeth Elle, Simon Fraser Univ., Burnaby, BC, Canada

3:50 **0731** If you build it, who will come? Evaluating the diversity of bees in flowering lawns. **James Wolfin** (wolfi009@umn.edu), Marla Spivak and Eric Watkins, Univ. of Minnesota, St. Paul, MN

4:00 Break

4:10 **0732** The effect of floral resource composition on the native solitary bee, *Osmia lignaria* Say, in western Washington. **Lila Westreich** (westr097@uw.edu), Jonathan Bakker and Patrick Tobin, Univ. of Washington, Seattle, WA

4:20 **0733** Context-dependent impacts of pollinator-dependent invasive plants on network characteristics, pollinator traits and native plant reproduction. **Sandra Gillespie** (sandra.gillespie@ufv.ca)¹ and Elizabeth Elle², ¹Univ. of the Fraser Valley, Abbotsford, BC, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada

4:30 **0734** Using biofertilizers to enhance mutualisms between specialty crops and beneficial insects. **Benjamin Glogoza** (benjamin.glogoza@ndus.edu), North Dakota State Univ., Fargo, ND

4:40 **0735** Enhancing crop-pollinator interactions using nectar-related plant traits. **Jarrad Prasifka** (jarrad.prasifka@ars.usda.gov)¹ and Rachel Mallinger², ¹USDA - ARS, Fargo, ND, ²Univ. of Florida, Gainesville, FL

4:50 **0736** Impacts of fertiliser and herbicide runoff on plant-pollinator interactions. **Laura Russo** (russola@tcd.ie) and Jane Stout, Trinity College, Dublin, Ireland

5:00 **0737** Habitat filtering affects plant-pollinator interactions in prairie ecosystems. **Diana Robson** (drobson@manitobamuseum.ca)¹, Cary Hamel² and Rebekah Neufeld³, ¹Manitoba Museum, Winnipeg, MB, Canada, ²Nature Conservancy of Canada, Winnipeg, MB, Canada, ³Nature Conservancy of Canada, Brandon, MB, Canada

5:10 **0738** Landscape composition differentially drives diet breadth for key pollinator species. **Sarah Cusser** (sarah.cusser@gmail.com)¹, John Neff² and Shalene Jha³, ¹Michigan State Univ., Hickory Corners, MI, ²Central Texas Melittological Institute, Austin, TX, ³Univ. of Texas, Austin, TX

10-min: P-IE, Resistance Management, Molecular and Cellular Biology

Meeting Room 122 (Convention Centre)

Moderators: Fangneng Huang¹ and Christa Ellers-Kirk², ¹Louisiana State Univ., Baton Rouge, LA, ²BASF Corporation, Research Triangle Park, NC

1:30 **0739** Cry1F binding is lost in midgut of the Asian corn borer (*Ostrinia furnacalis* (Guenée)) selected for high resistance to Cry1F. **Mark Nelson** (mark.e.nelson@pioneer.com)¹, Catherine Clark¹, John Mathis¹, Yueqin Wang², Kang-Lai He², Jian-Zhou (Joe) Zhao¹, Amit Sethi¹, Clint Pilcher¹ and Rodrigo Sarria³, ¹Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA, ²Chinese Academy of Agricultural Sciences, Beijing, China, ³Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

1:40 **0740** Documentation of field resistance to Cry1A.105/Cry2Ab2 corn in corn earworm populations in Louisiana. **Fangneng Huang** (fhuang@agcenter.lsu.edu)¹, Gagandeep Kaur², Sebe Brown³, Jianyang Guo⁴, Graham P. Head⁵, Paula A. Price⁵, Silvana Paula-Moraes⁶ and Xinzhi Ni⁷, ¹Louisiana State Univ., Baton Rouge, LA, ²Louisiana State Univ. AgCenter, Baton Rouge, LA, ³Louisiana State Univ., Winnsboro, LA, ⁴Chinese Academy of Agricultural Sciences, Beijing, China, ⁵Monsanto Company, St. Louis, MO, ⁶Florida Univ., Jay, FL, ⁷USDA - ARS, Tifton, GA

1:50 **0741** A possible mechanism for behavior-mediated resistance in *Bt* cotton. **Mohammad-Amir Aghaee** (maghaee@ncsu.edu)¹, Alejandro Del Pozo¹, Matt W. Turnbull², Jeremy Greene³ and Dominic Reising⁴, ¹North Carolina State Univ., Raleigh, NC, ²Clemson Univ., Clemson, SC, ³Clemson Univ., Blackville, SC, ⁴North Carolina State Univ., Plymouth, NC

2:00 **0742** Refining definitions of primary and secondary pests for resistance management considerations-a Corteva Agriscience™ perspective. **Clinton Pilcher** (clint.pilcher@pioneer.com)¹, Miles Lepping², Nicholas Storer² and Michael Shaw², ¹Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA, ²Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

- 2:10 **0743** Presentation withdrawn
- 2:20 **0744** Understanding the fate of larval movement of the fall armyworm in seed mixed plantings of *Bt* and non-*Bt* corn containing Trecepta™ trait. **Marcelo Dimase** (marcelo.dimase@gmail.com)¹, Jianguo Guo², Sebe Brown³, Graham P. Head⁴, Paula A. Price⁴, Ying Niu¹ and Fangneng Huang¹, ¹Louisiana State Univ., Baton Rouge, LA, ²Louisiana State Univ. AgCenter, Baton Rouge, LA, ³Louisiana State Univ., Winnsboro, LA, ⁴Monsanto Company, St. Louis, MO
- 2:30 **0745** Characterization of Cry34Ab1/Cry35Ab1 resistance in western corn rootworm. **Amit Sethi** (bugologist@gmail.com)¹, Stephen D. Thompson¹, Jian-Zhou (Joe) Zhao¹, Benchie Ortegon¹, Ashley Miles¹, Erick Hernandez-Chacon¹, Zaiqi Pan² and Andre Crespo¹, ¹Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA, ²Corteva Agriscience, Agriculture Division of DowDuPont, Wilmington, DE
- 2:40 Break
- 2:50 **0746** Modeling evolution of resistance by fall armyworm, *Spodoptera frugiperda*, to MIR162 (Vip3A) in Brazil. **Zaiqi Pan** (zaiqi.pan@pioneer.com)¹, Philip Crain¹, David Onstad² and Michael Shaw³, ¹DuPont Crop Protection, Wilmington, DE, ²DuPont Pioneer, Johnston, IA, ³Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN
- 3:00 **0747** Pyrethroid-resistance level affects performance of larvicides and adulticides from different insecticide classes in populations of the annual bluegrass weevil. **Albrecht Koppenhöfer** (a.koppenhofer@rutgers.edu), Olga Kostromytska and Shaohui Wu, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ
- 3:10 **0748** Use of molecular markers for plant DNA to determine host plant usage for potato leafhopper, *Empoasca fabae*. **Alina Avanesyan** (alina@umd.edu) and Bill Lamp, Univ. of Maryland, College Park, MD
- 3:20 **0749** Discovering wild bees hidden needs. **Erin Treiber** (treib020@umn.edu)¹, Colleen Satyshur¹, Michael Wilson² and Marla Spivak¹, ¹Univ. of Minnesota, St. Paul, MN, ²Univ. of Minnesota, Minneapolis, MN
- 3:30 **0750** Sefina™ insecticide: How a new tool fits into comprehensive management systems. **Christa Eilers-Kirk** (christa.kirk@basf.com), BASF Corporation, Research Triangle Park, NC

10-min: SysEB, Behavior and Genetics

Meeting Room 206 (Convention Centre)

Moderators: Jeffery K. Tomberlin¹ and Matthew Van Dam², ¹Texas A&M Univ., College Station, TX, ²California Academy of Sciences, San Francisco, CA

1:30 **0751** Morphology predicts foraging guild in araneomorphs. **Andrea Haberkern** (andrea.haberkern.526@my.csun.edu), The Univ. of British Columbia, Vancouver, BC, Canada

1:40 **0752** Extreme genome reduction in the specialist eriophyid mite herbivore *Aculops lycopersici*. **Wannes Dermauw** (wannes.dermauw@ugent.be)¹, Robert Greenhalgh², Thomas Van Leeuwen¹, Richard Clark² and Merijn R. Kant³, ¹Ghent Univ., Ghent, Belgium, ²Univ. of Utah, Salt Lake City, UT, ³Univ. of Amsterdam, Amsterdam, Netherlands

1:50 **0753** Presentation withdrawn

2:00 **0754** Olfactory choice for carrion age in the burying beetle *Nicrophorus vespilloides*: Preference or aversion? **Pablo Delclos** (delclos88@tamu.edu), Tammy Starr and Jeffery K. Tomberlin, Texas A&M Univ., College Station, TX

2:10 **0755** RAD-Seq reveals strong host-associated population structure in locoweed-feeding *Acanthoscelides pullus* (Coleoptera: Chrysomelidae: Bruchinae). **Mary Tenuta** (mtenuta@sandiego.edu), Daniel Sheridan and Geoff Morse, Univ. of San Diego, San Diego, CA

2:20 **0756** Integrating functional genomics into UCE phylogenomics and improving species tree accuracy. **Matthew Van Dam** (mvandam@calacademy.org), James Henderson and Michelle Trautwein, California Academy of Sciences, San Francisco, CA

2:30 Break

2:40 **0757** Mouthpart wetting dichotomy and its implications to the feeding mechanism of Diptera. **Ellen Camerato** (ecamerat@kent.edu), Matthew Lehnert, Rena Fonseca and La'Teshia Pullin, Kent State Univ., North Canton, OH

2:50 **0758** Partial ring species, clines, and disjunct geographic patterns of genetic differentiation reveal complex history of divergence for North American cherry-infesting *Rhagoletis* flies. **Jeffrey Feder** (jfeder@nd.edu)¹, Meredith Doelman¹, Gilbert Saint Jean¹, Scott Egan², Glen Hood², Thomas Powell³, Wee Yee⁴, Juan Rull⁵, James Smith⁶ and Martin Aluja⁵, ¹Univ. of Notre Dame, South Bend, IN, ²Rice Univ., Houston, TX, ³Binghamton Univ., Binghamton, NY, ⁴USDA - ARS, Wapato, WA, ⁵Instituto de Ecología, Xalapa, Mexico, ⁶Michigan State Univ., East Lansing, MI

3:00 **0759** Restless slumber: Transcriptional dynamics during winter diapause drives the evolution of summer emergence phenology. **Gregory Ragland** (gregory.ragland@ucdenver.edu)¹, Edwina Dowle¹, Thomas Powell², Jeffrey Feder³ and Dan Hahn⁴, ¹Univ. of Colorado, Denver, CO, ²Binghamton Univ., Binghamton, NY, ³Univ. of Notre Dame, South Bend, IN, ⁴Univ. of Florida, Gainesville, FL

3:10 **0760** Local adaptation to abiotic stress and its potential for adaptive introgression in apple maggot flies. **Dietmar Schwarz** (dietmar.schwarz@wwu.edu)¹, Jeffrey Feder² and Christa Kohnert¹, ¹Western Washington Univ., Bellingham, WA, ²Univ. of Notre Dame, South Bend, IN

3:20 **0761** Condition alters the degree of sex-biased gene expression in *Drosophila melanogaster*. **Antonino Malacrino** (antonino.malacrino@gmail.com), Christopher Kimber, Martin Brengdahl and Urban Friberg, Linköping Univ., Linköping, Sweden

3:30 **0762** Where to dump the kids? Oviposition site selection in a forensically important blowfly (*Cochliomyia macellaria*) when considering temperature, conspecifics, and predators. **Travis Rusch** (trusch262@gmail.com), Jeffery Tomberlin and Aaron Tarone, Texas A&M Univ., College Station, TX

3:40 **0763** Presentation withdrawn

10-min: SysEB, Biodiversity, Conservation, and Collections

Meeting Room 205 (Convention Centre)

Moderators: Isa Betancourt¹ and Julie-Éléonore Maisonhaute², ¹The Academy of Natural Sciences of Drexel Univ., Philadelphia, PA, ²Univ. du Québec, Montréal, QC, Canada

1:30 **0764** Museum specimen records reconstruct Plecoptera (stonefly) assemblages in Midwest USA. **R. Edward DeWalt** (dewalt@illinois.edu)¹, Jason Robinson¹ and Scott A. Grubbs², ¹Univ. of Illinois, Champaign, IL, ²Western Kentucky Univ., Bowling Green, KY

1:40 **0765** Behavioral and chemoecology on the pin: Utilizing museum collections to better understand the bat-moth arms race. **Nicolas Dowdy** (njdowdy@gmail.com)¹, William E. Conner², Alan Lemmon³, Emily Lemmon³ and Jennifer Zaspel⁴, ¹Milwaukee Public Museum, Milwaukee, WI, ²Wake Forest Univ., Winston-Salem, NC, ³Florida State Univ., Tallahassee, FL, ⁴Purdue Univ., West Lafayette, IN

1:50 **0766** Forest arthropods in planted tree stands of varying ages on the Sudbury barrens. **Martin Brummell** (martinbrummell@gmail.com) and Nathan Basiliko, Laurentian Univ., Sudbury, ON, Canada

2:00 **0767** Diversity and endemism of arthropods of high Appalachia. **Michael Caterino** (mcateri@clemson.edu), Clemson Univ., Clemson, SC

2:10 **0768** The fountain of science communication: How a historic center city fountain is being used to document urban biodiversity and link the public with science. **Isa Betancourt** (betancourt@ansp.org), The Academy of Natural Sciences of Drexel Univ., Philadelphia, PA

2:20 **0769** Biodiversity and abundance of important pollinators of spring flowers in urban areas of Rawalpindi and Islamabad, Pakistan. **Asim Gulzar** (asim@uaar.edu.pk)¹, Muhammad Ilyas¹, Fahid Hussain¹, Muhammad Tariq¹, Muhammad Ali² and Munir Ahmed¹, ¹Pir Mehr Ali Shah Arid Agriculture Univ., Rawalpindi, Pakistan, ²Univ. of the Punjab, Lahore, Pakistan

2:30 **0770** Report on recent surveys of fruit flies (Diptera: Tephritidae: Dacinae) in the Solomon Islands. **Luc Leblanc** (leblanc@uidaho.edu)¹, Francis Tsatsia² and Camiel Doorenweerd³, ¹Univ. of Idaho, Moscow, ID, ²Ministry of Agriculture and Livestock, Honiara, Solomon Islands, ³Univ. of Hawai'i, Honolulu, HI

2:40 **0771** Impact of exotic plant species on the diversity of soil insects of Birsia Munda Biological Park, Ranchi, Jharkhand, India. **Brajkishore Sinha** (brajkishore58ranchi@gmail.com), BBMK Univ., Dhanbad, India

2:50 **0772** Shifting occurrence of insect communities in the wake of white-nose syndrome. **Luke Dodd** (luke.dodd@eku.edu), Shelby Fulton and Rachael Griffiths, Eastern Kentucky Univ., Richmond, KY

3:00 Break

3:10 **0773** Threats to insects in the Anthropocene. **David Wagner** (david.wagner@uconn.edu), Univ. of Connecticut, Storrs, CT

3:20 **0774** Use of multi-gene sequence approach for the identification of forensically important insect species from the district of Faisalabad, Pakistan. **Zain Ul Abdin** (zainunibas@gmail.com)¹, Faisal Munir¹, Sohail Ahmed¹, Shahbaz Ahmad², Sana Rashid¹, Fiaz Hussain¹, Rao Sohail Khan¹ and Maria Bibi¹, ¹Univ. of Agriculture, Faisalabad, Pakistan, ²Univ. of the Punjab, Lahore, Pakistan

3:30 **0775** Towards new studies on necrophagous insects in the Québec province, with applications in forensic entomology. **Julie-Éléonore Maisonhaute** (jemaisonhaute@gmail.com)^{1,2}, Eric Lucas², Shari Forbes¹, Gilles Bronchti¹ and Frank Crispino¹, ¹Univ. du Québec, Trois-Rivières, QC, Canada, ²Univ. du Québec, Montréal, QC, Canada

3:40 **0776** Machine learning to categorize unidentified arthropods as invasive or endemic using DNA sequence signatures without a complete reference library: Impact on island ecosystems. **George Roderick** (roderick@berkeley.edu)¹, Jeremy Andersen², Peter T. Oboyski¹, Neil Davies³, Sylvain Charlat⁴, Natalie Graham¹, Curtis Ewing⁵, Henrik Krehenwinkel⁶, Milad Memarzadeh¹, Christopher Meyer⁷, Suzuki Noriyuki⁸, Carl Boettiger¹ and Rosemary Gillespie¹, ¹Univ. of California, Berkeley, CA, ²Univ. of Massachusetts, Amherst, MA, ³Univ. of California Gump Station, Maharepa, French Polynesia, ⁴Centre National de la Recherche Scientifique, Villeurbanne, France, ⁵California Dept. of Forestry and Fire Protection, Redding, CA, ⁶Univ. Trier, Trier, Germany, ⁷Smithsonian Institution, National Museum of Natural History, Washington, DC, ⁸Kochi Univ., Kochi, Japan

3:50 **0777** Experimental warming disrupts ecological and evolutionary processes among divergent host races of *Rhagoletis pomonella* and their parasitoid wasp communities. **Thomas Powell** (powellt@binghamton.edu)¹, Alycia Lackey¹, Gregory Ragland², Jeffrey Feder³ and Dan Hahn⁴, ¹Binghamton Univ., Binghamton, NY, ²Univ. of Colorado, Denver, CO, ³Univ. of Notre Dame, South Bend, IN, ⁴Univ. of Florida, Gainesville, FL

4:00 **0778** Relationships between species diversity of plants, caterpillars (Lepidoptera) and Microgasterinae parasitoid wasps (Hymenoptera). **Jose Fernandez-Triana** (jose.fernandez@agr.gc.ca), Agriculture and Agri-Food Canada, Ottawa, ON, Canada

4:10 **0779** Cross-breeding *Amblyomma maculatum*-group tick populations from distinct geographical regions within the United States. **Michelle Allerdice** (wro8@cdc.gov)¹, Alyssa Snellgrove¹, Joy Hecht¹, Kris Hartzler¹, Shelby Ford¹, Jesus Delgado², David Delgado³, J. David Licon⁴, Jerome Goddard⁵, Michael Levin¹ and Christopher Paddock¹, ¹Centers for Disease Control and Prevention, Atlanta, GA, ²Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán, Atlanta, GA, ³Technological Institute of Sonora, Atlanta, GA, ⁴Hospital de Pediatría Centro Médico Nacional Siglo XXI, Atlanta, GA, ⁵Mississippi State Univ., Mississippi State, MS

10-min: SysEB, Invasive Species and Biological Control

Meeting Room 207 (Convention Centre)

Moderators: James Young¹ and Richard Stouthamer², ¹USDA - APHIS, Riverdale, MD, ²Univ. of California, Riverside, CA

1:30 **0780** Application of emerging technologies for non-model genome sequencing. **Sheina Sim** (sheina.sim@ars.usda.gov) and Scott Geib, USDA - ARS, Hilo, HI

1:40 **0781** Europe vs. North America: A transatlantic comparison of potential vectors of *Xylella*. **Philippe Reynaud** (philippe.reynaud@anses.fr), Anses, Montferrier-sur-Lez, France

1:50 **0782** Laboratory hybridization between the green lacewings *Chrysoperla comanche* and *C. rufilabris* (Neuroptera: Chrysopidae), predators of the Asian citrus psyllid: Implications for biological control. **Marco Gebiola** (marco.gebiola@gmail.com)¹, Gregory S. Simmons² and Richard Stouthamer¹, ¹Univ. of California, Riverside, CA, ²USDA - APHIS, Salinas, CA

2:00 **0783** Origin of pest lineages of the Colorado potato beetle (Coleoptera: Chrysomelidae). **Victor Izzo** (vizzo@uvm.edu)¹, Yolanda Chen¹, Sean Schoville² and David J. Hawthorne³, ¹Univ. of Vermont, Burlington, VT, ²Univ. of Wisconsin, Madison, WI, ³Univ. of Maryland, College Park, MD

2:10 **0784** Males of the West Indian sweetpotato weevil, *Euscepes postfasciatus* (Coleoptera: Curculionidae), use accessory gland substances to inhibit remating by females. **Chihiro Himuro** (chimuro@cc.okayama-u.ac.jp)^{1,2,3}, Atsushi Honma^{1,2,3}, Yusuke Ikegawa^{1,2,3} and Tsuyoshi Ohishi², ¹Ryukyuu Sankei Co., Ltd, Naha, Okinawa, Japan, ²Okinawa Prefectural Plant Protection Center, Naha, Japan, ³Univ. of the Ryukyus, Okinawa, Japan

2:20 Break

2:30 **0785** Relationship between population dynamics of oriental fruit fly, *Bactrocera dorsalis*, and abiotic factors in different years (2012 and 2017) in Yezin, Myanmar. **Nwe Yin** (nnyin86@gmail.com), Dept. of Agricultural Research, Yezin, Myanmar

2:40 **0786** Complete mitochondrial genome sequences do not distinguish between the apple maggot, *Rhagoletis pomonella*, and the snowberry fly, *R. zephyria* (Diptera: Tephritidae). **James Smith** (jimsmit@msu.edu), Kelly Geith, Gino Caruso, Daniel Hulbert and Patrick Edger, Michigan State Univ., East Lansing, MI

2:50 **0787** Gene flow, diversity and hybridation of *Helicoverpa armigera* and *Helicoverpa zea* in Brazil. **Laura Pantoja Gomez** (lpantojag@usp.br)¹, Erick Cordeiro¹, Andy Michel², Celso Omoto¹ and Alberto Correa¹, ¹Univ. de São Paulo, Piracicaba, Brazil, ²The Ohio State Univ., Wooster, OH

3:00 **0788** Discovery of a new, previously misidentified *Anagyrus* species (Hymenoptera: Encyrtidae) released for biological control of the pink hibiscus mealybug, *Maconellicoccus hirsutus*. **Sharon Andreason** (sharona@ucr.edu), Serguei Triapitsyn and Thomas M. Perring, Univ. of California, Riverside, CA

3:10 **0789** Source of the invasive tropical fire ant, *Solenopsis geminata*, in the Galapagos Islands. **Marina Asuncion** (asuncion@ufl.edu)¹, Henri Hererra², Robert Vander Meer³ and Sanford Porter³, ¹Univ. of Florida, Gainesville, FL, ²Escuela Superior Politécnica de Chimborazo, Riobamba, Ecuador, ³USDA - ARS, Gainesville, FL

3:20 **0790** Mechanisms of resistance evolution under spatially heterogeneous selection pressure: An explicit dose-response model approach. **Masaaki Sudo** (masaaki@sudori.info)¹, Kohji Yamamura², Takehiko Yamanaka² and Daisuke Takahashi³, ¹National Agriculture and Food Research Organization, Shimada, Japan, ²National Agriculture and Food Research Organization, Tsukuba, Japan, ³Kyung-Hee Univ., Seoul, South Korea

Graduate Student Showcase

West Ballroom ABC (Convention Centre)

Moderators and Organizers: Anne-Sophie Caron¹, Rachel Rix² and Joanna Konopka³, ¹Concordia Univ., Montréal, QC, Canada, ²Dalhousie Univ., Truro, NS, Canada, ³Western Univ., London, ON, Canada

3:00 **0791** Engineering a dengue refractory phenotype in *Aedes aegypti*. **Heather Coatsworth** (hcoatswo@sfu.ca)¹, Paola Caicedo², Clara Ocampo² and Carl Lowenberger¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Centro Internacional de Entrenamiento e Investigaciones Medicas, Cali, Colombia

3:24 **0792** Environment and vertebrate resource availability mediate population genetic structure of the black blow fly, *Phormia regina* Meigen (Diptera: Calliphoridae). **Charity Owings** (charityowings@gmail.com), Indiana Univ.-Purdue Univ., Indianapolis, IN

3:48 **0793** Do multi-modal foraging cues attract mosquitoes (Diptera: Culidae) to flowers? **Dan Peach** (dap3@sfu.ca), Regine Gries and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada

4:12 **0794** Origins of an emergent forest health pest: Population genetic structure of the eastern white pine bark scale (*Matsucoccus macrocicatricis*). **Thomas D. Whitney** (thomas.whitney@uga.edu)^{1,2}, Rima Lucardi¹ and Kamal J. K. Gandhi², ¹USDA - Forest Service, Athens, GA, ²Univ. of Georgia, Athens, GA

4:36 **0795** The evolution of *Peristenus* (Hymenoptera: Braconidae): Taxonomy, phylogenetics and ecological speciation. **Miles Zhang** (yuanmeng.zhang@gmail.com), Univ. of Central Florida, Orlando, FL

SUNDAY, NOVEMBER 11 • EVENING

Opening Plenary Session with Keynote Speaker Randy Olson

West Ballroom ABC (Convention Centre)

Moderators and Organizers: Michael Parrella¹, Jenny Cory² and Pat Bouchard³, ¹Univ. of Idaho, Moscow, ID, ²Simon Fraser Univ., Burnaby, BC, Canada, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

5:30 First Nations Welcome

6:00 **0796** ESBC Welcome Message. **Jenny Cory** (jennifer_cory@sfu.ca), Simon Fraser Univ., Burnaby, BC, Canada

6:10 **0797** ESC Welcome Message. **Pat Bouchard** (patrice.bouchard@agr.gc.ca), Agriculture and Agri-Food Canada, Ottawa, ON, Canada

6:20 **0798** ESA Welcome Message. **Michael Parrella** (mpp@uidaho.edu), Univ. of Idaho, Moscow, ID

6:30 **0799** Introduction of Plenary Keynote Presenter. **Michael Parrella** (mpp@uidaho.edu), Univ. of Idaho, Moscow, ID

6:40 **0800** Narrative is Everything: Communicating Science in the Age of Information. **Randy Olson**, Scientist-Turned-Filmmaker, Los Angeles, CA

7:30 Adjourn to the Welcome Reception in the Exhibit Hall

MONDAY, NOVEMBER 12 • POSTERS

Grad Poster: MUVE 1

West Exhibit Hall A (Convention Centre)

D3000 Distribution of the quill mite, *Betasyringophiloidus seiuri* (Clark), in the flight feathers of the ovenbird, *Seiurus aurocapilla* (Linnaeus). **Alexandra Grossi** (grossi@ualberta.ca) and Heather C. Proctor, Univ. of Alberta, Edmonton, AB, Canada

D3001 Growth dynamics of *Rickettsia buchneri*, the endosymbiont of the blacklegged tick, *Ixodes scapularis*. **Codey Thorpe** (thorp113@umn.edu), Univ. of Minnesota, St. Paul, MN

D3002 Differences in tick infestation of Tunisian sheep breeds. **Khawla Elati** (elati.khawla@gmail.com), Univ. of Manouba, Sidi Thabet, Tunisia

D3003 SkitoSnack: An alternative blood meal for mosquitoes. **Yashoda Kandel** (yashoda@nmsu.edu), Kristina Gonzales, Stacy D. Rodriguez and Immo Hansen, New Mexico State Univ., Las Cruces, NM

D3004 Anthropological influence on the tolerance of *Anopheles gambiae* to insecticides in southwest Nigeria. Olajire Gbaye and **Seun Oladipupo** (seun_oladipupo@yahoo.com), Federal Univ. of Technology, Akure, Nigeria

D3005 Distributional patterns and variation in the microbiotas of *Aedes albopictus* (Diptera: Culicidae) on Maui, Hawai'i. **Priscilla Seabourn** (pseabour@hawaii.edu), Helen Spafford and Matthew Medeiros, Univ. of Hawai'i, Honolulu, HI

D3006 Impact of increased AMPK in the midgut of *Anopheles stephensi* on fitness and metabolism. **Chioma Oringanje** (chyoma12@yahoo.com), Yunan Han, Claudia LaBianca, Lillian Delacruz and Michael A. Riehle, Univ. of Arizona, Tucson, AZ

D3007 Sex and age modulate the expression of antennal chemosensory-related genes at the onset of host seeking in the yellowfever mosquito *Aedes aegypti*. **Anais Tallon** (anais.tallon@slu.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

D3008 Regional variation in life history traits of Brazilian *Nyssorhynchus darlingi* in response to temperature. **Virginia Chu** (virgchu@gmail.com), Wadsworth Center, Slingerlands, NY

D3009 Pupal tolerance of ethanol in scuttle flies (Diptera: Phoridae). **James Willett** (jrw023@shsu.edu), Bethany Walker and Sibyl Bucheli, Sam Houston State Univ., Huntsville, TX

Grad Poster: MUVE 2

West Exhibit Hall A (Convention Centre)

D3010 Impact of pyrethroid-treated cattle on tsetse populations at the interface of farming and wilderness areas in Tanzania.

Rachel Hopper (rachel.hopper@lstm.ac.uk)¹, Jennifer Lord¹, Harriet Auty², Geoffrey Mbata³, Liam Morrison⁴, Fiona Allan⁴, Furaha Mramba⁵ and Stephen Torr¹, ¹Liverpool School of Tropical Medicine, Liverpool, United Kingdom, ²Scotland's Rural College, Inverness, United Kingdom, ³Vector and Vector Borne Disease Research Institute, Tanga, Tanzania, ⁴Univ. of Edinburgh, Edinburgh, United Kingdom, ⁵Tanzania Veterinary Laboratory Agency, Dar es Salaam, Tanzania

D3011 Succession patterns of some arthropods associated with decomposing domestic rabbit (*Oryctolagus cuniculus*) in different habitats. **Izuma Joshua** (izuma.joshua@uniport.edu.ng), Aline Noutcha and Maduamaka Abajue, Univ. of Port Harcourt, Port Harcourt, Nigeria

D3012 Soldier morphology in hybrid termites of the two invasive *Coptotermes* species. **Jayshree Patel** (jayshree.patel@ufl.edu), Thomas Chouvenec and Nan-Yao Su, Univ. of Florida, Davie, FL

D3013 Examining the prevalence of *Solenopsis invicta* virus 3 in *Solenopsis invicta* alates collected in north Florida. **Donna Arnold** (donnaarnold16@hotmail.com), Florida A&M Univ., Tallahassee, FL

D3014 Cuticular hydrocarbon composition in *Solenopsis* species: Association with invasion success. **Olufemi Ajayi** (osa0001@auburn.edu) and Henry Fadamiro, Auburn Univ., Auburn, AL

D3015 Period prevalence vector-borne pathogen surveillance in diverse canine populations from three cities of Colombia. **Michael McCown** (michael.e.mccown.mil@mail.mil), US Army, Jacksonville, FL

D3016 Using dietary analysis of insectivorous birds at Dallas-Fort Worth International Airport to reduce bird strikes. **Taylor Gillum** (taylorgillum@my.unt.edu), Univ. of North Texas, Denton, TX

D3017 Functional analysis of a new type of SOD gene in *Tribolium castaneum*. **Maaya Nishiko** (s174830x@st.go.tuat.ac.jp)¹, Kikuo Iwabuchi¹, Michael Kanost² and Hiroko Tabunoki¹, ¹Tokyo Univ. of Agriculture and Technology, Fuchu, Japan, ²Kansas State Univ., Manhattan, KS

D3018 Activity of natural and synthetic compounds as repellents and toxicants for stored grain insects. **Gomaa Ramadan** (gomaa@ksu.edu)¹, Samir Abdelgaleil² and Thomas Phillips¹, ¹Kansas State Univ., Manhattan, KS, ²Alexandria Univ., Alexandria, Egypt

D3019 Incorporating food webs to the study of multi-host vector-borne parasite transmission across a landscape gradient: Using Chagas disease as a model system. **Christina Varian** (cpv7@uga.edu)¹, Nicole Gottdenker¹ and Azael Saldaña², ¹Univ. of Georgia, Athens, GA, ²Gorgas Memorial Research Institute, Panama, Panama

D3020 Synergistic interactions between plant essential oil components and their impacts on bed bug (Cimicidae: Hemiptera) nervous system. **Sudip Gaire** (sgaire@purdue.edu), Michael Scharf and Ameya Gondhalekar, Purdue Univ., West Lafayette, IN

Grad Poster: PBT 1

West Exhibit Hall A (Convention Centre)

D3021 Where do you Go to grow bigger beetles? Insights from *Tribolium castaneum goliath* mutants. **Meredith Favre** (mmhawley@ncsu.edu)¹, Nathaniel Grubbs¹, Fu-Chyun Chu¹, Yoonseong Park² and Marcé Lorenzen¹, ¹North Carolina State Univ., Raleigh, NC, ²Kansas State Univ., Manhattan, KS

D3022 Characterization of western corn rootworm pyrethroid resistance. **Dariane Souza** (dariane_lyra@hotmail.com)¹, Nicholas Miller², Blair Siegfried³ and Lance Meinke¹, ¹Univ. of Nebraska, Lincoln, NE, ²Illinois Institute of Technology, Chicago, IL, ³Univ. of Florida, Gainesville, FL

D3023 Transcriptome profiling of the resistant and susceptible western corn rootworm, *Diabrotica virgifera virgifera* LeConte, responses to eCry3.1Ab transgenic corn using PacBio sequencing technology. **Zixiao Zhao** (zxzhao5@gmail.com)¹, Kent S. Shelby², Bruce Hibbard² and Christine Elsik¹, ¹Univ. of Missouri, Columbia, MO, ²USDA - ARS, Columbia, MO

D3024 RNAi in the cigarette beetle, *Lasioderma serricor*: Transcriptome analysis and bioassays. **Jinmo Koo** (jko256@uky.edu), Shankar Chereddy and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

D3025 Presentation withdrawn

D3026 Ecdysis triggering hormone: A multifunctional peptide regulator of reproductive physiology in *Aedes aegypti*. **Yike Ding** (yding005@ucr.edu) and Michael E. Adams, Univ. of California, Riverside, CA

D3027 Impact of the insect growth regulator pyriproxyfen on life table characteristics of *Aedes albopictus*. **Megan Rhyne** (rhyne12@students.ecu.edu), East Carolina Univ., Greenville, NC

D3028 Examining the transcriptional effects of prolonged bat-call exposure in the brain of the fall armyworm moth (*Spodoptera frugiperda*). **Scott Cinel** (cinel1@ufl.edu) and Akito Kawahara, Univ. of Florida, Gainesville, FL

D3029 Knockout of *PTEN-like phosphatase (Plip)*, a selectively-expressed gene in corpora allata in *Bombyx mori*. **Yuri Homma** (yuri.1116.gf@icloud.com)¹, Miwa Uchibori-Asano², Kouhei Toga³, Tetsuro Shinoda⁴ and Toru Togawa¹, ¹Nihon Univ., Tokyo, Japan, ²National Agriculture and Food Research Organization, Tsukuba, Japan, ³Univ. of Toyama, Toyama, Japan, ⁴National Institute of Agrobiological Sciences, Tsukuba, Japan

D3030 Interpopulation variation in cold hardiness in the eastern spruce budworm, *Choristoneura fumiferana*. **Skye Butterson** (skye.butterson@ou.edu)¹, Amanda Roe² and Katie Marshall¹, ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada

D3031 Death cues in animals. **Jizhe Shi** (jizhe.shi@uky.edu), Univ. of Kentucky, Lexington, KY

Grad Poster: PBT 2

West Exhibit Hall A (Convention Centre)

D3032 The effect of physiological resistance on behavioral response of *Tetranychus urticae* to acaricides. **Adekunle Adesanya** (adekunle.adesanya@wsu.edu)¹, Laura Lavine¹, Doug Walsh² and Fang (Rose) Zhu¹, ¹Washington State Univ., Pullman, WA, ²Washington State Univ., Prosser, WA

D3033 Diet, nutritional stress and brain metabolism in ants. **Dajia Ye** (dajiaYe2@illinois.edu)¹, Sara Arganda², Zachary Coto¹, James S. Waters³, Marla Tipping³ and James F. A. Traniello¹, ¹Boston Univ., Boston, MA, ²King Juan Carlos Univ., Madrid, Spain, ³Providence College, Providence, RI

D3034 Evidence for a female-produced sex pheromone in *Ibalia leucospoides*, a parasitoid of *Sirex noctilio*. **Hajar Faal** (hajar.faal@gmail.com)¹, Dong Cha² and Stephen Teale¹, ¹State Univ. of New York, Syracuse, NY, ²USDA - ARS, Hilo, HI

D3035 Effects of immune challenge on bumble bee (*Bombus impatiens*) thermoregulatory capacity. **Hannah Stewart** (hus60@psu.edu) and Ruud Schilder, Pennsylvania State Univ., University Park, PA

D3036 The effect of body size on flight performance in solitary bees. **Courtney Grula** (courtney.grula@ndsu.edu)¹, Kendra Greenlee¹, Joseph P. Rinehart² and Julia Bowsher¹, ¹North Dakota State Univ., Fargo, ND, ²USDA - ARS, Fargo, ND

D3037 The influence of weather on the flight behavior of foraging honey bees (Hymenoptera: Apidae). **Megan Asche** (megan.asche@wsu.edu), Washington State Univ., Pullman, WA

D3038 Exploring the effects of old brood comb on larval honey bee (*Apis mellifera* L.) survival. **Stephanie Murray** (murray.968@osu.edu) and Reed Johnson, The Ohio State Univ., Wooster, OH

D3039 Effects of consuming fungicide-containing pollen on the intestinal structure and function of young adult honey bees (*Apis mellifera* L.). **Teddy Cogley** (tcogley@asu.edu), Adrian Fisher, Aurora Beans, Dena Kalamchi and Jon Harrison, Arizona State Univ., Tempe, AZ

D3040 Assessing the cocktail effect of pesticides on honey bees. **Joseph Belsky** (jebelsky@email.uark.edu) and Neelendra Joshi, Univ. of Arkansas, Fayetteville, AR

D3041 The nutritional ecology and physiology of rangeland grasshoppers in the United States. **Deanna Zembrzusi** (dzembrzu@asu.edu)¹, Derek Woller², Lonnie R. Black², Chris Reuter², Larry E. Jech² and Arianne Cease¹, ¹Arizona State Univ., Tempe, AZ, ²USDA - APHIS, Phoenix, AZ

D3042 *In silico* approach for pesticide discovery towards hemipteran ecdysone receptor. **Ciro Pedro Pinto** (cpedroea@gmail.com), Univ. Estadual Paulista, Jaboticabal, Brazil

D3043 A window into the past: Evidence for an ancient tripartite dopaminergic, adrenergic, and octopaminergic signaling system in the Chelicerata. **Anthony Auletta** (aulet002@umn.edu) and Karen Mesce, Univ. of Minnesota, St. Paul, MN

Grad Poster: P-IE, Bees

West Exhibit Hall A (Convention Centre)

D3044 An oasis in the desert: Evaluating contour buffer strips within agricultural fields as habitat for native bees in Iowa. **Morgan Mackert** (mmackert@iastate.edu) and Mary Harris, Iowa State Univ., Ames, IA

D3045 Optimizing the benefits of propolis to honey bee health in beekeeping operations. **Maggie Shanahan** (mshanaha@umn.edu)¹, Michael Simone-Finstrom² and Marla Spivak¹, ¹Univ. of Minnesota, St. Paul, MN, ²USDA - ARS, Baton Rouge, LA

D3046 Too hot in here: Heat stress impacts reproduction of *Megachile rotundata*. **Elisabeth Wilson** (elisabeth.wilson@ndsu.edu)¹, Claire Murphy², Joseph P. Rinehart³ and Julia Bowsher¹, ¹North Dakota State Univ., Fargo, ND, ²College of William and Mary, Arlington, VA, ³USDA - ARS, Fargo, ND

D3047 Degree-day modeling using soil temperatures to predict emergence of alkali bees in alfalfa seed fields of the Walla Walla Valley in Washington State. **Greta Dupuis** (greta.dupuis@wsu.edu) and Doug Walsh, Washington State Univ., Prosser, WA

D3048 Assessment of habitat use and ecology of native bees in a fragmented rare ecosystem in southern Ontario using novel tracking and molecular techniques. **Janean Sharkey** (sharkeyj@uoguelph.ca) and Nigel Raine, Univ. of Guelph, Guelph, ON, Canada

D3049 Attraction of native bees to Japanese beetle lures and traps. **Steven Sipolski** (steven_sipolski@my.uri.edu), Sara Datson and Steven Alm, Univ. of Rhode Island, Kingston, RI

D3050 Viral transmission among social bees in different landscapes. **Tugce Karacoban** (vetkaracoban@gmail.com), Univ. of Nebraska, Lincoln, NE

D3051 *Melittobia* sp. use and life cycle on *Megachile rotundata*. **Alan Anderson** (alananderson4182@gmail.com)¹ and Theresa Pitts-Singer², ¹Utah State Univ., Logan, UT, ²USDA - ARS, Logan, UT

D3052 Everything's sweeter in Texas? A chemical and palynological analysis of honey in Texas. **Pierre Lau** (plau0168@tamu.edu)¹, Vaughn Bryant¹, Arne Dübecke² and Juliana Rangel¹, ¹Texas A&M Univ., College Station, TX, ²Quality Services International, Bremen, Germany

D3053 Enhancement of honey bee health with conservation biological strategies. **Walker Marechal** (walker1.marechal@fam.u.edu), Florida Agricultural and Mechanical Univ., Tallahassee, FL

D3054 Presentation withdrawn

D3055 Genetic variation of feral honey bees, *Apis mellifera* L., from Utah. **Dylan Cleary** (dacleary@uark.edu)¹, Allen Szalanski¹, Amber Tripodi², Mary-Kate Williams¹, Clinton E. Trammel¹ and Danielle Downey³, ¹Univ. of Arkansas, Fayetteville, AR, ²USDA - ARS, Logan, UT, ³Hawai'i Dept. of Agriculture, Hilo, HI

Grad Poster: P-IE, Integrated Pest Management 1

West Exhibit Hall A (Convention Centre)

D3056 Management of sugarcane aphid (Hemiptera: Aphididae) in forage sorghum in Arizona. **Kyle Harrington** (kharrington@email.arizona.edu) and Ayman Mostafa, Univ. of Arizona, Phoenix, AZ

D3057 Analyzing the significance of photoperiod on fitness of sugarcane aphid, *Melanaphis sacchari*, on sorghum. **Ethan Triplett** (ethan.l.triplett@gmail.com) and Bonnie Pendleton, West Texas A&M Univ., Canyon, TX

D3058 Effect of *Bt* traits on sap beetles in field corn. **Katherine Cassell** (Kc71986@uga.edu) and G. David Buntin, Univ. of Georgia, Griffin, GA

D3059 Larval survival and movement of corn earworm in different planting patterns of *Bacillus thuringiensis* (*Bt*) and non-*Bt* corn containing Viptera traits. **Marcelo Dimase** (marcelo.dimase@gmail.com)¹, Jianguo Guo², Sebe Brown³, Isaac/Olatunji Oyediran⁴, Marlin Rice⁵ and Fangneng Huang¹, ¹Louisiana State Univ., Baton Rouge, LA, ²Louisiana State Univ. AgCenter, Baton Rouge, LA, ³Louisiana State Univ., Winnsboro, LA, ⁴Syngenta Biotechnology Inc., Research Triangle Park, NC, ⁵Syngenta Crop Protection, Greensboro, NC

D3060 Bio-economic modeling of yield effects of genetically modified diamondback moth (*Plutella xylostella*) to mitigate resistance to *Bt* crops. **Michael Jones** (msjones2@ncsu.edu), Jennifer Baltzegar and Nicole Gutzmann, North Carolina State Univ., Raleigh, NC

D3061 Effects of natural hosts, artificial diet, and *Bt* corn on *Striacosta albicosta* (Smith) (Lepidoptera: Noctuidae) larval development. **Débora Goulart Montezano** (deiaigm@gmail.com)¹, Thomas Hunt², Priscila Colombo Da Luz³ and Julie Peterson³, ¹Univ. of Nebraska, Lincoln, NE, ²Univ. of Nebraska, Concord, NE, ³Univ. of Nebraska, North Platte, NE

D3062 Rove and ground beetles in blackberries treated with biologically based insecticides and bordered by native perennial plants or pasture in Frankfort, Kentucky. **Sathya Govindasamy** (sathya.govindasamy@kysu.edu), John Sedlacek, Karen Friley, Mamata Bhashyal and Jill Fisk, Kentucky State Univ., Frankfort, KY

D3063 Lethal and sublethal effects of novel insecticides on the invasive spotted-wing drosophila (*Drosophila suzukii*). **Matthew Gullickson** (gulli139@umn.edu), Mary Rogers, Eric C. Burkness and William D. Hutchison, Univ. of Minnesota, St. Paul, MN

D3064 Timing is everything: Determining the most effective insecticide application timing to mitigate carrot weevil (*Listronotus oregonensis*) damage on carrots. **Alexandra Stinson** (astinson@uoguelph.ca), Mary Ruth McDonald and Cynthia Scott-Dupree, Univ. of Guelph, Guelph, ON, Canada

D3065 Evaluation of SPLAT for managing spotted-wing drosophila, *Drosophila suzukii* (Matsumura), in blueberries. **Gabrielle LaTora** (ag.latora@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

D3066 Lethal and sublethal effects of sulfoxaflor on two natural enemies of the soybean aphid (Hemiptera: Aphididae). **Rafael Carlesso Aita** (carle072@umn.edu), Anh K. Tran and Robert Koch, Univ. of Minnesota, St. Paul, MN

D3067 Impact of high temperature exposure on the survival and infectivity of commercially available entomopathogenic nematodes: *Steinernema carpocapsae*, *Steinernema feltiae*, and *Heterorhabditis bacteriophora*. **Anna Giesmann** (arg296@cornell.edu)¹, Elson J. Shields¹, John P. Sanderson¹ and Kyle Wickings², ¹Cornell Univ., Ithaca, NY, ²Cornell Univ., Geneva, NY

Grad Poster: P-IE, Integrated Pest Management 2

West Exhibit Hall A (Convention Centre)

D3068 Understanding the role of conservation biocontrol for billbug, *Sphenophorus* spp. (Coleoptera: Curculionidae), suppression in turfgrass. **Desiree Wickwar** (desiree.wickwar@gmail.com), Madeleine Dupuy and Ricardo A. Ramirez, Utah State Univ., Logan, UT

D3069 A novel approach to weed biological control host-specificity testing for non-target plant species restricted to highly specialized soil types. **Sujan Panta** (sujanp@uidaho.edu)¹, Mark Schwarzlaender¹, Philip Wye², Bradley L. Harmon¹ and Hariet Hinz², ¹Univ. of Idaho, Moscow, ID, ²CABI, Delémont, Switzerland

D3070 *Mogulones crucifer*, a biological control for the rangeland weed *Cynoglossum officinale*, is repelled by volatiles of closely related congeners of its host plant. **Karuna Nepal** (knepal@uidaho.edu)¹, Jessica Fung¹, Sanford D. Eigenbrode¹, Urs Schaffner² and Mark Schwarzländer¹, ¹Univ. of Idaho, Moscow, ID, ²CABI, Delémont, Switzerland

D3071 Analyses of nine years of citizen-based biological control monitoring of spotted knapweed, *Centaurea stoebe* subsp. *micranthos* (Asteraceae), in Idaho. **Arjun Pandey** (apandey@uidaho.edu)¹, Mark Schwarzländer¹, Joseph Milan² and Aaron Weed³, ¹Univ. of Idaho, Moscow, ID, ²USDI - Bureau of Land Management, Boise, ID, ³US National Park Service, Woodstock, VT

D3072 Soil microarthropod communities reduce *Heterorhabditis bacteriophora* (Nematoda: Heterorhabditidae) host infection. **Maxwell Helmsberger** (msh326@cornell.edu)¹, Elson J. Shields² and Kyle Wickings³, ¹Michigan State Univ., East Lansing, MI, ²Cornell Univ., Ithaca, NY, ³Cornell Univ., Geneva, NY

D3073 How secondary plant chemicals affect insect disease resistance. **Kevin Colmenares** (kcolmena@sfu.ca)¹ and Jenny Cory², ¹Simon Fraser Univ., Coquitlam, BC, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada

D3074 Drought- and heat-adapted perennials frequently harbor infections by multiple crop-associated and novel plant viruses. **Tessa Shates** (tshat003@ucr.edu), Penglin Sun and Kerry Mauck, Univ. of California, Riverside, CA

D3075 Tritrophic interactions among corn, *Diabrotica virgifera virgifera*, and entomopathogenic fungi. **Abigail Kropf** (alkropf@iastate.edu) and Aaron Gassmann, Iowa State Univ., Ames, IA

D3076 Fungal fugitives: Dispersal and risk assessment of *Pityophthorus juglandis* in forests. **Philip Hensley** (phensle2@vols.utk.edu)¹, Jerome Grant¹, Mark T. Windham¹, Paris L. Lambdin¹, Paul Merten² and Gregory J. Wiggins¹, ¹Univ. of Tennessee, Knoxville, TN, ²USDA - Forest Service, Asheville, NC

D3077 Viral prevalence of *Junonia coenia* densovirus in *Lycaeides melissa* (Lepidoptera: Lycaenidae) based on host plant. **Kelli McKeegan** (kelli.mckeegan@nevada.unr.edu), Angela Smilanich and Matthew L. Forister, Univ. of Nevada, Reno, NV

D3078 Laboratory evaluation of *Beauveria bassiana* ARP 14 against two *Frankliniella* spp. (Thysanoptera: Thripidae) and *Bemisia tabaci* (Hemiptera: Aleyrodidae). **Bikash Bhusal** (bhusalbikash2015@gmail.com), Md. Arefur Rahman and Un Taek Lim, Andong National Univ., Andong, South Korea

Grad Poster: P-IE, Integrated Pest Management 3

West Exhibit Hall A (Convention Centre)

D3079 Determining the effect of postharvest cold-storage treatment on the survival of immature *Drosophila suzukii* in small fruits. **Laura Kraft** (ljkraft@ncsu.edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

D3080 Monitoring system of mating behavior and acoustic communication of *Bemisia tabaci*. **Yasuhiko Nishijima** (nishijima@aclab.esys.tsukuba.ac.jp)¹, Ryusuke Miyamoto¹, Koichi Mizutani¹, Tadashi Ebihara¹, Naoto Wakatsuki¹, Kenji Kubota², Hiroyuki Uga³ and Masahisa Ishii², ¹Univ. of Tsukuba, Tsukuba, Japan, ²National Agriculture and Food Research Organization, Tsukuba, Japan, ³Saitama Prefecture Agriculture Research Center, Kumagaya, Japan

D3081 Activity of insect vectors and susceptibility of red oak trees to oak wilt infection in Michigan forests. **Olivia Morris** (morri702@msu.edu)¹, Deborah McCullough¹, Bert M. Cregg¹, Therese Poland² and Monique Sakalidis¹, ¹Michigan State Univ., East Lansing, MI, ²USDA - Forest Service, Lansing, MI

D3082 Aflatoxin suppression in stored corn by managing maize weevils and introducing an exogenous molecule. **Sarah Hobby** (shobby@uga.edu)¹, Pablo Delclos², Jeffery K. Tomberlin² and Michael Toews¹, ¹Univ. of Georgia, Tifton, GA, ²Texas A&M Univ., College Station, TX

D3083 Invasion of grain and legume storage facilities by stored grain insects. **Lauren Perez** (l.perez@uga.edu) and Michael Toews, Univ. of Georgia, Tifton, GA

D3084 Avoiding a sticky situation: Can pepper weevil escape sticky traps? **Cassandra Russell** (rcassie@uoguelph.ca) and Rebecca Hallett, Univ. of Guelph, Guelph, ON, Canada

D3085 Does *Cephus cinctus* Norton infestation induce compensatory grain yield in barley? **Buddhi Achhami** (buddhi.achhami@montana.edu)¹, Gadi V. P. Reddy², Robert K. D. Peterson¹, Jamie Sherman¹ and David Weaver¹, ¹Montana State Univ., Bozeman, MT, ²Montana State Univ., Conrad, MT

D3086 Economic threshold development for *Phyllotreta cruciferae* feeding activity on canola. **Lesley Lubenow** (lesley.lubenow@nds.edu)¹, Patrick Beauzay², Veronica Calles Torrez² and Janet Knodel², ¹North Dakota State Univ., Langdon, ND, ²North Dakota State Univ., Fargo, ND

D3087 Influence of height of ethanol-baited traps on Scolytinae collected within a mixed planting of red maple cultivars. **Joshua P. Basham** (joshua_basham@yahoo.com)¹, Jason Oliver¹, Debbie Eskandarnia¹, Nadeer Youssef¹ and Jerome Grant², ¹Tennessee State Univ., McMinnville, TN, ²Univ. of Tennessee, Knoxville, TN

D3088 Suitability of groundcherry (*Physalis longifolia*) to the potato psyllid and the zebra chip pathogen. **Cesar Reyes Corral** (reye8940@vandals.uidaho.edu)¹, William Rodney Cooper² and Alexander Karasev¹, ¹Univ. of Idaho, Moscow, ID, ²USDA - ARS, Wapato, WA

D3089 Population structure of chickpea leafminer in Morocco. **Abdelhadi Sabraoui** (a.sabraoui@cgia.org)¹, Mustapha El Bouhssini², Michel Andrew³, Karim el Fakhouri¹ and Aziz Bouchelta⁴, ¹International Center for Agriculture Research in the Dry Areas, Rabat, Morocco, ²International Center for Agriculture Research in the Dry Areas, Aleppo, Syria, ³The Ohio State Univ., Wooster, OH, ⁴Univ. Moulay Ismail, Meknes, Morocco

D3090 Evaluation of the invasive Asian chestnut gall wasp in commercial chestnut orchards in Michigan. **Louise Labbate** (daquillal@msu.edu) and Deborah McCullough, Michigan State Univ., East Lansing, MI

Grad Poster: P-IE, Integrated Pest Management 4 and Other

West Exhibit Hall A (Convention Centre)

D3091 Colonization and usage of eight milkweed (*Asclepias*) species by monarch butterflies and bees in urban garden settings. **Adam Baker** (heresadamb@uky.edu) and Daniel Potter, Univ. of Kentucky, Lexington, KY

D3092 Are you what you eat? Patterns of chemical sequestration in the lichen-feeding tiger moth *Cisthene angelus* (Lepidoptera: Erebiidae: Arctiinae). **Makani Fisher** (makanifisher@comcast.net)¹, Jennifer Zaspel², Steve Leavitt³ and C. Riley Nelson³, ¹Purdue Univ., West Lafayette, IN, ²Milwaukee Public Museum, Milwaukee, WI, ³Brigham Young Univ., Provo, UT

D3093 Energetic cost of girdling in the notodontid caterpillar, *Oedemasia leptinoides*. **Brianna Trejo** (btrejo1@cub.uca.edu), Matthew Gifford and David Dussourd, Univ. of Central Arkansas, Conway, AR

D3094 Tracking brown marmorated stink bug in Utah's urban-agricultural landscapes. **Mark Cody Holthouse** (cody.holthouse@aggiemail.usu.edu), Diane G. Alston and Lori R. Spears, Utah State Univ., Logan, UT

D3095 Microclimatic influence on hemlock woolly adelgid (*Adelges tsugae*) spread and mortality in Michigan forests. **Yvonne White** (whiteyval@gmail.com), Deborah McCullough, James Wiefelich and Justin Keyzer, Michigan State Univ., East Lansing, MI

D3096 Assessing the injury and susceptibility of selected strawberry cultivars to the seed bug (*Neopamera bilobata*) in organic production. **Hannah Talton** (htalton@ufl.edu) and Oscar Liburd, Univ. of Florida, Gainesville, FL

D3097 Crossing borders: Determining spread rate and important environmental factors of kudzu bug, *Megacopta cribraria*, in the United States. **Wanwan Liang** (wliang@vols.utk.edu)¹, Jerome Grant¹, Liem Tran¹, Gregory J. Wiggins¹, Robert Washington-Allen², Monica Pape¹ and Scott Stewart³, ¹Univ. of Tennessee, Knoxville, TN, ²Univ. of Nevada, Reno, NV, ³Univ. of Tennessee, Jackson, TN

D3098 Population distribution, host plants, and natural enemies of the brown marmorated stink bug, *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae), in Georgia. **Dilani Patel** (dilani.patel@uga.edu)¹, Brett Blaauw¹, Michael Toews², Glynn Tillman³ and Ashfaq Sial¹, ¹Univ. of Georgia, Athens, GA, ²Univ. of Georgia, Tifton, GA, ³USDA - ARS, Tifton, GA

D3099 Studies on ambulatory dispersal of the papaya mealybug, *Paracoccus marginatus*. **Ariane McCorquodale** (amccorquodale@ufl.edu) and Amanda Hodges, Univ. of Florida, Gainesville, FL

D3100 Impact of natural enemy interactions on biological control of ACP. **Binita Shrestha** (b.shrestha@ufl.edu) and Lukasz Stelinski, Univ. of Florida, Lake Alfred, FL

D3101 Enhancing uncultivated canal berms to support beneficial insects in the intensive agroecosystem of the Holland Marsh, Ontario. **Dillon Muldoon** (dmuldoon@uoguelph.ca), Mary Ruth McDonald and Cynthia Scott-Dupree, Univ. of Guelph, Guelph, ON, Canada

Grad Poster: P-IE, Parasitoids and Other

West Exhibit Hall A (Convention Centre)

D3102 Species composition and abundance of stink bugs (Hemiptera: Heteroptera: Pentatomidae) and their parasitoids in Nebraska cropping systems. **Blessing Ademokoya** (bademokoya@huskers.unl.edu)¹, Thomas Hunt² and Robert Wright¹, ¹Univ. of Nebraska, Lincoln, NE, ²Univ. of Nebraska, Concord, NE

D3103 Management of the western bean cutworm (*Striacosta albicosta*) in dry edible bean with inundative releases of the egg parasitoid *Trichogramma ostrinia*. **Jeffrey Cluever** (jcluever2@unl.edu) and Jeffrey Bradshaw, Univ. of Nebraska, Scottsbluff, NE

D3104 Predation and parasitism assessment of sentinel and naturally occurring egg masses of the brown marmorated stink bug, *Halymorpha halys*. **Lauren Fann** (lefa228@uky.edu)¹, Ric T. Bessin² and Raul T. Villanueva², ¹Univ. of Kentucky, Lexington, KY, ²Univ. of Kentucky, Princeton, KY

D3105 Crossing climates: What is the influence of a southern climate on emerald ash borer and its parasitoids? **James Palmer** (jpalme22@vols.utk.edu)¹, Jerome Grant¹, Gregory J. Wiggins¹ and Juli Gould², ¹Univ. of Tennessee, Knoxville, TN, ²USDA - APHIS, Buzzards Bay, MA

D3106 Presentation withdrawn

D3107 An attempt to use flowering plant strips to augment rice pest management. **Corey Riedel** (coreyr14@vt.edu) and Douglas G. Pfeiffer, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3108 Identification of rice stem borer species in Liberia. **Irene Kargbo** (kargbo.3@osu.edu), Luis Cañas, Andy Michel, Kelley Tilmon and Celeste Welty, The Ohio State Univ., Wooster, OH

D3109 Olfactory cues involved in the suitable host discrimination of *Drosophila mojavensis*. **Cody Patterson** (pattercd@mail.uc.edu), John Layne and Stephanie Rollmann, Univ. of Cincinnati, Cincinnati, OH

D3110 Effect of emerald ash borer on riparian forest structure. **Patrick Engelken** (engelke2@msu.edu), Deborah McCullough, M. Eric Benbow and Courtney Larson, Michigan State Univ., East Lansing, MI

D3111 Examining pre-alignment host-selection of a biological control candidate for *Isatis tinctoria* in response to olfactory and visual cues of non-target confamilial plants. **Bijay Subedi** (beejjus@gmail.com), Mark Schwarzaender and Sanford D. Eigenbrode, Univ. of Idaho, Moscow, ID

D3112 Presentation withdrawn

D3113 An alpine malaise trap. **Shasta Henry** (sc.henry@utas.edu.au) and Peter McQuillan, Univ. of Tasmania, Hobart, Australia

Grad Poster: P-IE, Pollination and Parasitoids

West Exhibit Hall A (Convention Centre)

D3114 Effect of nectar robbing by carpenter bees (*Xylocopa virginica*; Hymenoptera: Apidae) on pollination and fruit quality of highbush blueberry (*Vaccinium corymbosum*; Ericaceae). **Sara Tucker** (sara_tucker@uri.edu) and Steven Alm, Univ. of Rhode Island, Kingston, RI

D3115 Impact of insecticide on pollinator communities in a forested system: A model system using hemlocks, *Rhododendron maximum*, and imidacloprid. **David Bechtel** (dbechtel@vols.utk.edu)¹, Jerome Grant¹, Becky Nichols², R. Jesse Webster² and Gregory J. Wiggins¹, ¹Univ. of Tennessee, Knoxville, TN, ²National Park Service, Gatlinburg, TN

D3116 Passive and active restoration effects on plant-pollinator-*M. vatica* interactions. **Lindsey Kemmerling** (kemmerl4@msu.edu), Sean Griffin and Nick Haddad, Michigan State Univ., Hickory Corners, MI

D3117 Distribution and species diversity of native pollinators in New York State. **Abigail Jago** (ajjago@syr.edu)¹, Matthew Schlesinger², Erin White² and Melissa K. Fierke¹, ¹State Univ. of New York, Syracuse, NY, ²New York Natural Heritage Program, Albany, NY

D3118 Understanding the population dynamics of arthropod pollinators and their host preferences to mitigate food insecurities at the UMES campus. **Ebony Jenkins** (enjenkins@umes.edu), Jocelyn Simmons and Simon Zebelo, Univ. of Maryland, Princess Anne, MD

D3119 Effects of linear disturbances on pollinator communities in the boreal forests of northeastern Alberta. **Connor Nelson** (cnelson1@ualberta.ca), Carol Frost and Scott Nielsen, Univ. of Alberta, Edmonton, AB, Canada

D3120 Contrasting effects of landscape context on bee and hover fly pollinator populations. **Kaitlin Deutsch** (krd59@cornell.edu), Mahilet Kebede, Aaron Iverson and Scott McArt, Cornell Univ., Ithaca, NY

D3121 Flight tunnel responses of *Polistes aurifer* Saussure and *Polistes dominula* Christ (Hymenoptera: Vespidae) to odors of carbohydrate food sources. **Dane Elmquist** (dane.elmquist@wsu.edu)¹ and Peter J. Landolt², ¹Washington State Univ., Pullman, WA, ²USDA - ARS, Wapato, WA

D3122 Integration of non-crop habitat and semiochemicals for enhancing biological control of *Leptoglossus zonatus* (Heteroptera: Coreidae) by egg parasitoid *Gryon pennsylvanicum* (Hymenoptera: Platygasteridae). **Robert Straser** (rstra005@ucr.edu)¹, Kent Daane² and Sam Houston Wilson², ¹Univ. of California, Riverside, CA, ²Univ. of California, Parlier, CA

D3123 Optimal release timing of the larval parasitoid wasp, *Bracon hebetor* Say (Hymenoptera: Braconidae), for the biological control of the pearl millet ear headminer in Senegal. **Mame Fatoumata Goudiaby** (mamefatoumata.goudiaby@gmail.com)^{1,2}, Ibrahima Sarr¹, Malick Ba³, Rangaswamy Muniappan⁴ and Mbacke Sembene², ¹Senegalese Institute of Agricultural Research, Diourbel, Senegal, ²Cheikh Anta Diop Univ., Dakar, Senegal, ³International Crops Research Institute for the Semi-Arid Tropics, Niger, Niger, ⁴Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3124 Assessment of the impact of the egg parasitoid, *Paratelenomus saccharalis* (Hymenoptera: Platygasteridae), on populations of the kudzu bug, *Megacopta cribraria* (Hemiptera: Plataspidae), in north Florida and south Georgia. **Worrel Diedrick** (diedrick31@yahoo.co.uk)¹, Lambert Kanga¹, Muhammad Haseeb¹, Jesusa C. Legaspi² and Mrittunjai Srivastava³, ¹Florida A&M Univ., Tallahassee, FL, ²USDA - ARS, Tallahassee, FL, ³Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

Grad Poster: SysEB 1

West Exhibit Hall A (Convention Centre)

D3125 Defensive symbionts associated with ants: The diversity of bacterial genes in the biosynthesis of polyketides and non-ribosomal peptides across cephalotines (turtle ants). **Anais Chanson** (anais.chanson@ecofog.gf)¹, Christophe Duplais² and Corrie Moreau³, ¹Institut Pasteur de la Guyane, Cayenne, French Guiana, ²CNRS - UMR, Cayenne, France, ³Field Museum of Natural History, Chicago, IL

D3126 Differential success in ant (Hymenoptera: Formicidae) lineages at the end of the age of the dinosaurs. **Christine Sosiak** (ces43@njit.edu) and Phillip Barden, New Jersey Institute of Technology, Newark, NJ

D3127 A tale of two stages: The divergent microbiomes of larval vs. adult turtle ants encode overlapping, yet partially unique, digestive functions. **Benoit Bechade** (bb834@drexel.edu)¹, Yi Hu¹, Catherine D'Amelio¹, John Wertz² and Jacob Russell¹, ¹Drexel Univ., Philadelphia, PA, ²Calvin College, Grand Rapids, MI

D3128 Development, behavior, learning, and neuroanatomy in the ant *Ectatomma ruidium*. **Santiago Meneses** (santiamen@gmail.com)¹, Marc Seid² and Adam Smith¹, ¹George Washington Univ., Washington, DC, ²The Univ. of Scranton, Scranton, PA

D3129 Using species distribution modeling for bulk conservation assessments of Hong Kong ants. **Brett Morgan** (bmorgan@hku.hk) and Benoit Guénard, The Univ. of Hong Kong, Hong Kong, China

D3130 *Wolbachia* skew social and life history traits and reproductive investment in pharaoh ants. **Rohini Singh** (srohini@sas.upenn.edu), Univ. of Pennsylvania, Philadelphia, PA

D3131 Mining bees of Minnesota (Andrenidae: *Andrena*): Checklist and key to subgenera. **Joel Gardner** (gardner1@myumanitoba.ca), Univ. of Manitoba, Winnipeg, MB, Canada

D3132 Assessing native bee (Hymenoptera: Apoidea) diversity in natural wetland plant communities of the Mississippi Delta. **Sharilyn Taylor** (sat365@msstate.edu)¹, John Davis¹, Katherine Parys² and Marcus Lashley¹, ¹Mississippi State Univ., Mississippi State, MS, ²USDA - ARS, Stoneville, MS

D3133 An updated checklist of the bees (Hymenoptera: Apoidea: Anthophila) of Pennsylvania, United States of America. **Shelby Kilpatrick** (skk30@psu.edu)¹, Jason Gibbs², Martin Mikulas³, Sven-Erik Spichiger³, Nancy Ostiguy¹, David Biddinger⁴ and Margarita López-Urbe¹, ¹Pennsylvania State Univ., University Park, PA, ²Univ. of Manitoba, Winnipeg, MB, Canada, ³Pennsylvania Dept. of Agriculture, Harrisburg, PA, ⁴Pennsylvania State Univ. Fruit Research and Extension Center, Biglerville, PA

D3134 Comparing brain morphology and learning in the social sweat bee *Augochlorella aurata* and the solitary sweat bee *Augochlora pura*. **Sarah Pahlke** (pahlke@gwmail.gwu.edu)¹, Marc Seid² and Adam Smith¹, ¹George Washington Univ., Washington, DC, ²The Univ. of Scranton, Scranton, PA

D3135 Intraspecific-aggressive tactics undermine social structure stability in the European honey bee *Apis mellifera*. **Grayson James Grume** (mcwhorter@uky.edu) and Clare Rittschof, Univ. of Kentucky, Lexington, KY

D3136 Measurement of attitudes toward molecular techniques in conservation studies compared among stakeholders. **Ashley Rohde** (a.t.rohde@hotmail.com), Utah State Univ., Logan, UT

D3137 Get it right the first time: A case of mistaken identity discovered by flow cytometric genome size estimation. **Valerie Holmes** (vrh0933406@tamu.edu)¹, Derek Woller², Hojun Song¹ and J. Spencer Johnston¹, ¹Texas A&M Univ., College Station, TX, ²USDA - APHIS, Phoenix, AZ

Grad Poster: SysEB 2

West Exhibit Hall A (Convention Centre)

D3138 Insights into the evolutionary history of in-flight mating in flower wasps (Thynnidae). **Tom Semple** (thomas.semple@anu.edu.au) and Rod Peakall, Australian National Univ., Canberra, Australia

D3139 The role of a symbiotic poxvirus in the success of its parasitoid wasp host. **Kelsey Coffman** (kcoffman@uga.edu) and Gaelen Burke, Univ. of Georgia, Athens, GA

D3140 Fairyfly fantasy: Resolving phylogenetic relationships of Mymaridae (Hymenoptera: Chalcidoidea). **Krissy Dominguez** (cdomi009@ucr.edu) and John M. Heraty, Univ. of California, Riverside, CA

D3141 Presentation withdrawn

D3142 Spinning in the rain: Interactions between spider web morphology and microhabitat use. **Andrea Haberkern** (andrea.haberkern.526@my.csun.edu), Philippe Fernandez-Fournier and Leticia Aviles, The Univ. of British Columbia, Vancouver, BC, Canada

D3143 A comparison of beetle and spider assemblages across an elevational gradient in Denali National Park, Alaska: Preliminary results. **Adam Haberski** (ahaberski@alaska.edu) and Derek Sikes, Univ. of Alaska, Fairbanks, AK

D3144 Dagger moths (Lepidoptera: Noctuidae: Acronictinae) demonstrate the variable role of wing venation in the evolution of the nymphalid groundplan. **Sandra Schachat** (schachat@stanford.edu)¹ and Paul Goldstein², ¹Stanford Univ., Stanford, CA, ²USDA - ARS, Washington, DC

D3145 Caterpillar survival in urban gardens: Assessing predation rates on models of lepidopteran larvae along an urban-rural gradient. **Lindsay Nason** (ldnaso01@louisville.edu), Perri Eason, Amy Cherry, Jacob Lawson and Margaret Carreiro, Univ. of Louisville, Louisville, KY

D3146 Further digging in the Amphipyriinae (Lepidoptera: Noctuidae) junk drawer. **Kevin Keegan** (kevin.keegan@uconn.edu) and David Wagner, Univ. of Connecticut, Storrs, CT

D3147 Changes in Lepidoptera collecting in the United States since 1800. **Erica Fischer** (fisch259@msu.edu) and Anthony Cognato, Michigan State Univ., East Lansing, MI

D3148 Deconstructing warning signals in butterfly mimicry rings. **Jack Kellogg** (jack.kellogg@rutgers.edu), Rutgers, The State Univ. of New Jersey, Newark, NJ

D3149 To graze or to burn: How management affects butterflies in Minnesota remnant prairies. **Julia Leone** (leone050@umn.edu)¹, Diane Larson², Jen Larson¹, Karen Oberhauser³ and Patrick Pennarola¹, ¹Univ. of Minnesota, St. Paul, MN, ²US Geological Survey, St. Paul, MN, ³Univ. of Wisconsin, Madison, WI

D3150 Making sense of a mite-y problem: Phylogenetic inference in North American water mites (Genus *Arrenurus*, Subgenus *Micruracarus*). **Rachel Shoop** (r.k.shoop@gmail.com), San Diego State Univ., San Diego, CA

Grad Poster: SysEB 3

West Exhibit Hall A (Convention Centre)

D3151 Parental care influences the microbiome structure and function of earwig eggs. **Jordan Greer** (jag1uchicago@gmail.com)¹, Andrea Swee², Vance Vredenburg² and Andrew Zink², ¹Univ. of Chicago, Chicago, IL, ²San Francisco State Univ., San Francisco, CA

D3152 Behavior and interactions of the parasitic fly *Philornis downsi* from the Galapagos flycatcher in the Galapagos Islands. **Ismael Ramirez** (ramir238@umn.edu)¹, Piedad Lincango², George Heimpel¹ and Charlotte Causton³, ¹Univ. of Minnesota, St. Paul, MN, ²Univ. Central del Ecuador, Quito, Ecuador, ³Charles Darwin Foundation for the Galapagos Islands, Galapagos Islands, Ecuador

D3153 First report of Asia II 6 cryptic species from India and Asia I cryptic species of whiteflies, *Bemisia tabaci* (Gennadius), in ash gourd. **Tamilnayagan Thangavel** (tamil.ento14@gmail.com), Tamilnadu Agricultural Univ., Coimbatore, India

D3154 Superhydrophobicity of dipteran wings caused by hierarchical micro- and nanoscale features. **Kristen Reiter** (reiter5@illinois.edu) and Marianne Alleyne, Univ. of Illinois, Champaign, IL

D3155 Impacts of invasive rainbow trout on terrestrial and aquatic insect communities on Robalo River of Cape Horn Biosphere Reserve, Chile. **Sabrina Moore** (sabinamoore2@my.unt.edu)¹, Jose Sanchez Ruiz², Tamara Contador^{3,4} and James Kennedy^{1,4}, ¹Univ. of North Texas, Denton, TX, ²Georgia Southern Univ., Statesboro, GA, ³Univ. de Magallanes, Punta Arenas, Chile, ⁴Parque Etnobotánico Omora, Puerto Williams, Chile

D3156 Species composition of insects collected by aphid tower traps in the Highland Agricultural Area, Korea. Seunghwan Lee and **Sanghyeok Nam** (as0324@snu.ac.kr), Seoul National Univ., Seoul, South Korea

D3157 Mechanisms behind symbiont community structure in the pea aphid: How do within-host symbiont interactions shape maternal transmission efficiency? **Linyao Peng** (lp595@drexel.edu)¹, Nina Tang² and Jacob Russell¹, ¹Drexel Univ., Philadelphia, PA, ²Barnard College of Columbia Univ., New York, NY

D3158 Presentation withdrawn

D3159 Molecular phylogeny of Korean Athetini (Coleoptera: Staphylinidae: Aleocharinae). **Jae-Seok Lee** (ljs7615@naver.com)¹, Jeong-Hun Song¹, Seung-Gyu Lee² and Kee-Jeong Ahn¹, ¹Chungnam National Univ., Daejeon, South Korea, ²Korea National Arboretum, Pocheon, South Korea

D3160 Causes and consequences of plasticity in reproductive investment in a seed beetle (*Callosobruchus maculatus*). **Josiah Ritchey** (josiah.ritchey@uky.edu) and Charles W. Fox, Univ. of Kentucky, Lexington, KY

D3161 Presentation withdrawn

D3162 Evidence for watersheds as a factor in ground beetle (Carabidae) distribution in Ontario's far north. **Kaitlyn Fleming** (kaitlynflemin@trentu.ca), James Schaefer, Kenneth Abraham and David Beresford, Trent Univ., Peterborough, ON, Canada

Undergrad Poster: MUVE

West Exhibit Hall A (Convention Centre)

D3163 Profiling DSCAM exon usage in Gram-negative infections in *A. americanum*. **Bayleigh Smith** (bsmith034598@nsula.edu) and Lindsay Porter, Northwestern State Univ., Natchitoches, LA

D3164 Differentiating *Dermacentor variabilis* from *Dermacentor andersoni* using morphological differences. **Nicholas Vanderholm** (manunitedtopgear@gmail.com), Eastern Washington Univ., Elk, WA

D3165 Homology-based cloning and recombinant protein expression of the brown widow spider (*Latrodectus geometricus*) delta-latroinsectotoxin. **Samantha Smith** (ssmith031728@nsula.edu) and Lindsay Porter, Northwestern State Univ., Natchitoches, LA

D3166 Vertical transmission of Zika virus in *Aedes aegypti* and *Aedes albopictus*. **Stephanie Cantu** (stephanie.cantu02@utrgv.edu), Juan Garcia and Christopher Vitek, Univ. of Texas, Edinburg, TX

D3167 The effects of abscisic acid on *Anopheles stephensi* mosquito reproduction. **Reagan Haney** (reaganhs02@gmail.com), Dean Taylor and Shirley Luckhart, Univ. of Idaho, Moscow, ID

D3168 Microbial communities of necrophagous flies and their impact on bacterial transmission over time. **Victoria Pickens** (vpicken@ostatemail.okstate.edu), Edward Bird, Astri Wayadande and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK

Undergrad Poster: PBT

West Exhibit Hall A (Convention Centre)

D3169 Self-administration of morphine in *Bombus impatiens*. **Michael Moran** (Michael.moran2@scranton.edu)¹, Adam Smith², J. Cannon¹ and Marc Seid¹, ¹The Univ. of Scranton, Scranton, PA, ²George Washington Univ., Washington, DC

D3170 Analysis of the cuticle in *Camponotus floridanus* in the absence of *Blochmannia*. **Dylan Valente** (dylan.valente@scranton.edu) and Dylan Valente, The Univ. of Scranton, Scranton, PA

D3171 Characterizing the upper thermal limits of an important pollinator. **Korie Debardlabon** (korie.debardlabon.1@ndsu.edu)¹, Isaac Arnold¹, George Yocum², Joseph P. Rinehart² and Kendra Greenlee¹, ¹North Dakota State Univ., Fargo, ND, ²USDA - ARS, Fargo, ND

D3172 Evaluation of temperature and humidity conditions for optimal predation of *Varroa destructor* by the generalist mite *Stratiolaelaps scimitus*. **Travis Trimm** (travistrimm501@gmail.com), Makaylee Crone, Juliana Rangel and Ellie Chapkin, Texas A&M Univ., College Station, TX

D3173 Metagenomics allows for the characterization of viral communities carried by mosquitoes in the greater Houston area. **Alhasan Alshaarabaf** (alhasan.shaarabaf@gmail.com), Michelle Quiroz, Ayesha Hasan, Sused Silva, Amna Irfan, Veit Tran, Maia Larios-Sanz and Rosemarie Rosell, Univ. of St. Thomas, Houston, TX

D3174 Determining the correlation between *Drosophila melanogaster* toluene exposure and the resulting toxicity effects on fly survival and fecundity. **Brenda Luu** (xbrenda10xx@gmail.com), Dalia Arredondo, Mary Campanas, Gabrielle King, Erin Kovar, Angela Moreno, Kim Nguyen, Emaad Ullah, Elmer Ledesma and Rosemarie Rosell, Univ. of St. Thomas, Houston, TX

D3175 Effect of nutrition status on the lifespan and reproductive output of the click beetle *Agriotes obscurus*. **Danielle White** (danielle.white1@student.uvf.ca)¹, Kari Zurovski², Jenny Cory², Jessi Ly², Todd Kabaluk³ and Alida Janmaat¹, ¹Univ. of the Fraser Valley, Abbotsford, BC, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada, ³Agriculture and Agri-Food Canada, Agassiz, BC, Canada

D3176 The impacts of environmental stress on pheromone communication in *Heliothis virescens*. **Emma Jensen** (133522j@acadiau.ca), Acadia Univ., Wolfville, NS, Canada

D3177 Presentation withdrawn

D3178 Susceptibility of stored product pests to the fungal mycotoxin deoxynivalenol. **Valerie Nguyen** (ngueyval@ksu.edu)¹, Frank Arthur², Thomas Phillips¹, Matt Bakker³, Susan McCormick³ and Erin Scully², ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS, ³USDA - ARS, Peoria, IL

Undergrad Poster: P-IE

West Exhibit Hall A (Convention Centre)

D3179 Effect of plant diversity on insect pests and their predators in a forage agroecosystem. **Gabriella Altmire** (gaaltmire@ursinus.edu), Carter Usowski and Cory Straub, Ursinus College, Collegeville, PA

D3180 An assessment of host choice in invasive spotted lanternfly, *Lycorma delicatula* (White) (Hemiptera: Fulgoridae). **Jason Bielski** (jbiel654@live.kutztown.edu), Gregory Setliff and Hollis Carter, Kutztown Univ. of Pennsylvania, Kutztown, PA

D3181 Species-specific responses of the Colorado potato beetle to pheromone cues of predatory and phytophagous pentatomids. **Ari Grele** (ajg346@cornell.edu), Nicholas C. Aflitto and Jennifer Thaler, Cornell Univ., Ithaca, NY

D3182 An escaped species at large, the introduction and spread of *Prepona laertes* into the parks of Broward County, Florida. **Branden Davis** (davib16@mail.broward.edu), Jennifer Bishop, David Serrano, Joseph Sigmon and Giovanna Ortiz, Broward College, Davie, FL

D3183 Investigating ground beetles as predators of wireworms on the Canadian prairies. **Emily Lemke** (elemke96@gmail.com)^{1,2}, Haley Catton¹ and Brian Heise², ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²Thompson Rivers Univ., Kamloops, BC, Canada

D3184 Evaluation of temperature on the longevity of *Steinernema riobrave* infective juvenile nematodes in a water solution. **Diana Cantu** (diana.cantu01@utrgv.edu)¹, John A. Goolsby² and Alexis Racelis¹, ¹Univ. of Texas, Edinburg, TX, ²USDA - ARS, Edinburg, TX

D3185 Influence of winter cover crops on thrips abundance and cotton development in northeast Arkansas. **Haylee Campbell** (haylee.campbell@small.astate.edu)¹, Kyle Wilson², N. Benson³ and Tina Gray Teague¹, ¹Arkansas State Univ., State University, AR, ²Univ. of Arkansas Division of Agriculture, State University, AR, ³Univ. of Arkansas Division of Agriculture, Blytheville, AR

D3186 Relationship of wolf spider (*Pardosa* spp.) and *Bembidion* spp. activity levels to temperature in central Sweden. **Alexandra Bailey** (albailey2@ursinus.edu)¹, Cory Straub¹, Gabriella Altmire¹ and Mattias Jonsson², ¹Ursinus College, Collegeville, PA, ²Lincoln Univ., Christchurch, New Zealand

D3187 Changes in ground-dwelling arthropod communities across an elevational gradient in a cloud rainforest. Derek Iwema¹, **Phillip Davis** (dhoekman@mail.snu.edu)², Jackson Winslow², Tyler Souza² and David Hoekman², ¹Olivet Nazarene Univ., Bourbonnais, IL, ²Southern Nazarene Univ., Bethany, OK

D3188 Morphometric comparison of *Drosophila suzukii* ovipositors from various habitats. **Olivia Simaz** (simazoli@msu.edu) and Matthew Grieshop, Michigan State Univ., East Lansing, MI

D3189 Reduced predation by *Orius insidiosus* on *Empoasca fabae* on a leafhopper-resistant cultivar of alfalfa. **Joseph Cammarano** (jocammarano@ursinus.edu), Alexandra Bailey, Gabriella Altmire and Cory Straub, Ursinus College, Collegeville, PA

D3190 A diagnostic-concentration, glass-vial bioassay for the rapid monitoring of soybean aphid (*Aphis glycines*) susceptibility to pyrethroid insecticides. **James Menger** (meng0025@umn.edu)¹, Robert Koch¹, Ian MacRae², Janet Knodel³, Bruce Potter⁴, Philip Glogoza⁵, Erin Hodgson⁶, Adam Varenhorst⁷, Anitha Chirumamilla⁸ and John Gavloski⁹, ¹Univ. of Minnesota, St. Paul, MN, ²Univ. of Minnesota, Crookston, MN, ³North Dakota State Univ., Fargo, ND, ⁴Univ. of Minnesota, Lamberton, MN, ⁵Univ. of Minnesota, Moorhead, MN, ⁶Iowa State Univ., Ames, IA, ⁷South Dakota State Univ., Brookings, SD, ⁸North Dakota State Univ., Langdon, ND, ⁹Manitoba Agriculture, Food & Rural Development, Carman, MB, Canada

D3191 Effect of polyphenol and tannin production on the fitness of a common insect herbivore *Acyrtosiphon pisum* (pea aphid). **John Christakis** (jchrista@kent.edu), Kent State Univ., St. Clairsville, OH

D3192 Crossing borders with new crops: Hemp, insect guilds, and their impact in Tennessee. **Cody Seals** (wseals@utk.edu)¹, Jerome Grant¹, Frank Hale² and Darrell Hensley¹, ¹Univ. of Tennessee, Knoxville, TN, ²Univ. of Tennessee, Nashville, TN

D3193 Effect of introduced trout on stream macroinvertebrate communities in a tropical montane river system. **Jackson Winslow** (jwinslow@mail.snu.edu), Phillip Davis and David Hoekman, Southern Nazarene Univ., Bethany, OK

Undergrad Poster: SysEB 1

West Exhibit Hall A (Convention Centre)

D3194 Phylogenomics and evolution of carnivorous mayflies: Traditional genes may be misleading. **CaBri Montano** (cabrimontano@gmail.com) and T. Heath Ogden, Utah Valley Univ., Orem, UT

D3195 DNA barcode diversity of *Neothremma* and *Ferula* (Trichoptera: Uenoidae) of the Columbia River Gorge. **Seth Wilson** (sethwilson44@gmail.com)¹, Adam Taylor², Chris Castro², Paul Frandsen² and Robert Wisseman³, ¹Brigham Young Univ., Portland, OR, ²Brigham Young Univ., Provo, UT, ³Aquatic Biology Associates, Inc., Corvallis, OR

D3196 Finding “helicopters” (Odonata: Coenagrionidae) in Vanuatu. **Erica Paxman** (ericapaxman@gmail.com), Benjamin Sasine, Madison Lallatin, Teagan Mulford, Gareth Powell and Seth Bybee, Brigham Young Univ., Provo, UT

D3197 Testing phylogenetic relationships of damselflies (Odonata) in Fiji and Vanuatu. **Madison Lallatin** (maddilallatin@gmail.com), Erica Paxman, Teagan Mulford, Benjamin Sasine and Seth Bybee, Brigham Young Univ., Provo, UT

D3198 Marine insects of Puget Sound. **Tristan Carette-Meyers** (tristancarettemeyers@gmail.com), The Evergreen State College, Olympia, WA

D3199 Where earth, fire, and water meet: A story of *Atyphella* (Coleoptera: Lampyridae) in Vanuatu. **Stephen Serrano** (steve.l.serrano@gmail.com), Anna Monson, Kyler Johnson, Natalie Saxton, Gareth Powell and Seth Bybee, Brigham Young Univ., Provo, UT

D3200 Life on the edge: Edge effects of a coastal neotropical forest on benthic macroinvertebrates. **Jared Dyer** (jdyer15@kent.edu), Kent State Univ., North Canton, OH

D3201 Biodiversity in our neighboring parks: Biodiversity survey of two Broward County, Florida parks (Fern Forest and Tradewinds Park). **Giovanna Ortiz** (ortig21@mail.broward.edu), Elizabeth Arneson, David Serrano, Jennifer Bishop, Branden Davis and Joseph Sigmon, Broward College, Davie, FL

D3202 Diversity of the entomofauna present in the tropical dry forest to the northwest of the “Desierto de la Tatacoa” region, Villa Vieja, Huila, Colombia. **Dario Guevara Plata** (u0501102@unimilitar.edu.co), Marlene Lucia Aguilar Benavides and Rubén Martín Rojas, Univ. Militar Nueva Granada, Cajicá, Colombia

D3203 Distribution and habitat selection of the St. Anthony Dunes tiger beetle, *Cicindela arenicola* Rumpff. **Noelle Zenger** (zen01005@byui.edu)¹, Bethanie Twede¹, John Zenger¹, Jericho Whiting¹, Eric Billman¹, David Pennock² and Devin Englestead³, ¹Brigham Young Univ., Rexburg, ID, ²Idaho Falls Zoo, Idaho Falls, ID, ³Bureau of Land Management, Idaho Falls, ID

D3204 Insect survey of the El Yunque National Forest (Puerto Rico) along an altitude gradient. **Elizabeth Hickey** (hicker@farmingdale.edu) and Carly M. Tribull, Farmingdale State College, Farmingdale, NY

Undergrad Poster: SysEB 2

West Exhibit Hall A (Convention Centre)

D3205 What hides in darkness? A survey of cave arthropods. **Nicholas Newell** (nicknewell.nn@gmail.com) and T. Heath Ogden, Utah Valley Univ., Orem, UT

D3206 Do urban landscape features affect patterns of co-occurrence of the red imported fire ant (*Solenopsis invicta*) and the Argentine ant (*Linepithema humile*)? **Abigail Pierre** (apierre98@knights.ucf.edu), Univ. of Central Florida, Orlando, FL

D3207 The effect of sleep deprivation on biogenic amines and learning in *Camponotus floridanus*. **Julia McKinney** (julia.mckinney@scranton.edu) and Marc Seid, The Univ. of Scranton, Scranton, PA

D3208 The effects of an acetylcholinesterase inhibitor on associative learning in *Camponotus floridanus* ants. **Hailey Kindt** (hailey.kindt@scranton.edu) and Marc Seid, The Univ. of Scranton, Scranton, PA

D3209 The effect of isolation of *Camponotus floridanus* callow workers behavior and biogenic amines. **Matthew Barrett** (matthew.barrett@scranton.edu) and Marc Seid, The Univ. of Scranton, Scranton, PA

D3210 Presentation withdrawn

D3211 Taxonomic utility and genetic architecture of genitalic trait variation in spruce budworms (Lepidoptera: Tortricidae: *Choristoneura*). **Rowan French** (rfrench@ualberta.ca), Bryan Brunet, Pasan Lebusasin and Felix Sperling, Univ. of Alberta, Edmonton, AB, Canada

D3212 Population genetics of *Heterotermes paradoxus* across the Great Divide. **Maire Burder** (mob7@njit.edu), Rutgers, The State Univ. of New Jersey, Newark, NJ

D3213 Persistent insect misconceptions in biological education. **Emma Wester** (westere15@students.ecu.edu), Kristine Callis-Duehl and Kate W. Blinka, East Carolina Univ., Greenville, NC

D3214 The growth and development of the Broward College insect collection: Progress, current goals, focuses, and undergraduate research projects in our 2nd year. **Jennifer Bishop** (jenny.birdgirl@gmail.com), David Serrano, Branden Davis, Giovanna Ortiz and Joseph Sigmon, Broward College, Davie, FL

D3215 Caterpillar inflation as an alternative to alcohol preservation: Resurrecting an old technique to solve modern problems. **Joseph Sigmon** (joesigmon1895@gmail.com), David Serrano, Jennifer Bishop and Giovanna Ortiz, Broward College, Davie, FL

Grad Virtual Poster: MUVE, PBT, P-IE, and SysEB

West Exhibit Hall A (Convention Centre)

VP01 Improving the accuracy of genome assemblies of *Anopheles* species and revealing the principles of 3D genome organization in dipteran insects using the Hi-C approach. **Varvara Lukyanchikova** (lukva@vt.edu)^{1,2}, Veniamin Fishman², Miroslav Nuriddinov², Nariman Battulin², Oleg L. Serov² and Igor V. Sharakhov¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²Institute of Cytology and Genetics SB RAS, Novosibirsk, Russian Federation

VP02 Differences in environmental conditions between forest and domestic *Aedes aegypti* oviposition sites in Kenya. **Siyang Xia** (siyang.xia@yale.edu)¹, Joel Lutomia², Hany Dweck¹, Nanxi Lu³ and Jeffrey R. Powell¹, ¹Yale Univ., New Haven, CT, ²Kenya Medical Research Institute, Nairobi, Kenya, ³Yale Univ., West Haven, CT

VP03 Genetic transformation of *Aedes aegypti* by micro-particle bombardment and CRISPR-CAS9. **Amalia Lule-Chávez** (amalia.lule@cinvestav.mx), José Cabrera-Ponce and Jorge Ibarra, Cinvestav-Irapuato, Irapuato, Mexico

VP04 Towards the optimization of slaughter techniques for the production of black soldier fly larvae (*Hermetia illucens*) as food and feed. **Jennifer Larouche** (jennifer.larouche.1@ulaval.ca), Marie-Hélène Deschamps, Yolaine Lebeuf, Linda Saucier, Alain Doyen and Grant Vandenberg, Univ. Laval, Québec City, QC, Canada

VP05 Current status of entomopathogenic fungi and their role in biological control of insects in Pakistan. **Huma Naem** (hn.zoology@gmail.com)¹, Kamran Ashraf¹, Muhammad Oneeb¹, Muhammad Zubair Shabbir¹, Amna Chudhary¹ and Hania Ramzan², ¹Univ. of Veterinary and Animal Sciences, Lahore, Pakistan, ²Lahore College for Women Univ., Lahore, Pakistan

VP06 Sublethal pesticide exposure increases development time and reduces rate of weight gain in *Osmia cornifrons* larvae. **Ngoc Phan** (ngp5173@psu.edu)¹, Edwin Rajotte¹ and David Biddinger², ¹Pennsylvania State Univ., University Park, PA, ²Pennsylvania State Univ. Fruit Research and Extension Center, Biglerville, PA

VP07 Host plant switch affects the life history, growth and proteolytic digestion in *Pieris brassicae* L. (Lepidoptera: Pieridae). **Pawan Kumar** (pawan.parashar87@gmail.com), Rakesh Kumar, Tabasum Akhter and Sudeshna Mazumdar-Leighton, Univ. of Delhi, Delhi, India

VP08 Extracellular DNA traps were released by *Galleria mellonella* (Lepidoptera: Pyralidae) in response to enteropathogenic *Escherichia coli*. **Robin Chen** (ychen14@ualberta.ca) and B. Andrew Keddie, Univ. of Alberta, Edmonton, AB, Canada

VP09 A failure of meiosis leads to hybrid male sterility in the *Anopheles gambiae* complex. **Jiangtao Liang** (jtiliang@vt.edu) and Igor V. Sharakhov, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

VP10 dsRNA delivery to citrus plants and the citrus psyllid. **Sasha-Kay Clarke** (sashakayclarke@yahoo.com)¹, Thomson Paris², Wayne Hunter³, S. E. Brown⁴ and Jawwad Qureshi², ¹The Univ. of the West Indies, Kingston, Jamaica, ²Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL, ³USDA - ARS, Fort Pierce, FL, ⁴Univ. of the West Indies, Kingston, Jamaica

VP11 Incidence of mite pests on Citrus Under Protective Screens (CUPS). **Emilie Demard** (edemard@ufl.edu) and Jawwad Qureshi, Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL

VP12 Ethnobotanical survey of medicinal plants used as insects repellents in six malaria endemic localities of Cameroon. **Roger Ducos Youmsi Fokouo** (ducosf@yahoo.fr)¹, Patrick Valere Tsouh Fokou¹, Elisabeth Zeuko'o Menkem¹, Issakou Bakarnga-Via², Rodrigue Keumoe¹, Victor Nana³ and Fabrice Fekam Boyom¹, ¹Univ. of Yaounde 1, Yaounde, Cameroon, ²Univ. of Njamena, Njamena, Chad, ³National Herbarium of Cameroon, Yaounde, Cameroon

VP13 Efficacy of foliar insecticides on soybean aphids in South Dakota. **Cole Dierks** (cole.dierks@sdsu.edu), Adam Varenhorst and Philip Rozeboom, South Dakota State Univ., Brookings, SD

Grad Virtual Poster: P-IE

West Exhibit Hall A (Convention Centre)

VP14 Determining impacts of plant invasion on native arthropods using an eco-evolutionary framework. **Adam Mitchell** (mitchell.adam.b@gmail.com) and Douglas W. Tallamy, Univ. of Delaware, Newark, DE

VP15 Development and reproduction of *Hippodamia convergens* and *Olla v-nigrum* on *Aphis gossypii* and *Ephestia kuehniella*. **Muhammad Arshad** (makuaf@gmail.com)¹, Jawwad Qureshi², Muhammad Irfan Ullah¹ and Muhammad Afzal¹, ¹Univ. of Sargodha, Sargodha, Pakistan, ²Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL

VP16 Operation Orthoptera: Abundance and diversity in eastern South Dakota. **Erica Anderson** (erica.anderson@sdsstate.edu)¹, Adam Varenhorst¹, Philip Rozeboom¹, Patrick Wagner², Amanda Bachmann³ and Billy Fuller¹, ¹South Dakota State Univ., Brookings, SD, ²South Dakota State Univ., Rapid City, SD, ³South Dakota State Univ., Pierre, SD

VP17 Murderous Mycelia mollify *Megacopta cribraria*. **Amy Michael** (amicha12@vols.utk.edu)¹, Bonnie Ownley¹, Gregory J. Wiggins¹, Scott Stewart² and Jerome Grant¹, ¹Univ. of Tennessee, Knoxville, TN, ²Univ. of Tennessee, Jackson, TN

VP18 Do all great minds think alike? An assessment of expert perspective on the impacts of non-native insects in North America. **Ashley Schulz** (ashley.schulz@smail.astate.edu)¹, Angela Mech², Craig Allen³, Matthew Ayres⁴, Kamal J. K. Gandhi⁵, Jessica Gurevitch⁶, Nathan Havill⁷, Daniel Herms⁸, Ruth Huffbauer⁹, Andrew M. Liebhold¹⁰, Kenneth Raffa¹¹, Michael J. Raupp¹², Kathryn Thomas¹³, Patrick Tobin² and Travis D. Marsico¹⁴, ¹Arkansas State Univ., State Univ., AR, ²Univ. of Washington, Seattle, WA, ³Univ. of Nebraska, Lincoln, NE, ⁴Dartmouth College, Hanover, NH, ⁵Univ. of Georgia, Athens, GA, ⁶Stony Brook Univ., Stony Brook, NY, ⁷USDA - Forest Service, Hamden, CT, ⁸Davey Tree Expert Company, Kent, OH, ⁹Colorado State Univ., Fort Collins, CO, ¹⁰USDA - Forest Service, Morgantown, WV, ¹¹Univ. of Wisconsin, Madison, WI, ¹²Univ. of Maryland, College Park, MD, ¹³US Geological Survey, Tucson, AZ, ¹⁴Arkansas State Univ., Jonesboro, AR

VP19 Fitness factors: Effects of diet and cage structure on longevity and fecundity of adult *Tetanocera elata* (Diptera: Sciomyzidae). **Allison Bistline-East** (a.bistline-east1@nuigalway.ie), Alessio Volpato and Michael J. Gormally, National Univ. of Ireland, Galway, Ireland

VP20 Seed-sowing ants (Hymenoptera: Formicidae) sustain services in longleaf sandhill site despite fire season. **Rachel Atchison** (ratchison@ufl.edu) and Andrea Lucky, Univ. of Florida, Gainesville, FL

VP21 Forecasting rice leaf roller and oriental armyworm in Korea using maximum entropy model. **Ho Jeong Choe** (hojeong921@gmail.com), Tae Chul Park, Ho Jung Jang and Jung-Joon Park, Gyeongsang National Univ., Jinju, South Korea

VP22 Spatial pattern analysis for distribution of migratory insect pests in Jeolla-province. **Tae Chul Park** (ptch124@gmail.com), Ho Jeong Choe, Ho Jung Jang and Jung-Joon Park, Gyeongsang National Univ., Jinju, South Korea

VP23 Determining host foraging behavior of *Habrobracon hebetor* (Say) to *Plodia interpunctella* (Hübner) in simulated grain storage structures. **Sanower Warsi** (sanowerw@Yahoo.com) and George Mbata, Fort Valley State Univ., Fort Valley, GA

VP24 Damage evaluation of *Dichelops melacanthus* Dallas (Hemiptera: Pentatomidae) nymphal instars on corn seedlings. **Nádia Bueno** (nadia.bueno@gmail.com)¹, Edson Luiz Baldin², Gloria Melotto¹, Leandro Ribeiro³, Sabrina Ongaratto¹ and Jessica Rodrigues Gorri¹, ¹Univ. Estadual Paulista, Botucatu, Brazil, ²São Paulo State Univ., Botucatu, Brazil, ³Agricultural Research and Rural Extension Company of Santa Catarina, Chapecó, Brazil

VP25 Predation rates of *Tupiocoris cucurbitaceus* (Hemiptera: Miridae) feeding on different *Tuta absoluta* (Lepidoptera: Gelechiidae) developmental stages. **Rocio Montiel Cáceres** (rociomontielcaceres@gmail.com)¹, Margarita Rocca², Eliana Nieves² and Maria G. Luna^{2,3}, ¹Centro de Estudios Parasitológicos y de Vectores Conicet, La Plata, Argentina, ²Univ. Nacional de La Plata, CONICET, La Plata, Argentina, ³Univ. Nacional de San Antonio de Areco, San Antonio de Areco, Argentina

VP26 The effects of grassland management on wild bees in rotationally grazed pastures in southern Ontario. **Kyra Lightburn** (klightbu@uoguelph.ca), Ralph Martin and Nigel Raine, Univ. of Guelph, Guelph, ON, Canada

Undergrad Virtual Poster: MUVE, P-IE, and SysEB

West Exhibit Hall A (Convention Centre)

VP27 Food security on a warming planet: A case study with *Tenebrio molitor*. **Kerstin Thule** (kgt60894@uga.edu)¹, Alex Olvido² and Jim Konzelman², ¹Univ. of North Georgia, Atlanta, GA, ²Univ. of North Georgia, Watkinsville, GA

VP28 Monitoring dispersal of the parasitoid *Trichogramma ostrinae* in cornfields to improve western bean cutworm management in Nebraska. **Sara Salgado Astudillo** (sarasalgado96@hotmail.com)¹, Katharine Swoboda Bhattarai¹, Priscila Colombo Da Luz¹, Débora Goulart Montezano², Jeffrey Cluever³, Jeffrey Bradshaw³ and Julie Peterson¹, ¹Univ. of Nebraska, North Platte, NE, ²Univ. of Nebraska, Lincoln, NE, ³Univ. of Nebraska, Scottsbluff, NE

VP29 Western bean cutworm (*Striacosta albicosta*) (Smith) egg hatching and neonate behavior on maize. **Gloria Melotto** (gloriamelotto1@gmail.com)¹, Katharine Swoboda Bhattarai¹, Anthony J. McMechan² and Julie Peterson¹, ¹Univ. of Nebraska, North Platte, NE, ²Univ. of Nebraska, Lincoln, NE

VP30 Abundance and biodiversity of pollinators and traditional pests at conservation habitats near agricultural fields. **Franklin Dubón García** (franklindn80@gmail.com)¹, Katharine Swoboda Bhattarai¹, Samantha Daniel², Judy Wu-Smart², Thomas Weissling², Jeffrey Bradshaw³ and Julie Peterson¹, ¹Univ. of Nebraska, North Platte, NE, ²Univ. of Nebraska, Lincoln, NE, ³Univ. of Nebraska, Scottsbluff, NE

VP31 The behavioral response of stored product pests, *Rhyzopertha dominica* (Coleoptera: Bostrichidae) and *Tribolium castaneum* (Coleoptera: Tenebrionidae) to moldy grain volatiles. **Taylor Van Winkle** (taylorvanwinkle21@gmail.com)¹ and Rob Morrison², ¹Kalamazoo College, Kalamazoo, MI, ²USDA - ARS, Manhattan, KS

VP32 Density-mediated effects of crowding on the behavioral response of *Tribolium castaneum* and *Rhyzopertha dominica* to common food attractants. **Marco Ponce** (marco.ponce15@kzoo.edu)¹ and Rob Morrison², ¹Kalamazoo College, Kalamazoo, MI, ²USDA - ARS, Manhattan, KS

VP33 *Trogoderma variable* is not an adequate surrogate species for the behavioral response of the invasive stored product pest, *Trogoderma granarium* (Coleoptera: Dermestidae). **Robert Grosdidier** (rfgrsd@ksu.edu)¹, Rob Morrison², Michael Domingue³ and Frank Arthur², ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS, ³USDA - APHIS, Buzzards Bay, MA

VP34 Using the ANIC digitisation pipeline to assemble research datasets: analysis of Australian velvet ant mimicry from museum specimens. **Claudia Schipp** (claudiarschipp@gmail.com)¹, Juanita Rodriguez², Thekla Pleines² and Nicole Fisher², ¹The Univ. of Queensland, St. Lucia, Australia, ²Australian National Insect Collection, Canberra, Australia

VP35 Revealing trade-offs in sensory organs and morphological traits of ants (Hymenoptera: Formicidae). **Chloe Jelley** (cmj8@njit.edu) and Phillip Barden, New Jersey Institute of Technology, Newark, NJ

MONDAY, NOVEMBER 12 • MORNING

PBT Section Symposium: Gene Drive: 21st Century Genetic Control of Agricultural and Public Health Pests

Meeting Room 212 (Convention Centre)

Moderators and Organizers: David O'Brochta¹, Blair Siegfried², Scott O'Neal³ and Peter Jensen⁴, ¹Foundation for the National Institutes of Health, Rockville, MD, ²Univ. of Florida, Gainesville, FL, ³Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ⁴Monsanto Company, St. Louis, MO

8:00 Introductory remarks

8:05 **0801** Natural selfish genetic elements and gene drive - their relevance to evolution. **Gerald S. Wilkinson** (wilkinso@umd.edu)¹, Kimberly Paczolt¹ and Josephine Reinhardt², ¹Univ. of Maryland, College Park, MD, ²State Univ. of New York, Geneseo, NY

8:35 **0802** Engineered gene drives - types and mechanisms. **Omar Akbari** (oakbari@ucsd.edu), Univ. of California, San Diego, CA

8:50 **0803** Gene drives for public health - modifying vector populations. **Rebeca Carballar-Lejarazú** (rcarball@uci.edu), Univ. of California, Irvine, CA

9:05 Break

9:25 **0804** Gene drive performance - insights from modeling. **Alun Lloyd** (alun_lloyd@ncsu.edu), North Carolina State Univ., Raleigh, NC

9:55 **0805** Gene drives for agricultural insect control. **Max Scott** (mjscott3@ncsu.edu), North Carolina State Univ., Raleigh, NC

10:10 **0806** Ethics, social and community considerations raised by gene drives. **Claudia Emerson** (emerson@mcmaster.ca), McMaster Univ., Hamilton, ON, Canada

10:25 **0807** Environmental risk assessment of gene drive insects. **Andrew F. Roberts** (aroberts@ils.org), Center for Environmental Risk Assessment, Washington, DC

10:40 Concluding remarks

P-IE Section Symposium: From Researcher to Stakeholder: Using Extension to Cross Borders in a Changing World

Meeting Room 119/120 (Convention Centre)

Moderators and Organizers: Rebecca Schmidt-Jeffris¹, David Coyle² and Jeffrey Bradshaw³, ¹Clemson Univ., Charleston, SC, ²Clemson Univ., Clemson, SC, ³Univ. of Nebraska, Scottsbluff, NE

8:00 **0808** 21st century extension in the age of Google, drones, smart systems, and big data. **Sonny Ramaswamy** (bugswamy@gmail.com), Northwest Commission on Colleges and Universities, Redmond, WA

8:30 **0809** Forging the links from research to policy to practice. **Taylor Scarr** (taylor.scarr@canada.ca) and Chris MacQuarrie, Natural Resources Canada, Sault Ste. Marie, ON, Canada

8:45 **0810** Crossing borders: Lessons learned building relationships as a new extension specialist. **Kelly Hamby** (kahamby@umd.edu), Univ. of Maryland, College Park, MD

9:00 **0811** Extension entomology: More than just PowerPoints. **Jody Green** (jgreen17@unl.edu)¹ and Jonathan Larson², ¹Univ. of Nebraska, Lincoln, NE, ²Univ. of Nebraska, Omaha, NE

9:15 **0812** Promoting orange-fleshed sweetpotatoes in Zambia: A unique perspective in strengthening the extension service in Sub-Sahara Africa. **Emily Mueller** (emueller@ncsu.edu), North Carolina State Univ., Raleigh, NC

9:30 **0813** Extension and outreach in entomology: From an HBCU perspective. **Rizana M. Mahroof** (mahroof@scsu.edu), South Carolina State Univ., Orangeburg, SC

9:45 **0814** It's hashtag, not pound sign: Strategies for effective online communication. David Coyle¹ and **William Hubbard** (whubbard@sref.info)², ¹Clemson Univ., Clemson, SC, ²USDA - Forest Service, Gainesville, FL

10:00 **0815** Perspectives on indigenous agriculture development in BC. **Anne Skinner** (anne.skinner@gov.bc.ca), British Columbia Ministry of Agriculture, Vernon, BC, Canada

10:15 **0816** Implementing a collaborative approach for extension on invasive species. **Tracey Cooke** (tcooke@invasivespeciescentre.ca), Invasive Species Centre, Sault Ste. Marie, ON, Canada

10:30 **0817** Re-envisioning extension and the role of the 21st century extension professional. **Dennis D. Calvin** (ifa@psu.edu), Pennsylvania State Univ., University Park, PA

P-IE Section Symposium: Impact of Borders on Managing Insect Resistant Management

Meeting Room 116/117 (Convention Centre)

Moderators and Organizers: Scott Ludwig¹, Caydee Savinelli², Graham P. Head³ and Peter Porpiglia⁴, ¹Nichino America, Arp, TX, ²Syngenta Plant Protection, Greensboro, NC, ³Monsanto Company, St. Louis, MO, ⁴AMVAC Chemical Corporation, Newport Beach, CA

8:00 **0818** IRAC: Global cross-industry coordination to combat insect resistance. **Graham P. Head** (graham.p.head@monsanto.com)¹ and Caydee Savinelli², ¹Monsanto Company, St. Louis, MO, ²Syngenta Plant Protection, Greensboro, NC

8:15 **0819** Development and implementation of area wide insecticide resistance management strategies for fall armyworm and soybean looper in Puerto Rico. **Henry Teran Santofimio** (henry.teransantofimio@pioneer.com)¹, Hector E. Portillo², Caydee Savinelli³, Tony Burd⁴, James Dripps⁵, Jaime Sanchez¹, Sol Rosado-Arroyo⁶, Ramon Molinary⁷, Luz Flores⁸, Jim Johnson⁹ and Graham P. Head¹⁰, ¹DuPont Pioneer, Salinas, PR, ²FMC Agricultural Solutions, Newark, DE, ³Syngenta Plant Protection, Greensboro, NC, ⁴Syngenta Crop Protection, Research Triangle Park, NC, ⁵Dow AgroSciences, Indianapolis, IN, ⁶Bayer Puerto Rico, Guanica, PR, ⁷AgReliant Genetics, LLC, Santa Isabel, PR, ⁸Corteva Agriscience, Agriculture Division of DowDuPont, Aguirre, PR, ⁹Syngenta Crop Protection, Perry, MI, ¹⁰Monsanto Company, St. Louis, MO

8:30 **0820** Comparisons of genetic marker distributions in soybean looper and fall armyworm populations and their implications to migration behavior. **Rodney N. Nagoshi** (rodney.nagoshi@ars.usda.gov), USDA - ARS, Gainesville, FL

8:45 **0821** Cross-crop *Bt* resistance issues in the southern United States. **Angus Catchot** (acatchot@entomology.msstate.edu)¹, Don Cook² and Jeff Gore², ¹Mississippi State Univ., Mississippi State, MS, ²Mississippi State Univ., Stoneville, MS

9:00 **0822** Extreme resistance management: Eradication of pink bollworm in the US and northern Mexico. **Yves Carrière** (ycarrier@ag.arizona.edu)¹, Leighton Liesner², Robert Staten³ and Bruce Tabashnik¹, ¹Univ. of Arizona, Tucson, AZ, ²Arizona Cotton Research and Protection Council, Phoenix, AZ, ³USDA - APHIS, Gilbert, AZ

9:15 **0823** Borders and area wide pest eradication programs: The boll weevil eradication case study. **Charles Allen** (ctallen@ag.tamu.edu), Texas A&M Univ., San Angelo, TX

9:30 **0824** Update on Iowa's novel pest resistance management program (IPRMP). **Peter Porpiglia** (peterp@amvac-chemical.com)¹, Steven Bradbury² and Evan Sivesind², ¹AMVAC Chemical Corporation, Newport Beach, CA, ²Iowa State Univ., Ames, IA

9:45 Break

10:00 **0825** Spotted-wing drosophila – An invasive pest that has changed blueberry insect management and export considerations. **Ashfaq Sial** (ashsial@uga.edu)¹, Rufus Isaacs², Frank Zalom³, Brian Gress³, Philip Fanning², Steven Van Timmeren², Nathan Spaulding¹, Joseph Disi¹, Oscar Liburd⁴, Francis A. Drummond⁵, Kelly Hamby⁶, Cesar Rodriguez-Saona⁷, Nupur Sarkar⁴, Robert Holdcraft⁸, Margaret Lewis⁶, Judith A. Collins⁵, Lauren Diepenbrock⁹ and Hannah Burrack⁹, ¹Univ. of Georgia, Athens, GA, ²Michigan State Univ., East Lansing, MI, ³Univ. of California, Davis, CA, ⁴Univ. of Florida, Gainesville, FL, ⁵Univ. of Maine, Orono, ME, ⁶Univ. of Maryland, College Park, MD, ⁷Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, ⁸Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, ⁹North Carolina State Univ., Raleigh, NC

10:15 **0826** The impact of the urban-ag interface on the spread of Huanglongbing in California citrus. **Elizabeth E. Grafton-Cardwell** (eegraftoncardwell@ucanr.edu), Univ. of California, Riverside, CA

10:30 **0827** Adoption and success of an IRM program for onion thrips in onion: So good so far. **Brian A. Nault** (ban6@cornell.edu)¹, Ashley Leach¹, Erica Moretti², Christy Hoepting³ and Jeff Scott⁴, ¹Cornell Univ., Geneva, NY, ²Allegheny College, Meadville, PA, ³Cornell Cooperative Extension, Albion, NY, ⁴Cornell Univ., Ithaca, NY

10:45 **0828** Fungicides as inadvertent drivers of insecticide resistance. **Justin Clements** (jcllements2@wisc.edu)¹, Benjamin Sanchez-Sedillo¹, Anders Huset² and Russell Groves¹, ¹Univ. of Wisconsin, Madison, WI, ²North Carolina State Univ., Raleigh, NC

11:00 **0829** Recent outbreaks of diamondback moth insecticide resistance in the southeast United States and the IRM response. **David Riley** (dgr@uga.edu) and Alton Sparks, Univ. of Georgia, Tifton, GA

11:15 **0830** Proactive resistance management: Can we predict, and ultimately delay, resistance development in whiteflies across the agricultural landscape? **Peter Ellsworth** (peterell@calars.arizona.edu)¹, Al Fournier¹, John Palumbo², Yves Carrière³, Wayne Dixon¹ and Naomi Pier¹, ¹Univ. of Arizona, Maricopa, AZ, ²Univ. of Arizona, Yuma, AZ, ³Univ. of Arizona, Tucson, AZ

11:30 **0831** Impacts of international agricultural trade on management of pesticide resistance. Ray McAllister¹, John Aigner² and **Adrian Duehl** (adrian.duehl@bayer.com)³, ¹Crop Life America, Washington, DC, ²Nichino America, Camas, WA, ³Bayer CropScience, Research Triangle Park, NC

P-IE Section Symposium: Monitoring and Managing Agricultural Insects Crossing Borders

Meeting Room 121 (Convention Centre)

Moderators and Organizers: Julien Saguez¹, Tyler Wist², Megha Parajulee³ and Isabelle Fréchette¹, ¹CÉROM, Saint-Mathieu-de-Beloil, QC, Canada, ²Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ³Texas A&M Univ., Lubbock, TX

8:00 Welcoming remarks

8:05 **0832** Tactics for detection and surveillance of invasive insect species on the Canadian prairies. **Meghan Vankosky** (meghan.vankosky@canada.ca)¹, Jennifer Otani², John Gavloski³, Scott Meers⁴, James Tansey⁵ and Owen Olfert¹, ¹Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ²Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ³Manitoba Agriculture, Food & Rural Development, Carman, MB, Canada, ⁴Alberta Agriculture and Rural Development, Brooks, AB, Canada, ⁵Saskatchewan Ministry of Agriculture, Regina, SK, Canada

8:20 **0833** Aster yellows: An early warning system for western Canada based on leafhopper migration in the southern jet streams. **Tyler Wist** (tyler.wist@agr.gc.ca)¹, Chrystel Olivier¹, Tim Dumonceaux¹, Erl Svendsen¹, Sean Prager² and Keith Hobson³, ¹Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ²Univ. of Saskatchewan, Saskatoon, SK, Canada, ³Univ. of Western Ontario, London, ON, Canada

8:35 **0834** Using stable isotopes to monitor the seasonal migration of Lepidopteran pests. **Jeremy N. McNeil** (jmneil2@uwo.ca) and Keith Hobson, Western Univ., London, ON, Canada

8:50 **0835** Experimental assessment of the impact of varying precipitation levels on wheat stem sawfly performance and biological control. **Tatyana Rand** (tatyana.rand@ars.usda.gov), Debra Waters, David Branson and Robert B. Srygley, USDA - ARS, Sidney, MT

9:05 **0836** Aphid alert - an early warning for seed potato growers. **Ian MacRae** (imacrae@umn.edu) and Josephine Dillon, Univ. of Minnesota, Crookston, MN

9:20 **0837** Expanding the utility of small unmanned aircraft systems (sUAS). **Brian McCornack** (mccornack@ksu.edu) and Dan Flippo, Kansas State Univ., Manhattan, KS

9:35 **0838** Listening to insects with light – remote insect monitoring using LIDAR. **Klas Rydhmer** (kly@faunaphotonics.com), FaunaPhotonics Aps, Copenhagen, Denmark

9:50 **0839** Novel approach to area-wide monitoring and forecasting of pest insect population. **Matej Stefancic** (matej.stefancic@trapview.com), Katarina Mele, Dorian Suc and Mateja Stefancic, Efos/Trapview, Hruševlje, Slovenia

SD0840 Forecasting, monitoring and management of several agricultural pests under surveillance in the province of Québec. **Julien Saguez** (saguezj@yahoo.com)¹, Isabelle Fréchette¹, Mathieu Neau¹, Christine Toma¹, Jean-Philippe Légaré², Anne Blondlot³, Patrick Grenier³ and Annie-Ève Gagnon⁴, ¹CÉROM, Saint-Mathieu-de-Beloil, QC, Canada, ²Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec, Québec City, QC, Canada, ³Ouranos Inc, Montréal, QC, Canada, ⁴Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada

SD0841 Monitoring the Old World bollworm, *Helicoverpa armigera*, in Texas toward developing potential management strategies. **Megha Parajulee** (m-parajulee@tamu.edu), Texas A&M AgriLife Research and Extension Center, Lubbock, TX

MONDAY, NOVEMBER 12 /
LUNDI 12 NOVEMBRE

SD0842 IPM wheat survey in North Dakota. **Janet Knodel** (janet.knodel@ndsu.edu)¹, Andrew Friskop¹, Samuel Markell¹, Patrick Beauzay¹, Charles Elhard², Gerald Fauske¹, Ryan Buetow³, Greg Endres⁴, Audrey Kallil⁵, Scott Knoke¹, Lesley Lubenow⁶ and Travis Prochaska⁷, ¹North Dakota State Univ., Fargo, ND, ²North Dakota Dept. of Agriculture, Fargo, ND, ³North Dakota State Univ., Dickinson, ND, ⁴North Dakota State Univ., Carrington, ND, ⁵North Dakota State Univ., Williston, ND, ⁶North Dakota State Univ., Langdon, ND, ⁷North Dakota State Univ., Minot, ND

SD0843 Chemical cue for the management of rice caseworm (*Paraponyx stagnalis* Zeller) in rice in India. **K. Karthikeyan** (profkarthi@yahoo.co.in) and M.C. Narayanakutty, Kerala Agricultural Univ., Kerala, India

SD0844 Field optimization of the attractiveness of brown cocoa mirid *Sahlbergella singularis* Haglund (Hemiptera: Miridae), by different colorless sex pheromone sticky traps in the centre and south-west regions of Cameroon. **Hermine Mahot** (h.mahot@cgiar.org)¹, Joseph Mahob², David Hall³, Charles Bilong¹ and Rachid Hanna⁴, ¹Institut de recherche pour le développement, Yaounde, Cameroon, ²Univ. de Yaounde I, Yaounde, Cameroon, ³Natural Resources Institute, Kent, United Kingdom, ⁴International Institute of Tropical Agriculture, Yaounde, Cameroon

SD0845 Effect of searching area, predator-prey ratio, and predator-prey number on predation of western flower thrips, *Frankliniella occidentalis*, by the rove beetle, *Dalotia coriaria*. **Yinping Li** (yinpingli@ksu.edu) and Ray Cloyd, Kansas State Univ., Manhattan, KS

SD0846 First survey of thrips of fruit trees in Biskra, an arid region of Algeria. **Sabah Razi** (sabah_razi@yahoo.fr)¹, Malik Laamari² and Ernest C. Bernard³, ¹Univ. of Mohammed Kheidar, Biskra, Algeria, ²Univ. of Batna, Batna, Algeria, ³Univ. of Tennessee, Knoxville, TN

SD0847 Forecast model and risk factors for seedcorn maggot in Québec field crops. **Sébastien Boquel** (sebastien.boquel@cerom.qc.ca), Alexis Latraverse, Patrice Hamelin and Jennifer De Almeida, CÉROM, Saint-Mathieu-de-Beloil, QC, Canada

SD0848 Efficacy of some insect growth regulators and botanicals against *Trogoderma granarium* (Everts). **Mansoor ul Hasan** (mansoorsahi2000@yahoo.com)¹, Qurban Ali², Habib ur Rehman¹, Faizan Amjad¹, Saima Mirza¹ and Muhammad Yasir¹, ¹Univ. of Agriculture, Faisalabad, Pakistan, ²Ayub Agricultural Research Institute, Faisalabad, Pakistan

SD0849 Spinosad- and Deltamethrin-induced impact on mating and reproductive output of the maize weevil *Sitophilus zeamais*. **Mayra Vélez** (mayracarolinavelez@gmail.com)¹, Lorena Botina², Leonardo Turchen², Wagner Barbosa² and Raul Narciso Guedes², ¹Univ. Técnica Estatal de Quevedo, Quevedo, Ecuador, ²Univ. Federal de Viçosa, Viçosa, Brazil

SD0850 Predicting potential distribution of *Monochamus saltuarius* Gebler responding to climate change in Korea. **Youngwoo Nam** (orangmania99@korea.kr) and Jae-Min Jung, Division of Forest Insect Pests & Diseases, Seoul, South Korea

SD0851 Ghost riders in the sky: “Invisible” migration of insect pests within a year-round distribution. **Thomas Sappington** (tom.sappington@ars.usda.gov), USDA - ARS, Ames, IA

SD0852 Influence of intrinsic factors of cowpea seed varieties on the cowpea weevil, *Callosobruchus maculatus* (Coleoptera: Chrysomelidae). **Chris Adedire** (coadedire@gmail.com), Federal Univ. of Technology, Akure, Nigeria

SD0853 Life history characteristics of the Asiatic garden beetle, *Maladera castanea*, in field crops. **Adrian Pekarcik** (pekarcik.4@osu.edu)¹, Chris DiFonzo², Amy Raudenbush¹ and Kelley Tilmon¹, ¹The Ohio State Univ., Wooster, OH, ²Michigan State Univ., East Lansing, MI

SD0854 Ecological sustainable management of the invasive fall armyworm (*Spodoptera frugiperda*) pest in Africa. Amanuel Tamiru¹, Zeyaur Khan¹, Toby Bruce², **Charles Midega** (cmidega@icipe.org)¹, Sevgan Subramanian¹, Sunday Ekese¹, Segenet Kelemu¹ and Baldwin Torto¹, ¹International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya, ²Keele Univ., Keele, United Kingdom

SD0855 Herbivore and natural enemy survey in commercial cranberry fields in southwestern BC. **Renee Prasad** (renee.prasad@ufv.ca), Univ. of the Fraser Valley, Chilliwack, BC, Canada

10:05 Break and poster session

10:15 **0856** Challenges and novel concepts for maximizing the potential of beneficial insects in IPM programs in field crops. **John Gavloski** (john.gavloski@gov.mb.ca), Manitoba Agriculture, Food & Rural Development, Carman, MB, Canada

10:30 **0857** Status of biological control of wheat midge in Montana. **Gadi V. P. Reddy** (reddy@montana.edu), Govinda Shrestha and Ramadevi Gadi, Montana State Univ., Conrad, MT

10:45 **0858** Monitoring for western bean cutworm across borders: Using technology to deliver extension. **Tracey Baute** (tracey.baute@ontario.ca)¹, Jocelyn Smith² and Chris DiFonzo³, ¹Ontario Ministry of Agriculture, Food and Rural Affairs, Ridgetown, ON, Canada, ²Univ. of Guelph, Ridgetown, ON, Canada, ³Michigan State Univ., East Lansing, MI

11:00 **0859** Management on the fringe: The western bean cutworm story. **Chris DiFonzo** (difonzo@msu.edu)¹, Jocelyn Smith² and Tracey Baute³, ¹Michigan State Univ., East Lansing, MI, ²Univ. of Guelph, Ridgetown, ON, Canada, ³Ontario Ministry of Agriculture, Food and Rural Affairs, Ridgetown, ON, Canada

11:15 **0860** Measuring the expansion of western bean cutworm (*Striacosta albicosta*) and other insect pests/diseases/weeds of fields crops with arcgis apps developed for New York. **K. L. Wise** (klw24@cornell.edu)¹, Steve Smith² and Sean Carroll³, ¹New York State Integrated Pest Management Program, Geneva, NY, ²Cornell Univ., Ithaca, NY, ³Cornell Cooperative Extension, Millbrook, NY

11:30 **0861** Developing decision support tools for the agricultural industry – The Prairie Pest Monitoring Network Blog. **Jennifer Otani** (jennifer.otani@agr.gc.ca)¹, Shelby Dufton², David Giffen³, Ross Weiss³, Erl Svendsen³, Meghan Vankosky³, John Gavloski⁴, Scott Meers⁵, James Tansey⁶ and Owen Olfert³, ¹Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ²Univ. of Lethbridge, Lethbridge, AB, Canada, ³Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ⁴Manitoba Agriculture, Food & Rural Development, Carman, MB, Canada, ⁵Alberta Agriculture and Rural Development, Brooks, AB, Canada, ⁶Saskatchewan Ministry of Agriculture, Regina, SK, Canada

11:45 **0862** Insect monitoring in Québec field crops: An overview of the IPM network structure and of main insect pests. **Isabelle Fréchette** (isabelle.frechette@cerom.qc.ca), Julien Saguez, Sébastien Boquel and Mathieu Neau, CÉROM, Saint-Mathieu-de-Beloil, QC, Canada

SysEB Section Symposium: Species Delimitation and Identification in the Age of Big Data and Artificial Intelligence: Molecular and Morphological Approaches

Meeting Room 114/115 (Convention Centre)

Moderators and Organizers: Michael Branstetter¹ and Marek Borowiec², ¹USDA - ARS, Logan, UT, ²Arizona State Univ., Tempe, AZ

8:00 Introductory remarks

8:05 **0863** Two bee or not two bee: Phylogenomic species delimitation of megachilid bees using ultraconserved elements. **Michael Branstetter** (mgbranstetter@gmail.com), USDA - ARS, Logan, UT

8:20 **0864** Identifying diagnostic loci for species identification and delimitation in pest tephritids from diverse genomic resources. **Scott Geib** (scott.geib@ars.usda.gov), USDA - ARS, Hilo, HI

8:35 **0865** Delimiting species of silky fungus-farming ants (Formicidae: *Sericomyrmex*). Ana Jesovnik and **Ted Schultz** (schultzt@si.edu), Smithsonian Institution, National Museum of Natural History, Washington, DC

8:50 **0866** Presentation withdrawn

9:05 **0867** From barcodes to biomes: Surveying non-arthropod diversity through DNA barcoding of arthropods. **Evgeny Zakharov** (zakharov@uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada

9:20 **0868** Integrative species delimitation and revision of a “taxonomic nightmare” spider genus using natural history collections and “big data”. **Chris Hamilton** (chris@8legs2fangs.com)¹, Brent Hendrixson² and Jason Bond³, ¹The Univ. of Idaho, Moscow, ID, ²Millsaps College, Jackson, MS, ³Univ. of California, Davis, CA

9:35 Break

9:50 **0869** A deep learning framework for identification of North American ant genera using photographs of live and preserved specimens. **Marek Borowiec** (petiolus@gmail.com), Gabriele Valentini and Christian Rabeling, Arizona State Univ., Tempe, AZ

10:05 **SP0870** Visualizing salient features for ant identification (Hymenoptera: Formicidae): A neural network approach. **Ivana Jovicic** (ijovicic@nvidia.com)¹, Mikhail Yurasov¹, Patrick Donnelly¹ and Brian L. Fisher², ¹Nvidia, Santa Clara, CA, ²California Academy of Sciences, San Francisco, CA

10:15 **0871** Using machine learning to distinguish between and discover patterns of biodiversity in insects. **Chandra Earl** (sunray1@ufl.edu)¹, Rebecca Dikow², Paul Frandsen³, Akito Kawahara¹ and Robert Guralnick¹, ¹Univ. of Florida, Gainesville, FL, ²Smithsonian Institution, Washington, DC, ³Brigham Young Univ., Provo, UT

10:30 **0872** A new era of high-resolution taxonomy for middle American ants. **John Longino** (jacklongino@gmail.com)¹ and Michael Branstetter², ¹Univ. of Utah, Salt Lake City, UT, ²USDA - ARS, Logan, UT

10:45 **0873** Exploration of species boundaries in a trapdoor spider species complex: An integrative next-generation sequencing approach. **Nicole Garrison** (nlg0006@auburn.edu)¹, Jason Bond² and Michael Brewer³, ¹Auburn Univ., Auburn, AL, ²Univ. of California, Davis, CA, ³East Carolina Univ., Greenville, NC

11:00 **SP0874** Genomic divergence across the species boundary in *Heliconius* butterflies. **Brian Counterman** (bcounterman@biology.msstate.edu), Mississippi State Univ., Mississippi State, MS

11:10 Discussion

11:50 Concluding remarks

Member Symposium: The Unseen World Beneath Our Feet: Biology and Management of Elateridae in a Changing World

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Jacqueline Serrano¹, Lily Williams² and Wim Van Herk³, ¹Univ. of California, Riverside, CA, ²USDA - ARS, Charleston, SC, ³Agriculture and Agri-Food Canada, Agassiz, BC, Canada

8:00 Welcoming remarks

8:05 **0875** Elateridae: Classification status and biology knowledge needs. **Paul Johnson** (paul.johnson@sdstate.edu), South Dakota State Univ., Brookings, SD

8:35 **0876** Putting arable elaterids in a food web context: What do they eat and who eats them? **Michael Traugott** (michael.traugott@uibk.ac.at)¹, Christiane Zeisler¹, Claire Rotondo¹ and Corinna Wallinger^{1,2}, ¹Univ. of Innsbruck, Innsbruck, Austria, ²Austrian Academy of Sciences, Innsbruck, Austria

8:50 **0877** Feeding behavior of the corn wireworm, *Melanotus communis* (Coleoptera: Elateridae). **Ronald Cherry** (rcherry@ufl.edu) and Michael Karounos, Univ. of Florida, Belle Glade, FL

9:05 **0878** Wireworms under the Sword of Damocles: Root volatile emissions explain contrasting field and laboratory attraction in four maize varieties. **Diana la Forgia** (diana.laforgia@doct.uliege.be)¹, Frederic Francis², Georges Lognay¹, François Verheggen¹ and Jean-Baptiste Thibord³, ¹Univ. of Liege, Gembloux, Belgium, ²Gembloux Agricultural Univ., Gembloux, Belgium, ³Arvalis Institut du Végétal, Montardon, France

9:20 **0879** Microbial control of wireworms – is the active ingredient enough? **Todd Kabaluk** (todd.kabaluk@agr.gc.ca), Agriculture and Agri-Food Canada, Agassiz, BC, Canada

9:35 **SP0880** Locally adapted entomopathogenic nematodes for long-term sustainable pest management in vegetable agroecosystems. **Scott Lewins** (slewins@uvm.edu)^{1,2} and Victor Izzo¹, ¹Univ. of Vermont, Burlington, VT, ²Saint Michael’s College, Colchester, VT

9:45 **SP0881** An integrated approach to managing wireworms (Coleoptera: Elateridae) in potato fields. **Christine Noronha** (christine.noronha@agr.gc.ca), Md Habibullah Bahar and Natasha Boyle, Agriculture and Agri-Food Canada, Charlottetown, PE, Canada

9:55 Break

10:05 **0882** Trap crops and entomopathogens as biological control weapons for the management of wireworms in Montana. **Anamika Sharma** (anamika.sharma@montana.edu) and Gadi V. P. Reddy, Montana State Univ., Conrad, MT

10:20 **SP0883** Teraxxa™ insecticide seed treatment: A new product to control wireworms (Coleoptera: Elateridae) in cereals. **Mitchell Stamm** (mitchell.stamm@basf.com)¹, Lindsey Goudis², Chuck Rice¹, Sam Willingham¹, Bob Vernon³, Wim van Herk³, Aaron Esser⁴ and Rebecca Willis¹, ¹BASF Corporation, Research Triangle Park, NC, ²BASF Canada, Mississauga, ON, Canada, ³Agriculture and Agri-Food Canada, Agassiz, BC, Canada, ⁴Washington State Univ., Ritzville, WA

10:30 **0884** Phenology of *Agriotes obscurus* beetles: Modeling capture, egg maturation, and oviposition. **Wim van Herk** (vanherk@agr.gc.ca) and Bob Vernon, Agriculture and Agri-Food Canada, Agassiz, BC, Canada

MONDAY, NOVEMBER 12 / LUNDI 12 NOVEMBRE

10:45 **0885** Pheromone chemistry of Elateridae: Progress with the identification of pheromones from North American click beetles. **Jacqueline Serrano** (jserr005@ucr.edu)¹, Peter J. Landolt², Livy Williams³ and Jocelyn G. Millar¹, ¹Univ. of California, Riverside, CA, ²USDA - ARS, Wapato, WA, ³USDA - ARS, Charleston, SC

11:00 **0886** Love is in the air – identification and field evaluation of a sex pheromone component of the corn wireworm, *Melanotus communis* (Gyllenhal) (Coleoptera: Elateridae). **Livy Williams** (livy.williams@ars.usda.gov)¹, Jacqueline Serrano², Jocelyn G. Millar² and Paul Johnson³, ¹USDA - ARS, Charleston, SC, ²Univ. of California, Riverside, CA, ³South Dakota State Univ., Brookings, SD

11:15 **0887** Elaterid research: Past, present, and thoughts on the future. **Bob Vernon** (vernonbs@agr.gc.ca) and Wim van Herk, Agriculture and Agri-Food Canada, Agassiz, BC, Canada

11:45 Concluding remarks

Grad 10-min: MUVE, Mosquitoes 1

Meeting Room 217/218/219 (Convention Centre)

Moderators: Ary Faraji¹ and Mustapha Debboun², ¹Salt Lake City Mosquito Abatement District, Salt Lake City, UT, ²Harris County Public Health, Houston, TX

8:00 **0888** Disentangling the host cues used by female *Aedes aegypti* mosquitoes during close-range orientation. **Benjamin DeMasi-Sumner** (bdema001@ucr.edu) and Ring T. Cardé, Univ. of California, Riverside, CA

8:10 **0889** Mosquito diversity in the El Yunque National Forest, Puerto Rico: Effects of elevation and Hurricane Maria. **Joseph Nelsen** (joseph.nelsen@usm.edu), Nicole Scavo and Donald Yee, The Univ. of Southern Mississippi, Hattiesburg, MS

8:20 **0890** Effects of ultraviolet LED versus incandescent bulb and carbon dioxide for sampling abundance and diversity of *Culicoides* in Florida. **Kristin Sloyer** (kesloyer@ufl.edu)¹, Samantha Wisely² and Nathan Burkett-Cadena¹, ¹Univ. of Florida, Vero Beach, FL, ²Univ. of Florida, Gainesville, FL

8:30 **0891** Implicating *Culicoides* spp. (Diptera: Ceratopogonidae) vectors in the transmission of epizootic hemorrhagic disease virus in Florida. **Bethany McGregor** (bmgreg@ufl.edu)¹, Kristin Sloyer¹, Katherine Saylor², Olivia Goodfriend², Carolina Acevedo¹, Samantha Wisely² and Nathan Burkett-Cadena¹, ¹Univ. of Florida, Vero Beach, FL, ²Univ. of Florida, Gainesville, FL

8:40 **0892** Gone in 60 seconds: Impaired behavior and fecundity after exposing lab- and field-strains of *Aedes aegypti* to metofluthrin vapors. **Christopher Bibbs** (chrish89@ufl.edu)^{1,2}, Jeffrey Bloomquist², Dan Hahn², Phillip Kaufman² and Rui-De Xue¹, ¹Anastasia Mosquito Control District, St. Augustine, FL, ²Univ. of Florida, Gainesville, FL

8:50 **0893** Some physicochemical and biological properties of breeding habitat water of *Culex quinquefasciatus* (Diptera: Culicidae) mosquitoes in Dhaka City, Bangladesh. **Biplab Kumar Mandal** (bkmandalzo@gmail.com), Jagannath Univ., Dhaka, Bangladesh

9:00 **0894** Biorational products are effective spatial repellents against mosquitoes of multiple genera. **Caleb Corona** (clcorona@iastate.edu), Edmund Norris, James Klimavicz and Joel R. Coats, Iowa State Univ., Ames, IA

9:10 **0895** Mapping factors that affect the range of *Aedes aegypti*, the yellowfever mosquito, in the United States. **Nicole Mackey** (nicole.s.mackey@usm.edu) and Donald Yee, The Univ. of Southern Mississippi, Hattiesburg, MS

9:20 **0896** Diel host-seeking activity of *Culicoides sonorensis* biting midges at a southern California dairy. **Xinmi Zhang** (xzhan218@ucr.edu) and Alec Gerry, Univ. of California, Riverside, CA

9:30 **0897** Effect of temperature on the extrinsic incubation period of Zika virus in *Aedes aegypti*. **Olivia C. Winokur** (ocwinokur@ucdavis.edu), Bradley J. Main, Jay Nicholson and Christopher M. Barker, Univ. of California, Davis, CA

9:40 **0898** The effects of abscisic acid on juvenile hormone titers and the mevalonate pathway in *Anopheles stephensi*. **Dean Taylor** (tayl3660@vandals.uidaho.edu), Cassandra Olds, Brandi Torrevillas and Shirley Luckhart, Univ. of Idaho, Moscow, ID

9:50 **0899** Effects of landscape and demographic factors on West Nile virus infection in *Culex quinquefasciatus* Say (Diptera: Culicidae) in Harris County and Houston, Texas. **Karen Poh** (karenpoh@tamu.edu)¹, Oswaldo Villena², Martin Reyna³, Chris Fredregill³, Rudy Bueno¹, Mustapha Debboun³ and Gabriel Hamer¹, ¹Texas A&M Univ., College Station, TX, ²Univ. of Maryland, College Park, MD, ³Harris County Public Health, Houston, TX

Grad 10-min: PBT, Bee Health

Meeting Room 210 (Convention Centre)

Moderators: Christina Groezinger¹ and Juliana Rangel², ¹Pennsylvania State Univ., University Park, PA, ²Texas A&M Univ., College Station, TX

8:00 **0900** The effects of diet on honey bee (*Apis mellifera*) pesticide sensitivity. **Makaylee Crone** (mkc206@psu.edu)¹, Ngoc Phan¹, David Biddinger² and Christina Groezinger¹, ¹Pennsylvania State Univ., University Park, PA, ²Pennsylvania State Univ. Fruit Research and Extension Center, Biglerville, PA

8:10 **0901** Neglected stressor interactions: How do parasitic mites and neonicotinoid insecticides affect honey bee food glands? **Selina Bruckner** (szb0130@tigermail.auburn.edu), Christian Baker, Adler Salem and Geoffrey Williams, Auburn Univ., Auburn, AL

8:20 **0902** Naked bees lifting weights: The effects of pelage and induced flow on convective heat loss in hovering bumble bees (*Bombus impatiens*). **Chris Petranek** (chrispetranek@gmail.com), Tyler Berry and Michael Dillon, Univ. of Wyoming, Laramie, WY

8:30 **0903** Development of an embryo collection device for honey bee genome editing. **Jae Ho Lee** (lucanus@snu.ac.kr) and Si Hyeock Lee, Seoul National Univ., Seoul, South Korea

8:40 **0904** Active regulation of acetylcholine titer by acetylcholinesterase 1 in both neuronal and non-neuronal tissue and its function in honey bee workers. Sang Hyeon Kim and **Si Hyeock Lee** (shlee22@snu.ac.kr), Seoul National Univ., Seoul, South Korea

8:50 **0905** Adjusting analyses for body mass: Non-*Apis* bee risk assessment development using the alfalfa leafcutting bee *Megachile rotundata* (Fabricius) as a surrogate species. **Graham Ansell** (gansell@uoguelph.ca), Andrew Frewin, Angela Gradish and Cynthia Scott-Dupree, Univ. of Guelph, Guelph, ON, Canada

9:00 **0906** The scent of death: Detection mechanisms of death pheromones by honey bees. **Alison McAfee** (alison.n.mcafee@gmail.com)¹, Abigail Chapman¹, Immacolata Iovinella², Paolo Pelosi², Ylonna Gallagher-Kurtzke¹, Lufiani Madilao¹ and Leonard Foster¹, ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Univ. of Pisa, Pisa, Italy

9:10 **0907** Effects of pesticide exposure during development on the mating frequency of honey bee (*Apis mellifera* L.) queens. **Elizabeth Walsh** (walshe@tamu.edu), Mark Janowiecki, Edward Vargo and Juliana Rangel, Texas A&M Univ., College Station, TX

9:20 **0908** Larval toxicity to a field-relevant pesticide mixture compared across honey bee (*Apis mellifera*) stocks. **Joseph Milone** (jpmilone@ncsu.edu) and David Tarpy, North Carolina State Univ., Raleigh, NC

9:30 **0909** Potential exposure of honey bees to neonicotinoids in rice. **Angus Catchot III** (alc607@msstate.edu)¹, Jeff Gore², Jeffrey Harris³ and Don Cook², ¹Mississippi State Univ., Starkville, MS, ²Mississippi State Univ., Stoneville, MS, ³USDA - ARS, Baton Rouge, LA

9:40 **0910** Spillover in eusocial insects: Detection of honey bee (*Apis mellifera*) associated viruses in ants. **Alexandria Payne** (alexnpayne@gmail.com) and Juliana Rangel, Texas A&M Univ., College Station, TX

9:50 **0911** Investigating semiochemical control strategies for *Varroa destructor*, the primary pest of western honey bees. **Michael Light** (mikelight@acadiau.ca)¹, Dave Shutter¹, Chris Cutler² and Kirk Hillier¹, ¹Acadia Univ., Wolfville, NS, Canada, ²Dalhousie Univ., Truro, NS, Canada

Grad 10-min: P-IE, Behavior

Meeting Room 205 (Convention Centre)

Moderators: Monica Farfan¹ and Bruce Hibbard², ¹Clemson Univ., Charleston, SC, ²USDA - ARS, Columbia, MO

8:00 **0912** Consumptive and non-consumptive responses of an herbivore to two different predator species. **Margaret Lund** (lundmar6@msu.edu) and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

8:10 **0913** Hosts-parasitoids interactions under simulated light environments. **Précillia Cochard** (precillia.cochard.1@ulaval.ca), Tigran Galstian and Conrad Cloutier, Univ. Laval, Québec City, QC, Canada

8:20 **0914** Plasticity in host acceptance and feeding preference of the pea leaf weevil (Coleoptera: Curculionidae) in different physiological states. **Asha Wijerathna** (wijerath@ualberta.ca)¹, Héctor Cárcamo² and Maya Evenden¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

8:30 **0915** Prevalence and heritability of host preference in *Conotrachelus nenuphar* (Coleoptera: Curculionidae). **Timothy Lampasona** (timlampasona@gmail.com)¹, Anne Nielsen² and Clement Akotsen-Mensah², ¹Rutgers, The State Univ. of New Jersey, New Paltz, NY, ²Rutgers, The State Univ. of New Jersey, Bridgeton, NJ

8:40 **0916** The impacts of gall size and shape on housekeeping behavior of the gall-inducing aphid, *Tamalia coweni*. **Stephanie Parker** (sparker26@mail.csuchico.edu), California State Univ., Chico, CA

8:50 **0917** Butterfly dispersal and behavior in business-as-usual cattle grazing, conservation grazing, and native prairie management. **Samantha Bussan** (samantha.bussan@wsu.edu)¹, Sarah Hamman², Stephen Bramwell² and Cheryl Schultz¹, ¹Washington State Univ., Vancouver, WA, ²Center for Natural Lands Management, Olympia, WA, ³Washington State Univ., Lacey, WA

9:00 **0918** Interactions between host colonization and flight in the mountain pine beetle, *Dendroctonus ponderosae* Hopkins. **Kelsey Jones** (kljones1@ualberta.ca) and Maya Evenden, Univ. of Alberta, Edmonton, AB, Canada

9:10 **0919** Landing behavior of pioneer colonizing walnut twig beetles, *Pityophthorus juglandis*, in response to host and non-host volatiles in a riparian forest in northern California. **Jackson Audley** (jpaudley@ucdavis.edu)¹, Crystal Homicz¹, Richard M. Bostock¹ and Steven Seybold², ¹Univ. of California, Davis, CA, ²USDA - Forest Service, Davis, CA

9:20 **0920** Testing mate recognition through reciprocal crosses of two native populations of the whitefly *Bemisia tabaci* (Gennadius) in Australia. **Wanaporn Wongnikong** (wanaporn.wongnikong@uqconnect.edu.au)¹, Sharon van Brunschot², Paul de Barro³ and Gimme Walter¹, ¹Univ. of Queensland, Brisbane, Australia, ²Univ. of Greenwich, Kent, United Kingdom, ³CSIRO, Brisbane, Australia

Grad 10-min: P-IE, Ecology and Conservation

Meeting Room 202 (Convention Centre)

Moderators: Phil Mulder¹ and Jason Schmidt², ¹Oklahoma State Univ., Stillwater, OK, ²Univ. of Georgia, Tifton, GA

8:00 **0921** Disentangling how climate change affects a bromeliad-dwelling insect food web by combining multiple experimental approaches. **Sarah Amundrud** (amundrud@zoology.ubc.ca) and Diane S. Srivastava, The Univ. of British Columbia, Vancouver, BC, Canada

8:10 **0922** The influence of epiphytic tank bromeliads on surrounding arthropod communities through biotic habitat modification. **Pierre Rogy** (rogy@zoology.ubc.ca)¹, Diane S. Srivastava¹ and Edd Hammill², ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Utah State Univ., Logan, UT

8:20 **0923** The role of ants (Hymenoptera: Formicidae) in carrion decomposition. **Constance Lin** (clin75@tamu.edu), Micky Eubanks and Aaron Tarone, Texas A&M Univ., College Station, TX

8:30 **0924** Searching for the ground beetle's role in weed ecology. **Stefanie de Heij** (sedeheij@gmail.com), Univ. of Saskatchewan, Saskatoon, SK, Canada

8:40 **0925** Ants as biological indicators of the value of urban vacant land as a conservation habitat. **Alex Tyrpak** (tyrpak.3@buckeyemail.osu.edu)¹, Kayla I. Perry², Yvan Delgado de la Flor¹ and Mary Gardiner¹, ¹The Ohio State Univ., Columbus, OH, ²The Ohio State Univ., Wooster, OH

8:50 **0926** Biological water quality, community structure, and assessment of dragonflies and damselflies (Odonata) of Ilaramokin, Nigeria. **Babasola Adu** (williamsadubabs@yahoo.com), The Federal Univ. of Technology, Akure, Nigeria

9:00 **0927** The Siberian High causes the Pied Piper effect of *Mythimna separata* autumn migration in east Asia. **Jian Zhu** (2016202029@njau.edu.cn) and Baoping Zhai, Nanjing Agricultural Univ., Nanjing, China

9:10 **0928** Larval performance of a multivoltine generalist herbivore: Effects of diet and time. **Katherine Hernandez** (kahe3611@colorado.edu) and M. Deane Bowers, Univ. of Colorado, Boulder, CO

9:20 **0929** Assessment of oviposition behaviour and larval microhabitat location for potential reintroduction of endangered Poweshiek skipperling (*Oarisma poweshiek*) in Manitoba, Canada. **Justis Henault** (henault-j@webmail.uwinnipeg.ca) and Richard Westwood, The Univ. of Winnipeg, Winnipeg, MB, Canada

9:30 **0930** Isolation in the tallgrass prairie: Habitat of the regal fritillary (*Speyeria idalia*). Andrew Caven¹, **Kelsey King** (kelsey.king216@gmail.com)^{1,2}, Josh Wiese¹ and Emma Brinley Buckley³, ¹Crane Trust, Wood River, NE, ²Washington State Univ., Vancouver, WA, ³Univ. of Nebraska, Lincoln, NE

9:40 **0931** Do soil mitigation strategies following residential development facilitate invertebrate community recovery and ecosystem services? **Matthew Borden** (m.borden@ufl.edu), Nicole Benda and Adam Dale, Univ. of Florida, Gainesville, FL

Grad 10-min: P-IE, IPM, Field Crops 3

Meeting Room 213 (Convention Centre)

Moderators: Helen Spafford¹ and Melissa Willrich Siebert², ¹Univ. of Hawai'i, Honolulu, HI, ²Corteve Agriscience, Agriculture Division of DowDuPont, Greenville, MS

8:00 **0932** Susceptibility of the Asiatic garden beetle, *Maladera castanea*, to locally isolated entomopathogenic nematodes. **Adrian Pekarcik** (pekarcik.4@osu.edu) and Kelley Tilmon, The Ohio State Univ., Wooster, OH

8:10 **0933** The impact of tobacco thrips abundance and injury on peanut yield: Developing action thresholds for thrips management. **Pin-Chu Lai** (pclai@uga.edu), Mark R. Abney and Rajagopalbabu Srinivasan, Univ. of Georgia, Tifton, GA

8:20 **0934** Increasing grower adoption of action thresholds to manage onion thrips (*Thrips tabaci*) in onion. **Ashley Leach** (al2282@cornell.edu)¹, Christy Hoepting² and Brian A. Nault¹, ¹Cornell Univ., Geneva, NY, ²Cornell Cooperative Extension, Albion, NY

8:30 **0935** The effect of water stress on transmission and dispersal of an insect-vectored plant pathogen. **Abigail Cohen** (abigail.cohen@wsu.edu), Washington State Univ., Pullman, WA

8:40 **0936** Bottom-up effects of water stress on arthropod communities in winter wheat. **Jessica Kansman** (jtkp8b@missouri.edu) and Debbie Finke, Univ. of Missouri, Columbia, MO

8:50 **0937** Heat waves have persistent adverse effects on Colorado potato beetle (*Leptinotarsa decemlineata*) and potato (*Solanum tuberosum*). **Joshua Snook** (snookjo1@msu.edu), Zsofia Szendrei and William Wetzell, Michigan State Univ., East Lansing, MI

9:00 **0938** How does compost influence key potato pests? **Emilie Cole** (coleemi1@msu.edu), Kristin Poley, Jeff Shoemaker and Marisol Quintanilla, Michigan State Univ., East Lansing, MI

9:10 **0939** Presentation withdrawn

9:20 **0940** Wheat curl mite population dynamics in field corn and its relationship with kernel red streak formation. **Elliot Knoell** (elliottknoell@yahoo.com) and Gary Hein, Univ. of Nebraska, Lincoln, NE

9:30 **0941** Evaluating the effects of neonicotinoid seed treatments on GMO corn systems in Virginia. **Kyle Bekelja** (kbekelja@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:40 **0942** The sustainable management of insect pests of okra in two agro-ecological zones of Ghana. **Oghenetega Sunday** (sundayoghenetega1@gmail.com), Akotsen Clement, Ken Fening and David Wilson, Univ. of Ghana, Accra, Ghana

9:50 **0943** Characterizing sorghum defense responses to sugarcane aphids. **Sajjan Grover** (sajjan.grover@huskers.unl.edu)¹, Suresh Varsani¹, Scott E. Sattler² and Joe Louis¹, ¹Univ. of Nebraska, Lincoln, NE, ²USDA - ARS, Lincoln, NE

Grad 10-min: P-IE, IPM, Field Crops 4

Meeting Room 220 (Convention Centre)

Moderators: Clyde Sorenson¹ and Doug Sponsler², ¹North Carolina State Univ., Raleigh, NC, ²Pennsylvania State Univ., University Park, PA

8:00 **0944** Susceptibility of corn earworm (*Helicoverpa zea*) to Cry1A.105 and Cry2Ab2 in North and South Carolina.

Thomas Bilbo (bilbothomas@gmail.com)¹, Francis Reay-Jones¹, Dominic Reisig² and Jeremy Greene³, ¹Clemson Univ., Florence, SC, ²North Carolina State Univ., Plymouth, NC, ³Clemson Univ., Blackville, SC

8:10 **0945** The evaluation of Fortenza® seed treatment as a potential strategy to control *Bt* resistance in fall armyworm, *Spodoptera frugiperda*. **Ana Trabanino** (trabaninopino.1@buckeyemail.osu.edu)¹, Aline S. Guidolin¹, Julio Fatoreto² and Andy Michel¹, ¹The Ohio State Univ., Wooster, OH, ²Syngenta Proteção de Cultivos Ltda., São Paulo, Brazil

8:20 **0946** Characterizing life history traits of western corn rootworm, *Diabrotica virgifera virgifera* LeConte, adults after lifetime dietary exposure to SmartStax PRO®. **Jordan Reinders** (jordan.reinders3@gmail.com)¹, William Moar², Paula A. Price², Thomas Clark², Sean Evans², Graham P. Head² and Lance Meinke¹, ¹Univ. of Nebraska, Lincoln, NE, ²Monsanto Company, St. Louis, MO

8:30 **0947** Discovery and utility of single-nucleotide polymorphism (SNP) in *Sogatella furcifera* (Horváth) (Hemiptera: Delphacidae). **Hwa Yeun Nam** (jessienam@snu.ac.kr) and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

8:40 **0948** Baseline susceptibility of *Heliothis virescens* field populations to chlorantraniliprole. **Gabriel Zilnik** (glzilnik@ncsu.edu) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

8:50 **0949** Elucidating patterns of host selection in *Lygus hesperus*. **Matthew Hetherington** (mhetheringo@wisc.edu)¹ and Johanne Brunet², ¹Univ. of Wisconsin, Madison, WI, ²USDA - ARS, Madison, WI

9:00 **0950** Potential impact of climate change on the distribution and abundance of cassava-colonising *Bemisia tabaci* (Gennadius) in Africa. **Oluwatosin Aregbesola** (tosinaregbs@yahoo.com)^{1,2,3,4}, James Legg³, Ole Lund², Lene Sigsgaard², Marc Sporleder⁵, Pablo Carhuapoma⁵ and Carmelo Rapisarda¹, ¹Univ. of Catania, Catania, Italy, ²Univ. of Copenhagen, Copenhagen, Denmark, ³International Institute of Tropical Agriculture, Dar es Salaam, Tanzania, ⁴Wesley Univ., Ondo, Nigeria, ⁵International Potato Centre, Lima, Peru

9:10 **0951** Fecundity compensation: Possible in the sugarcane aphid? **Crys Wright** (cwright02@tamu.edu), Texas A&M Univ., College Station, TX

9:20 **0952** Characterization of the sugarcane aphid microbiome in the continental U.S. **Jocelyn R. Holt** (holtjocelyn@tamu.edu)¹, Jennifer White², Samuel Nibouche³, Laurent Costet³, Antonino Malacrinò⁴ and Raul F. Medina¹, ¹Texas A&M Univ., College Station, TX, ²Univ. of Kentucky, Lexington, KY, ³CIRAD - INRA, Saint-Pierre, France, ⁴Linköping Univ., Linköping, Sweden

9:30 **0953** Differential transcriptome expression between two North American Russian wheat aphid biotypes. **Catherine Stewart** (clstewart01@ksu.edu)¹, Erin Scully², Laramy Enders³ and C. Michael Smith¹, ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS, ³Purdue Univ., West Lafayette, IN

9:40 **0954** Plant defense against aphids: Role of *Arabidopsis* acyl-coenzyme A desaturase-like2 (ADS2) gene. **Kaitlin Chapman** (karmit.chapman@gmail.com) and Joe Louis, Univ. of Nebraska, Lincoln, NE

9:50 **0955** Baseline susceptibility to afidopyropen of soybean aphid (Hemiptera: Aphididae) from the north central United States. **Obiratanea da Silva Queiroz** (oqueiroz@umn.edu)¹, Teresia Nyoike² and Robert Koch¹, ¹Univ. of Minnesota, St. Paul, MN, ²BASF Corporation, Research Triangle Park, NC

Grad 10-min: P-IE, Pollinator Health

Meeting Room 215/216 (Convention Centre)

Moderators: John Adamczyk¹ and Colin Morrison², ¹USDA - ARS, Poplarville, MS, ²Smithsonian Tropical Research Institute, Panama City, Panama

8:00 **0956** Field-level fungicide exposure to honey bees (*Apis mellifera*) during orchard bloom in Michigan. **Jacquelyn Albert** (albertj9@msu.edu) and Julianna Wilson, Michigan State Univ., East Lansing, MI

8:10 **0957** The effects of climate change on plants, pollinators, and their associated microorganisms. **Kaleigh Russell** (kruss002@ucr.edu) and Quinn McFrederick, Univ. of California, Riverside, CA

8:20 **0958** Microbial relationships with pollinator host under stress from environmental toxins. **Laura Leger** (llege001@ucr.edu), Univ. of California, Lawndale, CA

8:30 **0959** Climate change, mistimed flowering phenology, and bee-pollinator losses in Guanacaste, Costa Rica. **Theresa Wolanin** (twolani1@kent.edu), Kent State Univ., North Canton, OH

8:40 **0960** The impact of heavy metals on native bees: How the byproducts of urbanization affect the common eastern bumble bee, *Bombus impatiens*. **Sarah Scott** (scott.2094@osu.edu), Frances S. Sivakoff and Mary Gardiner, The Ohio State Univ., Columbus, OH

8:50 **0961** Functional traits of wild bees predict pathogen prevalence. Sally Compton, Scott McArt, Heather Grab and **Laura Figueroa** (lff44@cornell.edu), Cornell Univ., Ithaca, NY

9:00 **0962** Do solitary and social bees respond in the same way to stressors in agroecosystems? **Mary Centrella** (mlc344@cornell.edu)¹, Katja Poveda¹, Bryan N. Danforth¹, Ashley Fersch¹, Nicolas Baert¹, Brian D. Eitzer², Maria van Dyke¹, Katalin Böröczky¹ and Scott McArt¹, ¹Cornell Univ., Ithaca, NY, ²Connecticut Agricultural Experiment Station, New Haven, CT

9:10 **0963** Detecting bumble bee pathogens (*Apicystis bombi*, *Crithidia* spp., and *Nosema* spp.) in native and managed bumble bees (*Bombus* spp.) in the Canadian prairies. **Kirsten Palmier** (palmieki@uregina.ca)^{1,2}, Andrew Cameron¹ and Cory Sheffield², ¹Univ. of Regina, Regina, SK, Canada, ²Royal Saskatchewan Museum, Regina, SK, Canada

9:20 **0964** Quantification of the sensitivity and communication responses in high and low-grooming honey bees (*Apis mellifera*) against the parasite *Varroa destructor*. **Derek Micholson** (derek.micholson@gmail.com) and Rob Currie, Univ. of Manitoba, Winnipeg, MB, Canada

9:30 **0965** Assessing the effects of fluctuating temperature regimes on *Bombus* queen lipid stores and content. **Thuy Tien Lindsay** (tien1438@gmail.com)¹, James Strange², Joseph P. Rinehart³ and Karen Kapheim¹, ¹Utah State Univ., Logan, UT, ²USDA - ARS, Logan, UT, ³USDA - ARS, Fargo, ND

9:40 **0966** Impact of agricultural intensity and landscape structure on *Bombus impatiens* colonies in southern Québec. **Amélie Gervais** (amelie.gervais.3@ulaval.ca)¹, Valérie Fournier¹ and Marc Bélisle², ¹Univ. Laval, Québec City, QC, Canada, ²Univ. de Sherbrooke, Sherbrooke, QC, Canada

9:50 **0967** *Varroa* mite impacts on queen bee quality in the Hawaiian Islands. **Lauren Rusert** (lrrusert@ncsu.edu)¹, Jeffery Pettis² and David Tarpay¹, ¹North Carolina State Univ., Raleigh, NC, ²Univ. of Bern, Bern, Switzerland

10:00 **0968** *Varroa destructor* feeds primarily on honey bee fat body tissue and not hemolymph. **Samuel Ramsey** (insectious@gmail.com)¹, Connor J. Gulbranson², Joseph Mowery², Gary R. Bauchan², Ronald Ochoa², Allen C. Cohen², Joseph M. Cicero⁴, James Ellis⁵ and Dennis vanEngelsdorp¹, ¹Univ. of Maryland, College Park, MD, ²USDA - ARS, Beltsville, MD, ³North Carolina State Univ., Raleigh, NC, ⁴Univ. of Arizona, Tucson, AZ, ⁵Univ. of Florida, Gainesville, FL

Grad 10-min: P-IE, Pollinators 2

Meeting Room 214 (Convention Centre)

Moderators: Christina Mogren¹ and Sam Houston Wilson², ¹Univ. of Hawai'i, Honolulu, HI, ²Univ. of California, Parlier, CA

8:00 **0969** Use of phylogenetic diversity as an aid in wild bee conservation. **Katherine Odanaka** (katherine.odanaka14@alumni.colostate.edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

8:10 **0970** How many pollinators does it take to make an apple (*Malus pumila* Mill.)? A disconnect between pollinator effectiveness and fruit set Jamie Staver¹, **Charlie Bailey** (charliep.bailey@yahoo.ca)², Lindsey Kirkland¹ and Romina Rader¹, ¹Univ. of New England, Armidale, Australia, ²Univ. of Regina, Regina, SK, Canada

8:20 **0971** Toward validation of acoustic monitoring of seasonal pollinator diversity. **Elizabeth Hedrick** (elizabeth.hedrick001@my.lincolnu.edu) and David Heise, Lincoln Univ., Jefferson City, MO

8:30 **0972** Response of pests and pollinators to multiple routes of insecticide exposure across adjacent cropping systems. **Jacob Pecenka** (jacob.pecenka@gmail.com), Rick Foster, Laura Ingwell, Christian Krupke and Ian Kaplan, Purdue Univ., West Lafayette, IN

8:40 **0973** Pollinator preference to ornamental plant varieties. **Emily Erickson** (ere6@psu.edu)¹, Harland Patch¹, Sinclair Adam², Victoria Agatha Wojcik³ and Christina M. Grozinger¹, ¹Pennsylvania State Univ., University Park, PA, ²Pennsylvania State Univ., Lebanon, PA, ³Univ. of California, Oakland, CA

8:50 **0974** The canola-pollinator relationships of eastern Washington and northern Idaho. **Rachel Olsson** (rachel.olsson@wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

9:00 **0975** The impact of arthropods on pollination and fruit set of 'Keitt' mangoes. **Matthew Quenaudon** (mquenaudon@ufl.edu), Jonathan H. Crane, Alejandra Canon, Mariane Ruvieri and Daniel Carrillo, Univ. of Florida, Homestead, FL

9:10 **0976** Integrated pest and pollinator management: Evaluating grower practices and insect communities on commercial watermelon farms. **John Ternest** (jternest@purdue.edu), Laura Ingwell, Ian Kaplan and Rick Foster, Purdue Univ., West Lafayette, IN

9:20 **0977** Temporal and spatial dynamics of pollinator communities across North Carolina agroecosystems. **Hannah Levenson** (hklevens@ncsu.edu) and David Tarpy, North Carolina State Univ., Raleigh, NC

9:30 **0978** Dancing bees communicate foraging preferences in row crop production systems. **Mary Silliman** (sillimanmr@vt.edu)¹, Sally Taylor¹, Roger Schurch² and Margaret Couvillon², ¹Virginia Polytechnic Institute and State Univ., Suffolk, VA, ²Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:40 **0979** Mixing regionally-distinct populations of blue orchard bees, *Osmia lignaria*, to understand development, emergence, and reproductive success. **Morgan Dunn** (morgan.dunn@aggiemail.usu.edu)¹, Diane G. Alston¹, Theresa Pitts-Singer² and Stephen Peterson³, ¹Utah State Univ., Logan, UT, ²USDA - ARS, Logan, UT, ³Foothills Bee Ranch, Visalia, CA

9:50 **0980** Acoustics of honey bee swarming. **Barukh Rohde** (barukh94-school@yahoo.com)¹, Charles Stuhl² and Richard Mankin², ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Gainesville, FL

Grad 10-min: P-IE, Stink Bugs

Meeting Room 204 (Convention Centre)

Moderators: Arthur Agnello¹ and Louis Hesler², ¹Cornell Univ., Geneva, NY, ²USDA - ARS, Brookings, SD

8:00 **0981** Survival, feeding, and life cycle completion by *Halyomorpha halys* on common plant species of Florida using choice and no-choice tests. **Arjun Khadka** (akhadka@ufl.edu) and Amanda Hodges, Univ. of Florida, Gainesville, FL

8:10 **0982** Exploiting migration behavior as a novel control tactic for stink bugs. **Adrian Marshall** (atmarshall@wsu.edu) and Betsy Beers, Washington State Univ., Wenatchee, WA

8:20 **0983** Differential attraction of brown marmorated stink bug adults to various growth stages of sunflower. **Warren Wong** (warrenwong89@gmail.com)¹, Paul Abram², Regine Gries¹ and Gerhard Gries¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Agriculture and Agri-Food Canada, Agassiz, BC, Canada

8:30 **0984** Brown marmorated stink bug feeding damage on tart cherry in Utah. **Zachary Schumm** (zach.schumm@aggiemail.usu.edu), Diane G. Alston and Lori R. Spears, Utah State Univ., Logan, UT

8:40 **0985** Exploiting more cues: Comparing parasitism of brown marmorated stink bug, *Halyomorpha halys* (Stål), sentinel egg masses utilizing different deployment strategies in Pennsylvania fruit orchards. **Hillary Peterson** (hjm5194@psu.edu)¹, Jared Ali¹ and Greg Krawczyk², ¹Pennsylvania State Univ., University Park, PA, ²Pennsylvania State Univ., Biglerville, PA

8:50 **0986** Prevalence of *Nosema maddoxi* in *Halyomorpha halys* populations in eastern and western U.S. **Carrie Preston** (cp597@cornell.edu)¹, Ann E. Hajek¹ and Arthur Agnello², ¹Cornell Univ., Ithaca, NY, ²Cornell Univ., Geneva, NY

9:00 **0987** Host plant effects on seasonal captures of *Halyomorpha halys* in Virginia. **Whitney Hadden** (wthadden@vt.edu)¹, Tracy C. Leskey² and Chris Bergh¹, ¹Virginia Polytechnic Institute and State Univ., Winchester, VA, ²USDA - ARS, Kearneysville, WV

9:10 **0988** Effects of aggregation lure and tree species on *Halyomorpha halys* (Stål) oviposition. **Adam Formella** (adam4@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

9:20 **0989** Characterizing natural enemy communities in Minnesota apple orchards to determine potential for biological control of *Halyomorpha halys*. **Hailey Shanovich** (shano004@umn.edu) and Robert Koch, Univ. of Minnesota, St. Paul, MN

9:30 **0990** Competition among *Trissolcus* wasps for egg masses of native and invasive stink bugs. **Krista De Cooke** (nich0452@msu.edu) and Ernest Delfosse, Michigan State Univ., East Lansing, MI

9:40 **0991** Early studies on the need for brown stink bug, *Euschistus servus*, management in southeastern Virginia maize. **Tim Bryant** (btim2@vt.edu), Virginia Polytechnic Institute and State Univ., Suffolk, VA

Grad 10-min: SysEB

Meeting Room 221/222 (Convention Centre)

Moderator: Jennifer Zaspel, Purdue Univ., West Lafayette, IN

8:00 **0992** Going native: Aphid colonization of South America. **Megan Licht** (meg.licht@aggiemail.usu.edu)¹, Juan M. Nieto Nafria², Jaime Ortego³ and Carol von Dohlen¹, ¹Utah State Univ., Logan, UT, ²Univ. de Leon, Leon, Spain, ³INTA, Mendoza, Argentina

8:10 **0993** Systematics and evolution of the genus *Notomicrus* (Adephaga: Noteridae: Notomicrinae). **Stephen Baca** (s953b810@ku.edu) and Andrew Short, The Univ. of Kansas, Lawrence, KS

8:20 **0994** Vertebrate scavenger access to mass mortality events impacts associated arthropod community structure. **Samantha Sawyer** (s1sawyer@tamu.edu)¹, Brandon Barton², Marcus Lashley², Heather Jordan² and Jeffery Tomberlin¹, ¹Texas A&M Univ., College Station, TX, ²Mississippi State Univ., Mississippi State, MS

8:30 **0995** Evidence of positive selection within the agricultural pest the Colorado potato beetle, *Leptinotarsa decemlineata*, relative to non-pest *Leptinotarsa* species. **Zachary Cohen** (zcohen3@wisc.edu)¹, Sean Schoville¹ and Yolanda Chen², ¹Univ. of Wisconsin, Madison, WI, ²Univ. of Vermont, Burlington, VT

8:40 **0996** A life in the web: Tracing the evolution of spider associated thread-legged assassin bugs (Emesinae: Reduviidae). **Samantha Smith** (samantha.gysler.smith@gmail.com)¹, Dimitri Forero², Junxia Zhang¹ and Christiane Weirauch¹, ¹Univ. of California, Riverside, CA, ²Pontificia Univ. Javeriana, Bogota, Colombia

8:50 **0997** Estimating dispersal of the endangered Karner blue butterfly (*Lycaeides melissa samuelis*). **Nicholas Dorian** (nicholas.dorian@tufts.edu)¹, Heidi Holman² and Elizabeth Crone¹, ¹Tufts Univ., Medford, MA, ²New Hampshire Fish and Game Dept., Concord, NH

9:00 **0998** Taxonomic review of the tribe Mirini Hahn (Heteroptera: Miridae) from the Korean Peninsula. **Minsuk Oh** (ary364@snu.ac.kr)¹, Tomohide Yasunaga², Ram Keshari Duwal³ and Seunghwan Lee¹, ¹Seoul National Univ., Seoul, South Korea, ²American Museum of Natural History, New York, NY, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

9:10 **0999** Presentation withdrawn

9:20 **1000** Revised classification of the sack-bearer moths (Lepidoptera: Mimallonoidea). **Ryan St Laurent** (rstlaurent@flmnh.ufl.edu), Chris Hamilton and Akito Kawahara, Univ. of Florida, Gainesville, FL

9:30 **1001** The effects of timber harvest on Lyme disease (*Borrelia burgdorferi*) prevalence in Maine. **Christine Conte** (christine.conte@maine.edu)¹ and Allison Gardner², ¹Univ. of Maine, Old Town, ME, ²Univ. of Maine, Orono, ME

9:40 **1002** Searching for transgenerational bacterial inoculation in the desert locust. **Omer Lavy** (omer.lavy@gmail.com)¹, Amir Ayali¹, Eran Gefen² and Uri Gophna¹, ¹Tel Aviv Univ., Tel Aviv, Israel, ²Univ. of Haifa-Oranim, Kiryat Tivon, Israel

9:50 **1003** Do *Rickettsiella* symbionts manipulate reproduction of a linyphiid spider? **Laura Rosenwald** (laura.rosenwald@uky.edu) and Jennifer White, Univ. of Kentucky, Lexington, KY

10:00 **1004** Investigating the effect of temperature variation on symbiont-based protection in aphids. **Clesson Higashi** (clessonh@uga.edu) and Kerry M. Oliver, Univ. of Georgia, Athens, GA

10:10 **1005** Will climate change trigger a developmental trap for a native multivoltine butterfly (*Pieris oleracea*)? **Natalie Kerr** (natalie.kerr@tufts.edu) and Elizabeth Crone, Tufts Univ., Medford, MA

Grad 10-min: SysEB, Beetles

Meeting Room 301 (Convention Centre)

Moderator: Ann Ray, Xavier Univ., Cincinnati, OH

8:00 **1006** Notes on developmental stages and nidification of some common scarabs (Coleoptera: Scarabaeoidea: Scarabaeidae) of India. **Suvarna Khadakkar** (suvarnask17@gmail.com)¹, Ashish Tiple² and Arun Khurad¹, ¹Rashtrasant Tukadoji Maharaj Nagpur Univ., Nagpur, India, ²Rashtrasant Tukadoji Maharaj Nagpur Univ., Wardha, India

8:10 **1007** Population genetics of an invasive ambrosia beetle species complex in southern California. **Christine Dodge** (cdodg001@ucr.edu) and Richard Stouthamer, Univ. of California, Riverside, CA

8:20 **1008** Multigene phylogeny uncovers oviposition-related evolutionary history of Cerambycinae (Coleoptera: Cerambycidae). **Seunghyun Lee** (chiyark@snu.ac.kr) and Seunghwan Lee, Seoul National Univ., Seoul, South Korea

8:30 **1009** Insights into the evolution of the desert stink beetles: Combining phylogenomics and phenotypes (Coleoptera: Tenebrionidae: Amphidorini). **M. Andrew Johnston** (ajohnston@asu.edu)¹, Kojun Kanda² and Aaron Smith², ¹Arizona State Univ., Tempe, AZ, ²Northern Arizona Univ., Flagstaff, AZ

8:40 **1010** Continuing illumination of South American ambrosia beetle (Coleoptera: Curculionidae: Scolytinae) diversity and their fungal associates. **Rachel Osborn** (rachelkosborn@gmail.com)¹, Michelle Jusino², Craig Bateman³ and Anthony Cognato⁴, ¹Michigan State Univ., Okemos, MI, ²USDA - Forest Service, Madison, WI, ³Univ. of Florida, Gainesville, FL, ⁴Michigan State Univ., East Lansing, MI

8:50 **1011** A review of the Neotropical Anopidiina (Coleoptera: Tenebrionidae) with description of a new Greater Antilles genus and six new species. **Erich Spiessberger** (anopidiina@gmail.com) and Michael Ivie, Montana State Univ., Bozeman, MT

9:00 **1012** Generic delimitation and phylogeny of Edrotini (Coleoptera: Tenebrionidae): Preliminary findings from targeted enrichment and morphology. **Christopher Wirth** (christophercwirth@gmail.com)¹, Kojun Kanda¹, Rolf Aalbu² and Aaron Smith¹, ¹Northern Arizona Univ., Flagstaff, AZ, ²California Academy of Sciences, San Francisco, CA

9:10 **1013** Insights in the biogeography, and evolution of a Mesoamerican montane group of beetles: Molecular phylogeny of the tribe Proculini Kaup (Coleoptera: Passalidae). **Cristian Beza-Beza** (cfbeza@memphis.edu) and Duane McKenna, Univ. of Memphis, Memphis, TN

9:20 **1014** Phylogeny and reclassification of the water scavenger beetle subfamily Acidocerinae (Coleoptera: Hydrophilidae). **Jennifer C. Girón** (jcgiron@ku.edu) and Andrew Short, The Univ. of Kansas, Lawrence, KS

9:30 **1015** Phylogeny and evolution of feeding behaviors in sap beetles (Coleoptera: Cucujoidea: Nitidulidae). **Gareth Powell** (garethpowell@byu.edu)¹, Andrew R. Cline², Michael F. Whiting¹ and Seth M. Bybee¹, ¹Brigham Young Univ., Provo, UT, ²California Dept. of Food and Agriculture, Sacramento, CA

9:40 **1016** Presentation withdrawn

Grad 10-min: SysEB, Morphology

Meeting Room 302/303 (Convention Centre)

Moderator: David Furth, Smithsonian Institution, Washington, DC

8:00 **1017** Form follows phylogeny? Insights into *Crematogaster* ant evolution by combining micro-CT and geometric morphometrics. **Julian Katzke** (julian.katzke@oist.jp)¹, Nicholas Friedman¹, Francisco Hita-Garcia¹, Georg Fischer¹, Bonnie Blaimer², Brian L. Fisher³ and Evan Economo¹, ¹Okinawa Institute of Science and Technology, Okinawa, Japan, ²North Carolina State Univ., Raleigh, NC, ³California Academy of Sciences, San Francisco, CA

8:10 **1018** Morphometrics of *Helicoverpa armigera* (Hübner), *Helicoverpa zea* (Boddie), and their F1 hybrids. **Dario Trujillo** (dario.trujillo@upr.edu)¹, Fernando Rodrigues da Silva², Jose Carlos Rodrigues¹ and Todd Gilligan³, ¹Univ. de Puerto Rico, San Juan, PR, ²Univ. of Florida, Homestead, FL, ³USDA - APHIS, Fort Collins, CO

8:20 **1019** Propulsion in Gomphidae (Odonata): A comparative study of morphology and mechanics. **Emily Sandall** (els22@psu.edu), István Mikó and Andrew Deans, Pennsylvania State Univ., University Park, PA

8:30 **1020** Connecting the pieces: Evolution of genitalia in Peiratinae (Heteroptera: Reduviidae). **Stephanie Castillo** (scast032@ucr.edu) and Christiane Weirauch, Univ. of California, Riverside, CA

8:40 **1021** Morphology and distribution of female *Trissolcus basalís* (Hymenoptera: Scelionidae) antennal sensilla. **Kendall King** (king.2488@osu.edu), The Ohio State Univ., Columbus, OH

8:50 **1022** Uncovering extreme allometries in the weevil *Brentus anchorago* (Linnaeus, 1758). **Salvatore Anzaldo** (sanzaldo@asu.edu)¹, Ummat Somjee², Peter Marting¹ and Christina Painting³, ¹Arizona State Univ., Tempe, AZ, ²Univ. of Florida, Gainesville, FL, ³Univ. of Auckland, Auckland, New Zealand

9:00 **1023** Ecomorph evolution: Multiple origins of the Papua New Guinea tree lobsters. **Yelena M. Pacheco** (yelena.marlese@gmail.com)¹, Sven Bradler², James A. Robertson³ and Michael F. Whiting¹, ¹Brigham Young Univ., Provo, UT, ²Georg August Univ., Göttingen, Germany, ³USDA - APHIS, Beltsville, MD

9:10 **1024** What shrinks ants? Identifying what modulates morphology along environmental gradients **François Brassard** (francois.brassard.3@ulaval.ca), Concordia Univ., Montréal, QC, Canada

9:20 **1025** Combining fossils and molecules to infer relationships among odonates. **Robert J. Erickson** (robert.j.erickson@byu.edu)¹, Seth Bybee¹, John C. Abbott², Adolfo Cordero-Rivera³, Klaas-Douwe Dijkstra⁴, Vincent Kalkman⁴ and Jessica Ware⁵, ¹Brigham Young Univ., Provo, UT, ²Univ. of Alabama, Tuscaloosa, AL, ³Univ. de Vigo, Pontevedra, Spain, ⁴Naturalis Biodiversity Center, Leiden, Netherlands, ⁵Rutgers, The State Univ. of New Jersey, Newark, NJ

9:30 **1026** Decoding the life history from winged jaguars found in museum collections. **Jose Martinez** (joemartinez@ufl.edu)¹, Jackie Miller¹ and Christian Schmidt², ¹Univ. of Florida, Gainesville, FL, ²Agriculture and Agri-Food Canada, Ottawa, ON, Canada

9:40 **1027** Description of the last larval instar of *Pyrractomena galeata* Olivier, 1899 (Coleoptera: Lampyridae). **Krystal Ashman** (krystalash93@gmail.com), Oliver Keller and Marc Branham, Univ. of Florida, Gainesville, FL

9:50 **1028** The occurrence of externalized mating plugs in butterflies (Lepidoptera: Papilionoidea) and their role in sexual coevolution. **Ana Paula Carvalho** (acarvalho@ufl.edu)¹, Albert Orr² and Akito Kawahara¹, ¹Univ. of Florida, Gainesville, FL, ²Griffith Univ., Nathan, Australia

Grad 10-min: SysEB, Social Insects

Meeting Room 224 (Convention Centre)

Moderator: M. Alma Solis, USDA - ARS, Washington, DC

8:00 **1029** Brain gene expression patterns in a facultatively social bee in the earliest stages of social evolutionary transition. **Wyatt Shell** (was2000@wildcats.unh.edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

8:10 **1030** The discovery of a novel organ system in termites (*Amitermes* sp.). **Megan M. Wilson** (meywilson@yahoo.com), Rutgers, The State Univ. of New Jersey, Newark, NJ

8:20 **1031** The distribution of *Reticulitermes* subterranean termites in the state of Georgia. **Allison Johnson** (ajohns14@uga.edu)¹, Jim Chase² and Brian T. Forschler¹, ¹Univ. of Georgia, Athens, GA, ²Terminix, GA

8:30 **1032** Vitellogenin and the genetic regulation of honey bee behavior. **Gyan Harwood** (gyan.harwood@asu.edu)¹, Christine Elisk² and Gro Amdam¹, ¹Arizona State Univ., Tempe, AZ, ²Univ. of Missouri, Columbia, MO

8:40 **1033** Honey bee (*Apis mellifera*) viral loads after exposure to waxborne viruses. **Megan Colwell** (colwellm@myumanitoba.ca)¹, Stephen Pernal² and Rob Currie¹, ¹Univ. of Manitoba, Winnipeg, MB, Canada, ²Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

8:50 **1034** Factors contributing to mimetic fidelity in North American bumble bees. **Briana Ezray** (bde125@psu.edu), Drew Wham, Carrie Hill and Heather Hines, Pennsylvania State Univ., University Park, PA

9:00 **1035** The role of the gut microbiome in the range of Formicidae. **Amanda Hale** (ahale004@ucr.edu), Univ. of California, Irvine, CA

9:10 **1036** The origin of castes in social insects: Examining the Diapause Ground Plan Hypothesis in bumble bees. **Erin Treanore** (ezt5142@psu.edu), Jacklyn Kiner, Mackenzie Kerner and Etya Amsalem, Pennsylvania State Univ., University Park, PA

9:20 **1037** Preliminary characterization of male morphology in the Leptanillinae (Hymenoptera: Formicidae) for phylogenetic inference. **Zachary Griebenow** (zgriebenow@ucdavis.edu)¹, Georg Fischer² and Evan Economo², ¹Univ. of California, Davis, CA, ²Okinawa Institute of Science and Technology, Okinawa, Japan

9:30 **1038** The weird eusociality of polyembryonic things: What we can learn from parasite societies. **Brian Whyte** (ba.whyte@berkeley.edu), Univ. of California, El Cerrito, CA

9:40 **1039** Effects of host colony size and hygiene behaviors on social spider kleptoparasite loads along an elevation gradient. **Samantha Straus** (straus@zoology.ubc.ca) and Leticia Aviles, The Univ. of British Columbia, Vancouver, BC, Canada

Grad 10-min: SysEB, Speciation

Meeting Room 304/305 (Convention Centre)

Moderator: Crystal Maier, Field Museum of Natural History, Chicago, IL

8:00 **1040** Phylogeny of the genus *Rhagoletis* (Diptera: Tephritidae): Relationships of species groups. **Daniel Hulbert** (hulbertd@msu.edu)¹, Valery Korneyev² and Jim Smith¹, ¹Michigan State Univ., East Lansing, MI, ²I. I. Schmalhausen Institute of Zoology, Kyiv, Ukraine

8:10 **1041** Genomic differentiation during speciation-with-gene-flow: Comparing life history and geographic variation within and across species in the *Rhagoletis pomonella* complex. **Meredith Doellman** (mdoellma@nd.edu)¹, Katherine Inskeep¹, Thomas Powell², Scott Egan³, Gregory Ragland⁴, Peter Meyers¹, Glen Hood³, James Smith⁵, Stewart Berlocher⁶ and Jeffrey Feder¹, ¹Univ. of Notre Dame, South Bend, IN, ²Binghamton Univ., Binghamton, NY, ³Rice Univ., Houston, TX, ⁴Univ. of Colorado, Denver, CO, ⁵Michigan State Univ., East Lansing, MI, ⁶Univ. of Illinois, Champaign, IL

8:20 **1042** The basis of the olfactory preference behavior initiating sympatric divergence of the apple maggot fly, *Rhagoletis pomonella*. **Cheyenne Tait** (ctait@nd.edu)¹, Hinal Kharva², Marco Schubert³, Daniel Kritsch⁴, Jeffrey Feder¹ and Shannon Olsson², ¹Univ. of Notre Dame, South Bend, IN, ²National Centre for Biological Sciences, Bangalore, India, ³Free Univ., Berlin, Germany, ⁴Max Planck Institute for Chemical Ecology, Jena, Germany

8:30 **1043** *Wolbachia* induced post-zygotic isolation among allopatric populations of *Rhagoletis cingulata* and *Rhagoletis indifferens*. **Daniel Bruzzese** (dbruzzese@nd.edu)¹, Hannes Schuler², Mary Glover¹ and Jeffrey Feder¹, ¹Univ. of Notre Dame, South Bend, IN, ²Free Univ., Bozen-Bolzano, Italy

8:40 **1044** Revision of *Paralobesia* (Lepidoptera: Tortricidae). **Hanna Royals** (hroyals@gmail.com)¹ and Todd Gilligan², ¹Colorado State Univ., Fort Collins, CO, ²USDA - APHIS, Fort Collins, CO

8:50 **1045** The role of temporal isolation in maintaining species boundaries between spruce budworms (Lepidoptera: Tortricidae). **Tyler Nelson** (tdnelson@ualberta.ca) and Felix Sperling, Univ. of Alberta, Edmonton, AB, Canada

9:00 **1046** Assessing species boundaries of crescent butterflies (Nymphalidae: *Phyciodes*) in Alberta using DNA. **Brittany Wingert** (bwingert@ualberta.ca), Erin Campbell, John Acorn and Felix Sperling, Univ. of Alberta, Edmonton, AB, Canada

9:10 **1047** Comparative phylogenetic test of escape and radiate. **Chloe Kaczvinsky** (cak0052@tigermail.auburn.edu) and Nate Hardy, Auburn Univ., Auburn, AL

9:20 **1048** Historical phylogeography and assessment of species boundaries in the *Speyeria hesperis/atlantidis* complex (Lepidoptera: Nymphalidae). **Erin Campbell** (eocampbe@ualberta.ca) and Felix Sperling, Univ. of Alberta, Edmonton, AB, Canada

9:30 **1049** Delimiting species of *Orasema* (Hymenoptera: Eucharitidae) using phased allele anchored hybrid enrichment data. **Austin Baker** (bakerau73@gmail.com) and John M. Heraty, Univ. of California, Riverside, CA

9:40 **1050** Museum barcoding: Uncovering new species of Darnini (Hemiptera: Membracidae). **Laura Gonzalez** (laura.gonzalez@rutgers.edu) and Jessica Ware, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:50 **1051** Mechanisms underlying host shift in *Drosophila mojavensis*. **Amber Crowley-Gall** (a.crowleygall@gmail.com), Mary Shaw, John E. Layne and Stephanie M. Rollmann, Univ. of Cincinnati, Cincinnati, OH

Grad 10-min: SysEB, Wasps and Bees

Meeting Room 306 (Convention Centre)

Moderator: Bryan N. Danforth, Cornell Univ., Ithaca, NY

8:00 **1052** Young brood modulates egg-laying behavior in workers of the bumble bee *Bombus impatiens*. **Jesse Starkey** (jas1374@psu.edu), Ahja Brown and Etya Amsalem, Pennsylvania State Univ., University Park, PA

8:10 **1053** Macho Megaspilidae: How males hold the key to revising *Conostigmus* spp. (Hymenoptera: Megaspilidae) of the nearctic. **Carolyn Trietsch** (carolyntrietsch@gmail.com), István Mikó and Andrew Deans, Pennsylvania State Univ., University Park, PA

8:20 **1054** Combining transcriptomes and ultraconserved elements to illuminate the phylogeny of Apidae. **Silas Bossert** (sb2346@cornell.edu)¹, Elizabeth Murray¹, Eduardo Almeida², Sean Brady³, Bonnie Blaimer⁴, Sophie Cardinal⁵ and Bryan N. Danforth¹, ¹Cornell Univ., Ithaca, NY, ²Univ. de São Paulo, São Paulo, Brazil, ³Smithsonian Institution, Washington, DC, ⁴North Carolina State Univ., Raleigh, NC, ⁵Agriculture and Agri-Food Canada, Ottawa, ON, Canada

8:30 **1055** Chemical fertility signaling in a flexibly eusocial insect. **Callum Kingwell** (callumkingwell@gmail.com)¹ and William Wcislo², ¹Cornell Univ., Ithaca, NY, ²Smithsonian Tropical Research Institute, Panama City, Panama

8:40 **1056** The revising and simplifying of Cirrospilini (Hymenoptera: Eulophidae), a tribe of economically vital parasitoid wasps, and its implications for the systematics of potential biological control agents. **Ryan Perry** (rperry003@ucr.edu), Univ. of California, Riverside, CA

8:50 **1057** Tree cover and climate impacts on North American Megachilidae biodiversity. **Lindsie McCabe** (lma243@nau.edu), Northern Arizona Univ., Flagstaff, AZ

9:00 **1058** The first phylogeny for the *Bembix* sand wasps. **Jeremy Frank** (jfrank@amnh.org), American Museum of Natural History, New York, NY

9:10 **1059** Biogeography of Mutillidae (Hymenoptera) from the Brazilian Cerrado. **Cecilia Vieira** (ceciliavieira@icloud.com)¹, James Pitts¹ and Guarino Colli², ¹Utah State Univ., Logan, UT, ²Univ. de Brasília, Brasília, Brazil

9:20 **1060** Morphology of the host-seeking first instar larva of *Stylops advarians* (Strepsiptera), a parasitic insect attacking *Andrena milwaukeensis* (Hymenoptera) in Saskatchewan. **Zach Balzer** (zach.balzer@usask.ca) and Arthur Davis, Univ. of Saskatchewan, Saskatoon, SK, Canada

9:30 **1061** Reproductive partitioning in polygynous, perennial *Vespula pensylvanica* colonies. **Madison Sankovitz** (madisonsankovitz@gmail.com) and Jessica Purcell, Univ. of California, Riverside, CA

9:40 **1062** Morphological phylogeny of colletine bees (Hymenoptera: Colletidae: Colletinae). **Rafael Ferrari** (raf_ferrari@hotmail.com), Thomas Onuferko and Laurence Packer, York Univ., Toronto, ON, Canada

9:50 **1063** Movement behavior as a metric of habitat quality for nest searching bumble bees (*Bombus* spp.). **Genevieve Pugsek** (genevieve.pugsek@tufts.edu) and Elizabeth Crone, Tufts Univ., Medford, MA

Workshop: Story Circles Demo Day with Randy Olson

Meeting Room 201 (Convention Centre)

Moderator and Organizer: Randy Olson, Scientist-Turned-Filmmaker, Los Angeles, CA

9:00 AM - 12:00 PM

Grad 10-min: MUVE, Mosquitoes 2

Meeting Room 217/218/219 (Convention Centre)

Moderators: Nicole L. Achee¹ and Kristen Healy², ¹Univ. of Notre Dame, South Bend, IN, ²Louisiana State Univ., Baton Rouge, LA

10:10 **1064** Exploring the localization of biodegradable nanoparticles in *Aedes aegypti*. **Edmund Norris** (ejnorris@iastate.edu), Iowa State Univ., Ames, IA

10:20 **1065** Endectocide susceptibility of *Anopheles albimanus*, a Central American vector, in a laboratory and field setting. **Staci Dreyer** (staci.dreyer@und.edu)¹, Kelsey Morin¹, Marla Magaña², Marie Pott², Donovan Leiva², Nicole L. Achee³, John Grieco³ and Jefferson Vaughan¹, ¹Univ. of North Dakota, Grand Forks, ND, ²Belize Vector and Ecology Center, Orange Walk Town, Belize, ³Univ. of Notre Dame, South Bend, IN

10:30 **1066** Socio-ecological perspectives on mosquito ecology in residential neighborhoods. **Allison Parker** (aparker9@illinois.edu) and Brian F. Allan, Univ. of Illinois, Champaign, IL

10:40 **1067** Carryover effect of two selected larvicidal botanicals (*Azadirachta indica* and *Jatropha curcas*) on emerged *Anopheles gambiae* sl mosquitoes in Accra Metropolis, Ghana. **Abundance Osaretin** (osaretinabundance@gmail.com), Fred Aboagye-Antwi, Seth Gbewonyo and Delphina-Adabie Gomez, Univ. of Ghana, Accra, Ghana

10:50 **1068** The mosquito mycobiome is diverse and distinct from its larval environment. **Patil Tawidian** (patilt@ksu.edu), Kristin Michel and Ari Jumpponen, Kansas State Univ., Manhattan, KS

11:00 **1069** Born to be bad: Zika vertical transmission in *Aedes aegypti*. **Genevieve Comeau** (genvcomeau@gmail.com), Univ. of Arizona, Tucson, AZ

11:10 **1070** 20-hydroxyecdysone (20E) activates mosquito cellular immunity and limits *Plasmodium* ookinete survival. **Rebekah Reynolds** (rebekahr@iastate.edu), Hyeogsun Kwon and Ryan Smith, Iowa State Univ., Ames, IA

11:20 **1071** Transmission risk of Zika virus by mosquito vector populations from Florida. **Rebecca Zimler** (razimler@ufl.edu) and Barry Alto, Univ. of Florida, Vero Beach, FL

11:30 **1072** Mark-release-recapture of irradiated male *Aedes aegypti* in northern Florida as part of a sterile insect technique control program. **Robert Aldridge** (robert.aldridge@ars.usda.gov)¹, Jedediah Kline¹, Seth Britch¹, Christopher Bibbs², Molly Clark², Daniel Dixon², Rui-De Xue², Dan Hahn³ and Kenneth J. Linthicum¹, ¹USDA - ARS, Gainesville, FL, ²Anastasia Mosquito Control District, St. Augustine, FL, ³Univ. of Florida, Gainesville, FL

11:40 **1073** Presentation withdrawn

11:50 **1074** Temperature influence on insecticide resistance in *Aedes aegypti* and *Aedes albopictus* mosquitoes from south Texas. **Wendy Westerheide** (wendysalinas22@hotmail.com), Teresa Feria and Christopher Vitek, Univ. of Texas, Edinburg, TX

12:00 **1075** Temperature effects on Zika virus dissemination in *Aedes aegypti* mosquitoes. **Ileana Lozano** (ileana.lozano01@utrgv.edu), John Thomas and Christopher Vitek, Univ. of Texas, Edinburg, TX

12:10 **1076** Sperm modification explains female fertility and reproductive behavior in the mosquito *Aedes aegypti*. **Ethan Degner** (ecd77@cornell.edu) and Laura Harrington, Cornell Univ., Ithaca, NY

12:20 **1077** Molecular and physiological characterization of inward rectifying potassium (Kir) channels expressed in the *Drosophila* neural systems. **Rui Chen** (rchen@agcenter.lsu.edu) and Daniel Swale, Louisiana State Univ., Baton Rouge, LA

Grad 10-min: MUVE, Social Insects

Meeting Room 214 (Convention Centre)

Moderators: Nan-Yao Su¹ and Edward Vargo², ¹Univ. of Florida, Davie, FL, ²Texas A&M Univ., College Station, TX

10:10 **1078** Opportunities for termite invasions: Introductions of exotic termites to the USA based on port-of-entry data. **Alexander Blumenfeld** (alex93@tamu.edu) and Edward Vargo, Texas A&M Univ., College Station, TX

10:20 **1079** Addition of exuviae to incipient *Coptotermes gestroi* (Wasmann) colonies increases biomass gained in a nitrogen-poor environment. **Reina Tong** (reinat@ufl.edu) and Nan-Yao Su, Univ. of Florida, Davie, FL

10:30 **1080** Colony age-dependent variation in cuticular hydrocarbon profiles and its impacts on recognition in termite primary reproductives (*Coptotermes gestroi*). **Johnalyn Gordon** (johnalynmgordon@ufl.edu) and Thomas Chouvenc, Univ. of Florida, Davie, FL

10:40 **1081** Fused colonies as alternative materials for laboratory experiments with subterranean termites. **Sang-Bin Lee** (lsb5162@ufl.edu), Daniel Aguilera-Olivares, Aaron Mullins, Thomas Chouvenc and Nan-Yao Su, Univ. of Florida, Davie, FL

10:50 **1082** The influence of soldiers on tunneling behavior of *Reticulitermes* spp. (Isoptera: Rhinotermitidae). **Mark Janowiecki** (janowiecki@tamu.edu) and Edward Vargo, Texas A&M Univ., College Station, TX

11:00 **1083** *Coptotermes gestroi* (Wasmann) and *Coptotermes formosanus* Shiraki (Blattodea: Rhinotermitidae) hybrids harbor an integrated protozoan community composed of protozoa from both parental communities. **Joseph Velenovsky** (jvelen10@ufl.edu)¹, Francesca De Martini², Thomas Chouvenc¹, Gillian Gile² and Nan-Yao Su¹, ¹Univ. of Florida, Davie, FL, ²Arizona State Univ., Tempe, AZ

11:10 **1084** Nitrogen fixation across termite lineages and diets. **Aaron Mullins** (amull81@ufl.edu) and Nan-Yao Su, Univ. of Florida, Davie, FL

11:20 **1085** Characterization of microbial communities outside and within subterranean termite colonies. **Carlos Aguerro** (cague001@tamu.edu)¹, Tawni L. Crippen² and Edward Vargo¹, ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, College Station, TX

11:30 **1086** Synthetic trail pheromone enhances recruitment of nestmates to food baits in the invasive European fire ant, *Myrmica rubra*. **Danielle Hoefele** (danielle_hoefele@sfu.ca), Jaime Chalissery, Regine Gries and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada

11:40 **1087** Chemical distress cry for help: Alarm communication in the western carpenter ant, *Camponotus modoc*. **Asim Renyard** (asim_renyard@sfu.ca), Regine Gries and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada

11:50 **1088** Transcriptome analysis in *Nylanderia fulva* under varying diets to improve colony growth and identification of RNAi target genes. **Fabian List** (fabian.list@tamu.edu), Joan King, Andrew Davitt, Edward Vargo and Aaron Tarone, Texas A&M Univ., College Station, TX

12:00 **1089** Genetic variation in the ghost ant, *Tapinoma melanocephalum* (F.), based on microsatellite analysis. **Christopher Scocco** (chris.scocco@ufl.edu), Brian Bahder, Ericka Helmick and Rudolf Scheffrahn, Univ. of Florida, Fort Lauderdale, FL

12:10 **1090** Genotypes of bacteria and host drive specificity of colonization in a bumble bee and gut symbiont system. **Logan Sauers** (lsauers@ilstu.edu) and Ben Sadd, Illinois State Univ., Normal, IL

Grad 10-min: PBT, Crop Pests

Meeting Room 210 (Convention Centre)

Moderators: Andy Michel¹ and Vaughn Walton², ¹The Ohio State Univ., Wooster, OH, ²Oregon State Univ., Corvallis, OR

10:10 **1091** Evaluation of chemoreceptor genes as potential targets for *Diabrotica virgifera virgifera* management. **Mariana Sanchez** (mariana.sanchez@huskers.unl.edu)¹, Joe Louis¹, Arnubio Valencia², Blair Siegfried³ and Ana Vélez¹, ¹Univ. of Nebraska, Lincoln, NE, ²Univ. de Caldas, Manizales, Colombia, ³Univ. of Florida, Gainesville, FL

10:20 **1092** *Drosophila* microbiome-dependent functions: More than the sum of its parts? **John McMullen** (jgm263@cornell.edu) and Angela E. Douglas, Cornell Univ., Ithaca, NY

10:30 **1093** Genetic mechanisms underlying desiccation resistance in desert fruit flies. **Zinan Wang** (wangzina@msu.edu)¹, Jian Pu¹, Mei Luo² and Henry Chung¹, ¹Michigan State Univ., East Lansing, MI, ²Jiangxi Agricultural Univ., Nanchang, China

10:40 **1094** Colour sensitivity and preference of spotted-wing drosophila (*Drosophila suzukii*). **Catherine Little** (clittle@mun.ca)¹, Ana Rizzato², Lise Charbonneau², Tom Chapman¹ and Kirk Hillier², ¹Memorial Univ. of Newfoundland, St. John's, NF, Canada, ²Acadia Univ., Wolfville, NS, Canada

10:50 **1095** Insecticide efficacy on *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae) immature stages and population modeling. **Serhan Mermer** (mermers@oregonstate.edu)¹, Ferdinand Pfab², Rufus Isaacs³, Philip Fanning³, Steven Van Timmeren³, Gregory Loeb⁴, Stephen P. Hesler⁴, Ashfaq Sial⁵, Jamal Hunter⁵, Harit K. Bal⁶, Francis A. Drummond⁷, Elissa S. Ballman⁷, Judith A. Collins⁷ and Vaughn Walton¹, ¹Oregon State Univ., Corvallis, OR, ²Trento Univ., Trento, Italy, ³Michigan State Univ., East Lansing, MI, ⁴Cornell Univ., Geneva, NY, ⁵Univ. of Georgia, Athens, GA, ⁶Association of Indian Entomologists in North America, Chesterfield, MO, ⁷Univ. of Maine, Orono, ME

11:00 **1096** Impact of bacterial endosymbiont on free amino acid levels in brown marmorated stink bug. **Priyanka Mittapelly** (mittapelly.1@buckeyemail.osu.edu), Larry Phelan and Andy Michel, The Ohio State Univ., Wooster, OH

11:10 **1097** *Lippia adoensis* essential oil: An effective insecticide for the management of molecular resistance in *Callosobruchus maculatus* (F.) (Coleoptera: Chrysomelidae). **Mazarin Akami** (makami1987@gmail.com)^{1,2}, Njintang Y. Nicolas², Andongma A. Awawing¹, Chen Zhengzhong¹, Changying Niu¹ and Elias N. Nukenine², ¹Huazhong Agricultural Univ., Wuhan, China, ²Univ. of Ngaoundere, Ngaoundere, Cameroon

11:20 **1098** Distribution, host plants and infestation levels of *Trioxa erytrae* (Hemiptera: Triozidae) in Kenya: New observations and attempts to outline risk of spread in citrus production areas. **Akua Antwi-Agyakwa** (aagyakwa@icipe.org)¹, Owusu Aidoo², Sunday Ekesi¹, Chrysantus Tanga¹, Mamoudou Sétamou³, Brenda Rasowo¹, Ivan Rwomushana⁴, Jackson Kimani¹, Samira Mohamed¹, Fathiya Khamis¹ and Christian Borgemeister², ¹International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya, ²Univ. of Bonn, Bonn, Germany, ³Texas A&M Univ., Weslaco, TX, ⁴CABI, Nairobi, Kenya

11:30 **1099** Roles of whitefly vitellogenin in the transmission of tomato yellow leaf curl virus. **Ya-Zhou He** (heyazhou@zju.edu.cn), Tian-Yan Yin, Yu-Meng Wang, Xiao-Wei Wang and Shu-Sheng Liu, Zhejiang Univ., Hangzhou, China

11:40 **1100** Characterization of sublethal effects of diamides on fall armyworm (*Spodoptera frugiperda*). **Emily Reinders** (emily.stricklin1@gmail.com), Terence A. Spencer, Dariane Souza, Jennifer Williams, Troy Anderson and Ana Véllez, Univ. of Nebraska, Lincoln, NE

11:50 **1101** Behavioral, physiological, and transcriptomic responses to cadmium in the Asian corn borer, *Ostrinia furnacalis*. **Mei Luo** (luomei@msu.edu)¹, Jian Pu², Zinan Wang², Hongmei Cao¹, Henry Chung² and Hongyi Wei¹, ¹Jiangxi Agricultural Univ., Nanchang, China, ²Michigan State Univ., East Lansing, MI

Grad 10-min: P-IE, Biocontrol, General 2

Meeting Room 202 (Convention Centre)

Moderators: Thomas Phillips¹ and Tolulope Morawo², ¹Kansas State Univ., Manhattan, KS, ²Auburn Univ., Auburn, LA

10:10 **1102** Comprehensive meta-analysis of endophytic, entomopathogenic *Beauveria bassiana* to cause insect mortality. **Shalini Yerukala** (syerukal@vols.utk.edu) and Bonnie Ownley, Univ. of Tennessee, Knoxville, TN

10:20 **1103** Effects of insecticides on lady beetles and insidious pirate bugs. **Carlos Esquivel** (esquivelpalma.1@buckeyemail.osu.edu)¹, Bill Hendrix², Andy Michel¹ and Luis Cañas¹, ¹The Ohio State Univ., Wooster, OH, ²Dow AgroSciences, Indianapolis, IN

10:30 **1104** The impact of habitat quality on the generalist predator *Coccinella septempunctata*. **Crystal Almdal** (cdalmdal@gmail.com) and Alejandro Costamagna, Univ. of Manitoba, Winnipeg, MB, Canada

10:40 **1105** Do cover crops structure natural enemy communities and trophic interactions in cotton agroecosystems? **Carson Bowers** (carson.bowers@uga.edu)¹, Michael Toews¹, Julia Gaskin² and Jason Schmidt¹, ¹Univ. of Georgia, Tifton, GA, ²Univ. of Georgia, Athens, GA

10:50 **1106** Investigating the possible host shift of *Teleonemia scrupulosa* between *Lantana camara* and *Myoporum stellatum*. **Dominique Zarders** (dreg@hawaii.edu)¹, Jesse Eiben¹, Jolene Sutton¹ and Tracy Johnson², ¹Univ. of Hawai'i, Hilo, HI, ²USDA - Forest Service, Volcano, HI

11:00 **1107** Larval host-plant species influences development and survival of viral infection in *Anartia jatrophae* (Lepidoptera: Nymphalidae). **Nadya Muchoney** (nmuchoney@nevada.unr.edu)¹, M. Deane Bowers², Adrian L. Carper² and Angela Smilanich¹, ¹Univ. of Nevada, Reno, NV, ²Univ. of Colorado, Boulder, CO

11:10 **1108** Targeting adult click beetles with the entomopathogenic fungus *Metarhizium brunneum*: Is it effective and are there reproductive trade-offs? **Kari Zurowski** (kari_zurowski@sfu.ca)¹, Jenny Cory¹, Todd Kabaluk² and Alida F. Janmaat³, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Agriculture and Agri-Food Canada, Agassiz, BC, Canada, ³Univ. of the Fraser Valley, Abbotsford, BC, Canada

11:20 **1109** Potential use of local strains of entomopathogenic fungus to control the coconut rhinoceros beetle, *Oryctes rhinoceros*, on Oahu, Hawai'i. **Mason Russo** (russomas@hawaii.edu)¹, Zhiqiang Cheng¹, Jing Li², Matthew Kellar¹ and Kelsey Mitsuda¹, ¹Univ. of Hawai'i, Honolulu, HI, ²Hebei Agricultural Univ., Hebei Sheng, China

11:30 **1110** Pest management tactics have seasonal impacts on the biological control potential of entomopathogenic fungi. **Lindsay Fennell** (lff39@cornell.edu)¹, John Tooker² and Kyle Wickings¹, ¹Cornell Univ., Geneva, NY, ²Pennsylvania State Univ., University Park, PA

11:40 **1111** Using native biological control bacteria and fungi for the management of an insect pest and fungal pathogens in stored grain. **Gülçin Ercan** (glcn.ercan@gmail.com)¹, Anthony Adesemoye² and Julie Peterson², ¹Univ. of Nebraska, Lincoln, NE, ²Univ. of Nebraska, North Platte, NE

11:50 **1112** Effects of bean seed treatment by the entomopathogenic fungi *Metarhizium robertsii* and *Beauveria bassiana* on plant growth, spider mite populations, and behavior of predatory mite. **Fernanda Canassa** (canassa.fe@gmail.com)^{1,2}, Susanna Tall², Rafael Moral³, Italo Delalibera¹ and Nicolai Meyling², ¹Univ. de São Paulo, Piracicaba, Brazil, ²Univ. of Copenhagen, Copenhagen, Denmark, ³Maynooth Univ., Maynooth, Ireland

12:00 **1113** Presentation withdrawn

12:10 **1114** Effect of integrating the entomopathogenic fungus, *Beauveria bassiana*, and the rove beetle, *Dalotia coriaria*, in suppressing western flower thrips, *Frankliniella occidentalis*, populations under greenhouse conditions. **Yinping Li** (yinpingli@ksu.edu) and Ray Cloyd, Kansas State Univ., Manhattan, KS

Grad 10-min: P-IE, Biocontrol, Parasitoids

Meeting Room 205 (Convention Centre)

Moderators: G. David Buntin¹ and Michael S. Crossley², ¹Univ. of Georgia, Griffin, GA, ²Univ. of Wisconsin, Madison, WI

10:10 **1115** Parasitoids of fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae), in Ethiopia. **Birhanu Amare** (birhanusay291@gmail.com), Addis Ababa Univ., Addis Ababa, Ethiopia

10:20 **1116** An investigation of *Caligula japonica* Moore (Lepidoptera: Saturniidae) egg distribution and its parasitoids on walnut trees (*Juglans regia* L.) in northwestern China. **Yong-Ming Chen** (595875334@qq.com) and Lian-Sheng Zang, Jilin Agricultural Univ., Changchun, China

10:30 **1117** Trapping *Trissolcus japonicus* in Virginia: Seasonal phenology and patch size effects. **Nicole Quinn** (quinni01@vt.edu)¹, Elijah Talamas², Tracy Leskey³ and Chris Bergh¹, ¹Virginia Polytechnic Institute and State Univ., Winchester, VA, ²Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ³USDA - ARS, Kearneysville, WV

10:40 **1118** Does plant defense variability affect development of a polyembryonic parasitoid? **Ryan Paul** (rlpaul@rams.colostate.edu)¹, Ian Pearse² and Paul Ode¹, ¹Colorado State Univ., Fort Collins, CO, ²US Geological Survey, Fort Collins, CO

10:50 **1119** Shedding UV-light on brood guarding parasitoids. **Mathilde Gaudreau** (mathilde.gaudreau@umontreal.ca)¹, Paul Abram² and Jacques Brodeur¹, ¹Univ. de Montréal, Montréal, QC, Canada, ²Agriculture and Agri-Food Canada, Agassiz, BC, Canada

11:00 **1120** Symbiotic polydnavirus of a parasitoid manipulates caterpillar and plant immunity. **Ching-Wen Tan** (czt5069@psu.edu), Michelle Peiffer and Gary Felton, Pennsylvania State Univ., University Park, PA

11:10 **1121** Effect of overwintering on emergence, fecundity, and reproduction of *Spathius agrili* and *Spathius galinae*, two parasitoids of emerald ash borer. **Max Ragazzino** (maxri@vt.edu)¹, Jian Duan² and Scott Salom¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²USDA - ARS, Newark, DE

11:20 **1122** Infestation by parasitized larvae affects attraction of the parasitoid *Microplitis croceipes* to cotton: Avoidance of superparasitism? **Basu Kafle** (bzk0055@auburn.edu), Tolulope Morawo and Henry Fadamiro, Auburn Univ., Auburn, AL

11:30 **1123** Range of *Cotesia flavipes* field parasitism of sugarcane borer. **Rafael Ferreira Santos** (rsdosantos.rs@gmail.com)¹, Caroline De Bortoli², Dagmara Ramalho³, Josy Santos⁴, Mailson Vitalli Pires⁴, Alessandra Marieli Vacari⁵ and Sergio De Bortoli¹, ¹Univ. Estadual Paulista, Jaboticabal, Brazil, ²The Univ. of Tennessee, Knoxville, TN, ³Univ. de São Paulo, Ribeirão Preto, Brazil, ⁴Usina São Martinho, Pradópolis, Brazil, ⁵Univ. de Franca, Franca, Brazil

11:40 **1124** Distribution of rice stem borers and their parasitoid in irrigated lowland rice ecosystems in the Kilombero Valley, Morogoro, Tanzania. **Bonaventure January** (bojatetesh@gmail.com), Sokoine Univ. of Agriculture, Morogoro, Tanzania

11:50 **1125** A wasp's quest: Dynamic modeling of an egg parasitoid life cycle. **Julie Augustin** (julie.augustin4@gmail.com)^{1,2}, Gaétan Bourgeois², Jacques Brodeur¹ and Guy Boivin², ¹Univ. de Montréal, Montréal, QC, Canada, ²Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada

12:00 **1126** Conservation biological control, pollinator enhancement, and soil biological activity for agriculture from native Australian plants. **Sunita Pandey** (supandey@csu.edu.au)^{1,2} and Geoff Gurr^{1,2,3}, ¹Charles Sturt Univ., Orange, Australia, ²Graham Centre for Agricultural Innovation, Wagga Wagga, Australia, ³Fujian Agriculture and Forestry Univ., Fuzhou, China

12:10 **1127** Where are the parasitoids of *Cephus cinctus* in Colorado? **Erika Peirce** (epeirce@rams.colostate.edu)¹, Tatyana Rand², Scott Haley¹, Darren Cockrell¹, Paul Ode¹ and Frank Peairs¹, ¹Colorado State Univ., Fort Collins, CO, ²USDA - ARS, Sidney, MT

12:20 **1128** Virus innexin expression in insect hosts disrupts cellular physiology and host fitness. **Peng Zhang** (pzhang2@clemson.edu) and Matthew Turnbull, Clemson Univ., Clemson, SC

Grad 10-min: P-IE, Host Plant Resistance and Preference

Meeting Room 213 (Convention Centre)

Moderators: Katelyn Kesheimer¹ and Lanka Srinivas², ¹Texas A&M Univ., Lubbock, TX, ²Louisiana State Univ. AgCenter, Baton Rouge, LA

10:10 **1129** Furanocoumarin detoxification in *Depressaria radiella* and *Depressaria depressana* (Lepidoptera: Oecophoridae). **Charles-Antoine Dean** (cedean2@illinois.edu) and May Berenbaum, Univ. of Illinois, Champaign, IL

10:20 **1130** Previous generation herbivory and maternal plant inbreeding influence *Manduca sexta* performance on horsenettle (*Solanum carolinense*) offspring. **Chad Nihranz** (ctn118@psu.edu) and Andrew Stephenson, Pennsylvania State Univ., University Park, PA

10:30 **1131** Effect of host foliage on the movement behavior of larvae of gypsy moth (*Lymantria dispar*). **Jacob Wittman** (wittm094@umn.edu) and Brian Aukema, Univ. of Minnesota, St. Paul, MN

10:40 **1132** Intraspecific competition shapes evolutionary trajectories of resistance to insect defoliation in forest stands. **Olivia Cope** (ocope@wisc.edu), Ken Keefover-Ring, Eric Kruger and Richard L. Lindroth, Univ. of Wisconsin, Madison, WI

10:50 **1133** Evaluation of alfalfa cultivars for potential management of clover root curculio (Coleoptera: Curculionidae). **Kaitlin Rim** (krim19@aggiemail.usu.edu) and Ricardo A. Ramirez, Utah State Univ., Logan, UT

11:00 **1134** The noisy buffet: How crop phylogenetic relatedness affects insect abundance. **Angela Coco** (amc604@psu.edu)¹, Ian Kaplan² and John Tooker¹, ¹Pennsylvania State Univ., University Park, PA, ²Purdue Univ., West Lafayette, IN

11:10 **1135** A metabolomics approach to better understand soybean aphid (*Aphis glycines*) adaptation to aphid-resistant soybean. **Ashley Yates** (yates.229@buckeyemail.osu.edu), Andy Michel and Joshua Blakeslee, The Ohio State Univ., Wooster, OH

11:20 **1136** Interactive effects of predators and host plant resistance on sugarcane aphids in sorghum. **Jeremy Hewlett** (jhewl@tamu.edu)¹, Apuleyo Yanez¹, MacKenzie Kjeldgaard¹, Ada Szczepaniec² and Micky Eubanks¹, ¹Texas A&M Univ., College Station, TX, ²Texas A&M Univ., Amarillo, TX

11:30 **1137** Singlet oxygen as a signaling molecule for aphid resistance. **Hillary Fischer** (hillfisch@gmail.com) and Fiona L. Goggin, Univ. of Arkansas, Fayetteville, AR

11:40 **1138** Crop defense diversity influences the predator-prey interaction between an insect pest and a biocontrol predator. **Kayleigh Hauri** (haurikay@msu.edu) and William Wetzels, Michigan State Univ., East Lansing, MI

11:50 **1139** The role of endophytic fungi in plant resistance and tolerance to herbivorous pests. **Leah Buchman** (lwb43@tamu.edu), Gregory Sword and Julio S. Bernal, Texas A&M Univ., College Station, TX

12:00 **1140** Reduction in the movement and dispersal capacity of immature stages of *Trogoderma variabile* (Coleoptera: Dermestidae) after exposure to long-lasting insecticide netting. **Rachel Wilkins** (rachwilk15@gmail.com)¹ and Rob Morrison², ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS

12:10 **1141** Presentation withdrawn

12:20 **1142** The effect of insecticidal and mycorrhizal seed treatments on rice growth and yield. **Lina Bernaola** (lbernaola@agcenter.lsu.edu) and Mike Stout, Louisiana State Univ., Baton Rouge, LA

Grad 10-min: P-IE, Turf and Horticulture

Meeting Room 204 (Convention Centre)

Moderators: Joshua Temple¹ and Jessica Warwick², ¹Corteva Agriscience, Agriculture Division of DowDuPont, Bradenton, FL, ²Univ. of Missouri, Columbia, MO

10:10 **1143** Understanding mechanisms of imidacloprid failure for control of white grubs in turfgrass. **Andrew Huling** (aih5334@psu.edu), Pennsylvania State Univ., University Park, PA

10:20 **1144** Microbially mediated resistance to pyrethroids in the annual bluegrass weevil, *Listronotus maculicollis* (Kirby). **Garrett Price** (gyp5046@psu.edu), Pennsylvania State Univ., University Park, PA

10:30 **1145** Impact of co-infection of tomato yellow leaf curl virus and tomato yellow leaf curl China virus on transmission by *Bemisia tabaci*. **Feixue Ban** (banfeixue@zju.edu.cn), Yin-Quan Liu, Shu-Sheng Liu and Xiao-Wei Wang, Zhejiang Univ., Hangzhou, China

10:40 **1146** Management of Tomato chlorotic spot virus and its vector thrips in tomatoes of south Florida. **Rafia Khan** (rkhan@ufl.edu)¹, Dakshina Seal¹, Oscar Liburd², Rajagopalbabu Srinivasan³ and Shouan Zhang¹, ¹Univ. of Florida, Homestead, FL, ²Univ. of Florida, Gainesville, FL, ³Univ. of Georgia, Tifton, GA

10:50 **1147** Global gene regulation in tomato plant (*Solanum lycopersicum*) responding to vector (*Bactericera cockerelli*) feeding and pathogen (*Candidatus Liberibacter solanacearum*) infection. **Ordor Brian Huot** (obhuot@ncsu.edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX

11:00 **1148** Use of models to predict efficacy of *Lygus hesperus* population mitigation factors in California strawberries. **Emily Bick** (enbick@ucdavis.edu), Univ. of California, Davis, CA

11:10 **1149** Evaluating onion volatiles as a potential deterrent in a push-pull strategy for the carrot weevil. **Emily Justus** (justus.67@osu.edu) and Elizabeth Long, The Ohio State Univ., Wooster, OH

11:20 **1150** Evaluating the impact of two herbivores on Brazilian pepper, *Schinus terebinthifolia*. **Kristen Bowers** (kebowers@ufl.edu), Eutyechus M. Kariuki and Carey Minter, Univ. of Florida, Fort Pierce, FL

11:30 **1151** Impact of natural habitat on trophic cascade strength in a broccoli system. **Olivia Smith** (olivia.m.smith@wsu.edu), Joseph Taylor and William Snyder, Washington State Univ., Pullman, WA

11:40 **1152** Phenology of *Erythroneura comes* (Hemiptera: Cicadellidae) in Oklahoma vineyards. **Kevin Jarrell** (kevin.jarrell@okstate.edu), Eric Rebeck, Kris Giles and Astri Wayadande, Oklahoma State Univ., Stillwater, OK

11:50 **1153** Occurrence of potato taste defect in coffee and its relations with insect management. **Joseph Bigirimana** (bigjos2200@gmail.com) and Larry Gut, Michigan State Univ., East Lansing, MI

12:00 **1154** The importance of insect herbivore density to induced metabolite blends in tea plants (*Camellia sinensis*) and implications for tea quality. **Eric Scott** (eric.scott@tufts.edu)¹, Ji-Peng Wei², Nicole Kfoury¹, Wen-Yan Han², Albert Robbat¹ and Colin M. Orians¹, ¹Tufts Univ., Medford, MA, ²Chinese Academy of Agriculture Sciences, Hangzhou, China

Grad 10-min: P-IE, Vectors of Plant Diseases

Meeting Room 220 (Convention Centre)

Moderators: Lisa Neven¹ and Gunbharpur Gill², ¹USDA - ARS, Wapato, WA, ²Utah State Univ., Logan, UT

10:10 **1155** Evaluating the non-consumptive effects of predators on aphid-borne plant viruses. **Benjamin Lee** (benjamin.w.lee@wsu.edu) and David Crowder, Washington State Univ., Pullman, WA

10:20 **1156** Effects of host plants on acquisition and inoculation of a *Begomovirus* by its vector, *Bemisia tabaci*. **Saurabh Gautam** (sg37721@uga.edu)¹, Bhabesh Dutta¹, Timothy Coolong¹, James Buck² and Rajagopalbabu Srinivasan¹, ¹Univ. of Georgia, Tifton, GA, ²Univ. of Georgia, Griffin, GA

10:30 **1157** Development and feeding behavior of *Trialeurodes vaporariorum* (Westwood) (Hemiptera: Aleyrodidae) as affected by potato yellow vein disease in potato plants. **Diego Vasquez** (dvasquezm@corpoica.org.co) and Diego Rincon, Corporacion colombiana de investigación agropecuaria, Mosquera, Colombia

10:40 **1158** '*Candidatus Liberibacter solanacearum*' infection negatively impacts the photosynthetic rate of the potato host and respiration rate of its vector, *Bactericera cockerelli* (Hemiptera: Trioziidae). **Regina Karin Cruzado Gutierrez** (cruz8967@vandals.uidaho.edu)¹, Xi Liang¹, Nilsa A. Bosque-Pérez² and Arash Rashed², ¹Univ. of Idaho, Aberdeen, ID, ²Univ. of Idaho, Moscow, ID

10:50 **1159** Reduced intracellular immune response of potato psyllids, *Bactericera cockerelli*, to '*Candidatus Liberibacter solanacearum*' in the gut interface. **Xiaotian Tang** (tangxt@tamu.edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX

11:00 **1160** *Xyleborus bispinatus*: A potential vector of the laurel wilt pathogen in avocados. What do we know so far? **Octavio Menocal** (omenocal18@ufl.edu), Luisa Cruz and Daniel Carrillo, Univ. of Florida, Homestead, FL

11:10 **1161** Insights into the evolution of bark beetle life histories: The alder bark beetle and its association with a *Neonectria* canker pathogen. **Debra Wertman** (wertmandebra@gmail.com) and Allan Carroll, The Univ. of British Columbia, Vancouver, BC, Canada

11:20 **1162** Areas of macroscopic damage caused by western flower thrips (*Frankliniella occidentalis*) exhibit greater cellular damage and promote *Salmonella enterica* populations. **Victoria Lason** (lason@wisc.edu), Matthew Maurice, Russell Groves and Jeri Barak, Univ. of Wisconsin, Madison, WI

11:30 **1163** Dispersal of wheat curl mite from virus-infected wheat. **Lindsay Overmyer** (overmyerlindsay@gmail.com) and Gary Hein, Univ. of Nebraska, Lincoln, NE

11:40 **1164** Evaluating acquisition and transmission capabilities of dipteran vectors of fire blight (*Erwinia amylovora*). **Matthew Boucher** (mtb245@cornell.edu), Kerik Cox and Gregory Loeb, Cornell Univ., Geneva, NY

11:50 **1165** Survey of auchenorrhynchan insects and determination of putative vector(s) of lethal bronzing disease. **De-Fen Mou** (defenmou@ufl.edu) and Brian Bahder, Univ. of Florida, Fort Lauderdale, FL

12:00 **1166** Geographic variation in microbial associates of the aster leafhopper, *Macrosteles quadrilineatus* (Hemiptera: Cicadellidae), a vector of aster yellows phytoplasma. **Shannon Piper** (sbpiper@wisc.edu)¹, Anna Graniero², Justin Clements¹, Marjorie Garcia¹, Lee Brady² and Russell Groves¹, ¹Univ. of Wisconsin, Madison, WI, ²Illumina, Madison, WI

Grad 10-min: SysEB, Ants

Meeting Room 306 (Convention Centre)

Moderator: Bernice DeMarco, Smithsonian Institution, Washington, DC

10:10 **1167** Ant species diversity in *Cucurbita* crop fields, their role in *Cucurbita* crop systems, and their exposure to pesticides. **Aaron Fairweather** (fairweaa@uoguelph.ca), Nigel Raine and Jonathan Schmidt, Univ. of Guelph, Guelph, ON, Canada

10:20 **1168** Who you are and where you've been: Transcriptional effects of supergenotype and developmental environment in the fire ant, *Solenopsis invicta*. **Samuel Arsenault** (sva@uga.edu)¹, Joan King², Sasha Kay³, Kip Lacy¹, Kenneth Ross¹ and Brendan Hunt³, ¹Univ. of Georgia, Athens, GA, ²Texas A&M Univ., College Station, TX, ³Univ. of Georgia, Griffin, GA

10:30 **1169** Unsaturated cuticular hydrocarbons and venom alkaloids are both essential components of queen supergene pheromone in the red imported fire ant. **Haolin Zeng** (hz92146@uga.edu) and Kenneth Ross, Univ. of Georgia, Athens, GA

10:40 **1170** The ontogeny of collective personality in the western harvester ant, *Pogonomyrmex occidentalis*. **Maya Reese** (mjreese@uh.edu) and Blaine J. Cole, Univ. of Houston, Houston, TX

10:50 **1171** Determining the role of ants as monarch butterfly (*Danaus plexippus* L.) egg predators in Michigan grasslands using exclusion experiments and camera monitoring. **Andrew Myers** (myersan7@msu.edu) and Douglas A. Landis, Michigan State Univ., East Lansing, MI

11:00 **1172** The evolution of the acorn ants, genus *Temnothorax* (Hymenoptera: Formicidae). **Matthew Prebus** (mprebus@gmail.com), Univ. of California, Davis, CA

11:10 **1173** Sugar is an ant's best friend: Testing food web theory predictions in invasive ants. **MacKenzie Kjeldgaard** (mkjeldgaard@tamu.edu) and Micky Eubanks, Texas A&M Univ., College Station, TX

11:20 **1174** Ant response to bacterial exposure and antimicrobial ability. **Omar Halawani** (ohalawa@ncsu.edu)¹, Adrian A. Smith² and Robert Dunn¹, ¹North Carolina State Univ., Raleigh, NC, ²North Carolina Museum of Natural Sciences, Raleigh, NC

11:30 **1175** The influence of an odorous tropical canopy ant, *Azteca trigona*, on forest odor composition and heterospecific ant behaviors. **Rachel Wells** (r.ann.wells@gmail.com), Christopher Frost and Stephen Yanoviak, Univ. of Louisville, Louisville, KY

11:40 **1176** A comparative assessment of endogenous viruses throughout ant genomes. **Peter Flynn** (pflynn@uchicago.edu)¹ and Corrie Moreau², ¹Univ. of Chicago, Chicago, IL, ²Field Museum of Natural History, Chicago, IL

11:50 **1177** Competition with Asian weaver ants reduces songbird diversity at low elevations in eastern Himalaya. **K. Supriya** (ksupriya@uchicago.edu)^{1,2}, Trevor Price¹ and Corrie Moreau², ¹Univ. of Chicago, Chicago, IL, ²Field Museum of Natural History, Chicago, IL

12:00 **1178** The role of temperature in competition and persistence of an invaded ant assemblage. **Karl Roeder** (karoeder@ou.edu)¹, Diane Roeder² and Michael Kaspari¹, ¹Univ. of Oklahoma, Norman, OK, ²Cameron Univ., Lawton, OK

12:10 **1179** Experimental cold-tolerance of *Trachymyrmex septentrionalis* and its symbiotic fungal cultivar. **Sarah Senula** (sfsenula@gmail.com), Jon Seal and Katrin Kellner, Univ. of Texas, Tyler, TX

Grad 10-min: SysEB, Biodiversity

Meeting Room 224 (Convention Centre)

Moderator: István Mikó, Pennsylvania State Univ., University Park, PA

10:10 **1180** Development and validation of an arthropod metabarcoding bioinformatic workflow. **Rodney Richardson** (richardson.827@osu.edu)¹, Johan Bengtsson-Palme², Mary Gardiner¹ and Reed Johnson³, ¹The Ohio State Univ., Columbus, OH, ²Univ. of Gothenburg, Gothenburg, Sweden, ³The Ohio State Univ., Wooster, OH

10:20 **1181** Assessing dung beetle (Coleoptera: Scarabaeidae) diversity in open and forested pasture in southern Alberta, Canada. **Giselle Bezanson** (giselle.bezanson@uleth.ca)^{1,2}, Cameron Goater¹ and Kevin Floate², ¹Univ. of Lethbridge, Lethbridge, AB, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

10:30 **1182** Native and introduced dung beetles assemblage along the environmental gradients of New South Wales northern tablelands, Australia. **Min Pokhrel** (pminraj@myune.edu.au), Univ. of New England, Armidale, Australia

10:40 **1183** DNA-based identification and diversity of antlion species in Pakistan. **Saleem Akhtar** (02arid28@gmail.com)¹, Muhammad Ashfaq², Ahmed Zia³, Ghulam Ali³, Shaukat Ali³ and Yusuf Zafar⁴, ¹Univ. of Agriculture, Islamabad, Pakistan, ²Univ. of Guelph, Guelph, ON, Canada, ³National Agricultural Research Centre, Islamabad, Pakistan, ⁴Pakistan Agricultural Research Council, Islamabad, Pakistan

10:50 **1184** Presentation withdrawn

11:00 **1185** Biodiversity studies of the order *Coleoptera* of Ajmer, India. **Rashmi Sharma** (sharmarashmigca@gmail.com), Maharshi Dayanand Saraswati Univ., Ajmer, India

11:10 **1186** Identification of fleas on sciurid rodents in southern Saskatchewan using PCR-based techniques. **Jessica Thoroughgood** (jessica.thoroughgood@usask.ca) and Neil Chilton, Univ. of Saskatchewan, Saskatoon, SK, Canada

11:20 **1187** The use of live-captured insects in population analysis. **Sarah Silverman** (Silverman@ucdavis.edu) and James R. Carey, Univ. of California, Davis, CA

11:30 **1188** Thysanoptera: A survey of the canopy and bark thrips of Madewini, Guyana. **Stephanie Mafla-Mills** (stephanie.maflamills@rutgers.edu), Rutgers, The State Univ. of New Jersey, Newark, NJ

11:40 **1189** A three-year study trapping with synthetic pheromone lures to assess the diversity of the Cerambycidae across several sites in Idaho. **Claudia D. Lyons-Yerion** (yeri5309@vandals.uidaho.edu)¹, James D. Barbour², Lawrence M. Hanks³, Stephen P. Cook¹, Jocelyn G. Millar⁴, Christopher J. Williams¹ and Frank W. Merickel⁵, ¹Univ. of Idaho, Moscow, ID, ²Univ. of Idaho, Parma, ID, ³Univ. of Illinois, Champaign, IL, ⁴Univ. of California, Riverside, CA, ⁵Univ. of Idaho (Retired), Moscow, ID

11:50 **1190** Carabids and the Conservation Reserve Program: The effects of habitat management on grassland ground beetles (Coleoptera: Carabidae). **Evan Waite** (waiteevan@gmail.com), Mary Liz Jameson, Molly Reichenborn, Fraser Watson and Gregory Houseman, Wichita State Univ., Wichita, KS

12:00 **1191** Diversity of Ophioninae wasps (Hymenoptera: Ichneumonidae) in California. **Rachel Behm** (behmrachel@yahoo.com) and Katja Seltmann, Univ. of California, Santa Barbara, CA

12:10 **1192** Environmental niche modeling reveals the effect of climate change on the availability of montane habitat in a North American biodiversity hotspot—the Madrean Sky Island archipelago. **Alan Yanahan** (yanahan@email.arizona.edu) and Wendy Moore, Univ. of Arizona, Tucson, AZ

12:20 **1193** Behind the mask: Revising the taxonomy of Canadian *Hylaeus* (Hymenoptera: Colletidae). **Ryan Oram** (ryanoram13@gmail.com) and Cory Sheffield, Royal Saskatchewan Museum, Regina, SK, Canada

Grad 10-min: SysEB, Evolution and Behavior

Meeting Room 304/305 (Convention Centre)

Moderator: Derek Woller, USDA - APHIS, Phoenix, AZ

10:10 **1194** Faking death: Environmental and genetic control of tonic immobility in larval lacewings. **Katherine Taylor** (katherine.l.taylor@uconn.edu)¹ and Timothy Farkas², ¹Univ. of Connecticut, Storrs, CT, ²Univ. of New Mexico, Albuquerque, NM

10:20 **1195** Evolutionary trade-offs do not constrain the evolution of infectivity in a facultatively parasitic mite (*Macrocheles muscaedomesticae*). **Emily Durkin** (edurkin@ualberta.ca) and Lien Luong, Univ. of Alberta, Edmonton, AB, Canada

10:30 **1196** Getting to the root of Lanchester's square law. **Elizabeth Clifton** (elizabeth.clifton@uconn.edu) and Eldridge Adams, Univ. of Connecticut, Storrs, CT

10:40 **1197** Exploring the migratory patterns of Texas fall armyworm populations (*Spodoptera frugiperda*) using spatiotemporal population genomics. **Ashley Tessnow** (atessnow@tamu.edu), Tyler Raszick and Gregory Sword, Texas A&M Univ., College Station, TX

10:50 **1198** Ecological consequences of a single introduced species to the Antarctic. **Jesamine Bartlett** (jcb553@bham.ac.uk)¹, Pete Convey¹ and Scott Hayward², ¹British Antarctic Survey, Cambridge, United Kingdom, ²Univ. of Birmingham, Birmingham, United Kingdom

11:00 **1199** Advanced maternal age affects offspring quality but not quantity. **Claudia Hallagan** (claudia.hallagan@du.edu)¹, Shannon Murphy¹, Angela Smilanich², Jacob Wilson and Robin Tinghitella¹, ¹Univ. of Denver, Denver, CO, ²Univ. of Nevada, Reno, NV

11:10 **1200** Caterpillar communication: Signal variation conveys different messages. **Melanie Scallion** (melaniescallion@gmail.carleton.ca)¹, Veronica Bura¹, Akito Kawahara² and Jayne Yack¹, ¹Carleton Univ., Ottawa, ON, Canada, ²Univ. of Florida, Gainesville, FL

11:20 **1201** Investigations on the biology of non-target planthopper species for host range testing of spotted lanternfly (Hemiptera: Fulgoridae) bio-control agents. **Tyler Hagerty** (hagertyt@udel.edu), Univ. of Delaware, Newark, DE

11:30 **1202** Mixed pathogen infection: Within and between host competition. **Pauline Deschodt** (pdeschod@sfu.ca), Olivia Walker, Jessi Ly and Jenny Cory, Simon Fraser Univ., Burnaby, BC, Canada

11:40 **1203** Do phytophagous insects compete? A phylogenetic meta-analysis on insect interactions. **Gwendolyn Bird** (gmb0032@auburn.edu) and Nate Hardy, Auburn Univ., Auburn, AL

11:50 **1204** Ecological life table of *Manduca blackburni* (Lepidoptera: Sphingidae). **Christine Elliott** (chelliot@hawaii.edu)¹, Conrad Gillett¹, Mark Wright¹, Elliott Parsons² and Daniel Rubinoff¹, ¹Univ. of Hawai'i, Honolulu, HI, ²Hawai'i Dept. of Land and Natural Resources, Kona, HI

12:00 **1205** The role of physical attack in the larval interactions of a solitary parasitoid that outcompetes its gregarious congener. **Dhaval Vyas** (dhaval.vyas@colostate.edu) and Paul Ode, Colorado State Univ., Fort Collins, CO

12:10 **1206** The influence of temperature on the activity and spatial behavior of vernal pool odonate larvae. **Nene Ugbah** (nu33@scarletmail.rutgers.edu), Rutgers, The State Univ. of New Jersey, Newark, NJ

Grad 10-min: SysEB, Phylogenetics

Meeting Room 302/303 (Convention Centre)

Moderator: Dave Clarke, Univ. of Memphis, Memphis, TN

10:10 **1207** Fossil calibration tips for divergence estimation: A case study from insects. **Manpreet Kohli** (manpreet.kohli@rutgers.edu) and Jessica Ware, Rutgers, The State Univ. of New Jersey, Newark, NJ

10:20 **1208** The next generation of phylogenetic relationships within Psocodea. **Robert de Moya** (rdemoya2@illinois.edu)¹, Kazunori Yoshizawa², Kimberly K. O. Walden¹, Julie Allen¹, Andrew Sweet¹, Malte Petersen³, Lars Podsiadlowski⁴, Christopher H. Dietrich¹, Hugh M. Robertson¹ and Kevin P. Johnson¹, ¹Univ. of Illinois, Champaign, IL, ²Hokkaido Univ., Sapporo, Japan, ³Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany, ⁴Univ. of Bonn, Bonn, Germany

10:30 **1209** Use of E-probes to analyze next-generation sequencing data from mixed insect traps for the detection of *Tuta absoluta*. **Travis van Warmerdam** (tcv34@msstate.edu)¹, Austin Drury¹, Todd Gilligan² and Jonas G. King¹, ¹Mississippi State Univ., Mississippi State, MS, ²USDA - APHIS, Fort Collins, CO

10:40 **1210** Phylogeny of the emerald moths (Lepidoptera: Geometridae: Geometrinae). **David Plotkin** (dplotkin@ufl.edu) and Akito Kawahara, Univ. of Florida, Gainesville, FL

10:50 **1211** Whitefly warfare: Phylogenetic insights into the aleyrodid parasitoid *Encarsia* Förster, 1878 (Hymenoptera: Aphelinidae). **Robert Kresslein** (rkres001@ucr.edu) and John M. Heraty, Univ. of California, Riverside, CA

11:00 **1212** Phylogenomic analysis of Paraneoptera using transcriptome sequencing. **Rachel Skinner** (rskinn2@illinois.edu)¹, Christopher H. Dietrich¹, Kazunori Yoshizawa², Karen Meusemann³, Hugh M. Robertson¹ and Kevin P. Johnson¹, ¹Univ. of Illinois, Champaign, IL, ²Hokkaido Univ., Sapporo, Japan, ³Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany

11:10 **1213** Testing the utility of well-known lepidopteran genes for examining phylogenetic relationships in mimetic tiger moths (Arctiinae: Arctiini: Euchromiina). **Melissa S. Sisson** (melissa.sisson@und.edu) and Rebecca B. Simmons, Univ. of North Dakota, Grand Forks, ND

11:20 **1214** From single sequences to supermatrices: What do we know about schizophoran systematics after 40 years of sequencing flies? **Morgan Jackson** (morgandjackson@gmail.com)¹, Stephen Marshall¹ and Jeffrey Skevington², ¹Univ. of Guelph, Guelph, ON, Canada, ²Agriculture and Agri-Food Canada, Ottawa, ON, Canada

11:30 **1215** Phylogeny of a cosmopolitan family of morphologically conserved trapdoor spiders (Mygalomorphae, Ctenizidae) using anchored hybrid enrichment, with a description of the family Halonoproctidae Pocock 1901. **Rebecca Godwin** (rgodwin@ucdavis.edu)^{1,2}, Vera Opatova², Nicole Garrison², Chris Hamilton³ and Jason Bond¹, ¹Univ. of California, Davis, CA, ²Auburn Univ., Auburn, AL, ³Univ. of Florida, Gainesville, FL

11:40 **1216** Presentation withdrawn

11:50 **1217** Leveraging phylogenetic history and comparative genomics to study the evolution of social behavior in treehoppers. **Micah Fletcher** (micahf@princeton.edu), Benjamin Rubin and Sarah Kocher, Princeton Univ., Princeton, NJ

12:00 **1218** Phylogeny-based natural classification of the family Pyrgomorphidae (Orthoptera: Caelifera). **Ricardo Mariño-Pérez** (pselliopus@yahoo.com.mx) and Hojun Song, Texas A&M Univ., College Station, TX

12:10 **1219** UCE phylogenomics unveiling the evolution of ant-plant associations in the ant genus *Myrmelachista* (Hymenoptera: Formicidae: Formicinae). **Rodolfo Probst** (probstrodolfo@gmail.com)¹, Michael Branstetter² and John Longino¹, ¹Univ. of Utah, Salt Lake City, UT, ²USDA - ARS, Logan, UT

Undergrad 10-min: SysEB

Meeting Room 301 (Convention Centre)

Moderators: Sean Schoville¹ and Rebecca B. Simmons², ¹Univ. of Wisconsin, Madison, WI, ²Univ. of North Dakota, Grand Forks, ND

10:10 **1220** Color and pattern analysis for studies of evolution: A case study utilizing the jewel beetles (Coleoptera: Buprestidae). **Kariann Lamon** (kariannlamon@gmail.com) and Nathan Lord, Louisiana State Univ., Baton Rouge, LA

10:20 **1221** The naiads (nymphs) of *Vanuatusbasis* (Odonata: Coenagrionidae). **Teagan Mulford** (teaganmulford@gmail.com), Madison Lallatin, Benjamin Sasine, Erica Paxman, Anna Monson, Gareth Powell and Seth Bybee, Brigham Young Univ., Provo, UT

10:30 **1222** Presentation withdrawn

10:40 **1223** Sap beetle (Coleoptera: Nitidulidae) ecology on the islands of Vanuatu. **Parker Nielson** (parkerleenielson@gmail.com), Talmage Brown, Gareth Powell and Seth M. Bybee, Brigham Young Univ., Provo, UT

10:50 **1224** A summary of the adventive sap beetles (Coleoptera: Nitidulidae) in Vanuatu: Small beetles with a large reach. **Rachael Hadden** (rachael.a.hadden@gmail.com), Amelia Johnson, Gareth Powell and Seth Bybee, Brigham Young Univ., Provo, UT

11:00 **1225** Distribution and abundance of Gibson's big sand tiger beetle (*Cicindela formosa gibsoni*) in the Douglas Provincial Park sand hills. **Kiara Calladine** (kiara.calladine@hotmail.com)^{1,2}, Aaron Bell^{1,2} and Iain Phillips^{1,2,3}, ¹Univ. of Saskatchewan, Saskatoon, SK, Canada, ²Troutreach Saskatchewan, Moose Jaw, SK, Canada, ³Water Security Agency, Saskatoon, SK, Canada

11:10 **1226** Taxonomy of *Atyphella aphrogeneia*, a marine firefly in Melanesia. **Natalie Saxton** (nsaxton55@gmail.com), Tyler Johnson, Anna Monson, Stephen Serrano, Gareth Powell, Gavin Martin and Seth Bybee, Brigham Young Univ., Provo, UT

11:20 **1227** Taxonomy and diversity of little-known South African grasshopper genus *Eremidium* (Orthoptera: Lentulidae). **Carla De Loera** (carla_deloera05@tamu.edu)¹, Daniel Otte² and Hojun Song¹, ¹Texas A&M Univ., College Station, TX, ²Academy of Natural Sciences of Drexel Univ., Philadelphia, PA

11:30 **1228** Quantitative comparison of color and morphology between phases in the Central American locust, *Schistocerca piceifrons* (Orthoptera: Acrididae). **Aria Deluna** (ariadeluna@tamu.edu), Bert Foquet and Hojun Song, Texas A&M Univ., College Station, TX

11:40 **1229** Survey of bees (Hymenoptera: Apoidea) and the floral resources associated with them in two patches of the tropical dry forest in "El desierto de la Tatacoa", Villavieja, Huila, Colombia. **Andrés Herrera Motta** (andresfelipe.herreramotta@gmail.com), Marlene Lucia Aguilar Benavides and Jose Ricardo Cure Hakim, Univ. Militar Nueva Granada, Cajicá, Colombia

11:50 **1230** Identifying pollinator communities with high-throughput molecular sequencing. **Abby Keller** (abby.safford@und.edu)¹, Wendie Hasler¹, Madison Jochim¹, Josephine Moe¹, Carrie Pratt¹, Brian Darby¹, Mia Park² and Rebecca B. Simmons¹, ¹Univ. of North Dakota, Grand Forks, ND, ²North Dakota State Univ., Fargo, ND

12:00 **1231** Taxonomic revision of the assassin-fly genus *Microphontes* Londt, 1994 (Diptera: Asilidae). **Amanda Markee** (amanda.markee15@ncf.edu)¹ and Torsten Dikow², ¹New College of Florida, Sarasota, FL, ²Smithsonian Institution, National Museum of Natural History, Washington, DC

12:10 **1232** A survey of higher termites biodiversity along the Guyana-Brazil border. **Amany Emam** (aye3@njit.edu), Rutgers, The State Univ. of New Jersey, Newark, NJ

MUVE Section Symposium: Combating Vector-Borne Disease During Disaster and Humanitarian Relief Efforts

Meeting Room 111/112 (Convention Centre)

Moderator and Organizer: Erica Lindroth, US Army, Silver Spring, MD

10:30 Introductory remarks

10:35 **1233** Understanding DoD disaster response: The what and how. **Jamie Blow** (jamie.a.blow.mil@mail.mil), Armed Forces Pest Management Board, Silver Spring, MD

- 11:05 **1234** U.S. military vector-control during the 2015–2016 Ebola response efforts in West Africa. **Scott Mueller** (scott.t.mueller.mil@mail.mil), US Army, San Antonio, TX
- 11:20 **1235** Lessons from the field: Communication pitfalls, time constraints, and monkeys. **Elizabeth Foley** (elizabeth.foley@us.af.mil), US Air Force, Ramstein Air Base, AE, Germany
- 11:35 **1236** Hurricane Harvey: Harris County Public Health Mosquito & Vector Control Division response. **Mustapha Debboun** (mustapha.debboun@phs.hctx.net), Harris County Public Health, Houston, TX
- 11:50 **1237** Observations and lessons learned from the DoD regional response to the 2016 Zika outbreak in the Republic of the Marshall Islands. **Lewis Long** (lewis.s.long.mil@mail.mil), US Army, Camp Zama, AP, Japan
- 12:05 **1238** Inherent benefits of overseas military entomology activities. **Joseph Diclaro** (npv8@cdc.gov), Navy Entomology Center of Excellence, Jacksonville, FL
- 12:20 Concluding remarks

MONDAY, NOVEMBER 12 • AFTERNOON

Member Symposium: Frontiers in Molecular Trophic Interactions: Advancing Biodiversity Research

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Jason Schmidt¹, Zsofia Szendrei² and Tara Gariepy³, ¹Univ. of Georgia, Tifton, GA, ²Michigan State Univ., East Lansing, MI, ³Agriculture and Agri-Food Canada, London, ON, Canada

12:15 Introductory remarks

12:15 **1239** Integration of molecular and ecological methods to determining key natural enemies of a pest complex of *Brassica* crops in West Java, Indonesia. Rini Murtiningsih¹, Peter M. Ridland² and **Michael J. Furlong** (m.furlong@uq.edu.au)¹, ¹Univ. of Queensland, Brisbane, Australia, ²Consulting Entomologist, Northcote, Australia

12:30 **1240** Cross system biodiversity exchange: Implications of crop rotation for arthropod communities. **Jason Schmidt** (jschmid2@uga.edu)¹, Magdy Alabady², Zengyan Wang², Dawn Olson³ and Alisa Coffin³, ¹Univ. of Georgia, Tifton, GA, ²Univ. of Georgia, Athens, GA, ³USDA - ARS, Tifton, GA

12:45 **1241** Pitfalls and lessons from next generation sequencing techniques for molecular gut content analysis. **Kacie Athey** (kacie.johansen@uky.edu), Eric Chapman and Jennifer White, Univ. of Kentucky, Lexington, KY

1:00 **1242** Endosymbiont insights into trophic interactions. **Jennifer White** (jenawhite@uky.edu), Univ. of Kentucky, Lexington, KY

1:15 **1243** Organic plant fertilization stabilizes food web interactions and biological control. **Oskar Rubbmark** (oskar.rubbmark@uibk.ac.at), Daniela Sint, Lena Manzl and Michael Traugott, Univ. of Innsbruck, Innsbruck, Austria

1:30 **1244** Spider dietary niche partitioning positively influences species richness within urban vacant lots. **Mary Gardiner** (gardiner.29@osu.edu), The Ohio State Univ., Columbus, OH

1:45 **1245** Unraveling an omnivore's diet: European earwig (*Forficula auricularia*), a beneficial predator in apple orchards. **Robert Orpet** (robert.orpet@wsu.edu)¹, Thomas R. Unruh², David Crowder³ and Vincent Jones¹, ¹Washington State Univ., Wenatchee, WA, ²USDA - ARS, Wapato, WA, ³Washington State Univ., Pullman, WA

2:00 Concluding remarks

Member Symposium: Functional Diversity of Arthropods

Meeting Room 121 (Convention Centre)

Moderator and Organizer: Tanya Handa, Univ. du Québec, Montréal, QC, Canada

12:15 Introductory remarks

12:20 **1246** The geography of ant morphology: Within colony and across populations. **Jean-Philippe Lessard** (jp.lessard@concordia.ca), François Brassard and Frédérique Larichelière, Concordia Univ., Montréal, QC, Canada

12:35 **1247** Phenotype-dependent dispersal in a semi-aquatic insect: A mark-release-recapture study. **Celina Baines** (celina.baines@mail.utoronto.ca) and Shannon McCauley, Univ. of Toronto, Mississauga, ON, Canada

12:50 **1248** Scaling from trophic traits to community function. **Benjamin Gilbert** (benjamin.gilbert@utoronto.ca), Denon Start and Tess Grainger, Univ. of Toronto, Toronto, ON, Canada

1:05 **1249** Taking a bite out of trophic interaction complexity: Do arthropod feeding and resource traits covary in forest soils? **Tanya Handa** (handa.ira_tanya@uqam.ca)¹, Pierre-Marc Brousseau¹, Laura Raymond-Leonard¹ and Dominique Gravel², ¹Univ. du Québec, Montréal, QC, Canada, ²Univ. de Sherbrooke, Sherbrooke, QC, Canada

1:20 **1250** The biogeography of aquatic invertebrate functional traits: Lessons from studying Bromeliads. **Laura Melissa Guzman** (guzman@zoology.ubc.ca) and M. Kurt Trzcinski, The Univ. of British Columbia, Vancouver, BC, Canada

1:35 **SP1251** Dispersal limitations constrain ground-dwelling beetle assemblages in an urban ecosystem. **Kayla I. Perry** (perry.1864@osu.edu)¹, Nicole C. Hoekstra², Yvan Delgado de la Flor¹ and Mary Gardiner¹, ¹The Ohio State Univ., Columbus, OH, ²The Ohio State Univ., Wooster, OH

1:45 **SP1252** Variations in functional traits associated with divergent uses of post-fire boreal forest by two closely related cerambycid beetles. **Christian Hébert** (christian.hebert@canada.ca), Natural Resources Canada, Québec City, QC, Canada

1:55 Panel discussion

Member Symposium: Multitrophic Interactions in a Changing World

Meeting Room 119/120 (Convention Centre)

Moderator and Organizer: Tolulope Morawo, Auburn Univ., Auburn, AL

12:15 Introductory remarks

12:20 **1253** The ecological consequences of brief events: Heat waves alter trophic interactions on common milkweed. **Luke Zehr** (zehr@msu.edu) and William Wetzell, Michigan State Univ., East Lansing, MI

12:35 **1254** Evaluating changes in cotton plant volatile organic compounds emissions in drought stressed cotton plants. **Esther Ngumbi** (enn0002@auburn.edu) and Henry Fadamiro, Auburn Univ., Auburn, AL

12:50 **1255** Communication breakdown? The effects of ozone pollution on volatile-mediated interactions. **James Blande** (james.blande@uef.fi)¹, Tao Li², Patricia Giron Calva¹ and Eliezer Khaling¹, ¹Univ. of Eastern Finland, Kuopio, Finland, ²Univ. of Copenhagen, Copenhagen, Denmark

1:05 **1256** Interspecific competition and enemy free space: Impact of drought stress on the interaction between *Rorippa indica* (Brassicaceae) and *Pieris rapae* (Lepidoptera: Pieridae). **Po-An Lin** (pbl5066@psu.edu)¹, Chuan-Kai Ho², Natsuko Kinoshita³, Chia-Ming Liu⁴, Cheng-Han Sun² and Gary Felton¹, ¹Pennsylvania State Univ., University Park, PA, ²National Taiwan Univ., Taipei, Taiwan, ³Univ. of Tsukuba, Ibaraki, Japan, ⁴Univ. of Tsukuba, Tsukuba, Japan

1:20 **SP1257** Top-down predation effects on forest tent caterpillar population dynamics. **Anne-Sophie Caron** (annesophie.caron.p@gmail.com)¹, Emma Despland¹, Benoit Lafleur² and Joshua Jarry², ¹Concordia Univ., Montréal, QC, Canada, ²Univ. du Québec en Abitibi-Témiscamingue, Rouyn-Noranda, QC, Canada

1:30 **SP1258** Rapid assessment of predator induced biological control in Great Plains' *Brassica* production. **Hannah Gray** (grayx379@umn.edu) and David A. Andow, Univ. of Minnesota, St. Paul, MN

1:40 **SP1259** Semiochemicals mediating responses of local egg parasitoids to the invasive herbivorous stink bug, *Halyomorpha halys*. **Stefano Colazza** (stefano.colazza@unipa.it)¹, Letizia Martorana¹, Jacques Brodeur², Maria Cristina Foti¹ and Ezio Peri¹, ¹Univ. of Palermo, Palermo, Italy, ²Univ. de Montréal, Montréal, QC, Canada

1:50 Presentation withdrawn

2:00 Concluding remarks

Lunch and Learn: Advocate Entomology! Learn How with the Science Policy Committee

Meeting Room 206 (Convention Centre)

Moderator and Organizer: Susan J. Weller, Univ. of Nebraska, Lincoln, NE

12:30 PM - 1:30 PM

Lunch and Learn: Down with Publish or Perish! Nontraditional Careers in Entomology

Meeting Room 205 (Convention Centre)

Moderator and Organizer: Esther Serrano, USDA - APHIS, Fort Lauderdale, FL

12:30 PM - 1:30 PM

Lunch and Listen: What is the Future of ESA and Where Do I Belong?

West Ballroom ABC (Convention Centre)

Moderator and Organizer: Sherry Marts, Smarts Consulting, Silver Spring, MD

12:30 PM - 1:30 PM

10-min: PBT, Risk Assessment

Meeting Room 210 (Convention Centre)

Moderators: Fabien Demares¹ and Adrian Fisher², ¹Univ. of Florida, Gainesville, FL, ²Arizona State Univ., Tempe, AZ

12:40 **1261** Don't drink the guttation water! Impacts of fungicide residue within turfgrass guttation fluid on *Apis mellifera*. **Audrey Simard** (asimard@wisc.edu), Univ. of Wisconsin, Madison, WI

12:50 **1262** Effects of cyantraniliprole oilseed rape seed treatment on honey bees and other pollinators. **Ed Pilling** (edpilling@dow.com)¹, Vincent Kramer² and Bridget O'Neill³, ¹Dow AgroSciences, Abingdon, United Kingdom, ²Dow AgroSciences, Indianapolis, IN, ³DuPont Crop Protection, Wilmington, DE

1:00 **1263** Neonicotinoids and savannah honey bees: Effects on nutrition, survival, and sugar detection. **Fabien Demares** (fabien.demares@ufl.edu)¹, Christian Pirik², Susan Nicolson² and Hannelie Human², ¹Univ. of Florida, Gainesville, FL, ²Univ. of Pretoria, Pretoria, South Africa

1:10 **1264** Amygdalin: A naturally-occurring allelochemical in almond nectar and pollen is toxic to adult and larval honeybees (*Apis mellifera* L.) and may contribute to reported effects following almond pollination season. **Vincent Kramer** (vjkramer@dow.com), Dow AgroSciences, Indianapolis, IN

1:20 **1265** Negative impact of pesticides/chemicals on the environment, pollinators, insect populations, wildlife, and food due to lack of regulations: A case study in Iran. **Ahmad Mahdavi** (bugmahda@gmail.com), Univ. of Tehran (Retired), Tehran, Iran

1:30 **1266** The effect of a widely used fungicide on honey bee (*Apis mellifera*) colony health. **Adrian Fisher** (afishe16@asu.edu)¹, Teddy Cogley¹, Aurora Beans¹, Dena Kalamchi¹, Jon Harrison¹, Jennifer H. Fewell¹, Osman Kaftanoglu¹, Brian Smith¹ and Gloria DeGrandi-Hoffman², ¹Arizona State Univ., Tempe, AZ, ²Carl Hayden Bee Research Center, Tucson, AZ

1:40 Break

1:50 **1267** Toxicity of synthetic insecticides to the parasitoid wasp *Cotesia flavipes* (Cameron, 1891) (Hymenoptera: Braconidae). **Thais Matioli** (thaisf.matioli@usp.br)¹, Leticia Ivanovici¹, Gustavo Thomas² and Pedro Yamamoto¹, ¹Univ. de São Paulo, Piracicaba, Brazil, ²Macquarie Univ., Sydney, Australia

2:00 **1268** Characterizing the spectrum of activity of IPD072Aa and potential effects on non-target organisms. **Kristine Sturtz** (kristine.sturtz@pioneer.com) and Chad Boeckman, Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

Lunch and Learn: An Image is Worth a Thousand Words: Science Visualization and Communication for Entomological Research

Meeting Room 201 (Convention Centre)

Moderators and Organizers: Jacquelyn Whisenant, Univ. of Wisconsin, Madison, WI

12:45 PM - 1:45 PM

Organized Meeting: Highlights of Medical, Urban, and Veterinary Entomology & MUVE Business Meeting

Meeting Room 109/110 (Convention Centre)

Moderator and Organizer: Mustapha Debboun, Harris County Public Health, Houston, TX

- 1:30 Welcoming remarks
- 1:35 **1269** Highlights in medical entomology. **C. Roxanne Connolly** (csz5@cdc.gov), Centers for Disease Control and Prevention, Fort Collins, CO
- 2:10 **1270** Highlights in urban entomology. **Ameya Gondhalekar** (ameyag@purdue.edu), Purdue Univ., West Lafayette, IN
- 2:45 **1271** Highlights in veterinary entomology. **Amy C. Murillo** (alock001@ucr.edu), Univ. of California, Riverside, CA
- 3:20 **1272** CDC update. **Ben Beard** (cbeard@cdc.gov), Centers for Disease Control and Prevention, Fort Collins, CO
- 3:35 MUVE reception
- 4:05 Preliminary business meeting

Organized Meeting: Physiology, Biochemistry, and Toxicology (PBT) Section Meeting Networking Session

Meeting Room 208/209/City Foyer (Level 2) (Convention Centre)

Moderators and Organizers: David O'Brochta¹, Blair Siegfried², Kun Yan Zhu³ and Peter Jensen⁴, ¹Foundation for the National Institutes of Health, Rockville, MD, ²Univ. of Florida, Gainesville, FL, ³Kansas State Univ., Manhattan, KS, ⁴Monsanto Company, St. Louis, MO

- 2:30 Open and welcome
- 2:35 PBT representatives and volunteer recognition, award winners
- 2:40 PBT Section initiatives
- 3:00 Solicit nominations for open positions or initiative volunteers
- 3:05 **1273** PBT Recognition Award in Insect Physiology, Biochemistry and Toxicology winner presentation: Nature inspired insecticides. **Thomas Sparks** (tcsparks@dow.com), Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN
- 3:30 Governing Board report
- 3:35 Treasurer report
- 3:40 Science Policy Fellow report
- 3:45 **1274** Lillian and Alex Feir Graduate Student Travel Award winner presentation: Insects, plants, and reactive oxygen species. **Hillary Fischer** (hdfische@uark.edu), Univ. of Arkansas, Fayetteville, AR
- 4:00 PBT social hour
- 4:30 Speed networking session

Organized Meeting: Plant-Insect Ecosystem (P-IE) Section Networking, Business, and Learning Session (All Welcome!)

Meeting Rooms 301/302/303/304/305 (Convention Centre)

Moderators and Organizers: Mark Wright¹ and Diane G. Alston², ¹Univ. of Hawai'i, Honolulu, HI, ²Utah State Univ., Logan, UT

- 2:30 P-IE Section business meeting and awards
- 3:30 P-IE Section Invasive Species Field Tour review
- 3:50 P-IE Section Pollinator Field Tour review
- 4:10 **1275** Healthy bees, healthy people, healthy planet: How the Honey Bee Health Coalition is fostering collaboration for pollinator health. **Julie Shapiro** (jshapiro@keystone.org), Keystone Center, Keystone, CO
- 4:40 **1276** Bee diversity and ecological interactions – why we stumble on issues of pollinator health. **Ethel Villalobos** (emv@hawaii.edu), Univ. of Hawai'i, Manoa, HI
- 5:10 Discussion
- 5:25 Member networking and refreshments

Organized Meeting: Systematics, Evolution, and Biodiversity (SysEB) Section Meeting

Meeting Room 211 (Convention Centre)

Moderators and Organizers: Andrew Short¹ and Floyd Shockley², ¹The Univ. of Kansas, Lawrence, KS, ²Smithsonian Institution, National Museum of Natural History, Washington, DC

- 2:30 Welcome reception
- 3:00 Introductory remarks
- 3:05 SysEB awards & recognition: Introducing an expansion and reorganization
- 3:15 Student Research Travel awards
- 3:30 **1277** Patch award winner presentation: Small beetles in a big world: A framework for Nitidulidae taxonomy and systematics. **Gareth Powell** (garethpowell@byu.edu), Brigham Young Univ., Provo, UT
- 3:45 **1278** Snodgrass Memorial Research Award winner presentation: The evolution of *Peristenus* (Hymenoptera: Braconidae): Taxonomy, phylogenetics and ecological speciation. **Miles Zhang** (yuanmeng.zhang@gmail.com), Univ. of Central Florida, Orlando, FL
- 4:00 **1279** NSF report. **Katharina Dittmar** (katharinad@hotmail.com), Brigham Young Univ., Provo, UT
- 4:25 Break
- 4:30 Committee reports
- 4:40 Discussion and forum on Section business

MONDAY, NOVEMBER 12 / LUNDI 12 NOVEMBRE

TUESDAY, NOVEMBER 13 • POSTERS

Poster: MUVE, Vectors, Forensics, and Urban

West Exhibit Hall A (Convention Centre)

D3216 Molecular identification of the carrion beetles (Coleoptera) in selected regions of Saudi Arabia. **Ashraf Mashaly** (mmashely@ksu.edu.sa) and Ahmed Khireldin, King Saud Univ., Riyadh, Saudi Arabia

D3217 Insect activities and soil chemistry profiles associated with rabbit decomposition processes in Punjab, India. **Sarabjit Singh** (sabi_ghotra88@yahoo.com), Punjabi Univ., Patiala, India; Univ. Teknologi MARA, Sungai Buloh, Malaysia

D3218 Effect of alcohol or over the counter medications on Calliphoridae larval development. **Erin McEwen** (erin.mcewen@my.ccsu.edu) and Alicia Bray, Central Connecticut State Univ., New Britain, CT

D3219 Insect succession study associated with indoor, outdoor and submerged pig carcasses, in summer and winter season: Seasonal insect succession study from north India (Punjab). **Pawandeep Kaur** (pawandeep19ap@gmail.com) and Madhu Bala, Punjabi Univ., Patiala, India

D3220 Toxicity of cypermethrin and chlorpyrifos against German cockroach [*Blattella germanica* (Blattaria: Blattellidae)] strains from Hamadan, Iran. **Mansour Nazari** (ynazari@yahoo.com)¹, Behrouz Alipourianmotlagh¹ and Hassan Nasirian², ¹Hamadan Univ. of Medical Sciences, Hamadan, Iran, ²Tehran Univ. of Medical Sciences, Tehran, Iran

D3221 *Reticulitermes okanaganensis*, a new subterranean termite species from North America. **Allen Szalanski** (aszalan@uark.edu)¹ and James Austin², ¹Univ. of Arkansas, Fayetteville, AR, ²BASF Corporation, Research Triangle Park, NC

D3222 Living in paradise: Identifying & managing pests in Hawaii's urban landscapes. **Andrew Kaufman** (kaufmana@hawaii.edu)¹ and Leyla V. Kaufman², ¹Univ. of Hawai'i, Honolulu, HI, ²Hawai'i Invasive Species Council, Honolulu, HI

D3223 Using green fluorescent protein transformed *Escherichia coli* to reveal bacterial dispersal ability of *Blattella germanica*. **Xueyang Fan** (xf24@njit.edu), New Jersey Institute of Technology, Newark, NJ

D3224 The house fly *Musca domestica* as a mechanical vector of *Corynebacterium pseudotuberculosis*. **Xing Ping Hu** (huxingp@auburn.edu), Auburn Univ., Auburn, AL

D3225 Vector-borne pathogen surveillance in diverse canine populations from three cities in Colombia – applying the One Health concept to infectious and zoonotic diseases in an international military context. Michael McCown¹ and **Benjamin Grzeszak** (grpvet@gmail.com)², ¹US Army, Jacksonville, FL, ²US Army, DPO, AE, Germany

D3226 Vector-borne pathogens in fleas from free-ranging *Cerdocyon thous* (crab-eating fox) in southern Brazil. **Diogo Schott** (diogo.schott@yahoo.com)¹, Ugo Souza¹, Bruno Dall'Agnol¹, Anelise Webster¹, Rovaina Doyle¹, Felipe Peters², Marina Favarini², Fábio Mazim³, André Rosa⁴, Márcia Jardim⁵, Tatiane Trigo⁵ and José Reck¹, ¹Instituto de Pesquisas Veterinárias Desidério Finamor, Eldorado do Sul, Brazil, ²Área de Vida Assessoria e Consultoria em Biologia e Meio Ambiente, Canoas, Brazil, ³Ka'aguy Consultoria Ambiental, Pelotas, Brazil, ⁴Univ. Paul Sabatier, Porto Alegre, Brazil, ⁵Fundação Zoobotânica do Rio Grande do Sul (FZB-RS), Porto Alegre, Brazil

D3227 *Plasmodium falciparum* antimalarial drug resistance in asymptomatic patients with and without HIV co-infection in western Kenya. **Brandi Torrevillas** (bktorrevillas@uidaho.edu)¹, Nicholas Hathaway², Sarah Garrison¹, Carol Kifude³, Robin Miller⁴, Deborah Stiffler⁴, Priya Venkatesan⁴, Nathaniel Dizon⁴, Matthew Fagnan¹, Daniel New¹, Alida Gerritsen¹, Ozkan Aydemir², Jeff Bailey², V. Ann Stewart⁴ and Shirley Luckhart¹, ¹Univ. of Idaho, Moscow, ID, ²Univ. of Massachusetts Medical School, Worcester, MA, ³US Army, Kisumu, Kenya, ⁴Uniformed Services Univ. of Health Sciences, Bethesda, MD

D3228 Vertical transmission of Zika virus by Florida *Aedes aegypti* and *Aedes albopictus*. **Rebecca Zimler** (razimler@ufl.edu)¹, Casey Parker¹, Barry Alto¹ and C. Roxanne Connelly², ¹Univ. of Florida, Vero Beach, FL, ²Centers for Disease Control and Prevention, Fort Collins, CO

D3229 Paratransgenic manipulation of microRNA-275 expression in the tsetse fly midgut, and the downstream impact on trypanosome infection outcomes. **Brian Weiss** (brian.weiss@yale.edu)¹, Aurélien Vigneron¹, Emre Aksoy² and Serap Aksoy¹, ¹Yale Univ., New Haven, CT, ²Univ. of California, Riverside, CA

D3230 Biological activity and mode of action of four aromatic plants extracts against *Anopheles gambiae* s.l. in Burkina Faso. **Dimitri Wangrawa** (dimwang56@gmail.com)¹, Athanase Badolo², Moussa Guelbeogo³, Martin Kiendrebeogo², Roger Nebié⁴, N'Falé Sagnon³ and Antoine Sanon⁵, ¹Univ. Norbert Zongo, Koudougou, Burkina Faso, ²Univ. Ouaga I Pr Joseph Ki-Zerbo, Ouagadougou, Burkina Faso, ³Centre National de Recherche et de Formation sur le Paludisme, Ouagadougou, Burkina Faso, ⁴Centre National de la Recherche Scientifique et Technologique, Ouagadougou, Burkina Faso, ⁵Univ. de Ouagadougou, Ouagadougou, Burkina Faso

D3231 Repellency efficiency of *Melissa officinalis* extracts on *Anopheles* mosquitoes. **Funmilola Omoya** (fomoya@yahoo.com), Kehinde Ajayi and Babatunde Adewumi, Federal Univ. of Technology, Akure, Nigeria

D3232 Assessment of insecticide resistance effects on phenotypes related to the vectorial capacity of an *Aedes aegypti* mosquito population from Key West, Florida. **Dongyoung Shin** (dshin@ufl.edu) and Chelsea T. Smartt, Univ. of Florida, Vero Beach, FL

D3233 Presentation withdrawn

D3234 Establishing insecticide resistance testing for *Aedes* mosquitoes in Belize, Central America. **Jonathan Kay** (jonathan.r.kay93@gmail.com)¹, Donovan Leiva¹, Marla Magaña¹, Marie Pott¹, Alvaro Cruz¹, Nicole L. Achee² and John Grieco², ¹Belize Vector and Ecology Center, Orange Walk Town, Belize, ²Univ. of Notre Dame, South Bend, IN

D3235 Engaging the public to help track tick populations in Washington state - results of 8 years of public tick submissions.

Elizabeth Dykstra (elizabeth.dykstra@doh.wa.gov) and David Kangiser, Washington State Dept. of Health, Olympia, WA

D3236 Enhancing mosquito surveillance efforts in south Texas. **Christopher Vitek** (christopher.vitek@utrgv.edu) and John Thomas, Univ. of Texas, Edinburg, TX

D3237 Stoichiometric comparisons in the mosquito *Aedes albopictus* across urban-rural gradients in southern Mississippi. **Catherine Dean** (catherine.dean@usm.edu)¹, Nicole Mackey¹, J. Hunter Deerman², Wendy Varnado² and Donald Yee¹, ¹The Univ. of Southern Mississippi, Hattiesburg, MS, ²Mississippi Dept. of Health, Jackson, MS

D3238 Detection of natural infection by *Leishmania* and new records of sand flies (Psychodidae: Phlebotominae) in lowlands from Colombia. **Maulo Hoyos** (mj.hoyos@uniandes.edu.co), Cielo González, Marla Leon and Camila González, Univ. de los Andes, Bogota, Colombia

D3239 Surveillance of bromeliads for mosquito larvae in southern California. **Aviva Goldmann** (aviva.goldmann@ucr.edu)¹, Melissa Doyle² and William Walton¹, ¹Univ. of California, Riverside, CA, ²San Gabriel Valley Mosquito and Vector Control District, West Covina, CA

D3240 Potential dengue vectors in northern Taiwan. **Tsai-Ying Yen** (farscape@ms38.hinet.net) and Kun-Hsien Tsai, National Taiwan Univ., Taipei, Taiwan

D3241 Application of *Aedes aegypti* and *Aedes albopictus* surveillance in northern Belize. **Donovan Leiva** (bvec.bz@gmail.com)¹, Marla Magaña¹, Jonathan Kay¹, Marie Pott¹, Alvaro Cruz¹, John Grieco² and Nicole L. Achee², ¹Belize Vector and Ecology Center, Orange Walk Town, Belize, ²Univ. of Notre Dame, South Bend, IN

D3242 Efficacy of newly developed boric acid gel baits against German cockroaches (Dictyoptera: Blattellidae) under laboratory conditions. **Anil Neupane** (anilnp111@gmail.com) and Lekhnath Kafle, National Pingtung Univ. of Science and Technology, Pingtung, Taiwan

Poster: PBT, IPM, Ecology, and Social Insects

West Exhibit Hall A (Convention Centre)

D3243 Developmental polymorphism and the Brooks-Dyar law. Fernando Rivera, **Diego Vasquez** (dvasquezm@corpoca.org.co), Carolina Ruiz, Juliana Gomez-Valderrama, Felipe Borrero-Echeverry and Diego Rincon, Corporacion colombiana de investigación agropecuaria, Mosquera, Colombia

D3244 Manipulation of host choice and mobility of *Varroa* mites as a possible avenue for mitigation of varroosis in honey bee colonies. Victoria Soroker¹, Stephen Pernal² and **Erika Plettner** (plettner@sfu.ca)³, ¹Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel, ²Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ³Simon Fraser Univ., Burnaby, BC, Canada

D3245 The role of temporal changes in *Varroa* mite (Acari: Varroidae) phoretic host selection behavior in honeybee (Hymenoptera: Apidae) forager-mediated mite migration. **Emily Watkins de Jong** (ewatkinsdejong@email.arizona.edu), Univ. of Arizona, Tucson, AZ

D3246 Impacts of systemic insecticides to control cabbage maggot, *Delia radicum*, on honey bees, *Apis mellifera*, in a biennial seed crop. **Beverly Gerdeman** (bgerdeman@wsu.edu), Hollis Spitzer and Sharmila Sunwar, Washington State Univ., Mount Vernon, WA

D3247 Presentation withdrawn

D3248 Effects of insecticide-fungicide combinations commonly applied to almonds during bloom on honey bee queens. **Chia-Hua Lin** (lin.724@osu.edu)¹ and Reed Johnson², ¹The Ohio State Univ., Columbus, OH, ²The Ohio State Univ., Wooster, OH

D3249 Determining *Varroa destructor* acaricide resistance and the success of integrated pest management techniques in *Apis mellifera* colonies of Virginia. Morgan Roth, James M. Wilson and **Aaron Gross** (adgross@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

D3250 Transcriptional response of honey bee to differential nutritional status and *Nosema* infection. **Farida Azzouz-Olden** (farida.olden@kysu.edu)¹, Arthur Hunt² and Gloria DeGrandi-Hoffman³, ¹Kentucky State Univ., Frankfort, KY, ²Univ. of Kentucky, Lexington, KY, ³Carl Hayden Bee Research Center, Tucson, AZ

D3251 How low can they go: Does hypoxia increase survival of overwintering *Bombus impatiens* queens? **Georgia Starr Davis** (georgiastarr.davis@ndsu.edu)¹, Kendra Greenlee¹, Joseph P. Rinehart² and George Yocum², ¹North Dakota State Univ., Fargo, ND, ²USDA - ARS, Fargo, ND

D3252 Emergence data at the individual level provides insights into alfalfa leafcutting bee rhythmicity. **Joseph P. Rinehart** (joseph.rinehart@ars.usda.gov)¹, George Yocum¹, Korie Debarlabon² and Meghan Bennett³, ¹USDA - ARS, Fargo, ND, ²North Dakota State Univ., Fargo, ND, ³Arizona State Univ., Tempe, AZ

D3253 It's electric: Using electrophysiology to study learning phenomena in the honey bee brain. **Meaghan Bennett** (mbenne15@asu.edu), Hong Lei, Chelsea N. Cook and Brian Smith, Arizona State Univ., Tempe, AZ

D3254 Role of dopamine on honeybee foraging decisions. **Fanfan Noel** (fanfan.noel@upr.edu)¹, Tugrul Giray¹, Jose Agosto¹, Eddie Perez¹, Wickensonn Norze¹, Adriana Padilla¹, Cliton Seide² and Yves Leconte³, ¹Univ. de Puerto Rico, San Juan, PR, ²Univ. of Missouri, Columbia, MO, ³INRA, Avignon, France

D3255 The effect of water limitation on nutritional regulation in the Australian plague locust, *Chortoicetes terminifera*. **Rick Overson** (rickoverson@gmail.com), Jonah Brosemann and Arianne Cease, Arizona State Univ., Tempe, AZ

D3256 Long-term multiparameter assessment of the impact of Hurricane María on colony measures: A case study in gentle Africanized honey bees (gAHB) from Puerto Rico. **Janpierre Alemán Ríos** (janpierre.alemanrios@gmail.com)¹, Ashley Lozada Valcárcel¹, Cheryl González¹, Esteban Morales Ramos¹, Giancarlo Piovanetti¹, José Mayoral¹, Rochelly Rivera¹, Vivian Reyes¹, Johann Santos-Rodríguez¹, Jonathan Alemán Ríos¹, Stephanie Feliciano Cardona¹, Isada Claudio-Ford¹, Edgar Acuña², Remi Megret¹, Tugrul Giray¹ and Jose Agosto-Rivera¹, ¹Univ. de Puerto Rico, San Juan, PR, ²Univ. de Puerto Rico, Mayagüez, PR

D3257 RNA virus-induced gene silencing and viral-like particles from dsRNA viruses for delivery of RNAi in insects. **Luc Swevers** (swevers@bio.demokritos.gr)¹, Yongchao Zhao¹, Jingchen Sun², Anna Kolliopoulou¹, Clauvis N. T. Taning³, Olivier Christiaens³ and Guy Smagghe³, ¹National Centre of Scientific Research Demokritos, Athens, Greece, ²South China Agricultural Univ., Guangzhou, China, ³Ghent Univ., Ghent, Belgium

D3258 Biology of *Anisopteromalus calandrae* on different stored grain hosts and temperatures regimes and effect of essential oils and diatomaceous earth on its parasitic potential. **Khurram Kamboh** (kmsk555@gmail.com), Univ. of Sargodha, Faisalbad, Pakistan

D3259 Immunological response of *Sesamia cretica* Lederer larvae to *Beauveria bassiana* (Bals. -Criv.). Reza Sadeghi, **Arsalan Jamshidnia** (jamshidnia@ut.ac.ir) and Niloufar Hadizadeh Raeisi, Univ. of Tehran, Tehran, Iran

D3260 Development of solid mass culture condition of entomopathogenic nematode (*Steinernema carpocapsae* PC) isolated from Korea. **Yeon Su Yu** (ysyu1973@naver.com)¹, Sang Hyung Park¹, Kyeong-Yeoll Lee² and Kwang-Hyun Baek³, ¹Daedong Tech Co., Kyeongsan, South Korea, ²Kyungpook National Univ., Daegu, South Korea, ³Yeungnam Univ., Kyeongsan, South Korea

D3261 *Xenorhabdus* symbionts impact ascroside production and reproduction of first generation *Steinernema* entomopathogenic nematodes. Alexandra Roder and **S. Patricia Stock** (spstock@email.arizona.edu), Univ. of Arizona, Tucson, AZ

D3262 *Metarhizium* sp. isolated from dead *Pachnoda interrupta* (Coleoptera: Scarabaeidae) as a potential entomopathogenic fungus for the pest insect: Proof-of-concept for autodissemination. **Gessese Yitbarek** (yitbarek.wh07@gmail.com), Addis Ababa Univ., Addis Ababa, Ethiopia

D3263 Diversity of midgut microbiome composition of the spined soldier bug, *Podisus maculiventris* (Heteroptera: Pentatomidae). **Kent S. Shelby** (kent.shelby@ars.usda.gov)¹, Michelle Gregory¹, Aaron Ericsson² and Thomas Coudron¹, ¹USDA - ARS, Columbia, MO, ²Univ. of Missouri, Columbia, MO

D3264 Lethal and sublethal effect of insecticides on *Doru luteipes* (Dermaptera: Forficulidae). Kleber Silva and **Pedro Yamamoto** (pedro.yamamoto@usp.br), Univ. de São Paulo, Piracicaba, Brazil

D3265 Electrophysiological responses of widespread insect species to fire ant alarm pheromone. **Yuzhe Du** (yuzhe.du@ars.usda.gov), Michael Grodowitz and Jian Chen, USDA - ARS, Stoneville, MS

D3266 Pheromone diversity in heliothine moths. **Kirk Hillier** (kirk.hillier@acadiau.ca), Acadia Univ., Wolfville, NS, Canada

D3267 Components of *Varroa* chemosensory mechanism: What is new? Nurit Eliash^{1,2}, Starlin Thangarajan³, Inna Goldenberg³, Noa Sela³, Yam Altman³, Yosef Kamer³, Ada Rafaeli¹ and **Victoria Soroker** (sorokerv@volcani.agri.gov.il)¹, ¹Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel, ²The Hebrew Univ., Rehovot, Israel, ³Agricultural Research Organization, The Volcani Center, Rishon LeZion, Israel

D3268 Occurrence and chemical control of dry bulb mite, *Aceria tulipae* (Keifer) in Korea. **Yeonguk Park** (papark1@korea.kr), Chungcheongbuk-do Agricultural Research & Extension Services, Danyang-gun, South Korea

D3269 Behavioral response of little fire ant, *Wasmannia auropunctata*, to trail chemicals laid on epiphytic moss. **Dong H. Cha** (dong.cha@ars.usda.gov)¹, Dominick Skabeikis¹, Man-Yeon Choi² and Robert Vander Meer³, ¹USDA - ARS, Hilo, HI, ²USDA - ARS, Corvallis, OR, ³USDA - ARS, Gainesville, FL

D3270 Comparing carotenoid content across arthropod groups to improve understanding of bird-arthropod food webs. **Ashley Kennedy** (kennedy@udel.edu), Univ. of Delaware, Wilmington, DE

D3271 Calibration of the effect of collection and preservation method on locust and grasshopper body parts for analysis of carbon, nitrogen, and stable isotopes, in food web research. **Ben Ellert** (benjamin.ellert@agr.gc.ca)¹, Dan Johnson² and Sejer Meyhoff², ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²Univ. of Lethbridge, Lethbridge, AB, Canada

D3272 The use of thermal refuges generates divergent outcomes of warming for diurnally and nocturnally active species. **Marshall McMunn** (mmcmunn@gmail.com), Univ. of California, Davis, CA

D3273 How can life adapt to global warming and pollution – the answer may lie in the thermal springs of Yellowstone National Park. **Kelly Willemssens** (kelly_willemssens@hotmail.com), Univ. of Nebraska, Lincoln, NE

D3274 Phantom midge larvae use pH to actively regulate buoyancy by expanding and contracting the cuticle of air-filled tracheal sacs. **Evan McKenzie** (emckenzie@zoology.ubc.ca) and Philip Matthews, The Univ. of British Columbia, Vancouver, BC, Canada

D3275 Abnormal swelling of the peritrophic membrane in caterpillar midgut caused by MLX56 family mulberry-latex defense proteins with chitin-binding and extensin domains: Plant defense proteins against insects with a novel mode of action. **Kotaro Konno** (konno@affrc.go.jp)¹, Sachiko Shimura¹, Chihiro Ueno¹, Toru Arakawa¹ and Masatoshi Nakamura², ¹National Agriculture and Food Research Organization, Tsukuba, Japan, ²National Agriculture and Food Research Organization, Hokuto, Japan

D3276 *Helicoverpa*-inducible pathogenesis-related 10 protein from *Cicer arietinum*: Structural modeling, allergenicity prediction and potential targets. **Archana Singh** (archanasingh@hrc.du.ac.in), Univ. of Delhi, New Delhi, India

D3277 *In silico* analysis of molecular interaction between chemosensory proteins of *Spodoptera litura* and detoxification enzymes during adapting polyphagy. **Indrakant Singh** (iksingh@db.du.ac.in), Univ. of Delhi, New Delhi, India

D3278 Using RNAi to suppress tawny crazy ant (*Nylanderia fulva*). **Keyan Zhu-Salzman** (ksalzman@tamu.edu), Texas A&M Univ., College Station, TX

D3279 Development of a bioassay to evaluate insecticidal activity against sweetpotato weevil larvae. **Kukuh Hernowo** (khernowo@agcenter.lsu.edu)¹, Jeffrey Davis¹ and Josephine Antwi², ¹Louisiana State Univ., Baton Rouge, LA, ²Oregon State Univ., Hermiston, OR

D3280 Can spermatophore isotope composition indicate natal origin of males in the migratory true armyworm moth (*Mythimna unipuncta*)? **Aida Parvizi** (aparvizi@uwo.ca), Univ. of Western Ontario, London, ON

Poster: P-IE, IPM, Behavior, and Biocontrol

West Exhibit Hall A (Convention Centre)

D3281 Temporal complementarity and resource continuity at a landscape scale: Consequences for predators and their prey. **Brian Spiesman** (brianspiesman@hotmail.com), Kansas State Univ., Manhattan, KS

D3282 Effect of omnivore-herbivore interactions on the aphidophagous hoverfly *Sphaerophoria rueppellii*. Teresa Vaello¹, **Ana Pineda** (a.pineda@nioo.knaw.nl)^{1,2} and Maria Ángeles Marcos-García¹, ¹Univ. de Alicante, San Vicente del Raspeig, Spain, ²Netherlands Institute of Ecology, Wageningen, Netherlands

D3283 Ornamental plants as hosts of tomato chlorotic spot virus and its vector thrips (Thysanoptera: Thripidae) in tomatoes. **Rafia Khan** (rkhan@ufl.edu)¹, Dakshina Seal¹, Oscar Liburd², Shouan Zhang¹ and Edward Evans³, ¹Univ. of Florida, Homestead, FL, ²Univ. of Florida, Gainesville, FL, ³Univ. of Florida Tropical Research and Education Center, Homestead, FL

D3284 Using next generation sequencing to determine predator-prey associations. **Tania N. Kim** (tkim@ksu.edu)^{1,2}, Brian Spiesman¹, Yury Bukhman¹, Michelle Jusino¹ and Claudio Gratton¹, ¹Univ. of Wisconsin, Madison, WI, ²Kansas State Univ., Manhattan, KS

D3285 Egg cannibalism by larvae of the weed biological control agent, *Galerucella californiensis* L. **Alida Janmaat** (alida.janmaat@ufv.ca)¹, Shawn Dove², Meghan Brennan² and Jenny Cory², ¹Univ. of the Fraser Valley, Abbotsford, BC, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada

D3286 Insights into color vision of the Asian citrus psyllid. **Sandra A. Allan** (sandy.allan@ars.usda.gov), USDA - ARS, Gainesville, FL

D3287 Berry size, colour and odour impact female oviposition choice in the invasive pest *Drosophila suzukii*. **Joelle Lemmen-Lechelt** (jlemmen@ualberta.ca), Emil Dekker, Paul Becher and Teun Dekker, Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

D3288 Aphid circadian rhythm and the effect of day and night feeding behaviors. **Vamsi Nalam** (vamsi.nalam@colostate.edu)¹, Travis Isaacs² and Sarah Moh², ¹Colorado State Univ., Fort Collins, CO, ²Purdue Univ., Fort Wayne, IN

D3289 Presentation withdrawn

D3290 Does the amount of water available in the soil for Brassicaceae interfere with the development of *Plutella xylostella*? **Sergio De Bortoli** (bortoli@fcav.unesp.br)¹, Dagmara Ramalho², Nathalia Santos², Matheus Pinto¹, Rafael Ferreira Santos¹, Caroline De Bortoli³ and Alessandra Marieli Vacari⁴, ¹Univ. Estadual Paulista, Jaboticabal, Brazil, ²Univ. de São Paulo, Ribeirão Preto, Brazil, ³Univ. of Tennessee, Knoxville, TN, ⁴Univ. de Franca, Franca, Brazil

D3291 Behavioral evidence for sex pheromones in *Leptoglossus zonatus* (Dallas), a leaf-footed plant bug. **Andrea Joyce** (ajoyce2@ucmerced.edu) and Ricardo Hernandez, Univ. of California, Merced, CA

D3292 Side effects of fluridone applications in rice and impact on *Nilaparvata lugens* behaviour. **Jinglan Liu** (liujl@yzu.edu.cn), Yangzhou Univ., Yangzhou, China

D3293 Effects of hunger level and prey availability on predatory ability and dispersal behavior of an omnivorous predator *Arma chinensis* Fallou. Mingzhen Pan¹, **Tong-Xian Liu** (txliu@nwsuaf.edu.cn)² and Hongyin Chen³, ¹Qingdao Agricultural Univ., Qingdao, China, ²Northwest A&F Univ., Yangling, China, ³Chinese Academy of Agricultural Sciences, Beijing, China

D3294 Flight performance of *Monochmus saltuarius* (Gebler) on flight mills: Effect of sex, age, body weight, and copulation. **Chansik Jung** (csjung@korea.kr)¹, Hyuk Jun Kwon¹, Jong Kook Jung¹, Hwang Kim² and Sang Hyun Koh¹, ¹National Institute of Forest Science, Seoul, South Korea, ²Seoul National Univ., Seoul, South Korea

D3295 Nitrogen fertilizer promotes pests via impaired natural enemy performance. **Pingyang Zhu** (zpy85@163.com)^{1,2,3}, Xusong Zheng¹, Kai Liu^{1,4}, Kong Luen Heong⁵, Geoff Gurr² and Zhongxian Lu¹, ¹Zhejiang Academy of Agricultural Sciences, Hangzhou, China, ²Charles Sturt Univ., Orange, Australia, ³Jinhua Plant Protection Station, Jinhua, China, ⁴Sun Yat-Sen Univ., Guangzhou, China, ⁵Zhejiang Univ., Hangzhou, China

D3296 Air potato biological control extension program success story. **Ken Gioeli** (ktgioeli@ufl.edu) and Carey Minter, Univ. of Florida, Fort Pierce, FL

D3297 Establishment and impact of the weevil *Mecinus janthiniformis* for biocontrol of Dalmatian toadflax in southern California. **Patrick Moran** (patrick.moran@ars.usda.gov)¹, Irene Wibawa¹, Lincoln Smith² and Michael Pitcairn³, ¹USDA - ARS, Albany, CA, ²USDA - ARS, Montferrier-sur-Lez, France, ³California Dept. of Food and Agriculture, Sacramento, CA

D3298 Using microbial volatile organic compounds (MVOCs) produced by *Streptomyces* bacteria in controlling *Drosophila suzukii*. **Adam Discher** (130856d@acadiau.ca) and Kirk Hillier, Acadia Univ., Wolfville, NS, Canada

D3299 Host plant specificity of the psyllid, *Arytinnis hakani*, a prospective biological control agent of French broom (*Genista monspessulana*). **Lincoln Smith** (link.smith@ars.usda.gov), USDA - ARS, Montferrier-sur-Lez, France

D3300 Comparative cold tolerance of geographically distinct populations of *Cyrtobagous salviniae*, a biological control agent of *Salvinia molesta*. Alana Russell, Rodrigo Diaz and **Seth Johnson** (sjohnson@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

D3301 An experimental test of the impacts of cereal leaf beetle (*Oulema melanopus*), a biocontrol wasp (*Tetrastichus julis*), and generalist predators on wheat yield in the Canadian prairies. **Haley Catton** (haley.catton@canada.ca)¹, Héctor Cárcamo¹ and Alejandro Costamagna², ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²Univ. of Manitoba, Winnipeg, MB, Canada

D3302 Viability of the entomopathogenic nematode *Steinernema diaprepesi* for the control of larval western corn rootworm (*Diabrotica virgifera virgifera*). **Ryan Geisert** (rhwg5h8@mail.missouri.edu)¹, Kent S. Shelby¹, David Shapiro-Ilan², Thomas Coudron¹ and Bruce Hibbard¹, ¹USDA - ARS, Columbia, MO, ²USDA - ARS, Byron, GA

D3303 Use of Nemasys®R to control citrus root weevil. **Diana Londoño** (diana.londono@basf.com)¹ and Larry Duncan², ¹BASF Corporation, Durham, NC, ²Univ. of Florida, Lake Alfred, FL

D3304 What your dental hygienist (or really, anybody) probably thinks about classical biological control. **Chris Looney** (clooney@agr.wa.gov)¹, Jennifer Andreas² and Shannon Donovan³, ¹Washington State Dept. of Agriculture, Olympia, WA, ²Washington State Univ. Extension, Puyallup, WA, ³Univ. of Alaska, Anchorage, AK

D3305 Oviposition preferences and development of *Calophya* sp. on male and female Brazilian peppertree plants. **Rachel Watson** (rachelw2525@gmail.com)¹, Patricia Prade², James Cuda¹ and Carey Minter², ¹Univ. of Florida, Gainesville, FL, ²Univ. of Florida, Fort Pierce, FL

D3306 Biology and ecology of *Plutella armoraciae*, a little-known cousin of the infamous diamondback moth, *Plutella xylostella*. **Jason Thiessen** (jason.thiessen@agr.gc.ca), Peggy Clarke and Paul Abram, Agriculture and Agri-Food Canada, Agassiz, BC, Canada

D3307 Field releases and monitoring of *Hypena opulenta*, a biological control agent of *Vincetoxicum* spp. (swallow-worts). **Alana Russell** (alana.russell0@gmail.com), Lisa Tewksbury, Rebecca Donegan and Shiloh Clerjuste, Univ. of Rhode Island, Kingston, RI

D3308 The kudzu bug, *Megacopta cribraria*: Has it crossed its last border? **Jerome Grant** (jgrant@utk.edu) and Amy Michael, Univ. of Tennessee, Knoxville, TN

D3309 Combining herbivore-induced plant volatiles to attract natural enemies in coffee crops in Colombia. **Jordano Salamanca** (jordanosalamanca@gmail.com)¹, Vanessa Garzón-Tovar¹, Cesar Rodriguez-Saona² and Cristina Mendoza¹, ¹Univ. Nacional Abierta y a Distancia, Bogotá, Colombia, ²Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

D3310 Assessment of artificial diets for the rearing of *Hypena opulenta* (Lepidoptera: Erebididae), a weed biocontrol agent for swallow-worts. **Vincent Hervet** (vincent.hervet@gmail.com) and Rob Bouchier, Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

D3311 Ovicidal effect of essential oils of Piperaceae species, in parasitizing eggs of *Oebalus insularis* (Heteroptera: Pentatomidae), in Panama. **Bruno Zachrisson** (bazzsalam@gmail.com)¹, Mahabir Gupta², Ana Santana² and Pedro Osorio¹, ¹Instituto de Investigación Agropecuaria de Panamá, Panama City, Panama, ²Univ. of Panama, Panama City, Panama

D3312 Lethal effects of conventional and certified organic insecticides on the parasitic wasp, *Trissolcus japonicus*, a parasitoid of the brown marmorated stink bug, *Halyomorpha halys*. **Sarah G. Holle** (holle248@umn.edu), Eric C. Burkness, Robert Koch and William D. Hutchison, Univ. of Minnesota, St. Paul, MN

D3313 *Trissolcus japonicus*: Egg suitability and resources. Hanna McIntosh and **Jana Lee** (jana.lee@ars.usda.gov), USDA - ARS, Corvallis, OR

D3314 Parasitoids in North American soybean fields: The effect of neonicotinoid seed treatments and hyperparasitism on soybean aphid biological control. **Jonathan Dregni** (dreg0005@umn.edu)¹, Kelton Welch¹, Mar Ferrer-Suay² and George Heimpel¹, ¹Univ. of Minnesota, St. Paul, MN, ²Univ. of Valencia, Valencia, Spain

D3315 Assessment of parasitism, development and reproduction in *Asobara japonica* according to temperature condition. **Seung-Hwan Yun** (ysh1986@gg.go.kr)¹, Jingu Lee¹, Gab June Lim¹, Jae Eun Jang¹, Jieun Hwang¹, A-Young Kim², Hong-Yul Seo², Chang-Sung Kang¹ and In-Tae Park¹, ¹Gyeonggi Agricultural Research & Extension Service, Hwaseong, South Korea, ²National Institute of Biological Resources, Incheon, South Korea

D3316 Monitoring and redistribution releases of *Trissolcus japonicus* (Hymenoptera: Scelionidae) in Virginia. **Chris Bergh** (cbergh@vt.edu)¹, Ashley Edwards², Kate Lawrence³, Kathleen Reed⁴ and Elijah Talamas⁵, ¹Virginia Polytechnic Institute and State Univ., Winchester, VA, ²Virginia Cooperative Extension, Hillsville, VA, ³Virginia Cooperative Extension, Fincastle, VA, ⁴Virginia Cooperative Extension, Roanoke, VA, ⁵Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

D3317 Multi-year control of black vine weevil, *Otiorynchus sulcatus*, in strawberries using a single application of native persistent entomopathogenic nematodes. **Elson J. Shields** (es28@cornell.edu), Antonio Testa and Benjamin Engbers, Cornell Univ., Ithaca, NY

D3318 Evaluation of two strains of *Beauveria bassiana* spores compatibility with a sprayable bioplastic formulation to control *Lygus lineolaris* (Hemiptera: Miridae) under laboratory and field conditions. **Maribel Portilla** (maribel.portilla@ars.usda.gov)¹, Hamed Abbas², Cesare Accinelli³ and Randall Luttrell¹, ¹USDA - ARS, Stoneville, MS, ²USDA - ARS, Stoneville, MS, ³Univ. of Bologna, Bologna, Italy

D3319 Susceptibility of the peanut burrower bug, *Pangaeus bilineatus* (Heteroptera: Cydnidae) to strains of entomopathogenic nematodes. **George Mbata** (mbatag@fvsu.edu)¹ and David Shapiro-Ilan², ¹Fort Valley State Univ., Fort Valley, GA, ²USDA - ARS, Byron, GA

D3320 Effect of leaf extracts from two *Brassica rapa* subspecies on *in vitro* growth of entomopathogenic fungi. Daniel Cerritos¹, **Pasco Avery** (pbavery@ufl.edu)¹, Xavier Martini², Valentina Candian¹, Liliana Cano¹ and Ronald Cave¹, ¹Univ. of Florida, Fort Pierce, FL, ²Univ. of Florida, Quincy, FL

D3321 Analysis of two *Beauveria bassiana* isolates infecting kudzu bugs, *Megacopta cribraria* (F.). Jeffery Jolly, Brandi Celia and **Erika Niland** (e.niland@wingate.edu), Wingate Univ., Wingate, NC

D3322 Investigating the use of endophytic fungi for the control of *Bagrada hilaris* on crops and weed hosts. **Joanna Fisher** (jfisher@ucdavis.edu), Ian Grettenberger and Frank Zalom, Univ. of California, Davis, CA

D3323 Field tests to reduce bird activity and related aircraft bird strike risk by microbial control of airfield grass insect populations, using replicated field applications of a locally isolated entomopathogen, *Metarhizium*. **Kathleen Gurski** (kathleen.gurski@forces.gc.ca)¹, Kelly Gurski¹, Dan Johnson², Stefan T. Jaronski³, Lawrence Kawchuk⁴ and Jul Wojnowski⁵, ¹Dept. of National Defence, Cold Lake, AB, Canada, ²Univ. of Lethbridge, Lethbridge, AB, Canada, ³USDA - ARS, Sidney, MT, ⁴Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ⁵Edmonton International Airport, Edmonton, AB, Canada

D3324 *Amblyseius swirskii* as a tool for pest management in nursery production. **Karla Adesso** (kaddesso@tnstate.edu), Paul O'Neal and Anthony Witcher, Tennessee State Univ., McMinnville, TN

D3325 Rearing and release of predators for management of hemlock woolly adelgid (*Adelges tsugae*) on the Cumberland Plateau in Tennessee. **Pat Parkman** (jparkman@utk.edu), Univ. of Tennessee, Knoxville, TN

D3326 Twospotted spider mite management in field-grown tomatoes using *Phytoseiulus persimilis* (Acari: Phytoseiidae). **Julian Golec** (jgolec@ncsu.edu) and Jim Walgenbach, North Carolina State Univ., Mills River, NC

D3327 Do more beneficial arthropods successfully overwinter in adjacent CRP pollinator habitat compared to arable organic soybean fields? **C. Scott Clem** (carlc2@illinois.edu) and Alexandra Harmon-Threatt, Univ. of Illinois, Champaign, IL

D3328 Monitoring the green lacewing *Chrysopa nigricornis* in Tennessee (Neuroptera: Chrysopidae). **Kaushalya Amarasekare** (kaushalya2641@yahoo.com) and Richard Link, Tennessee State Univ., Nashville, TN

D3329 Predatory insects captured in blackberries treated with biologically based insecticides and bordered by native perennial plants or pasture in Franklin County, Kentucky. **Karen Friley** (karen.friley@kysu.edu), John Sedlacek, Mamata Bashyal, Sathya Govindasamy, Megan McCoun and Jill Fisk, Kentucky State Univ., Frankfort, KY

D3330 Modeling interactions of hemlock woolly adelgid with two predatory beetle species in the Great Smoky Mountains National Park. Hannah Thompson, Suzanne Lenhart, **Gregory J. Wiggins** (wiggybug@utk.edu) and Jerome Grant, Univ. of Tennessee, Knoxville, TN

D3331 Feeding lifestyles of the Phytoseiidae revisited: Searching for a factitious rearing host for *Neoseiulus fallacis* (Acari: Phytoseiidae). **Robert McGregor** (mcgregorr@douglascollege.ca), Katelyn Crisp and Camile Castiglia, Douglas College, New Westminster, BC, Canada

D3332 Performance of *Benning* soybean pyramided with native traits for insect resistance when used with selected IPM tactics. **John All** (jall@uga.edu)¹, Zenglu Li¹, Wayne Parrott¹, Roger Boerma², Dean Kemp¹ and Phillip Roberts³, ¹Univ. of Georgia, Athens, GA, ²Georgia Seed Development, Athens, GA, ³Univ. of Georgia, Tifton, GA

D3333 Presentation withdrawn

D3334 Impact of microbial soil biofertilizers on wheat plants and interactions with Hessian fly (*Mayetiola destructor*). **Deirdre Prischmann-Voldseth** (deirdre.prischmann@ndsu.edu)¹, Tülin Özsisli², Kirk Anderson¹ and Marion Harris¹, ¹North Dakota State Univ., Fargo, ND, ²Kahramanmaraş Sütçü İmam Univ., Kahramanmaraş, Turkey

D3335 Aphid-responsive immune networks in hybrid switchgrass (*Panicum virgatum* L.). Kyle G. Koch¹, Nathan Palmer², Teresa Donze-Reiner³, Erin Scully⁴, Javier Seravalli⁵, Keenan L. Amundsen¹, Paul Twigg⁵, Joe Louis¹, Jeffrey Bradshaw⁶, Tiffany Heng-Moss¹ and **Gautam Sarath** (gautam.sarath@ars.usda.gov)², ¹Univ. of Nebraska, Lincoln, NE, ²USDA - ARS, Lincoln, NE, ³West Chester Univ. of Pennsylvania, West Chester, PA, ⁴USDA - ARS, Manhattan, KS, ⁵Univ. of Nebraska, Kearney, NE, ⁶Univ. of Nebraska, Scottsbluff, NE

D3336 Activity of a maize chitinase-like protein against maize insect pests. **Patrick Dowd** (patrick.dowd@ars.usda.gov), Todd Naumann, Eric Johnson and Neil Price, USDA - ARS, Peoria, IL

D3337 Susceptibility of hybrid and inbred corn to *Peregrinus maidis*, the corn planthopper. **Ordum Huot** (obhuot@ncsu.edu) and Anna Whitfield, North Carolina State Univ., Raleigh, NC

D3338 Investigating swede midge, *Contarinia nasturtii*, host plant interactions: A multi-pronged approach. **Boyd Mori** (boyd.mori@canada.ca)¹, Shane Hladun¹, Juliana Soroka¹, Owen Olfert¹, Eiji Nambara², Raju Soolanayakanahally¹, Dwayne Hegedus¹ and Martin Erlanson¹, ¹Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ²Univ. of Toronto, Toronto, ON, Canada

D3339 Does an apple a day keep the doctor away? **Jacques Brodeur** (jacques.brodeur@uMontréal.ca) and Julie Poitras-Saulnier, Univ. de Montréal, Montréal, QC, Canada

D3340 Efficacy of benzoate analogs as insecticides in high tunnel system. **Tahir Rashid** (trashid@alcorn.edu)¹ and Jian Chen², ¹Alcorn State Univ., Mound Bayou, MS, ²USDA - ARS, Stoneville, MS

D3341 Characterization of off target spray drift from a solid set canopy delivery system (SSCDS) in apples. **Matthew Grieshop** (grieshop@msu.edu)¹, Keith Kooner¹, Benjamin Savage¹ and Mark Ledebuhr², ¹Michigan State Univ., East Lansing, MI, ²Application Insight, LLC, Lansing, MI

D3342 Effect of insecticidal seed treatments on development and survival of fall armyworm larvae (*Spodoptera frugiperda*) on maize.

Gregg Nuessly (gnuessly@ufl.edu), Julien Beuzelin and Jehangir Bhadha, Univ. of Florida, Belle Glade, FL

D3343 Mixes and rotations: Incorporating the new baculovirus product, Loopex, into an IPM strategy for Lepidoptera brassica pests. **Michelle Franklin** (michelle.franklin@kpu.ca)¹, Matilda Tabert¹, Kiara Viaene² and Deborah Henderson¹, ¹Kwantlen Polytechnic Univ., Langley, BC, Canada, ²Ghent Univ., Ghent, Belgium

D3344 Evaluation of a sweet corn IPM program in Virginia. **Andrew Dechaine** (dechaine@vt.edu)¹, Hélène Doughty² and Thomas P. Kuhar¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²Virginia Polytechnic Institute and State Univ., Virginia Beach, VA

D3345 Chemical control on the dominant insect vector of sugarcane white leaf disease. **Youichi Kobori** (koboriy@affrc.go.jp)¹ and Yupa Hanboonsong², ¹Japan International Research Center for Agricultural Sciences, Tsukuba, Japan, ²Khon Kaen Univ., Khon Kaen, Thailand

D3346 Remote sensing for soybean aphid. Theresa Cira¹, Zach Marston¹, Ian MacRae², Erin Hodgson³ and **Robert Koch** (koch0125@umn.edu)¹, ¹Univ. of Minnesota, St. Paul, MN, ²Univ. of Minnesota, Crookston, MN, ³Iowa State Univ., Ames, IA

D3347 Comparison of rootworm management options in South Dakota. **Bradley McManus** (bradley.mcmanus@sdstate.edu) and Billy Fuller, South Dakota State Univ., Brookings, SD

D3348 Dispersion indices and eco-friendly control methods to *Ricania* sp. (Hemiptera: Ricaniidae). **YongSeok Choi** (yschoi92@korea.kr), Chuncheonnamdo Agricultural Research & Extension Services, Yesan, South Korea

D3349 Management of redbanded stink bug (*Piezodorus guildinii* Westwood) in Mississippi soybean production systems. **Dung Bao** (db3@entomology.msstate.edu)¹, Whitney Crow¹, Angus Catchot¹, John North¹, Adam Whalen¹, Ben Thrash¹, John Corbin¹, Tyler Towles¹, Bill McRight¹, Ty Smith¹, Keiton Croom¹, Mariane Coelho² and Brittany Lipsey¹, ¹Mississippi State Univ., Mississippi State, MS, ²Univ. Estadual Paulista, Botucatu, Brazil

D3350 Economic thresholds in soybean integrated pest management (IPM). **Adeney Bueno** (adeney.bueno@embrapa.br)¹, Rafael Hayashida², Ana Paula Queiroz³, Claudia Justus⁴ and Emerson Gomes⁵, ¹Embrapa Pesquisa e Desenvolvimento, Londrina, Brazil, ²State Univ. of Londrina, Londrina, Brazil, ³Parana Federal Univ., Londrina, Brazil, ⁴Londrina State Univ., Londrina, Brazil, ⁵Instituto Agronomico do Paraná, Londrina, Brazil

D3351 A new pest risk assessment tool for guiding the area-wide integrated management of *Spodoptera exigua* (Lepidoptera, Noctuidae: beet armyworm) on *Allium* spp. in Jamaica. **Michelle Sherwood** (mishanton@yahoo.com)¹, Marina Young² and Ronald Moody³, ¹Ministry of Industry Commerce, Agriculture and Fisheries, St. Catherine, Jamaica, ²Rural Agricultural and Development Authority, Kingston, Jamaica, ³Meteorological Office of Jamaica, Kingston, Jamaica

D3352 Inter-relationship between plants and insects as the basis for IPM systems. Shoil Greenberg¹ and **John Adamczyk** (john.adamczyk@ars.usda.gov)², ¹USDA - ARS, Carmel, IN, ²USDA - ARS, Poplarville, MS

D3353 Monitoring the efficacy of Flonicamid™ against the western tarnished plant bug, *Lygus hesperus* (Hemiptera: Miridae). Ayman Mostafa and **Gadelhak Ahmed** (gadelhakg@email.arizona.edu), Univ. of Arizona, Phoenix, AZ

D3354 Sugarcane borer (Lepidoptera: Crambidae) injury and infestation levels in Florida sugarcane and rice. **Erik Roldán Salazar** (erikroldan@ufl.edu), Julien Beuzelin, Matthew VanWeelden, Michael Karounos and Ronald Cherry, Univ. of Florida, Belle Glade, FL

D3355 Spatial abundance and temporal flight activity of peanut burrower bug, *Pangaeus bilineatus*, in Georgia. **Mark R. Abney** (mrabney@uga.edu) and Benjamin Aigner, Univ. of Georgia, Tifton, GA

D3356 Area-wide program to eradicate the European grapevine moth, *Lobesia botrana* in California, USA. **Gregory S. Simmons** (gregory.s.simmons@aphis.usda.gov)¹, Lucia Varela², Matt Daugherty³, Monica Cooper⁴ and Tyler E. Scharfel⁵, ¹USDA - APHIS, Salinas, CA, ²Univ. of California Cooperative Extension, Santa Rosa, CA, ³Univ. of California, Riverside, CA, ⁴Univ. of California, Napa, CA

D3357 Effect of seed treatment and cover crop on soybean seedling insects. **Dawson Kerns** (dkerns1@vols.utk.edu), Scott Stewart and Drake Copeland, Univ. of Tennessee, Jackson, TN

D3358 Assessing slug presence in a double crop system (wheat and soybeans) in western Kentucky. **Rocio Davila** (rdavila@uky.edu), Raul T. Villanueva and Zenaída Viloria, Univ. of Kentucky, Princeton, KY

D3359 Larval movement of soybean looper and southern armyworm in non-*Bt* soybean: Implications for refuge strategy. **Thiago Luis Fanela** (tfanela@yahoo.com.br)¹, Thomas Hunt², Nicole Luh², Matheus Ribeiro³, Tamiris de Araujo⁴, Rodrigo Faria¹ and Edson Luiz Baldin¹, ¹São Paulo State Univ., Botucatu, Brazil, ²Univ. of Nebraska, Concord, NE, ³Crop Enhancement, Inc., San Jose, CA, ⁴Federal Univ. of Viçosa, Viçosa, Brazil

D3360 Presentation withdrawn

D3361 The effects of planting date on corn earworm density and damage in a *Bt* and non-*Bt* corn isolate. **Blake Elkins** (blake.elkins@ars.usda.gov) and Nathan Little, USDA - ARS, Stoneville, MS

D3362 The occurrence and harm of spotted-wing drosophila (*Drosophila suzukii*) in China. **Liu Peixuan** (liupeixuan91@163.com), Zheng Yanan, Shi Yong and Fan Lichun, Shenyang Agricultural Univ., Shenyang, China

D3363 Integrated pest management of kudzu bug with an emphasis on trap cropping and biological control. **Rammohan Rao Balusu** (balusr@auburn.edu), Blessing Ademokoya and Henry Fadamiro, Auburn Univ., Auburn, AL

D3364 Small berry pests in China. **Shi Yong** (shiyong3929@163.com) and Zheng Yannan, Shenyang Agricultural Univ., Shenyang, China

D3365 Comparing the efficacy of various aerial spraying scenarios using *Bacillus thuringiensis* to protect trees from spruce budworm defoliation. **Alvaro Fuentealba** (alvaro.fuentealba-morales.1@ulaval.ca)¹, Alain Dupont², Christian Hébert³, Richard Berthiaume¹ and Eric Bauce⁴, ¹Laval Univ., Québec City, QC, Canada, ²Société de protection des forêts contre les insectes et maladies, Québec City, QC, Canada, ³Natural Resources Canada, Québec City, QC, Canada, ⁴Univ. Laval, Québec City, QC, Canada

D3366 California fivespined ips range expansion and outreach in the Pacific Northwest. Todd Murray¹, **Glenn R. Kohler** (glenn.kohler@dnr.wa.gov)² and Elizabeth A. Willhite³, ¹Washington State Univ., Pullman, WA, ²Washington State Dept. of Natural Resources, Olympia, WA, ³USDA - Forest Service, Sandy, OR

D3367 Insecticidal activity evaluation of natural and synthetic methyl benzoate analogs. **Yan Feng** (yan.feng@ars.usda.gov) and Aijun Zhang, USDA - ARS, Beltsville, MD

D3368 Fresh ideas for teaching organic pest management in the classroom. **Randa Jabbour** (rjabbour@uwyo.edu) and Makenzie Pellissier, Univ. of Wyoming, Laramie, WY

D3369 Low genetic differentiation among *Rhopalosiphum maidis* (Homoptera: Aphididae) populations feeding on *Sorghum* spp. Alicia Timm¹, Luay Khalaf², **Luke Tembrock** (tembrock@colostate.edu)¹ and C. Michael Smith², ¹Colorado State Univ., Fort Collins, CO, ²Kansas State Univ., Manhattan, KS

D3370 Regional pest pressure drives geographic variation in use of insecticidal seed treatments in mid-south rice. **Blake Wilson** (bwilson@agcenter.lsu.edu)¹, Mike Stout¹, Michael (Mo) Way², Gus Lorenz³, Nick Bateman⁴ and Jeff Gore⁵, ¹Louisiana State Univ., Baton Rouge, LA, ²Texas A&M AgriLife Research, Beaumont, TX, ³Univ. of Arkansas, Lonoke, AR, ⁴Univ. of Arkansas Division of Agriculture, Stuttgart, AR, ⁵Mississippi State Univ., Stoneville, MS

D3371 Application of Markov chain analysis to compute likelihood of multiyear infestation, from 34 years of grasshopper (Orthoptera: Acrididae) infestations in 25 counties and districts in Alberta, Canada. Everett Blakley¹, **Dan Johnson** (dan.johnson@uleth.ca)¹ and Scott Meers², ¹Univ. of Lethbridge, Lethbridge, AB, Canada, ²Alberta Agriculture and Rural Development, Brooks, AB, Canada

D3372 Who likes onions? Distribution and feeding preference of *Delia* in Canadian onion **Julia Mlynarek** (julia.mlynarek@canada.ca)¹, Kathrin Sim¹, Kim Hiltz² and Suzanne Blatt², ¹Agriculture and Agri-Food Canada, Harrow, ON, Canada, ²Agriculture and Agri-Food Canada, Kentville, NS, Canada

D3373 Coating of guava (*Psidium guajava* L.) fruits with botanical edible oils for control of fruit flies (*Ceratitis* spp. and *Bactrocera* spp.) in Khartoum, Sudan. **Esameldin Kabbashi** (esameldinkabbashi@gmail.com), National Food Research Center, Khartoum North, Sudan

D3374 Investigating barrier sprays and trapping to refine plum curculio, *Conotrachelus nenuphar* Herbst, management in peaches (Coleoptera: Curculionidae). **Jackie Lee** (jalee@uaex.edu) and Michael Brown, Univ. of Arkansas, Little Rock, AR

D3375 Investigating the effects of cover crops on both beneficial and insect pest populations. Jackie Lee and **Michael Brown** (mjbrown@uaex.edu), Univ. of Arkansas, Little Rock, AR

D3376 Duration of stress on hosts and colonization success by ambrosia beetles. **Michael Reding** (mike.reding@ars.usda.gov) and Christopher Ranger, USDA - ARS, Wooster, OH

D3377 Expanding the WSU-Decision Aid System to British Columbia. **Vincent Jones** (vpjones@wsu.edu)¹, Melissa Tesche², Ute Chambers¹ and Stefano Borghi¹, ¹Washington State Univ., Wenatchee, WA, ²Okanagan-Kootenay Sterile Insect Release Program, Kelowna, BC, Canada

D3378 Supplementing mating disruption with release of sterile codling moths in Washington apples. **Betsy Beers** (ebeers@wsu.edu)¹ and David Crowder², ¹Washington State Univ., Wenatchee, WA, ²Washington State Univ., Pullman, WA

D3379 Curative activity of insecticides used to control spotted-wing drosophila (Diptera: Drosophilidae) in tart cherry. **Ignatius Andika** (andikaig@msu.edu), Christine Vandervoort and John Wise, Michigan State Univ., East Lansing, MI

D3380 Apple leaf curling midges, *Dasineura mali* (Keif.): Infestation, impact and modeling in Québec province. **Franz Vanoosthuysse** (franz.vanoosthuysse@irda.qc.ca)¹, Daniel Cormier², Dominique Plouffe³ and Gaétan Bourgeois³, ¹Institut de recherche et de développement en agroenvironnement, Saint-Bruno-de-Montarville, QC, Canada, ²Centre de recherche et siège social, St-Bruno, QC, Canada, ³Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada

D3381 Management of *Halyomorpha halys* (Hemiptera: Pentatomidae) using integrated pest management crop perimeter restructuring in commercial apple orchards. **Clement Akotsen-Mensah** (ca555@scarletmail.Rutgers.edu)¹, Tracy C. Leskey², Chris Bergh³, Brett Blaauw⁴, Brent Short² and Anne Nielsen¹, ¹Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, ²USDA - ARS, Kearneysville, WV, ³Virginia Polytechnic Institute and State Univ., Winchester, VA, ⁴Univ. of Georgia, Athens, GA

D3382 Carpenterworm moths do not respond to ethanol baited traps. **David Held** (dwh0004@auburn.edu)¹, Jeremy Pickens² and Dylan Bartlett¹, ¹Auburn Univ., Auburn, AL, ²Auburn Univ., Mobile, AL

D3383 AAFC - Pest Management Centre: Successes in insect pest management. **Martin Trudeau** (martin.trudeau@agr.gc.ca)¹ and Cezarina Kora², ¹Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada, ²Agriculture and Agri-Food Canada, Ottawa, ON, Canada

D3384 Effect of seasonal timing on efficacy of Japanese beetle harmonization plan dip treatments. **Nadeer Yousef** (nyousef@blomand.net)¹, Jason Oliver¹, Karla Adesso¹, Anthony Witcher¹, Paul O'Neal¹, Michael Reding², Christopher Ranger² and Phillip A. Lewis³, ¹Tennessee State Univ., McMinnville, TN, ²USDA - ARS, Wooster, OH, ³USDA - APHIS, Buzzards Bay, MA

D3385 Living on the edge: Spatial distributions of codling moth, *Cydia pomonella* (L.), trap captures in English walnuts. **Elizabeth Boyd** (eaboyd@csuchico.edu)¹, Mateo Marquez², Yong-Lak Park³ and Justin Nay², ¹California State Univ., Chico, CA, ²Integral Ag. Inc, Durham, CA, ³West Virginia Univ., Morgantown, WV

D3386 Recent pepper weevil, *Anthonomus eugenii*, outbreaks and management in Georgia, USA. Alton N. Sparks, Jr. and **David Riley** (dgr@uga.edu), Univ. of Georgia, Tifton, GA

D3387 Evaluation of insecticides containing heat-killed *Burkholderia rinojensis* strain A396 and non-viable *Chromobacterium subtsugae* against key pests of fruit and berry production across multiple continents. **Timothy Johnson** (tjohnson@marronebio.com), Melissa O'Neal, Karla Medina Ortega, Brian Mueller and Pamela G. Marrone, Marrone Bio Innovations, Inc, Davis, CA

D3388 Comparison of conventional and OMRI-approved insecticides for the sustainable management of Caribbean fruit flies, *Anastrepha suspensa* Loew (Diptera: Tephritidae) in guava orchards in south Florida. **Simon Yeboah** (syeboah678@ufl.edu)¹, Nancy D. Epsy², Norman Leppa¹, Daniel Carrillo³ and Oscar Liburd¹, ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Miami, FL, ³Univ. of Florida, Homestead, FL

D3389 Presentation withdrawn

D3390 Viability of an irradiated pollen diet in *Bombus impatiens*. **Brooke Merrill** (merrillbee92@gmail.com), Koppert Biological Systems, Inc., Howell, MI

D3391 Presentation withdrawn

D3392 The role of (E)- β -caryophyllene in the tripartite interaction of virus-vector-host plant. **Xuefei Chang** (changxuefei2015@163.com), Qi Fang, Fang Wang and Gongyin Ye, Zhejiang Univ., Hangzhou, China

D3393 Effects of cattle grazing on milkweed density and monarch butterfly egg laying. **Brittany Poynor** (bpoynor@unomaha.edu)¹, Chris Helzer² and Timothy L. Dickson¹, ¹Univ. of Nebraska, Omaha, NE, ²The Nature Conservancy, Aurora, NE

Poster: SysEB, Ecology, Invasives, and Behavior

West Exhibit Hall A (Convention Centre)

D3394 Rare saproxylic hover flies (Diptera: Syrphidae) inhabiting old growth forests of New York state: One component of the Empire State Native Pollinator Survey. **Carmen Greenwood** (greenwcm@cobleskill.edu)¹, Liam Somers¹, Zachary Jacobson¹, Jeff Corser², Erin White² and Matthew Schlesinger³, ¹State Univ. of New York, Cobleskill, NY, ²New York State Natural Heritage Program, Albany, NY, ³New York Natural Heritage Program, Albany, NY

D3395 Cooperative fighting in social insects: An empirical test of Lanchester's laws. **Elizabeth Clifton** (elizabeth.clifton@uconn.edu) and Eldridge Adams, Univ. of Connecticut, Storrs, CT

D3396 Effect of *Bombus impatiens* workers on queen nest initiation and recovery. **Erica Sarro** (esarr002@ucr.edu), Univ. of California, Riverside, CA

D3397 Friend or foe: Discovering the colony-recognition cues of eusocial flatworms. **Brian Whyte** (ba.whyte@berkeley.edu), Univ. of California, El Cerrito, CA

D3398 Diversity of ants and bees associated with boreal and Great Lakes-St. Lawrence forest sites near Thunder Bay, Ontario. **Don Henne** (dhenne@lakeheadu.ca), Lakehead Univ., Thunder Bay, ON, Canada

D3399 Butterfly diversity and fauna of Qinling Mountains, China. **Lijun Fang** (fanglijun@hotmail.com), Shaanxi Academy of Sciences, Xi'an, China

D3400 Bacteriophage as a highly dynamic component of the pea aphid microbiome. **Jacob Russell** (jar337@drexel.edu)¹, Stephanie Weldon², Melissa Carpenter¹, Jonah Joffe¹, Andrew H. Smith³ and Kerry M. Oliver⁴, ¹Drexel Univ., Philadelphia, PA, ²Univ. of Montana, Missoula, MT, ³Rodale Institute, Kutztown, PA, ⁴Univ. of Georgia, Athens, GA

D3401 Relative importance of the surrounding matrices on the distribution of forest drosophilids (Diptera) in the Brazilian savanna. **Francisco Roque** (1117564@etfbsb.edu.br)¹ and Rosana Tidon², ¹Instituto Federal de Brasília, Recanto das Emas, Brazil, ²Univ. de Brasília, Brasília, Brazil

D3402 Comparisons of the shape in sexual traits with reference to phylogenetic relationships in false blister beetle *Oedemera sexualis*. **Haruki Tatsuta** (htatsuta@agr.u-ryukyuu.ac.jp)¹, Wataru Ogasa¹, Daisuke Satomi², Shin-ichi Kudo³ and Chiharu Koshio³, ¹Univ. of the Ryukyus, Nishihara, Japan, ²Kobe Univ., Kobe, Japan, ³Naruto Univ. of Education, Naruto, Japan

D3403 Systematic study and demographic fluctuations of some noctuid species in Algeria (Lepidoptera: Noctuidae). **Hadjer Barkou** (hadjer.barkou@gmail.com), Ecole Nationale Supérieure Agronomique, Bab Ezzouar, Algeria

D3404 Differential response by ants, spiders and butterflies to pinyon-juniper tree removal in the Great Basin, U.S.A. **James McIver** (james.mciver@oregonstate.edu), Oregon State Univ., Union, OR

D3405 Spider biodiversity of the Sam D. Hamilton Noxubee National Wildlife Refuge in Mississippi. **Breanna Lyle** (bl334@msstate.edu), Mississippi State Univ., Mississippi State, MS

D3406 Gut microbes associated with unique behaviour in *Cephalodesmius* (Scarabaeidae: Scarabaeinae), an Australian endemic rainforest dung beetle. **Kathryn Ebert** (k.ebert@uq.edu.au) and David Merritt, Univ. of Queensland, St. Lucia, Australia

D3407 Conservation of endangered Hawaiian bees. **Jason Graham** (jgraham3154@gmail.com), Univ. of Hawai'i, Honolulu, HI

D3408 Ecotone effects on flying invertebrate communities in a temperate hardwood forest. **Colleen Cosgrove** (ccosgro1@kent.edu), Christopher B. Blackwood and Mark W. Kershner, Kent State Univ., North Canton, OH

D3409 Towards a macroecology of "the little things that run the world." **Katie Marshall** (kmarshall@zoology.ubc.ca)¹, Jessica McLaughlin², Matthew Miller², Cameron Siler², Michael Weiser² and Michael Kaspari², ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Univ. of Oklahoma, Norman, OK

D3410 Seasonality and natural enemies of solitary bees and wasps (Hymenoptera: Aculeata) in trap-nests in the Parque Estadual de Porto Ferreira, Porto Ferreira, São Paulo, Brazil. **Marlene Lucia Aguilar Benavides** (marlene.aguilar@unimilitar.edu.co)¹ and Carlos Alberto Garófalo², ¹Univ. Militar Nueva Granada, Cajicá, Colombia, ²Univ. de São Paulo, Ribeirão Preto, Brazil

D3411 Insights on sediment management for macroinvertebrate forage resources in saline northern Great Plains lakes. **Iain Phillips** (iain.phillips@wsask.ca), Water Security Agency, Saskatoon, SK, Canada

D3412 Aposematic color variation in velvet ants (Hymenoptera: Mutillidae) along an environmental gradient. **Cecilia Vieira** (ceciliavieira@icloud.com)¹, Julio Miguel Alvarenga da Silva², James Pitts¹ and Guarino Colli³, ¹Utah State Univ., Logan, UT, ²Univ. do Estado de Mato Grosso, Nova Xavantina, Brazil, ³Univ. de Brasília, Brasília, Brazil

D3413 Mosquito surveillance and the first record of the invasive mosquito species *Aedes (Stegomyia) albopictus* (Skuse) (Diptera: Culicidae) in southern Iran. **Sara Doosti** (fania2008@gmail.com)¹, Mohamad Reza Yaghoobi-Ershadi², Kamran Akbarzadeh², Seyed Hassan Moosa-Kazemi², Hassan Vatandoost², Francis Schaffner³, Mohammad Mehdi Gooya⁴, Mohamad Reza Shirzadi⁴ and Ehsan Mostafavi⁵, ¹Zanjan Univ. of Medical Sciences, Zanjan, Iran, ²Tehran Univ. of Medical Sciences, Tehran, Iran, ³Univ. of Zürich, Zürich, Switzerland, ⁴Ministry of Health and Medical Education, Tehran, Iran, ⁵Pasteur Institute of Iran, Tehran, Iran

D3414 Examining population structure of bertha armyworm, *Mamestra configurata* (Lepidoptera: Noctuidae) in western North America during one outbreak cycle. **Dwayne Hegedus** (dwayne.hegedus@agr.gc.ca)¹, Martin Erlandson¹, Boyd Mori¹, Cathy Coutu¹, Jennifer Holowachuk¹, Owen Olfert¹ and Tara Garipey², ¹Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ²Agriculture and Agri-Food Canada, London, ON, Canada

D3415 Benefits of living underground: The case of the ant lion (Neuroptera: Myrmeleontidae). **Dumas Gálvez** (dumas.galvez@mail.com)^{1,2}, Milagros Garrido² and Fermin Gil², ¹INDICASAT AIP, Panama, Panama, ²Univ. de Panamá, Panamá, Panama

D3416 Greater banded hornet (*Vespa tropica*) established at several locations on Guam. **Christopher Rosario** (rosarioc1640@gmail.com)¹, Ross Miller², Aubrey Moore² and Lee Roy Sablan², ¹EA Engineering, Science and Technology Inc. PBC, Barrigada, Guam, ²Univ. of Guam, Mangilao, Guam

D3417 Bees at large: Identifying exotic bees in the United States. **Skyler Burrows** (skyler.burrows@gmail.com)¹, Lori R. Spears¹, Allan Smith-Pardo², Amanda Redford³, Ricardo A. Ramirez¹ and Terry Griswold⁴, ¹Utah State Univ., Logan, UT, ²USDA - APHIS, San Francisco, CA, ³USDA - APHIS, Fort Collins, CO, ⁴USDA - ARS, Logan, UT

D3418 Insect screening aids for CAPS. **Hanna Royals** (hroyals@gmail.com)¹ and Todd Gilligan², ¹Colorado State Univ., Fort Collins, CO, ²USDA - APHIS, Fort Collins, CO

D3419 Immature stages of the tribe Membracini (Hemiptera: Membracidae). **Stuart McKamey** (stuart.mckamey@ars.usda.gov)¹ and Adam Wallner², ¹USDA - ARS, Washington, DC, ²USDA - APHIS, Miami, FL

D3420 The spread of rice water weevil *Lissorhoptrus oryzophilus* in China. **Chunyan Jiang** (jiangchunyan@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

D3421 Colorado potato beetle in China. **Runzhi Zhang** (zhangrz@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

D3422 Cuticular differentials between prothoracic, mesothoracic and metathoracic legs seen in Grylotalpidae (Orthoptera). **Kylee Kleiner** (knkleiner@shsu.edu), Sibyl Bucheli, Justin Williams, Tamara J. Cook and Autumn J. Smith-Herron, Sam Houston State Univ., Huntsville, TX

D3423 The ecology and conservation of mountain butterflies in southern Mexico. **Jorge León-Cortés** (jleon@ecosur.mx), Zenia P. Ruiz-Utrilla and Marisol Almaraz-Almaraz, El Colegio de la Frontera Sur, San Cristóbal de las Casas, Mexico

Virtual Poster: MUVE

West Exhibit Hall A (Convention Centre)

VP36 Use and evaluation of identification workshops for pest ant species (Formicidae) in the Pacific Northwest and British Columbia. **Laurel Hansen** (laurel.hansen@sfcc.spokane.edu), Spokane Falls Community College, Spokane, WA

VP37 Using biodegradable seaweed-based hydrogels to deliver aqueous ant bait. **Jia-Wei Tay** (jiawei@ucr.edu) and Dong-Hwan Choe, Univ. of California, Riverside, CA

VP38 Compact all glass, TRUE CHOICE™ Olfactometer / Wind Tunnel. **James Estaver** (jbestaver@gmail.com), Sigma Scientific LLC, Micanopy, FL

VP39 Human food subsidies drive an urban ant feeding syndrome. **Amy Savage** (amy.savage@rutgers.edu), Rutgers, The State Univ. of New Jersey, Camden, NJ

Virtual Poster: PBT

West Exhibit Hall A (Convention Centre)

VP40 Susceptibility of western corn rootworm, *Diabrotica virgifera virgifera* LeConte, to the biological insecticide Spear® in diet toxicity assays. **Adriano Pereira** (aelias374@yahoo.com.br)¹, Alvar Carlson², Alexandra Haase², Kent S. Shelby³, Thomas Coudron³ and Bruce Hibbard³, ¹Univ. of Missouri, Columbia, MO, ²Vestaron, Kalamazoo, MI, ³USDA - ARS, Columbia, MO

VP41 Influence of *Citrus* seeds and their fixed oils on the behavior of the medfly *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae). Antonella Rosa, Alessandra Piras and **Carla Masala** (cmasala@unica.it), Univ. of Cagliari, Monserrato, Italy

VP42 Degassing rhythms of geogenic gases in a red wood-ant nest (*F. polyctena*) and in soil in the dormant East Eifel Volcanic Field, Germany. **Gabriele M. Berberich** (gabriele.berberich@tu-dortmund.de)¹, Martin B. Berberich², Aaron M. Ellison³ and Christian Woehler¹, ¹Technische Univ., Dortmund, Germany, ²IT-Consulting Berberich, Erfstadt, Germany, ³Harvard Univ., Petersham, MA

VP43 Sequence analyses of Lepidopteran serine proteases and identification of lineages likely associated with adaptations to herbivory. Sochanngam Kashung, Pawan Kumar, Parul Bhardwaj, Aashima Mehra, Tabasum Akhter and **Sudeshna Mazumdar-Leighton** (smazumdar@botany.du.ac.in), Univ. of Delhi, Delhi, India

VP44 Insecticidal activity, putative binding proteins and histopathological effects of *Bacillus thuringiensis* Vip3(459) toxin on the Lepidopteran pest *Ectomyelois ceratoniae*. **Hanan Boukedi** (hanan.boukedi@gmail.com)¹, Slim Tounsi¹ and Lobna Abdelkafi-Mesrati², ¹Centre de biotechnologie de sfax, Tunisie, Tunisia, ²Univ. of Jeddah, Jeddah, Saudi Arabia

VP45 Synergistic effects of amitraz and different pesticide classes on honey bee (*Apis mellifera*) worker survivorship. **Elina Niño** (elnino@ucdavis.edu), Cameron Jasper and Kyle Gray, Univ. of California, Davis, CA

VP46 Molecular mechanism of metabolic regulation during *Aedes aegypti* reproduction. **Xueli Wang** (wangxueli@ioz.ac.cn)¹, Yuan Hou¹, Tusar Saha², Alex Raikhel² and Zhen Zou¹, ¹Chinese Academy of Sciences, Beijing, China, ²Univ. of California, Riverside, CA

Virtual Poster: P-IE

West Exhibit Hall A (Convention Centre)

VP47 Suitability of *Diaphorina citri* as prey for *Sympherobius barberi* (Neuroptera: Hemerobiidae). **Azhar Khan** (azhar512@gmail.com)¹, Jawwad Qureshi², Muhammad Afzal³ and Philip A. Stansly⁴, ¹Bahauddin Zakariya Univ., Layyah, Pakistan, ²Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL, ³Univ. of Sargodha, Sargodha, Pakistan, ⁴Univ. of Florida, Immokalee, FL

VP48 The ART of the specialty crops-pollinator connection: Awareness, Relevance, and Training. **Christine Casey** (cacasey@ucdavis.edu) and Elina Niño, Univ. of California, Davis, CA

VP49 Using RNAi to change *Diaphorina citri* behavior in response to visual cues. **Thomson Paris** (thomsonparis@ufl.edu)^{1,2,3}, Justin George², Godfrey Miles^{1,2,3}, Sasha-Kay Clarke⁴, Chad Vosburg⁵, Max Reynolds⁵, Blessy Tamayo⁵, Kyle Kercher⁵, Dan DeAvila⁵, Christopher Cordola⁵, Rebecca Grace⁵, Jordan Norus⁵, Helen Wiersma-Koch⁵, Tom D'Elia⁵, Jawwad Qureshi¹, Sandra A. Allan⁶, Stephen L. Lapointe³, Wayne Hunter³ and Kirsten Pelz-Stelinski², ¹Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL, ²Univ. of Florida, Lake Alfred, FL, ³USDA - ARS, Fort Pierce, FL, ⁴The Univ. of the West Indies, Kingston, Jamaica, ⁵Indian River State College, Fort Pierce, FL, ⁶USDA - ARS, Gainesville, FL

VP50 A new pest risk assessment tool for guiding the area-wide integrated management of *Spodoptera exigua* (Lepidoptera, Noctuidae; beet armyworm) on *Allium* spp. in Jamaica. **Michelle Sherwood** (mishanton@yahoo.com)¹, Marina Young² and Ronald Moody³, ¹Ministry of Industry Commerce, Agriculture and Fisheries, St. Catherine, Jamaica, ²Rural Agricultural and Development Authority, Kingston, Jamaica, ³Meteorological Office of Jamaica, Kingston, Jamaica

VP51 Communicating knowledge and respect for spiders and their functions in ecosystems to audiences such as elementary students. **Mary Stark** (starkm@central.edu), Central College, Pella, IA

VP52 Mississippi bug blues: 2017-2018 year in review. **Jason Sanders** (jsanders@entomology.msstate.edu), Jennifer Seltzer and JoVonn Hill, Mississippi State Univ., Mississippi State, MS

VP53 Designing a robust large-scale monitoring scheme for monarch butterflies and milkweed. **Emily Weiser** (eweiser@usgs.gov)¹, Jay Diffendorfer², Laura López-Hoffman³, Darius Semmens² and Wayne Thogmartin¹, ¹US Geological Survey, La Crosse, WI, ²US Geological Survey, Denver, CO, ³Univ. of Arizona, Tucson, AZ

VP54 Ultraviolet b radiation modifies plant phenotypes and responses to insect herbivory in a recombinant inbred line population of *Arabidopsis thaliana*. **M. Gabriela Bidart** (gbidart@bgsu.edu), Bowling Green State Univ., Bowling Green, OH

VP55 Comparing two formulations of vebenone to protect whitebark pine from colonization by mountain pine beetle (*Dendroctonus ponderosae*). **Robert A. Progar** (rprogar@fs.fed.us)¹, Christopher J. Fettig², Cynthia Snyder³, Sandy Kegley⁴, Lia Spiegel¹, Brytten E. Steed⁵, Danny Cluck⁶, Leif Mortenson⁷, Steve Munson⁸ and Agenor Mafrá-Neto⁹, ¹USDA - Forest Service, La Grande, OR, ²USDA - Forest Service, Davis, CA, ³USDA - Forest Service, Redding, CA, ⁴USDA - Forest Service, Coeur d'Alene, ID, ⁵USDA - Forest Service, Missoula, MT, ⁶USDA - Forest Service, Susanville, CA, ⁷USDA - Forest Service, Placerville, CA, ⁸USDA - Forest Service, Ogden, UT, ⁹ISCA Technologies, Inc., Riverside, CA

VP56 Investigating the insect pollinators of black cherry (*Prunus serotina*) flowers in the Allegheny National Forest. **Craig Larcenaire** (craiglarcenaire@fs.fed.us)¹, Richard M. Turcotte¹, Michael Gutensohn² and Yong-Lak Park², ¹USDA - Forest Service, Morgantown, WV, ²West Virginia Univ., Morgantown, WV

VP57 Effect of host-plant switch on acquisition and transmission of Huanglongbing (citrus greening) bacterium by the Asian citrus psyllid *Diaphorina citri* (Hemiptera: Liviidae). El-Desouky Ammar¹, John Ramsey^{2,3}, Jaclyn Mahoney³, **David Hall** (david.hall@ars.usda.gov)⁴ and Michelle Heck², ¹Univ. of Florida, Fort Pierce, FL, ²USDA - ARS, Ithaca, NY, ³Boyce Thompson Institute, Ithaca, NY, ⁴USDA - ARS, Fort Pierce, FL

VP58 Ohio Agricultural Production Pollinator Habitat Utilization Survey. **James Jasinski** (jasinski.4@osu.edu)¹, Keng-Lou Hung², Celeste Welty³, Karen Goodell⁴, Elizabeth Long³, Amy Stone² and Kristina Vik², ¹Ohio State Univ. Extension, Urbana, OH, ²The Ohio State Univ., Columbus, OH, ³The Ohio State Univ., Wooster, OH, ⁴The Ohio State Univ., Newark, OH

VP59 Evaluation of piperitone as a repellent for *Euwallacea fornicatus*, vector of *Fusarium dieback*. **Paul E. Kendra** (paul.kendra@ars.usda.gov)¹, Wayne S. Montgomery¹, Teresa Narvaez¹, Elena Q. Schnell¹, Nurhayat Tabanca¹, Daniel Carrillo² and David Wakarchuk³, ¹USDA - ARS, Miami, FL, ²Univ. of Florida, Homestead, FL, ³Synergy Semiochemicals Corp, Burnaby, BC, Canada

Virtual Poster: SysEB

West Exhibit Hall A (Convention Centre)

VP60 Fine structure of pseudoscorpion from Qassim farm by SEM. **Souad Alsaqabi** (s.alsaqabi@qu.edu.sa), Qassim Univ., Unizah, Saudi Arabia

VP61 Phenotypic plasticity in cuticular hydrocarbons in ant populations. **Diego Assis** (santanaphoenix@gmail.com)^{1,2}, Izabel Cristina Turatti², Noberto Lopes², Ted Schultz¹ and Fabio Nascimento², ¹Smithsonian Institution, Washington, DC, ²Univ. de São Paulo, Ribeirão Preto, Brazil

VP62 Population genetics of Linda's Roadside Skipper, *Amblyscirtes linda* Freeman (Hesperiidae: Hesperinae), in the Oklahoma Ouachita Mountains and south-east region of the state. **Melissa Sadir** (melissa.sadir@ou.edu) and Katrina Menard, Sam Noble Museum of Natural History, Norman, OK

VP63 Molecular identification of three insects from the UAE desert ecosystem based mitochondrial Cytochrome c Oxidase Subunit I (COI) gene. **Mohammad Ali Al-Deeb** (m_aldeeb@uaeu.ac.ae), United Arab Emirates Univ., Al-Ain, United Arab Emirates

VP64 Quantifying aposematic body color: Testing for correlated evolution of conspicuousness and diurnal compound eye phenotype in cerambycid beetles (Coleoptera: Cerambycidae). **Ricky Zhu** (rzhubio@gmail.com) and Amy Berkov, City College of New York, New York, NY

TUESDAY, NOVEMBER 13 • MORNING

ESA and ESC Professional Awards Breakfast Featuring the Founders Memorial and Heritage Lectures

West Ballroom ABC (Convention Centre)

Moderators and Organizers: Michael Parrella¹ and Pat Bouchard², ¹Univ. of Idaho, Moscow, ID, ²Agriculture and Agri-Food Canada, Ottawa, ON, Canada

- 7:00 Breakfast
- 7:40 ESA Awards: Honorary Members, Fellows and Professional
- 8:00 Entomological Foundation Awards
- 8:05 ESA Certification Awards
- 8:10 ESC Awards
- 8:20 Introduction of the Founders Memorial Lecture
- 8:22 **1280** Founders' Lecture Memorial Lecture: He gave to man control over that dreadful scourge, yellow fever. **Shirley Luckhart** (sluckhart@uidaho.edu), Univ. of Idaho, Moscow, ID
- 8:52 Introduction of the Heritage Lecture
- 8:54 **1281** Heritage Lecture: Insect pests and invasive species don't stop at the border. **Judith H. Myers** (myers@zoology.ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada
- 9:25 Concluding Remarks

TUESDAY, NOVEMBER 13 / MARDI 13 NOVEMBRE

Program Symposium: Crossing Borders without Permission: Accidental Introduction of Biological Control Agents, a Significant Phenomenon with Risks, Benefits, and Policy Implications

Meeting Room 109/110 (Convention Centre)

Moderators and Organizers: Donald Weber¹, Tim Haye² and Peter Mason³, ¹USDA - ARS, Beltsville, MD, ²CABI, Delémont, Switzerland, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

9:30 **1282** Reality in a regulated realm: Accidental introduction of natural enemies is now common. **Donald Weber** (don.weber@ars.usda.gov)¹, Tim Haye² and Peter Mason³, ¹USDA - ARS, Beltsville, MD, ²CABI, Delémont, Switzerland, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

9:45 **1283** Risks and benefits of unintentional biological control introductions in Canada. **Peter Mason** (peter.mason@agr.gc.ca)¹, Owen Olfert², Tim Haye³, Tara Garipey⁴ and Paul Abram⁵, ¹Agriculture and Agri-Food Canada, Ottawa, ON, Canada, ²Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ³CABI, Delémont, Switzerland, ⁴Agriculture and Agri-Food Canada, London, ON, Canada, ⁵Agriculture and Agri-Food Canada, Agassiz, BC, Canada

10:00 **1284** Accidental versus intentional introductions of parasitoids against brown marmorated stink bug. **Kim Hoelmer** (kim.hoelmer@ars.usda.gov)¹, Donald Weber², Marie-Claude Bon³ and Tim Haye⁴, ¹USDA - ARS, Newark, DE, ²USDA - ARS, Beltsville, MD, ³USDA - ARS, Montferrier-sur-Lez, France, ⁴CABI, Delémont, Switzerland

10:15 **1285** Kudzu bug invasion of US now includes two Asian parasitoids. **Blessing Ademokoya** (bfa0003@auburn.edu)¹, Rammohan Rao Balusu², Charles H. Ray², Jason Mottern³ and Henry Fadamiro², ¹Univ. of Nebraska, Lincoln, NE, ²Auburn Univ., Auburn, AL, ³USDA - ARS, Washington, DC

10:30 **1286** Emergence of *Trissolcus hyalinipennis* Rajmohana & Narendran (Hymenoptera: Scelionidae), a parasitoid of *Bagrada hilaris* (Burmeister) (Hemiptera: Pentatomidae), in North America. **Fatemeh Ganjisaffar** (fatemeh.ganjisaffar@email.ucr.edu)¹, Elijah Talamas², Marie-Claude Bon³, Lisa Gonzalez⁴, Brian V. Brown⁴ and Thomas M. Perring¹, ¹Univ. of California, Riverside, CA, ²Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ³USDA - ARS, Montferrier-sur-Lez, France, ⁴Natural History Museum, Los Angeles, CA

10:45 **1287** Unexpected immigrants: Introduced entomopathogens can play key roles suppressing insect pests. **Ann E. Hajek** (aeh4@cornell.edu) and Sana Gardescu, Cornell Univ., Ithaca, NY

11:00 Break

11:15 **1288** Projecting the economic benefits of an accidentally introduced biological control agent of common ragweed, *Ambrosia artemisiifolia*, in Europe. **Urs Schaffner** (u.schaffner@cabi.org)¹, Sandro Steinbach², Heinz Müller-Schärer³ and the SMARTER Team⁴, ¹CABI, Delémont, Switzerland, ²Swiss Federal Institute of Technology, Zurich, Switzerland, ³Univ. of Fribourg, Fribourg, Switzerland, ⁴Sustainable management of *Ambrosia artemisiifolia* in Europe (SMARTER), Fribourg, Switzerland

11:30 **1289** Biocontrol of aquatic weeds within their native ranges illustrates the power of classical biological control, without permits. **Guillermo Cabrera Walsh** (gcabrera@fueidei.org)¹, M. Christina Hernández¹, Fernando McKay¹, Marina Oleiro^{1,2}, Mariel Guala¹ and Alejandro Sosa^{1,2}, ¹Fundación para el Estudio de Especies Invasivas, Hurlingham, Argentina, ²CONICET, Buenos Aires, Argentina

11:45 **1290** Cessation of enemy release or continuation of invasional meltdown? The case of soybean aphid and its natural enemies. **Joe Kaser** (joe.kaser@rutgers.edu)¹, James Miksanek² and George Heimpel², ¹USDA - ARS, Newark, DE, ²Univ. of Minnesota, St. Paul, MN

12:00 **1291** Why pursue regulated biological control introductions in an era of rampant "self-introduction" of natural enemies? **Richard Stouthamer** (richard.stouthamer@ucr.edu) and Paul F. Rugman-Jones, Univ. of California, Riverside, CA

12:15 **1292** Leaky borders, world trade and hobby hitchhikers: Biological, scientific and regulatory implications for classical biological control. **Tim Haye** (t.haye@cabi.org)¹, Peter Mason² and Donald Weber³, ¹CABI, Delémont, Switzerland, ²Agriculture and Agri-Food Canada, Ottawa, ON, Canada, ³USDA - ARS, Beltsville, MD

MUVE Section Symposium: Entomology without Borders: Tackling Insecticide Resistance through Science, Extension, and Collaboration

Meeting Room 224 (Convention Centre)

Moderators and Organizers: Casey Parker¹, Jocelyn R. Holt², Lina Bernaola³, Carlos Esquivel⁴ and Emily Justus⁴, ¹Univ. of Florida, Vero Beach, FL, ²Texas A&M Univ., College Station, TX, ³Louisiana State Univ., Baton Rouge, LA, ⁴The Ohio State Univ., Wooster, OH

9:30 Introductory remarks

9:30 **1293** The absurdity of borders from a mosquito perspective. **C. Roxanne Connelly** (csz5@cdc.gov), Centers for Disease Control and Prevention, Fort Collins, CO

10:00 **1294** Spatial and temporal dynamics of *Aedes aegypti* pyrethroid resistance in Iquitos, Peru. **Jennifer Baltzegar** (jen_baltzegar@ncsu.edu) and Fred Gould, North Carolina State Univ., Raleigh, NC

10:15 **1295** Neighbors help neighbors control urban mosquitoes. **Dina Fonseca** (dinafons@rci.rutgers.edu) and Brian Johnson, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

10:30 **1296** Collaborating with vector control to improve our understanding of insecticide resistance. **Casey Parker** (caseyparker@ufl.edu)¹, Daviela Ramirez¹ and C. Roxanne Connelly², ¹Univ. of Florida, Vero Beach, FL, ²Centers for Disease Control and Prevention, Fort Collins, CO

10:45 **1297** Incorporating insecticide resistance monitoring into an extension program. **Kristen Healy** (khealy@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

11:00 **1298** Understanding the molecular genetic basis of *Bt* resistance in insect pests. **Rey Cotto** (rc725@cornell.edu) and Ping Wang, Cornell Univ., Geneva, NY

11:15 **1299** Management of resistance to insecticides in the oriental fruit moth. **Lambert Kanga** (lambert.kanga@fam.u.edu), Florida A&M Univ., Tallahassee, FL

11:30 **1300** Knockdown resistance to pyrethroid insecticides. **Ke Dong** (dongk@msu.edu), Michigan State Univ., East Lansing, MI

11:45 **1301** Cracking the insect egg problem: Considering insecticide resistance in early life stages. **Brittany Campbell** (bcampbell@pestworld.org), National Pest Management Association, Fairfax, VA

12:00 **1302** Challenges and opportunities in pesticide resistance management of bed bugs. **Nina Jenkins** (nej2@psu.edu) and Matthew Thomas, Pennsylvania State Univ., University Park, PA

12:15 **1303** Pesticide perception and use on deer farms in Florida and its influence on resistance development in *Culicoides*. **Laura Harmon** (larharmon@ufl.edu)¹, Emma Weeks¹, Katherine Saylor¹, Nathan Burkett-Cadena² and Lee Cohnstaedt³, ¹Univ. of Florida, Gainesville, FL, ²Univ. of Florida, Vero Beach, FL, ³USDA - ARS, Manhattan, KS

MUVE Section Symposium: Mosquito-Microbe Interactions Beyond Vector-Pathogen

Meeting Room 121 (Convention Centre)

Moderator and Organizer: Matan Shelomi, National Taiwan Univ., Taipei, Taiwan

9:30 Welcoming remarks

9:35 **1304** “Attract and kill”: Bacterial isolates as a source of oviposition attractants for *Aedes aegypti*, the principal mosquito vector of dengue and Zika viruses. **Loganathan Ponnusamy** (loganathan_ponnusamy@ncsu.edu)¹, Coby Schal¹, Dawn M. Wesson² and Charles Apperson¹, ¹North Carolina State Univ., Raleigh, NC, ²Tulane Univ. School of Public Health & Tropical Medicine, New Orleans, LA

9:50 **1305** Prospecting for mosquito-killing bacteria: Towards the development of new insecticides. **George Dimopoulos** (gdimopo1@jhu.edu)¹, Jose Luis Ramirez², Sarah Short¹, Eric Caragata³, Jenny Carlson⁴, Chinmay Tikhe⁵, Sarah van Tol⁶, Hannah MacLeod¹, Raul Saraiva¹, Nahid Borhani¹ and Yuemei Dong¹, ¹Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, ²USDA - ARS, Peoria, IL, ³Fundação Oswaldo Cruz, Belo Horizonte, Brazil, ⁴Univ. of California, Davis, CA, ⁵Louisiana State Univ. AgCenter, Baton Rouge, LA, ⁶Univ. of Texas Medical Branch, Galveston, TX

10:05 **1306** Impact of host blood meal identity on gut microbiota of *Aedes aegypti*. **Ephantus Muturi** (ephanthus.muturi@ars.usda.gov)¹, Jose Luis Ramirez¹, Alejandro Rooney¹ and Chang-Hyun Kim², ¹USDA - ARS, Peoria, IL, ²Univ. of Illinois, Champaign, IL

10:20 **1307** Gut microbes strongly affect growth and development of larval stage mosquitoes. **Luca Valzania** (valzania@uga.edu)¹, Kerri Coon², Kevin Vogel¹, Mark Brown¹ and Michael Strand¹, ¹Univ. of Georgia, Athens, GA, ²Univ. of Texas, Austin, TX

10:35 **1308** Mosquito larval infection impacts adult life history traits and the ability to combat a secondary infection. **Julian F. Hillyer** (julian.hillyer@vanderbilt.edu) and Lisa D. Brown, Vanderbilt Univ., Nashville, TN

10:50 **1309** Interkingdom communication regulates mosquito attraction to hosts: Linking microbial ecology with insect behavior. **Jeffery K. Tomberlin** (jktomberlin@tamu.edu)¹ and Tawni Crippen², ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, College Station, TX

SD1310 Physicochemical study of mosquito larval habitats in the city of Rosso, Mauritania. **Mohamed Aly Ould Lemrabott** (mohamedalylemrabott@yahoo.fr)¹, Brahim Baba Aloueimine², Baba Adama Niass¹ and Driss Belglyti², ¹Univ. de Nouakchott Al-Aasriya, Nouakchott, Mauritania, ²Univ. Ibn Tofail, Kénitra, Morocco

11:05 Break and poster session

11:15 **1311** How do mosquito larvae influence microbial communities and ecosystem function across a gradient of nutrient enrichment? **William Walton** (william.walton@ucr.edu)¹, Jessica Coolidge², Dagne Duguma³ and Benjamin Nyman¹, ¹Univ. of California, Riverside, CA, ²West Valley Mosquito and Vector Control District, Ontario, CA, ³Univ. of Florida, Vero Beach, FL

11:30 **1312** Direct and indirect interactions between mosquitoes and their microbiota are a major determinant of vector competence. **Jason Rasgon** (jlr54@psu.edu)¹, Brittany Dodson¹, Grant Hughes¹, Laura D. Kramer², Marco Brustolin¹ and Sujit Pujhari¹, ¹Pennsylvania State Univ., University Park, PA, ²New York State Dept. of Health, Slingerlands, NY

11:45 **1313** Microbes associated with container waters and the presence or absence of *Aedes* mosquitoes in southern Taiwan. **Matan Shelomi** (mshelomi@ntu.edu.tw), National Taiwan Univ., Taipei, Taiwan

12:00 **SP1314** Environmentally-acquired bacteria are shed within one generation of mosquito colonization. **Nsa Dada** (ndada@cdc.gov)¹, Juan C. Lol², Ana C. Benedict², Francisco López², Mili Sheth¹, Norma Padilla² and Audrey Lenhart¹, ¹US Centers for Disease Control and Prevention, Atlanta, GA, ²Univ. del Valle de Guatemala, Guatemala City, Guatemala

12:10 **SP1315** Microbiota composition alters mosquito development. **Vincent Martinson** (vmartinson@uga.edu) and Michael Strand, Univ. of Georgia, Athens, GA

12:20 **SP1316** Survey for viral symbionts in mosquitoes from Texas, USA and their influence on vector competence of zoonotic arboviruses. **Estelle Martin** (estellemartin@tamu.edu)¹, Selene Garcia-Luna¹, Andrew Golnar¹, Wendy Tang¹, Monica Borucki², Megan Wise de Valdez³, Matthias Frank² and Gabriel Hamer¹, ¹Texas A&M Univ., College Station, TX, ²Lawrence Livermore National Laboratory, Livermore, CA, ³Texas A&M Univ., San Antonio, TX

MUVE Section Symposium: What Can We Learn About Vector-borne Diseases of Plants, Animals, and Humans from Talking to Each Other?

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Shirley Luckhart¹, Michael A. Riehle² and Judith Brown², ¹Univ. of Idaho, Moscow, ID, ²Univ. of Arizona, Tucson, AZ

9:30 **1317** Vectors living at the ecological edge and the impact on human arbovirus transmission. **Michael A. Riehle** (mriehle@ag.arizona.edu)¹, Teresa K. Joy¹, Chris Schmidt¹, Daniel Williamson¹, Andrew Monaghan², Pablo Reyes-Castro³, Lucia Castro³, Kacey Ernst¹ and Kathleen Walker¹, ¹Univ. of Arizona, Tucson, AZ, ²National Center for Atmospheric Research, Boulder, CO, ³El Colegio de Sonora, Hermosillo, Mexico

10:00 **1318** The role of vector life history and movement behavior in driving plant pathogen spread. **Allison Shaw** (ashaw@umn.edu)¹, Angela Peace², Morganne Igoe³, Nilsa A. Bosque-Pérez⁴ and Alison Power⁵, ¹Univ. of Minnesota, St. Paul, MN, ²Texas Tech Univ., Lubbock, TX, ³Univ. of Tennessee, Knoxville, TN, ⁴Univ. of Idaho, Moscow, ID, ⁵Cornell Univ., Ithaca, NY

10:30 **1319** Emergent vector-borne DNA viruses of cotton and cacao – possible risks and routes of global spread. **Judith Brown** (jbrown@ag.arizona.edu), Univ. of Arizona, Tucson, AZ

11:00 **1320** Emerging vector-borne disease issues for public health in Europe. **Jolyon Medlock** (jolyon.medlock@phe.gov.uk), Public Health England, Salisbury, United Kingdom

11:30 **1321** Flies, human bacterial pathogens and plants – plants as hosts in a new cross-kingdom disease cycle. **Astri Wayadande** (a.wayadande@okstate.edu), Oklahoma State Univ., Stillwater, OK

12:00 **1322** Cross-kingdom biology in malaria – shared cell signaling and responses of mosquitoes and humans to parasite infection. **Shirley Luckhart** (sluckhart@uidaho.edu)¹ and Michael A. Riehle², ¹Univ. of Idaho, Moscow, ID, ²Univ. of Arizona, Tucson, AZ

P-IE Section Symposium: Crossing Borders: Global Collaborations to Combat Forest Insect Pests

Meeting Room 213 (Convention Centre)

Moderators and Organizers: Kayla I. Perry¹, Jessica Hartshorn² and Rachel Ann Arango³, ¹The Ohio State Univ., Wooster, OH, ²Clemson Univ., Clemson, SC, ³USDA - Forest Service, Madison, WI

9:30 Introductory remarks

9:35 **1323** Optimizing surveillance strategies for early detection of biological invasions. **Denys Yemshanov** (denys.yemshanov@canada.ca), Natural Resources Canada, Sault Ste. Marie, ON, Canada

9:50 **1324** Biosurveillance of forest insects: Integration and application of genomic tools to the surveillance of high priority invasive pests. **Ilga Porth** (ilga.porth@sbf.ulaval.ca)¹, Amanda Roe², Roger Levesque¹, Melody A. Keena³, Juan Shi⁴, Christopher Keeling⁵, Michel Cusson^{1,5} and Richard Hamelin¹, ¹Univ. Laval, Québec City, QC, Canada, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada, ³USDA - Forest Service, Hamden, CT, ⁴Beijing Forestry Univ., Beijing, China, ⁵Natural Resources Canada, Québec City, QC, Canada

10:05 **1325** Using evolutionary history to help identify high-impact, non-native herbivorous specialist insects prior to their arrival. **Angela Mech** (angmech@gmail.com)¹, Daniel Herms², Kathryn Thomas³, Travis D. Marsico⁴ and Patrick Tobin⁵, ¹Western Carolina Univ., Cullowhee, NC, ²Davey Tree Expert Company, Kent, OH, ³US Geological Survey, Tucson, AZ, ⁴Arkansas State Univ., Jonesboro, AR, ⁵Univ. of Washington, Seattle, WA

10:20 Break

10:30 **1326** Climate change and the implications for eastern larch beetle population dynamics. **Fraser R. McKee** (fraser.mckee@gov.ab.ca)¹ and Brian Aukema², ¹Alberta Agriculture and Forestry, Edmonton, AB, Canada, ²Univ. of Minnesota, St. Paul, MN

10:45 **1327** Genetic variation in aspen phytochemical patterns mediates herbivore responses to phenological shifts. **Michael Falk** (michael.falk@wisconsin.gov)¹, Richard Lindroth², Ken Keefover-Ring² and Kenneth Raffa², ¹Wisconsin Dept. of Agriculture, Trade, and Consumer Protection, Madison, WI, ²Univ. of Wisconsin, Madison, WI

11:00 **1328** Do conifers exhibit tradeoffs between their constitutive and induced chemical defenses against tree-killing bark beetles? **Michael Howe** (howe3@wisc.edu)¹, Claudio Gratton¹, Ken Keefover-Ring¹, Charles Mason², Kimberly Wallin³, Alvin D. Yanchuk⁴, Jun Zhu¹ and Kenneth Raffa¹, ¹Univ. of Wisconsin, Madison, WI, ²Pennsylvania State Univ., University Park, PA, ³Univ. of Vermont, Burlington, VT, ⁴British Columbia Ministry of Forests, Victoria, BC, Canada

11:15 **1329** Induced monoterpenes of pine alter the interaction between two bark beetle-vectored, phytopathogenic fungi. **Fu'ai Wang** (fuai@ualberta.ca), Jonathan Cale and Nadir Erbilgin, Univ. of Alberta, Edmonton, AB, Canada

11:30 Concluding remarks

P-IE Section Symposium: Ecology and Evolution in Novel Species Interactions

Meeting Room 214 (Convention Centre)

Moderators and Organizers: Chandra Moffat¹ and Michael Stastny², ¹Agriculture and Agri-Food Canada, Summerland, BC, Canada, ²Natural Resources Canada, Fredericton, NB, Canada

9:30 **1330** Reconciling across scales: The challenges of novel species interactions in forest systems. **Michael Stastny** (michael.stastny@canada.ca), Natural Resources Canada, Fredericton, NB, Canada

9:45 **1331** Effects of temperature on the population life stage structure and phenological synchrony of a tree-killing bark beetle. **Jeffrey Lombardo** (jalombardo@smcm.edu)¹, Aaron Weed², Carissa Aoki³, Brian T. Sullivan⁴ and Matthew Ayres³, ¹St. Mary's College of Maryland, St. Mary's City, MD, ²US National Park Service, Woodstock, VT, ³Dartmouth College, Hanover, NH, ⁴USDA - Forest Service, Pineville, LA

10:00 **1332** Vegetation and habitat characteristics affect the abundance and impact of North American parasitoids attacking the emerald ash borer. **Justin Gaudon** (justin.gaudon@utoronto.ca)¹, Danijela Puric-Mladenovic^{1,2} and Sandy Smith¹, ¹Univ. of Toronto, Toronto, ON, Canada, ²Ontario Ministry of Natural Resources and Forestry, Peterborough, ON, Canada

10:15 **1333** Effects of joint shifts in phenology and distribution on plant-pollinator communities under climate change. **Nicole Rafferty** (nicole.rafferty@ucr.edu)^{1,2}, Andrea Keeler^{1,2} and Charlotte de Keyzer³, ¹Univ. of California, Riverside, CA, ²Rocky Mountain Biological Laboratory, Crested Butte, CO, ³Univ. of Toronto, Toronto, ON, Canada

10:30 **1334** Novel insect florivory strategy initiates autogamy in unopened allogamous flowers. **Kirk Hillier** (kirk.hillier@acadiau.ca), Emily Evans and Rodger C. Evans, Acadia Univ., Wolfville, NS, Canada

10:45 Break

10:55 **1335** Rapid evolution of a plant invader in response to biological control and global warming. **Yan Sun** (yan.sun@unifr.ch) and Heinz Müller-Schärer, Univ. of Fribourg, Fribourg, Switzerland

11:10 **1336** Accelerated adaptation of native novel enemies to aid in biological control. **Rhoda deJonge** (Rhoda.dejonge@utoronto.ca)¹, Rob Bouchier² and Sandy Smith¹, ¹Univ. of Toronto, Toronto, ON, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

11:25 **1337** Variability of xanthotoxin defense is difficult for a generalist caterpillar to track. **Ian Pearse** (ipearse@usgs.gov)¹, Ryan Paul² and Paul Ode², ¹US Geological Survey, Fort Collins, CO, ²Colorado State Univ., Fort Collins, CO

11:40 **SP1338** Altered host-parasitoid interactions for a species on the move: Comparing host-parasitoid interaction webs in the native and expanded ranges of *Neuroterus saltatorius* (Hymenoptera: Cynipidae). **Kirsten Prior** (kprior@binghamton.edu), Shannon Meadley-Dunphy, Susan Lee and Thomas Powell, Binghamton Univ., Binghamton, NY

11:50 **SP1339** A notodontid novelty: *Theroa zethus* caterpillars use their defensive weaponry to disarm the latex defense of their atypical host plants. **David Dussourd** (dussourd@uca.edu)¹, Madalyn Van Valkenburg¹, Kalavathy Rajan², Danielle Carrier² and David Wagner³, ¹Univ. of Central Arkansas, Conway, AR, ²Univ. of Tennessee, Knoxville, TN, ³Univ. of Connecticut, Storrs, CT

P-IE Section Symposium: The Gypsy Moth (*Lymantria dispar* L.) at 150: Contributions to the Development of Invasion Ecology

Meeting Room 215/216 (Convention Centre)

Moderators and Organizers: Dylan Parry¹ and Patrick Tobin²,
¹State Univ. of New York, Syracuse, NY, ²Univ. of Washington, Seattle, WA9:30 **Introductory remarks**9:35 **1340** Dispar lure: Application of social, political, and technological capital to improve Trouvelot's invention. **Forrest Ravlin** (ravlin@msu.edu), Michigan State Univ., East Lansing, MI9:50 **1341** Climate, adaptation, and stasis along the 2000 km gypsy moth invasion front. **Dylan Parry** (dparry@esf.edu)¹, Kristine Grayson², Derek Johnson³ and Patrick Tobin⁴, ¹State Univ. of New York, Syracuse, NY, ²Univ. of Richmond, Richmond, VA, ³Virginia Commonwealth Univ., Richmond, VA, ⁴Univ. of Washington, Seattle, WA10:05 **1342** A double edged sword: Gypsy moth outbreaks wreak extensive damage but yield a wealth of ecological information. **Kyle J. Haynes** (haynes@virginia.edu), Univ. of Virginia, Blandy, VA10:20 **1343** What can a phenology model tell us about the risk of introduction and the potential range of Asian and North American gypsy moth? **David Gray** (david.gray@nrcan.gc.ca), Natural Resources Canada, Fredericton, NB, Canada10:35 **1344** Re-evaluating the *Compsilura* hypothesis for explaining declines of native giant silk moths (Saturniidae). **Rea Manderino** (rmanderi@syrr.edu)¹, Patrick Tobin² and Dylan Parry¹, ¹State Univ. of New York, Syracuse, NY, ²Univ. of Washington, Seattle, WA10:50 **1345** Fungal entomopathogen dominant among gypsy moth natural enemies. **Saskya van Nouhuys** (saskya@cornell.edu)¹, Ann E. Hajek¹, Kyle J. Haynes² and Patrick Tobin³, ¹Cornell Univ., Ithaca, NY, ²Univ. of Virginia, Blandy, VA, ³Univ. of Washington, Seattle, WA11:05 **Break**11:15 **1346** Gypsy moth population dynamics before and after the introduction of *Entomophaga maimaiga* in 1989. **George Boettner** (boettner@psis.umass.edu)¹, Joseph Elkinton¹, Ann E. Hajek² and Andrew M. Liebhold³, ¹Univ. of Massachusetts, Amherst, MA, ²Cornell Univ., Ithaca, NY, ³USDA - Forest Service, Morgantown, WV11:30 **1347** Using genomic approaches to understand local adaptation and range dynamics in North American gypsy moth populations. **Trevor Faske** (fasket@vcu.edu)¹, Lily Thompson², Dylan Parry³, Andrew Eckert¹ and Kristine Grayson², ¹Virginia Commonwealth Univ., Richmond, VA, ²Univ. of Richmond, Richmond, VA, ³State Univ. of New York, Syracuse, NY11:45 **1348** Remote sensing of forest insect invasions: New approaches for historic mapping and near-real-time monitoring of pest impacts using Landsat time series. **Valerie Pasquarella** (valpasq@umass.edu)¹, Bethany Bradley¹, Joseph Elkinton¹ and David Orwig², ¹Univ. of Massachusetts, Amherst, MA, ²Harvard Univ., Petersham, MA12:00 **1349** Keynote: An old fart's perspective of the influence of gypsy moth research on advances in invasion ecology. **Andrew M. Liebhold** (aliebhold@fs.fed.us), USDA - Forest Service, Morgantown, WV**SysEB Section Symposium: Evolutionary and Phylogenetic Morphology**

Meeting Room 111/112 (Convention Centre)

Moderators and Organizers: Brendon Boudinot¹, István Mikó², Jéssica Gillung¹ and Ziad Khouri¹, ¹Univ. of California, Davis, CA, ²Pennsylvania State Univ., University Park, PA9:30 **1350** Symposium prospective: Evolutionary and phylogenetic morphology. **Brendon Boudinot** (beboudinot@ucdavis.edu), Univ. of California, Davis, CA9:45 **1351** Evolutionary morphology of the insect head: Untangling ancestral states and convergent transformations. **Markus Koch** (mkoch@evolution.uni-bonn.de), Univ. of Bonn, Bonn, Germany; Senckenberg Biodiversity and Climate Research Center, Frankfurt am Main, Germany10:00 **1352** Beyond calibration: Amber fossils reveal ancient adaptive radiations and lost morphological diversity in the earliest ants (Hymenoptera: Formicidae). **Phillip Barden** (pbarden@amnh.org), New Jersey Institute of Technology, Newark, NJ; American Museum of Natural History, New York, NY10:15 **1353** Next-generation phenomics and the renaissance of morphology in ant systematics. **Francisco Hita-Garcia** (fhitagarcia@gmail.com)¹, Nicholas Friedman¹, Adam Khalife^{1,2} and Evan Economo¹, ¹Okinawa Institute of Science and Technology, Okinawa, Japan, ²Univ. of Sorbonne, Paris, France10:30 **1354** Resilin discovered in the pygidial glands of *Harpalus pensylvanicus* (Coleoptera: Carabidae). **Adam Rork** (amr483@psu.edu), István Mikó and Tanya Renner, Pennsylvania State Univ., University Park, PA10:45 **Break**11:00 **1355** Phylogenomics and Bayesian ancestral state reconstruction support multiple origins of the "gula" of Neuropterida. **Jéssica Gillung** (jgillung@ucdavis.edu)¹ and Shaun Winterton², ¹Univ. of California, Davis, CA, ²California Dept. of Food and Agriculture, Sacramento, CA11:15 **1356** Understanding darkling beetle (Coleoptera: Tenebrionidae) morphology in relation to phylogenomics and the developing Coleoptera anatomy ontology. **Aaron Smith** (aaron.smith@nau.edu) and Kojun Kanda, Northern Arizona Univ., Flagstaff, AZ11:30 **1357** Ontology-informed phylogenetics opens new horizons for analyzing morphology. **Sergei Tarasov** (sergxf@yandex.ru)¹, István Mikó² and Matthew J. Yoder³, ¹Univ. of Tennessee, Knoxville, TN, ²Pennsylvania State Univ., University Park, PA, ³Univ. of Illinois, Champaign, IL11:45 **1358** Applying a flexible model of discrete trait evolution to estimate a phylogeny of the Formicidae. **April Wright** (april.wright@selu.edu), Southeastern Louisiana Univ., Hammond, LA12:00 **1359** Leveraging quantitative trait data to reconstruct disparification dynamics and phylogenetic relationships. **Caroline Parins-Fukuchi** (cfukuchi@umich.edu), Univ. of Michigan, Ann Arbor, MI12:15 **1360** Know your insect: Teaching insect morphology in the United States in the 21st century. **István Mikó** (istvan.miko@gmail.com), Pennsylvania State Univ., University Park, PA

SysEB Section Symposium: Insects in 3D - Current Uses and Future Directions for High Resolution 3D Data

Meeting Room 119/120 (Convention Centre)

Moderators and Organizers: Tom Semple¹ and Mark Metz²,
¹Australian National Univ., Canberra, Australia, ²USDA - ARS, Washington, DC

9:30 Introductory remarks

9:35 **1361** High-throughput X-ray microtomography for 3D digitization of insects: Applications and challenges. **Thomas van de Kamp** (thomas.vandekamp@kit.edu), Karlsruhe Institute of Technology, Karlsruhe, Germany10:05 **1362** Anatomy and functional responses of the mosquito olfactory system. **Olena Riabinina** (olena.riabinina@manchester.ac.uk), The Univ. of Manchester, Manchester, United Kingdom10:20 **1363** Non-destructive 3D visualization of whole live insects by using carbon dioxide as anesthetic during micro-CT imaging. **Joanna Konopka** (jkonopk@uwo.ca), Danny Poinapen, Jeremy N. McNeil and David Holdsworth, Western Univ., London, ON, Canada10:35 **1364** Microtomographic 3D imaging in arthropod research: A diversity of applications. **Brian Metscher** (brian.metscher@univie.ac.at), Univ. of Vienna, Vienna, Austria

10:50 Break

11:00 **1365** Introduction to blender, an open source software suite for 3D modeling, rigging, animation, and video compositing. **Mark Metz** (mark.metz@ars.usda.gov), USDA - ARS, Washington, DC11:15 **1366** Real time modeling of an insect structure in the open source 3D application Blender. **Mike Pan** (mike.c.pan@gmail.com), The Pixelary, Burnaby, BC, Canada11:30 **1367** Creation of morphologically accurate 3D models of mites. **Gary R. Baughan** (gary.baughan@ars.usda.gov)¹, Connor Gilbranson², Joseph Mowery¹, Chris Pooley¹ and Ronald Ochoa¹, ¹USDA - ARS, Beltsville, MD, ²US National Arboretum, Beltsville, MD11:45 **1368** Using 3D models and biophysical simulations to understand arthropod communication systems. **Natasha Mhatre** (natasha.mhatre@gmail.com), Univ. of Toronto, Scarborough, ON, Canada12:00 **1369** Integrating 3D data with evolutionary research: A case study on thynnid wasps. **Tom Semple** (thomas.semple@anu.edu.au), Australian National Univ., Canberra, Australia12:15 **SP1370** Nano-CT scanning the light organs of fireflies (Coleoptera: Lampyridae). **Kristin Dunn** (kristindunn@ufl.edu) and Marc Branham, Univ. of Florida, Gainesville, FL**SysEB Section Symposium: Latin American Entomology - Ecology & Biodiversity**

Meeting Room 122 (Convention Centre)

Moderators and Organizers: Clifford Keil¹, Erick Rodriguez² and Luis Camacho³, ¹Pontificia Univ. Católica, Quito, Ecuador, ²Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ³Univ. of British Columbia, Vancouver, BC, Canada9:30 **1371** Diversity of *Anastrepha* (Diptera: Tephritidae) in Latin America: Current status and knowledge from a USDA Farm Bill Project. **Erick Rodriguez** (erick.rodriguez@freshfromflorida.com)¹, Allen Norrbom², Gary Steck¹, Bruce Sutton¹, Raul Ruiz-Arce³, Norman Barr³, Pratibha Srivastava¹, Marc Branham⁴, Matthew Moore⁴, Brian M. Wiegmann⁵ and Clifford Keil⁶, ¹Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ²USDA - ARS, Washington, DC, ³USDA - APHIS, Edinburg, TX, ⁴Univ. of Florida, Gainesville, FL, ⁵North Carolina State Univ., Raleigh, NC, ⁶Pontificia Univ. Católica, Quito, Ecuador9:45 **1372** Bark and ambrosia beetles (Curculionidae: Scolytinae) of Latin America: Diversity, biological novelties and emerging pests. **Anthony Cognato** (cognato@msu.edu)¹, Sarah Smith¹, Rachel Osborn² and Malena Martinez³, ¹Michigan State Univ., East Lansing, MI, ²Michigan State Univ., Okemos, MI, ³Univ. Técnica Estatal, Quevedo, Ecuador10:00 **1373** Barcoding a megadiverse country – the case of the ants. **David A. Donoso** (david.donosov@gmail.com), Escuela Politécnica Nacional, Quito, Ecuador10:15 **1374** Does functional morphology predict coevolution and modularity among genital parts of stink bugs? **Cristiano Schwertner** (acrosternum@yahoo.com.br)¹ and Bruno Genevicius², ¹Univ. Federal de São Paulo, Diadema, Brazil, ²Univ. Federal de São Paulo, Diadema, Brazil10:30 **1375** Orchid bees: Past, present and future. The ecological miners' canary? **David Roubik** (roubikd@si.edu), Smithsonian Tropical Research Institute, Washington, DC

10:45 Break

11:00 **1376** Brown food webs in a neotropical rainforest. **Rafael Cardenas** (recardenasm@yahoo.com), Pontificia Univ. Católica, Quito, Ecuador11:15 **1377** Ants shape predation patterns along elevational gradients in the tropical Andes. **Luis Camacho** (lfcamachoc@gmail.com) and Leticia Aviles, The Univ. of British Columbia, Vancouver, BC, Canada11:30 **1378** Bidirectional lethality: Lethal parasitoids and lethal prey – tritrophic interactions of tephritid (Diptera: Tephritidae) flies, host plants (Curcubitaceae) and parasitoids (Braconidae: Hymenoptera) – cryptic speciation. **Marty A. Condon** (mcondon@cornellcollege.edu)¹, Isaac Winkler¹, Nina Theis², Gaelen Burke³, Tyler Simmonds³, Robin Bagley⁴, Andrew Forbes⁴, Heather Widmayer⁴, Sonja Scheffer⁵, Matthew Lewis⁵ and Brian Wiegmann⁶, ¹Cornell College, Mount Vernon, IA, ²Elms College, Chicopee, Ecuador, ³Univ. of Georgia, Athens, GA, ⁴Univ. of Iowa, Iowa City, IA, ⁵USDA - ARS, Beltsville, MD, ⁶North Carolina State Univ., Raleigh, NC11:45 **1379** Presentation withdrawn12:00 **1380** Cataloging orchid bees in Yasuni, Ecuador, using the stacking photography technique. **Rubén Jarrin** (hereyde88@hotmail.com) and Esteban Baus, Pontificia Univ. Católica, Quito, Ecuador

12:15 **1381** The role of behaviour in community assembly: Social spiders as a case study. **Leticia Aviles** (laviles@zoology.ubc.ca) and Philippe Fernandez-Fournier, The Univ. of British Columbia, Vancouver, BC, Canada

Member Symposium: Brown Marmorated Stink Bug, *Halyomorpha halys*, in Western North America: Status and Potential Harm to Agriculture

Meeting Room 217/218/219 (Convention Centre)

Moderators and Organizers: Charles H. Pickett¹ and Kent Daane², ¹California Dept. of Food and Agriculture, Sacramento, CA, ²Univ. of California, Parlier, CA

9:30 Introductory remarks

9:35 **1382** Not to be underestimated: Lessons learned from the invasion of brown marmorated stink bug in the west. **Jesus Lara Artiga** (jlara007@ucr.edu)¹, Charles Pickett² and Mark Hoddle¹, ¹Univ. of California, Riverside, CA, ²California Dept. of Food and Agriculture, Sacramento, CA

9:50 **1383** Biological control of brown marmorated stink bug in British Columbia: A waiting game, or a pre-emptive strike? **Paul Abram** (paul.abram@canada.ca)¹ and Susanna Acheampong², ¹Agriculture and Agri-Food Canada, Agassiz, BC, Canada, ²British Columbia Ministry of Agriculture, Kelowna, BC, Canada

10:05 **1384** BMSB in the shrub-steppe: Parasitoids, purshia, and proteins. **James Hepler** (james.hepler@wsu.edu), Adrian Marshall, Joshua Milnes and Betsy Beers, Washington State Univ., Wenatchee, WA

10:20 **1385** BMSB status in Oregon and future outlook. **Nik G. Wiman** (nik.wiman@oregonstate.edu)¹, David Max Lowenstein¹, Heather Andrews¹, Vaughn Walton² and Richard Hilton³, ¹Oregon State Univ., Aurora, OR, ²Oregon State Univ., Corvallis, OR, ³Oregon State Univ., Central Point, OR

10:35 Break

10:50 **1386** Using behavior and detection to identify potential for biocontrol of brown marmorated stink bug. **David Max Lowenstein** (david.lowenstein@oregonstate.edu), Heather Andrews, Erica Rudolph and Nik G. Wiman, Oregon State Univ., Aurora, OR

11:05 **1387** Status of BMSB in Utah, a mountain west state. **Diane G. Alston** (diane.alston@usu.edu), Lori R. Spears, Cody Holthouse, Zachary Schumm and Cami Cannon, Utah State Univ., Logan, UT

11:20 **1388** The role of temperature and humidity on BMSB population outbreaks in California. **Joanna Fisher** (fisher@ucdavis.edu)¹, Jhalendra Rijal², Chuck Ingels³ and Frank Zalom¹, ¹Univ. of California, Davis, CA, ²Univ. of California Cooperative Extension, Modesto, CA, ³Univ. of California Cooperative Extension, Sacramento, CA

11:35 **1389** Story of the BMSB invasion into California agriculture, including almonds a five billion-dollar industry. **Jhalendra Rijal** (jrjial@ucanr.edu)¹, Joanna Fisher² and Frank Zalom², ¹Univ. of California Cooperative Extension, Modesto, CA, ²Univ. of California, Davis, CA

11:50 **1390** Predation of brown marmorated stink bug eggs in California: New insights through imaging. **Charles Pickett** (charlie.pickett@cdfa.ca.gov)¹, Jesus Lara Artiga² and Mark Hoddle², ¹California Dept. of Food and Agriculture, Sacramento, CA, ²Univ. of California, Riverside, CA

12:05 Concluding remarks

Member Symposium: Density Dependence, Community Genetics, and Resistance Evolution

Meeting Room 116/117 (Convention Centre)

Moderators and Organizers: Nicholas Friedenber¹, Michael Caprio² and Jeannette Martinez³, ¹Applied Biomathematics, Setauket, NY, ²Mississippi State Univ., Mississippi State, MS, ³US Environmental Protection Agency, Washington, DC

9:30 **1391** Evolutionary implications of small-scale density dependence across a complex life cycle. **Jessie Mutz** (jmutz@bio.fsu.edu), Florida State Univ., Tallahassee, FL

9:45 **1392** Insect resistance to population control: Evolutionarily (almost) inevitable. **James Mallet** (jmallet@oeb.harvard.edu), Harvard Univ., Cambridge, MA

10:00 **1393** Larval density and survival of the western corn rootworm. **Bruce Hibbard** (bruce.hibbard@ars.usda.gov), USDA - ARS, Columbia, MO

10:15 **1394** Larval movement and density dependence in blended refuge. **Jeannette Martinez** (martinez.jeannette@epa.gov), US Environmental Protection Agency, Washington, DC

10:30 **1395** Population and resistance management with self-limiting transgenic insects. Liqin Zhou¹, Nina Alphey², Adam Walker³, Laura Travers¹, Neil Morrison³, Michael Bonsall^{2,3} and **Ben Raymond** (b.raymond@exeter.ac.uk)¹, ¹Univ. of Exeter, Penryn, United Kingdom, ²Univ. of Oxford, Oxford, United Kingdom, ³Oxitec Ltd, Abingdon, United Kingdom

10:45 **1396** Modeling population dynamics in IRM models: R_0, R_{max} , the ideal and the real. **David Onstad** (david.onstad@pioneer.com), DuPont Pioneer, Johnston, IA

11:00 **1397** Modeling density-dependent survival in western corn rootworm (*Diabrotica virgifera virgifera* LeConte): Implications for population dynamics and management. **Haridas Chirakkal** (npharidas@gmail.com), Union College, Lincoln, NE

11:15 **1398** Density dependence and growth rate: Evolutionary effects on resistance development to *Bt*. **Michael Caprio** (mcaprio@entomology.msstate.edu)¹, Jeannette Martinez² and Nicholas Friedenber³, ¹Mississippi State Univ., Mississippi State, MS, ²US Environmental Protection Agency, Washington, DC, ³Applied Biomathematics, Setauket, NY

11:30 **1399** Ignorance is bliss: How do we model density dependence on a daily time scale? **Nicholas Friedenber** (nick@ramas.com), Applied Biomathematics, Setauket, NY

11:45 **SP1400** Resistance to the neonicotinoid insecticides imidacloprid and thiamethoxam in Asian citrus psyllid *Diaphorina citri* Kuwayama (Hemiptera: Liviidae): Stability and relationship to gene expression. **Xue Dong Chen** (xuedongc@yahoo.com), Torrence Gill, Kirsten Pelz-Stelinski and Lukasz Stelinski, Univ. of Florida, Lake Alfred, FL

Member Symposium: Ethics in Entomology: Considerations for Research and Policy

Meeting Room 206 (Convention Centre)

Moderators and Organizers: Emily Sandall¹ and Christopher Ernst², ¹Pennsylvania State Univ., University Park, PA, ²Simon Fraser Univ., Burnaby, BC, Canada

9:30 Introductory remarks

9:35 **1401** Why it is (at least a small) wrong to harm a fly. **Jeffrey Lockwood** (lockwood@uwyo.edu), Univ. of Wyoming, Laramie, WY

TUESDAY, NOVEMBER 13 / MARDI 13 NOVEMBRE

9:50 **1402** Editing insects in the wild: Who should decide? **Carolyn Neuhaus** (neuhausc@thehastingscenter.org), The Hastings Center, Garrison, NY

10:05 **1403** Using bycatch to turn wanton slaughter into science. **Chris Looney** (clooney@agr.wa.gov)¹, Angela Yoder¹ and Lori R. Spears², ¹Washington State Dept. of Agriculture, Olympia, WA, ²Utah State Univ., Logan, UT

10:20 **1404** Entomological ethics and the 3Rs. **Bob Fischer** (fischer@txstate.edu), Texas State Univ., San Marcos, TX

10:35 Break

10:50 **1405** Insect collecting: An ethical pursuit. **Maxwell Barclay** (m.barclay@nhm.ac.uk), Natural History Museum, London, United Kingdom

11:05 **1406** Consideration of diverse publics and diverse markets in ethical debates of gene drives in agriculture. **Michael Jones** (msjones2@ncsu.edu)¹, Zachary Brown¹, Johanna Elsensohn¹, Jason Delborne¹ and Paul D. Mitchell², ¹North Carolina State Univ., Raleigh, NC, ²Univ. of Wisconsin, Madison, WI

11:20 **1407** Cognitive bias and moral deliberation: The case of invertebrate animals. **Irina Mikhalevich** (irina.mikhalevich@gmail.com), Rochester Institute of Technology, Rochester, NY

11:35 **1408** Do insects feel pain? **Shelley A. Adamo** (sadamo@dal.ca), Dalhousie Univ., Halifax, NS, Canada

12:05 Panel discussion

12:25 Concluding remarks

Member Symposium: Forest Insect Genomics

Meeting Room 114/115 (Convention Centre)

Moderators and Organizers: Christopher Keeling¹, Dezene P. W. Huber² and Gary J. Blomquist³, ¹Natural Resources Canada, Québec City, QC, Canada, ²Univ. of Northern British Columbia, Prince George, BC, Canada, ³Univ. of Nevada, Reno, NV

9:30 Introductory remarks

9:35 **1409** The evolution of neo-sex chromosomes in tree killing *Dendroctonus*. **Ryan R. Bracewell** (ryan.bracewell@berkeley.edu)¹, Barbara J. Bentz² and Jeff M. Good³, ¹Univ. of California, Berkeley, CA, ²USDA - Forest Service, Logan, UT, ³Univ. of Montana, Missoula, MT

9:50 **1410** Morphology and functional genes associated with dispersal capacity in the mountain pine beetle. **Victor Shegelski** (shegelsk@ualberta.ca)¹, Maya Evenden¹, Dezene P. W. Huber² and Felix A. H. Sperling¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²Univ. of Northern British Columbia, Prince George, BC, Canada

10:05 **1411** Monoterpenyl esters in the mountain pine beetle and sex-specific release of the aggregation pheromone *trans*-verbenol. **Christine C. Chiu** (ccchiu@msl.ubc.ca)¹, Christopher I. Keeling^{1,2} and Joerg Bohlmann¹, ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Natural Resources Canada, Québec City, QC, Canada

10:20 **1412** Omics approach to inquire into the metabolic network of the hydrolysis of complex polysaccharides in the bark beetle *Dendroctonus rhizophagus* (Curculionidae: Scolytinae) and its gut-associated microorganisms. **Gabriel Obregón-Molina** (gobregonm@live.com), L. Viridiana Soto-Robles, Verónica Torres-Banda, Rosa M. Pineda-Mendoza, María Fernanda López, Claudia Cano-Ramírez, Flor N. Rivera-Orduña and Gerardo Zúñiga, Instituto Politécnico Nacional, Ciudad de México, Mexico

10:35 **1413** Further on in the wood down there – they've got no names: Forest insect genomics to better understand forest arthropod diversity. **M. Alex Smith** (salex@uoguelph.ca)¹, Sarah Dolson¹, Thanushi Eagalle¹, Aaron Fairweather¹, Chris Ho¹, Kate Pare¹, Ellen Richard¹, Lauren Stitt¹, Winnie Hallwachs² and Daniel H. Janzen², ¹Univ. of Guelph, Guelph, ON, Canada, ²Univ. of Pennsylvania, Philadelphia, PA

10:50 Break

SD1414 Transcriptomic signatures of invasion-relevant traits in the Asian longhorned beetle. **Alex Torson** (atorson@uwo.ca)¹, Amanda Roe², Daniel Doucet² and Brent Sinclair³, ¹Western Univ., London, ON, Canada, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada, ³Univ. of Western Ontario, London, ON, Canada

SD1415 Population structure and demographic expansion evidences in *Drosophila sturtevanti* (*saltans* group, Drosophilidae) from Atlantic Forest fragments based on *COI* and *COII* genes. **Lilian Madi-Ravazzi** (lilian@ibilce.unesp.br) and Samara Videira Zorzato, Univ. Estadual Paulista, São José do Rio Preto, Brazil

SD1416 Functional characteristics of oxidative stress proteins in *Dendroctonus ponderosae* (Coleoptera: Curculionidae). **Luke Spooner** (lukespooner89@gmail.com), Philip Batista and Dezene P. W. Huber, Univ. of Northern British Columbia, Prince George, BC, Canada

SD1417 Population genomic structure of the spruce budworm (*Choristoneura fumiferana*). **Lisa Lumley** (lisa.lumley@gov.ab.ca)¹, Esther Pouliot², Jérôme Laroche³, Brian Boyle³, Bryan Brunet⁴, Roger Levesque³, Felix Sperling⁵ and Michel Cusson³, ¹Royal Alberta Museum, Edmonton, AB, Canada, ²Natural Resources Canada, Québec City, QC, Canada, ³Univ. Laval, Québec City, QC, Canada, ⁴Canadian Food Inspection Agency, Nepean, ON, Canada, ⁵Univ. of Alberta, Edmonton, AB, Canada

11:05 Poster session

11:20 **1418** Genomics of the Eurasian spruce bark beetle, *Ips typographus*. **Paal Krokene** (krp@nibio.no)¹, Martin N. Andersson², Ewald Grosse-Wilde³ and Fredrik Schlyter^{3,4}, ¹Norwegian Institute of Bioeconomy Research, Ås, Norway, ²Lund Univ., Lund, Sweden, ³Czech Univ. of Life Sciences, Prague, Czech Republic, ⁴Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

11:35 **1419** Candidate genes for flight ability in female gypsy moths (Erebidae, *Lymantria dispar* spp.) based on a genome-wide association study and genome scans. **Gwylim Blackburn** (gwylim.blackburn@gmail.com)^{1,2}, Julien Prunier¹, Christopher Keeling², Melody A. Keena³, Nathan Havill³, Michel Cusson^{1,2} and Ilga Porth³, ¹Univ. Laval, Québec City, QC, Canada, ²Natural Resources Canada, Québec City, QC, Canada, ³USDA - Forest Service, Hamden, CT

11:50 **SP1420** Genomic architecture of regional differentiation in the mountain pine beetle (*Dendroctonus ponderosae*). Stephen Trevooy¹, Jasmine Janes^{2,3}, Victor Shegelski¹, Christopher I. Keeling^{4,5} and **Felix Sperling** (felix.sperling@ualberta.ca)¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²Vancouver Island Univ., Nanaimo, BC, Canada, ³Univ. of New England, Armidale, Australia, ⁴Natural Resources Canada, Québec City, QC, Canada, ⁵Univ. Laval, Québec City, QC, Canada

12:00 Concluding remarks

Member Symposium: Microbial Synergies and Interactions in Biocontrol Systems

Meeting Room 203 (Convention Centre)

Moderators and Organizers: Robert Behle¹ and Surendra Dara², ¹USDA - ARS, Peoria, IL, ²Univ. of California Cooperative Extension, San Luis Obispo, CA

9:30 Introductory remarks

9:40 **1421** Interactions among *Bt* insecticidal proteins as the cornerstone for biological control. **Brian A. Federici** (brian.federici@ucr.edu), Univ. of California, Riverside, CA10:10 **1422** Leveraging the power of peptides with *Bacillus thuringiensis*. **Robert Kennedy** (rmkennedy@vestaron.com), Vestaron, Kalamazoo, MI10:40 **1423** Tritrophic interactions: Insect, plant, and endophytic insect pathogenic fungus, *Metarhizium*. **Michael Bidochka** (mbidochka@brocku.ca), Brock Univ., St. Catharines, ON, Canada

11:10 Break

11:25 **1424** Efficacy of entomopathogenic fungi against early blight of tomato. **M. Usman Ghazanfar** (usmanghazanfar1073@yahoo.com), Univ. of Sargodha, Sargodha, Pakistan11:55 **1425** Determining synergy among insect pathogens for augmentation biological control. **Robert Behle** (robert.behle@ars.usda.gov), USDA - ARS, Peoria, IL**Member Symposium: Newly Established Exotic Pests: Transitioning from Emergency Response to IPM**

Meeting Room 207 (Convention Centre)

Moderators and Organizers: Godshen Pallipparambil and Jaap B. van Kretschmar, NSF Center for Integrated Pest Management, Raleigh, NC

9:30 Introductory remarks

9:35 **1426** The pest regulatory continuum: From the proactive assessment of pre-emergent species to control, recovery and management. **Karl Suiter** (karl_suiter@cipm.info), NSF Center for Integrated Pest Management, Raleigh, NC9:50 **1427** After detecting a new pest: Evaluation and response activities. **Ricardo Valdez** (ricardo.valdez@aphis.usda.gov), USDA - APHIS, Riverdale, MD10:05 **1428** Managing domestic programs: Eradication versus suppression. **Robyn Rose** (robyn.i.rose@aphis.usda.gov), USDA - APHIS, Riverdale, MD10:20 **1429** Recovery: Facilitating the transition to long-term pest management. **Amanda Hodges** (achodges@ufl.edu)¹ and Greg Hodges², ¹Univ. of Florida, Gainesville, FL, ²Florida Dept. of Agriculture and Consumer Services, Gainesville, FL10:35 **1430** Failed attempts to establish IPM for Asian cycad scale and coconut rhinoceros beetle on Guam. **Aubrey Moore** (aubreymoore@guam.net), Univ. of Guam, Mangilao, Guam10:50 **1431** From the lab to the field: The challenge of developing IPM strategies for *Drosophila suzukii* (Diptera: Drosophilidae). **Lauren Diepenbrock** (laurendiepenbrock@gmail.com) and Hannah Burrack, North Carolina State Univ., Raleigh, NC

11:05 Break

11:20 **1432** Guiding growers from widespread panic to pragmatic pest management. **Michael Toews** (mtoews@uga.edu), Univ. of Georgia, Tifton, GA11:35 **1433** History and management of invasive vineyard pests in the isolated southern interior of British Columbia. **Thomas Lowery** (loweryt@agr.gc.ca), Agriculture and Agri-Food Canada, Summerland, BC, Canada

11:50 Panel discussion

12:25 Concluding remarks

Member Symposium: The Dirt on Plant-Insect Interactions

Meeting Room 205 (Convention Centre)

Moderators and Organizers: Elizabeth Rowen and Elizabeth Davidson-Lowe, Pennsylvania State Univ., University Park, PA9:30 **1434** When loess is more: Managing agricultural soils to improve pest resistance in plants. **Ebony Murrell** (egmurrell@gmail.com)¹, Brandon Barton², Eileen Cullen³, Crystal Hanson⁴, Jason Kaye⁵, Mary Lemmon⁶, Dawn Luthé⁵ and Swayamjit Ray⁵, ¹The Land Institute, Salina, KS, ²Mississippi State Univ., Mississippi State, MS, ³California State Polytechnic Univ., Pomona, CA, ⁴Univ. of Wisconsin, Madison, WI, ⁵Pennsylvania State Univ., University Park, PA9:45 **1435** Cover-crop facilitated effects on arbuscular mycorrhizal fungi impacts resistance to herbivores from multiple feeding guilds. **Elizabeth Davidson-Lowe** (exd33@psu.edu)¹, Swayamjit Ray¹, Ebony Murrell² and Jared Ali¹, ¹Pennsylvania State Univ., University Park, PA, ²The Land Institute, Salina, KS10:00 **1436** Root endophytic fungi have variable effects on belowground plant-insect interactions. **Kyle Wickings** (kgw37@cornell.edu) and Huijie Gan, Cornell Univ., Geneva, NY10:15 **1437** Soil microbiomes in plant-insect interactions and their application for pest control. **Ana Pineda** (a.pineda@nioo.knaw.nl), Univ. de Alicante, San Vicente del Raspeig, Spain; Netherlands Institute of Ecology, Wageningen, Netherlands10:30 **1438** Mechanisms of fungal endophyte-mediated deterrence to herbivores in cotton. **Gregory Sword** (gasword@tamu.edu)¹, Cody Gale¹, Eli Borrego¹, Wenqing Zhou¹, Jose Perez², Charles Suh² and Michael Kolomiets¹, ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, College Station, TX

10:45 Break

10:55 **1439** Manure cocktails promote conservation biological control. **Carmen Blubaugh** (carmen.blubaugh@gmail.com)¹ and William Snyder², ¹Clemson Univ., Clemson, SC, ²Washington State Univ., Pullman, WA11:10 **1440** Bull manure increases corn resistance to some lepidopteran herbivores. **Elizabeth Rowen** (epr5119@psu.edu) and John Tooker, Pennsylvania State Univ., University Park, PA11:25 **1441** Arbuscular mycorrhizal fungi determine the susceptibility of milkweed herbivores to their predators and parasites. **Mark D. Hunter** (mdhunter@umich.edu)¹, Rachel Vannette², Leiling Tao³, Amanda Meier¹ and Jacobus de Roodé⁴, ¹Univ. of Michigan, Ann Arbor, MI, ²Univ. of California, Davis, CA, ³Simon Fraser Univ., Burnaby, BC, Canada, ⁴Emory Univ., Atlanta, GA11:40 **1442** Biological buffering: How the soil community promotes plant resistance and resilience to pests. **Larry Phelan** (phelan.2@osu.edu), The Ohio State Univ., Wooster, OH

11:55 **SP1443** Different “ghosts of insect herbivores past” for soil microbes if goldenrod grows in fertile vs. infertile soil. **Karin Burghardt** (burghardt@si.edu)¹, Oswald Schmitz² and Mark Bradford², ¹Univ. of Maryland, College Park, MD, ²Yale Univ., New Haven, CT

Member Symposium: The Value of Forests to Insect Pollinators

Meeting Room 202 (Convention Centre)

Moderators and Organizers: Michael D. Ulyshen¹, Sara Galbraith² and James Rivers², ¹USDA - Forest Service, Athens, GA, ²Oregon State Univ., Corvallis, OR

9:30 **1444** Patterns of forest bee biodiversity in human-modified landscapes. **Colleen Smith** (cms599@rutgers.edu) and Rachael Winfree, Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:45 **1445** Dynamic habitat associations of native bees in early-successional forests of Pennsylvania. **Darin McNeil** (darin.j.mcneil@gmail.com)¹, Codey Mathis², Erin Moser², Clint Otto³, Katherine Urban-Mead¹, David King⁴, Amanda Rodewald¹ and Jeffery Larkin², ¹Cornell Univ., Ithaca, NY, ²Indiana Univ. of Pennsylvania, Indiana, PA, ³US Geological Survey, Jamestown, ND, ⁴Univ. of Massachusetts, Amherst, MA

10:00 **1446** Effects of seasonality, forest structure and understory plant richness on bee community assemblage in a southern Rocky Mountain mixed conifer forest. **Thomas Davis** (seth.davis@colostate.edu)¹, Paul Raymond Rhoades², Wade Tinkham¹ and Chad Hoffman¹, ¹Colorado State Univ., Fort Collins, CO, ²Idaho State Dept. of Agriculture, Hayden, ID

10:15 **1447** Managing the shrub layer for pollinators in forests. **Michael D. Ulyshen** (mulyshen@fs.fed.us)¹, Chelcy Miniat², Katherine Elliott², Peter Caldwell² and Scott Horn¹, ¹USDA - Forest Service, Athens, GA, ²USDA - Forest Service, Otto, NC

10:30 **1448** Experimental removal of timber harvest residue enhances wild bee diversity within managed conifer forests. **James Rivers** (jim.rivers@oregonstate.edu)¹, Codey L. Mathis², Andrew R. Moldenke¹ and Matthew G. Betts¹, ¹Oregon State Univ., Corvallis, OR, ²Indiana Univ. of Pennsylvania, Indiana, PA

10:45 Break

11:00 **1449** Bees in the trees: Early spring forest canopy resources support orchard pollinators. **Katherine Urban-Mead** (kru4@cornell.edu), Scott McArt and Bryan N. Danforth, Cornell Univ., Ithaca, NY

11:15 **1450** Predicting the response of pollinators to fire and fire diversity. **Stephen Mason** (scm77@drexel.edu)¹ and Lauren Ponisio², ¹Drexel Univ., Philadelphia, PA, ²Univ. of California, Riverside, CA

11:30 **1451** Wild bee reproductive output and sex ratio is influenced by wildfire severity in mixed conifer forest. **Sara Galbraith** (sara.galbraith@oregonstate.edu)¹, James H. Cane² and James Rivers¹, ¹Oregon State Univ., Corvallis, OR, ²USDA - ARS, Logan, UT

11:45 **1452** Impacts of large prescribed burns on pollinators in the longleaf pine ecosystem. **Conor Fair** (cfair13@uga.edu)¹, Michael D. Ulyshen², Scott Pokswinski³ and Kevin Hiers³, ¹Univ. of Georgia, Athens, GA, ²USDA - Forest Service, Athens, GA, ³Tall Timbers Research Station, Tallahassee, FL

10-min: MUVE, Forensic Entomology

Meeting Room 221/222 (Convention Centre)

Moderators: Jodie Warren¹ and Jennifer Pechal², ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Michigan State Univ., East Lansing, MI

9:30 **1453** Development of immunoassays for distinction of necrophagous fly artifacts from human bloodstains. **David B. Rivers** (drivers@loyola.edu), Gillian Acca, Marc Fink, Rebecca Brogan, Dorothy Chen and Andrew Schoeffield, Loyola Univ. Maryland, Baltimore, MD

9:40 **1454** The colonization of human remains in Australia. **Angela Skopyk** (angela.skopyk@uoit.ca)¹, Helen LeBlanc² and Shari Forbes³, ¹Univ. of Ontario Institute of Technology, Oshawa, ON, Canada, ²Univ. of Ontario, Oshawa, ON, Canada, ³Univ. du Québec, Trois-Rivières, QC, Canada

9:50 **1455** Early examinations of hyperspectral remote sensing to age post feeding *Lucilia sericata* reared on different food substrates. **Jodie Warren** (jwarren@sfu.ca) and Gail Anderson, Simon Fraser Univ., Burnaby, BC, Canada

10:00 **1456** The effect of tissue type on the development of two forensically important blow fly species, *Phormia regina* (Meigen) and *Lucilia sericata* (Meigen). Veena Mehta, Joseph Fragale, Hannah Chu and **Jennifer Rosati** (jrosati@jay.cuny.edu), John Jay College of Criminal Justice, New York, NY

10:10 **1457** Presentation withdrawn

10:20 **1458** Providing pest identification & civil forensic entomology services for a commercial pest control company. **Alicia Gettis** (alicia.gettis@ecolab.com), Ecolab, Eagan, MN

10:30 **1459** Reproductive capacity and lifespan of the blow fly, *Chrysomya megacephala* (F.) (Diptera: Calliphoridae). **Narin Sontigun** (narinsontigun@gmail.com)¹, Anchalee Wannasan¹, Kom Sukontason¹, Jens Amendt² and Kabkaew Sukontason¹, ¹Chiang Mai Univ., Chiang Mai, Thailand, ²Goethe-Universität, Frankfurt am Main, Germany

10:40 **1460** Differential expression of proteins in species of forensically relevant Diptera. **Carl Hjelmén** (cehjelmen09@tamu.edu), Aaron Tarone, Jonathan Parrott, Lawrence Dangott and Satyam Srivastav, Texas A&M Univ., College Station, TX

10:50 **1461** Does indigenous microorganism management impact the Calliphoridae microbiome? **Jennifer Pechal** (pechalje@msu.edu)¹, Michael DuPonte², Jonathan A. Cammack³, Tawni L. Crippen⁴, Heather Jordan⁵, Jeffery K. Tomberlin³ and M. Eric Benbow¹, ¹Michigan State Univ., East Lansing, MI, ²Univ. of Hawai'i, Hilo, HI, ³Texas A&M Univ., College Station, TX, ⁴USDA - ARS, College Station, TX, ⁵Mississippi State Univ., Mississippi State, MS

10-min: MUVE, Molecular Biology of Medical, Veterinary, and Urban Pests

Meeting Room 220 (Convention Centre)

Moderators: Lindsay Porter¹ and Pia Olafson², ¹Northwestern State Univ., Natchitoches, LA, ²USDA - ARS, Kerrville, TX

9:30 **1462** Functional analysis of general odorant-binding proteins from the stable fly, *Stomoxys calcitrans*. **Pia Olafson** (pia.olafson@ars.usda.gov) and Greta Buckmeier, USDA - ARS, Kerrville, TX

- 9:40 **1463** Non-model fly genomics – from short reads to genomes, from microbes to chromosomes. **Ana Carolina Junqueira** (anacmj@gmail.com)¹, Daniel Paulo², Rosângela Rodrigues², Rikky Purbojati³, Daniela Drautz-Moses³, Aakrosh Ratan⁴, Ana Maria Azeredo-Espin² and Stephan Schuster³, ¹Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil, ²Univ. of Campinas, Campinas, Brazil, ³Nanyang Technological Univ., Singapore, Singapore, ⁴Univ. of Virginia, Charlottesville, VA
- 9:50 **1464** Differential gene expression in flies fed high and low doses of *Salmonella typhimurium*: insight into dose-dependent AMP expression and feedback-repression of immune overstimulation. **Dana Nayduch** (dana.nayduch@ars.usda.gov)¹, Klara Zurek², Jessica Thomson² and Christopher A. Sasaki³, ¹USDA - ARS, Manhattan, KS, ²Kansas State Univ., Manhattan, KS, ³Clemson Univ., Clemson, SC
- 10:00 **1465** Chemosensory genome provides insights into the complex chemical ecology of sandflies populations. **Zainulabeuddin Syed** (zainulabeuddin.syed@uky.edu), Univ. of Kentucky, Lexington, KY
- 10:10 **1466** VectorBase data, tools and resources for variation and population analyses. **Gloria I. Giraldo-Calderón** (ggiraldo@nd.edu)¹, Daniel Lawson², Scott J. Emrich¹, Frank H. Collins¹ and Mary Anne McDowell¹, ¹Univ. of Notre Dame, South Bend, IN, ²European Bioinformatics Institute (EMBL-EBI), Hinxton, England
- 10:20 **1467** Delineating the global invasion history of the Formosan subterranean termite, *Coptotermes formosanus* Shiraki, using multiple molecular markers. **Laura Johnson** (laura.nlj@gmail.com)¹, Paul Labadie², Claudia Husseneder³, Jianchu Mo⁴ and Edward Vargo¹, ¹Texas A&M Univ., College Station, TX, ²North Carolina State Univ., Raleigh, NC, ³Louisiana State Univ., Baton Rouge, LA, ⁴Zhejiang Univ., Hangzhou, China
- 10:30 **1468** Impact of increased AMP-activated protein kinase in the midgut of *Anopheles stephensi* on fitness and metabolism. **Chioma Oringanje** (chyo12@yahoo.com), Yunan Han, Claudia LaBianca, Lillian Delacruz and Michael A. Riehle, Univ. of Arizona, Tucson, AZ
- 10:40 **1469** Genetic variability of *Aedes aegypti* (Linnaeus) in Central America. **Andrea Joyce** (ajoyce2@ucmerced.edu), Univ. of California, Merced, CA
- 10:50 Break
- 11:00 **1470** Differential gene expression in two populations of *Culex pipiens* with divergent host preferences. **Megan Fritz** (mfritz13@umd.edu), Univ. of Maryland, College Park, MD
- 11:10 **1471** The population and colony genetic structure of the dark rover ant, *Brachymyrmex patagonicus* Mayr. **Elida Espinoza** (ellyspnz@gmail.com) and Edward Vargo, Texas A&M Univ., College Station, TX
- 11:20 **1472** The IMD pathway as part of the *Ae. aegypti* antifungal immune repertoire. **Jose Luis Ramirez** (jose.l.ramirez@ars.usda.gov), Ephantus Muturi and Alejandro Rooney, USDA - ARS, Peoria, IL
- 11:30 **1473** Transcriptome analysis of permethrin resistance *Aedes aegypti* mosquitoes in response to Zika virus infection. **Liming Zhao** (lmzhao@ufl.edu), Univ. of Florida, Vero Beach, FL
- 11:40 **1474** Sex and age modulate the expression of antennal chemosensory-related genes linked to the onset of host seeking in the yellow-fever mosquito *Aedes aegypti*. **Anais Tallon** (anais.tallon@slu.se), Swedish Univ. of Agricultural Sciences, Alnarp, Sweden

11:50 **1475** Silencing *sig* gene in *Amblyomma americanum* reduces immune response to bacterial infection. **Lindsay Porter** (porterl@nsula.edu) and Emily Bencosme, Northwestern State Univ., Natchitoches, LA

12:00 **1476** JH affects the splicing of *Culex quinquefasciatus* early trypsin. **Dov Borovsky** (dovborovsky@gmail.com)¹, Robert Hancock², Pierre Roug  ³, Charles A. Powell⁴ and Robert Shatters¹, ¹USDA - ARS, Fort Pierce, FL, ²Metropolitan State Univ., Denver, CO, ³Univ. Paul Sabatier, Toulouse, France, ⁴Univ. of Florida, Fort Pierce, FL

10-min: MUVE, Urban Pests: Bed Bugs, Cockroaches, and Others

Meeting Room 301 (Convention Centre)

Moderators: Murray B. Isman¹ and Matthew Bertone², ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²North Carolina State Univ., Raleigh, NC

9:30 **1477** Delusions of parasitosis, the ugly stepsister to the human bed bug narrative. **Gale E. Ridge** (gale.ridge@ct.gov), Connecticut Agricultural Experiment Station, New Haven, CT

9:40 **1478** Wandering behavior of bed bugs, *Cimex lectularius*, infected by a commercial formulation of the biological control agent, *Beauveria bassiana* (Apreh  nd  ). **Ikkei Shikano** (ishikano@gmail.com)¹, Giovanni Bellicanta², Nina Jenkins¹ and Matthew Thomas¹, ¹Pennsylvania State Univ., University Park, PA, ²ConidioTec, Centre Hall, PA

9:50 **1479** Insecticide resistance and its underlying mechanisms in the tropical bed bug, *Cimex hemipterus* (F.). **Chow-Yang Lee** (chowyang@usm.my), Universiti Sains Malaysia, Penang, Malaysia

10:00 **1480** Natural products for pest management – The toxicity of *Piper nigrum* on the common bed bug *Cimex lectularius* L. **Junaid Rehman** (junaiddua@gmail.com), Univ. of Mississippi, Univ., MS

10:10 **1481** Contact toxicity and horizontal transfer of DX13TM dust and other commercial dusts in the common bed bug, *Cimex lectularius* L. (Hemiptera: Cimicidae). **Yasmin Akhtar** (yasmin.akhtar@ubc.ca) and Murray B. Isman, The Univ. of British Columbia, Vancouver, BC, Canada

10:20 **1482** Ontogeny of aldehyde pheromones in bed bugs (Heteroptera: Cimicidae). **Mark Dery** (mdery001@ucr.edu), Kyle Arriola and Dong-Hwan Choe, Univ. of California, Riverside, CA

10:30 **1483** Investigating the use of bacterial biocontrol agents against the bed bug, *Cimex lectularius*: Mechanisms of action and environmental effects on pathogenicity. **Jose Pietri** (jose.e.pietri@gmail.com)¹, Carly Miranda¹, Dangsheng Liang¹ and Jonas G. King², ¹Apex Bait Technologies, Inc., Santa Clara, CA, ²Mississippi State Univ., Mississippi State, MS

10:40 **1484** Effectiveness of steamers for bed bug control. **Changlu Wang** (cwang@aesop.rutgers.edu)¹, Desen Wang² and Richard Cooper¹, ¹Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, ²South China Agricultural Univ., Guangzhou, China

10:50 Break

11:00 **1485** Building-wide bed bug inspections: Which is most efficient? **Karen M. Vail** (kvail@utk.edu), Jennifer G. Chandler and Lucas Hietala, Univ. of Tennessee, Knoxville, TN

11:10 **1486** Differences in aggregation behavior in *Cimex lectularius* L. based on gender and mating status. **Paul Baker** (paul.baker1@uky.edu) and Kenneth Haynes, Univ. of Kentucky, Lexington, KY

11:20 **1487** Reluctance of bed bugs to step on sticky surfaces. **Catherine Loudon** (cloudon@uci.edu), Khanh Tran and Chloe Kok, Univ. of California, Irvine, CA

11:30 **1488** Using assessment-based pest management (APM) for German cockroach control in US HUD housing authorities. **Dini Miller** (dinim@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:40 **1489** Insecticidal baits effectively manage outdoor nuisance cockroaches while minimizing exposure risks at sensitive sites. **Andrew Sutherland** (amsutherland@ucanr.edu)¹, Michael K. Rust², Dong-Hwan Choe², Siavash Taravati³, Kathleen Campbell² and Casey Hubble-Wirgler¹, ¹Univ. of California Cooperative Extension, Hayward, CA, ²Univ. of California, Riverside, CA, ³Univ. of California, Alhambra, CA

11:50 **1490** Development of a more durable general insect control spray. **Alexander Ko** (ko.e.alexander@gmail.com), Bayer Crop Science, Durham, NC

12:00 **1491** Food-based fruit fly trap for the consumer market. **Qing-He Zhang** (qing-he@rescue.com), Sterling International, Inc, Spokane, WA

12:10 **1492** Twitter-aided recluse identifications: One year of @recluseornot. **Matthew Bertone** (matt_bertone@ncsu.edu)¹, Catherine Scott² and Eleanor Spicer Rice³, ¹North Carolina State Univ., Raleigh, NC, ²Univ. of Toronto, Toronto, ON, Canada, ³Verdant Word, Raleigh, NC

10-min: P-IE, Vector Control and Vectors of Plant Disease

Meeting Room 212 (Convention Centre)

Moderators: Nakorn Pradit¹ and Kyle Koch², ¹Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, ²Univ. of Nebraska, Lincoln, NE

9:30 **1493** Distribution of in potato psyllid (*Bactericera cockerelli*) in Alberta, Saskatchewan and Manitoba, Canada, and detection of *Candidatus Liberibacter solanacearum*, zebra chip pathogen of potatoes, in multiple locations. **Dan Johnson** (dan.johnson@uleth.ca)¹, Lawrence Kawchuk², Scott Meers³, Vikram Bisht⁴ and Jazeem Wahab⁵, ¹Univ. of Lethbridge, Lethbridge, AB, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ³Alberta Agriculture and Rural Development, Brooks, AB, Canada, ⁴Manitoba Agriculture, Food & Rural Development, Carman, MB, Canada, ⁵Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

9:40 **1494** An attract-and-kill trap device for Asian citrus psyllids. **Justin George** (georgejustine@gmail.com)¹, Lukasz Stelinski¹ and Stephen L. Lapointe², ¹Univ. of Florida, Lake Alfred, FL, ²USDA - ARS, Fort Pierce, FL

9:50 **1495** Analysis of "*Candidatus Liberibacter solanacearum*" haplotype effect on the feeding behavior of its insect vector. **Kyle Koch** (kyle.koch@ag.tamu.edu) and Ismael E. Badillo-Vargas, Texas A&M AgriLife Research, Weslaco, TX

10:00 **1496** Differential efficiency of a begomovirus to cross the midgut of vectors results in variation of virus transmission. Li-Long Pan and **Shu-Sheng Liu** (shshliu@zju.edu.cn), Zhejiang Univ., Hangzhou, China

10:10 **1497** Effect of temperature on the survival and reproduction of *Bactericera cockerelli*. **Gabriela Esparza-Díaz** (gesparza@amerstem.com)¹, Miguel Arias-Guerrero² and Ismael E. Badillo-Vargas², ¹Amerstem, Inc., Camarillo, CA, ²Texas A&M AgriLife Research, Weslaco, TX

10:20 **1498** Barley yellow dwarf virus (BYDV) transmission by the bird cherry-oat aphid *Rhopalosiphum padi* L. (Hem.: Aphididae): Can corn and grassy weeds contribute to regional BYDV outbreaks? Mahnaz Rashidi¹, Regina Cruzado¹, Pamela J. S. Hutchinson¹, Juliet Marshall¹, Nilsa A. Bosque-Pérez² and **Arash Rashed** (arashed@uidaho.edu)², ¹Univ. of Idaho, Aberdeen, ID, ²Univ. of Idaho, Moscow, ID

10:30 **1499** Sharpshooter EPG X wave represents the *Xylella fastidiosa* inoculation behavior: Evidence from systemic, symptomatic Pierce's disease infections induced after X waves. **Elaine Backus** (elaine.backus@ars.usda.gov)¹, Holly Shugart² and Felix Cervantes¹, ¹USDA - ARS, Parlier, CA, ²Univ. of Florida, Lake Alfred, FL

10:40 **1500** Host resistance is a driving factor of vector-pathogen interactions: A case study with the sweetpotato whitefly (*Bemisia tabaci*) and a DNA virus infecting tomato. **Rajagopalbabu Shrinivasan** (babusri@uga.edu)¹, Saioa Legarrea² and Wendy G. Marchant³, ¹Univ. of Georgia, Griffin, GA, ²Univ. of Amsterdam, Amsterdam, Netherlands, ³Univ. of Georgia, Tifton, GA

10:50 Break

11:00 **1501** Biological control and insecticides for managing Asian citrus psyllid, *Diaphorina citri*. **Jawwad Qureshi** (jawwadq@ufl.edu)¹ and Philip A. Stansly², ¹Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL, ²Univ. of Florida, Immokalee, FL

11:10 **1502** Internal microbiota of *Lygus lineolaris*. **Jesus Esquivel** (jesus.esquivel@ars.usda.gov) and Enrique Medrano, USDA - ARS, College Station, TX

11:20 **1503** Effects of time of infection on zebra chip disease development at harvest and during storage. **Erik Wenninger** (erikw@uidaho.edu)¹, Arash Rashed², Nora Olsen¹, Phillip Wharton³ and Alexander Karasev², ¹Univ. of Idaho, Kimberly, ID, ²Univ. of Idaho, Moscow, ID, ³Univ. of Idaho, Aberdeen, ID

11:30 **1504** Life table statistics of *Myzus persicae* (Sulzer) and *Macrosiphum euphorbiae* (Thomas) on nitrogen use efficient potato selections. **Jeffrey Davis** (jeffdavis@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

11:40 **1505** Influence of light on infestations of Asian citrus psyllid. **David Hall** (david.hall@ars.usda.gov) and Matthew G. Hentz, USDA - ARS, Fort Pierce, FL

11:50 **1506** Disease infection benefits non-vector phytophagous insects of cranberries. **Nakorn Pradit** (nakorn.pradit@rutgers.edu)¹ and Cesar Rodriguez², ¹Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, ²Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

12:00 **1507** Host plant effects on morphometric variation of *Trioza erytrae* Del Guercio (Hemiptera: Triozidae), vector of citrus Huanglongbing disease. **Owusu Fordjour Aidoo** (owusufordjouraidoo@yahoo.com)¹, Tanga Chrysantus², Thomson Paris³, Sandra A. Allan⁴, Samira Mohamed², Fathiya Khamis², Mamoudou Sétamou⁵, Fathiya Khamis², Ekesi Sunday² and Christian Borgemeister¹, ¹Univ. of Bonn, Bonn, Germany, ²International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya, ³Univ. of Florida Indian River Research and Education Center, Fort Pierce, FL, ⁴Insect Behavior and Biocontrol Research Unit Center for Medical, Agricultural and Veterinary Research, Florida, FL, ⁵Texas A&M Univ., Weslaco, TX

12:10 **1508** Connectivity of aerial corridors of white-backed rice planthopper and winter survival and cycles of southern rice black-streaked dwarf virus. **Baoping Zhai** (bpzhai@njau.edu.cn), Nanjing Agricultural Univ., Nanjing, China

12:20 **1509** Distribution of wheat curl mite (*Aceria tosichella*) virulence and mite-vectored viruses in the north-central United States. Luayy Khalaf¹, Wen-Po Chuang², Lina Aguirre-Rojas¹, Peter Klein¹ and **C. Michael Smith** (cmsmith@ksu.edu)¹, ¹Kansas State Univ., Manhattan, KS, ²National Taiwan Univ., Taipei, Taiwan

10-min: SysEB, Biodiversity, Evolution, and Conservation of Bees

Meeting Room 306 (Convention Centre)

Moderators: Elizabeth Murray¹ and Cory Sheffield², ¹Cornell Univ., Ithaca, NY, ²Royal Saskatchewan Museum, Regina, SK, Canada

9:30 **1510** The native bees of the Americas: Patterns across the western hemisphere. **Terry Griswold** (terry.griswold@ars.usda.gov)¹, John S. Ascher², Harold Ikerd¹, Philippe Sagot³, Remy Vandame³, Michael Orr^{4,5}, Zachary Portman⁶ and Joseph Wilson⁷, ¹USDA - ARS, Logan, UT, ²National Univ. of Singapore, Singapore, Singapore, ³El Colegio de la Frontera Sur, San Cristóbal de las Casas, Mexico, ⁴Utah State Univ., Logan, UT, ⁵Chinese Academy of Sciences, Beijing, China, ⁶Univ. of Minnesota, St. Paul, MN, ⁷Utah State Univ., Tooele, UT

9:40 **1511** Presentation withdrawn

9:50 **1512** Likely resident populations of a euglossine bee (*Eufriesea* sp.) in two national parks of west Texas, USA (Hymenoptera: Apidae). **Robinson Sudan** (robinson@newleaf-tx.org), New Leaf, Lockhart, TX

10:00 **1513** Bee diversity on electric transmission rights-of-way in Pennsylvania: A continuing study of how vegetation management strategies influence wild pollinators. **Hannah Stout** (e.guttulata@gmail.com)¹, Laura Russo², Dana Roberts³, Bradley Ross⁴ and Carolyn Mahan⁴, ¹Independent Researcher, State College, PA, ²Trinity College, Dublin, Ireland, ³Pennsylvania State Univ., University Park, PA, ⁴Pennsylvania State Univ., Altoona, PA

10:10 **1514** Investigating ecological effects of wind turbines on native bee communities in Wyoming, USA. **Delina Dority** (dbarbosa@uwyo.edu), Michael Dillon and Lusha Tronstad, Univ. of Wyoming, Laramie, WY

10:20 **1515** Diversification of the cleptoparasitic bee genus *Epeolus* Latreille (Hymenoptera: Apidae) through space and time. **Thomas Onuferko** (onuferko@yorku.ca)¹, Petr Bogusch², Rafael Ferrari¹ and Laurence Packer¹, ¹York Univ., Toronto, ON, Canada, ²Univ. of Hradec Králové, Hradec Králové, Czech Republic

10:30 **1516** Environmental drivers of microbiome composition in the blue orchard bee, *Osmia lignaria*. **Hamutahl Cohen** (hcohen1@ucsc.edu)¹, Quinn McFrederick¹ and Stacy M. Philpott², ¹Univ. of California, Riverside, CA, ²Univ. of California, Santa Cruz, CA

10:40 Break

10:50 **1517** Pollinivory and the diversification dynamics of bees. **Elizabeth Murray** (emurr001@ucr.edu), Silas Bossert and Bryan N. Danforth, Cornell Univ., Ithaca, NY

11:00 **1518** Color pattern evolution in large carpenter bees. **Bonnie Blaimer** (bonnie_blaimer@ncsu.edu)¹, Jonathan Mawdsley² and Sean Brady², ¹North Carolina State Univ., Raleigh, NC, ²Smithsonian Institution, Washington, DC

11:10 **1519** Presentation withdrawn

11:20 **1520** How much habitat is enough? Assessing optimal habitat requirements for native bees. **Alana Pindar** (apindar@uoguelph.ca) and Nigel Raine, Univ. of Guelph, Guelph, ON, Canada

11:30 **1521** The bee genus *Agapostemon* (Hymenoptera: Halictidae) in North America - resurrected name and a new species allied to *A. melliventris*. **Cory Sheffield** (cory.sheffield@gov.sk.ca), Royal Saskatchewan Museum, Regina, SK, Canada

11:40 **1522** Insect collecting for fun: The scientific benefits of hunting bees for sport. **Jason Gibbs** (jason.gibbs@umanitoba.ca), Univ. of Manitoba, Winnipeg, MB, Canada

10-min: SysEB, Biodiversity, Systematics, and Morphology of Coleoptera

Meeting Room 304/305 (Convention Centre)

Moderators: Matthew Gimmel¹ and Sarah Smith², ¹Santa Barbara Museum of Natural History, Santa Barbara, CA, ²Michigan State Univ., East Lansing, MI

9:30 **1523** Species traits modify the species-area relationships of island ground beetle (Coleoptera: Carabidae) assemblages. **Aaron Bell** (ajbell@ualberta.ca)¹, Iain Phillips², Scott Nielsen³ and John Spence³, ¹Troutreach Saskatchewan, Moose Jaw, SK, Canada, ²Water Security Agency, Saskatoon, SK, Canada, ³Univ. of Alberta, Edmonton, AB, Canada

9:40 **1524** Diversity and evolution of complex sperm traits in ground beetles (Coleoptera: Carabidae). **Antonio Gomez** (gomezr@oregonstate.edu), Oregon State Univ., Corvallis, OR

9:50 **1525** The phylogeny of Panagaeitae (Coleoptera: Carabidae): A combined molecular approach. **James M. Pflug** (pflugja@oregonstate.edu) and David Maddison, Oregon State Univ., Corvallis, OR

10:00 **1526** *Mecyclothorax* (Coleoptera: Carabidae), a humongous Pacific taxon, shows its deep Australian roots. **James Liebherr** (jkl5@cornell.edu), Cornell Univ. Insect Collection, Ithaca, NY

10:10 **1527** Molecular phylogeny of the Saprininae reveals three independent convergences to obligate psammophily (Coleoptera: Histeridae). **Tomas Lackner** (tomaslackner@me.com), Caroline Kindler and Michael Balke, Zoologische Staatssammlung München, München, Germany

10:20 **1528** Revision of the soft-winged flower beetles of the genus *Asydates* Casey (Coleoptera: Melyridae: Dasytinae). **Matthew Gimmel** (mgimmel@sbnature2.org)¹ and Adريان Mayor², ¹Santa Barbara Museum of Natural History, Santa Barbara, CA, ²Univ. of Tennessee, Knoxville, TN

10:30 **1529** DNA-based identification of subfossil insect fragments recovered from pack rat middens. **Kojun Kanda** (kk933@nau.edu)¹, Marcin Kaminski², Michael Hofreiter³, Julio Betancourt⁴ and Aaron D. Smith¹, ¹Northern Arizona Univ., Flagstaff, AZ, ²Polish Academy of Sciences, Warsaw, Poland, ³Univ. of Potsdam, Potsdam, Germany, ⁴US Geological Survey, Reston, VA

10:40 Break

10:50 **1530** The catalogue of life needs global checklists for Elateroidea. **Yuri Roskov** (yroskov@illinois.edu) and R. Edward DeWalt, Univ. of Illinois, Champaign, IL

11:00 **1531** Structural beetle iridescence as a mechanism for controlling mobility. **Kristen Reiter** (reiter5@illinois.edu)¹, Lihua Wei¹, Thomas McElrath², Ainsley Seago³, Alison Dunn¹ and Marianne Alleyne¹, ¹Univ. of Illinois, Champaign, IL, ²Illinois Natural History Survey, Champaign, IL, ³Univ. of California, Berkeley, CA

11:10 **1532** Species delimitation in *Callipogon* longhorn beetles (Cerambycidae: Prioninae) based on target enrichment sequencing data. **Sangil Kim** (sikim@g.harvard.edu) and Brian D. Farrell, Harvard Univ., Cambridge, MA

11:20 **1533** Taxonomic and functional diversity of longhorn beetles (Coleoptera: Cerambycidae) in Nagaland, India. **Sreedevi Kolla** (kolla.sreedevi@gmail.com)¹ and Pankaj Neog², ¹ICAR, Bengaluru, India, ²Nagaland Univ., Nagaland, India

11:30 **1534** Developing an identification tool for southeast Asian xyleborine ambrosia beetles (Coleoptera: Curculionidae: Scolytinae). **Sarah Smith** (smith462@msu.edu)¹, Roger A. Beaver², Jiri Hulcr³, Rachel Osborn⁴, Amanda Redford⁵, Sudhir Singh⁶ and Anthony Cognato¹, ¹Michigan State Univ., East Lansing, MI, ²Chiangmai, Thailand, ³Univ. of Florida, Gainesville, FL, ⁴Michigan State Univ., Okemos, MI, ⁵USDA - APHIS, Fort Collins, CO, ⁶Forest Research Institute, Dehradun, India

11:40 **1535** Targeted surveys for the endemic and little-known bark beetles of Hawai'i reveal their precarious persistence in low abundance among a multitude of adventive exotic species (Curculionidae: Scolytinae: Xyleborini). **Conrad Gillett** (cgillett@hawaii.edu), Ishakh Pulakkatu-Thodi, Christine Elliott and Daniel Rubinoff, Univ. of Hawai'i, Honolulu, HI

10-min: SysEB, Evolution and Diversity of Odonata and Polyneoptera

Meeting Room 302/303 (Convention Centre)

Moderators: Christopher Beatty¹ and Sandra Schachat², ¹Cornell Univ., Ithaca, NY, ²Stanford Univ., Stanford, CA

9:30 **1536** Molecular characterization and phylogenetics of family Gomphidae (Odonata: Anisoptera) of Hazara region, Pakistan. **Sardar Mehmood** (banianhu@gmail.com), Hazara Univ., Mansehra, Pakistan

9:40 **1537** How physiological color change affects the conspicuousness of the blue-fronted dancer damselfly, *Argia apicalis* (Odonata). **Amanda Whispell** (amanda.whispell@rutgers.edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

9:50 **1538** Widespread *Wolbachia* infection in an insular radiation of damselflies (Odonata: Coenagrionidae). **Christopher Beatty** (beatty@cornell.edu)¹ and Maria Lorenzo-Carballa^{2,3}, ¹Cornell Univ., Ithaca, NY, ²Univ. of Vigo, Pontevedra, Spain, ³Univ. of Liverpool, Liverpool, United Kingdom

10:00 **1539** Sexual selection and species recognition in *Calopteryx* damselflies. **Idelle Cooper** (cooperia@jmu.edu), James Madison Univ., Harrisonburg, VA

10:10 **1540** The Targeted Odonata Wing Digitization (TOWD) project: Creating a unique resource for studying wing evolution in dragonflies (Odonata). **Dirk Gassmann** (dirk.gassmann@rutgers.edu)¹, Jessica Ware¹, William Kuhn², John C. Abbott³ and Melissa Sanchez¹, ¹Rutgers, The State Univ. of New Jersey, Newark, NJ, ²Univ. of Tennessee, Knoxville, TN, ³Univ. of Alabama, Tuscaloosa, AL

10:20 **1541** There is no "gap" in the early fossil record of insects: Major implications for time-calibrating molecular phylogenies. **Sandra Schachat** (schachat@stanford.edu), Stanford Univ., Stanford, CA

10:30 Break

10:40 **1542** OrthopNet: Connecting grasshoppers to field notes. **Greg Cowper** (cowper@ansp.org)¹ and Jon K. Gelhaus², ¹Academy of Natural Sciences of Drexel Univ., Philadelphia, PA, ²Drexel Univ., Philadelphia, PA

10:50 **1543** Speciation in the mountains: Phylogenomics of the alpine grasshopper genus *Kosciuscola* (Orthoptera: Acrididae). **Hojun Song** (hsong@tamu.edu)¹, Rachel Slatyer² and Nikolai J. Tatarnic³, ¹Texas A&M Univ., College Station, TX, ²Univ. of Melbourne, Parkville, Australia, ³Western Australian Museum, Welshpool, Australia

11:00 **1544** Diversity and distribution of Pyrgomorphae (Orthoptera: Pyrgomorphidae) from Thar Desert Sindh, Pakistan. **Riffat Sultana** (riffat.sultana@usindh.edu.pk), Univ. of Sindh Jamshoro, Jamshoro, Pakistan

11:10 **1545** Some observations on the genus *Himertula* (Orthoptera: Tettigoniidae: Phaneropterinae). **Waheed Ali Panhwar** (waheed.panhwar@salu.edu.pk), Shah Abdul Latif Univ., Khairpur Mir's, Pakistan

11:20 **1546** Phylogenetics of Australia's giant burrowing cockroaches and the repeated parallel evolution of complex behaviour. **Perry Beasley-Hall** (perry.beasley-hall@sydney.edu.au), Univ. of Sydney, Sydney, Australia

11:30 **1547** A distinctive new population of diurnal alpine cockroach (Blattodea: Blattellidae) from the highlands of Tasmania, Australia. **Shasta Henry** (sc.henry@utas.edu.au) and Peter McQuillan, Univ. of Tasmania, Hobart, Australia

Member Symposium: Entomologists Hooked on Fly Fishing

Meeting Room 204 (Convention Centre)

Moderators and Organizers: Tim Lysyk¹ and Lowell Nault², ¹Retired, Lethbridge, AB, Canada, ²The Ohio State Univ., Wooster, OH

10:00 Welcoming remarks and introduction to, and overview of, symposium

10:15 **1548** How best to fool a trout: Designing effective fly patterns. **Lowell Nault** (bugmanosu@gmail.com), The Ohio State Univ., Wooster, OH

10:30 **1549** Invisible patterns are not "hidden" patterns: Ultraviolet light and fly fishing entomology. **John Acorn** (jacorn@ualberta.ca) and Sydney Worthy, Univ. of Alberta, Edmonton, AB, Canada

10:45 **1550** Tying flies for a cutthroat world. **Tim Lysyk** (timlysyk@gmail.com), Retired, Lethbridge, AB, Canada

11:00 **1551** The relationship between macroinvertebrate drift in lotic waters and the feeding behavior of trout. **John R. Anderson** (jranderson@bendbroadband.com), Univ. of California, Berkeley, CA

11:15 **1552** Nymphs and nymphing. **Ernest Delfosse** (delfosse@msu.edu), Michigan State Univ., East Lansing, MI

11:30 **1553** Aquatic insects: Monitoring streams, fly fishing, and youth outdoor education. **Donald H. Dean** (dean.10@osu.edu), The Ohio State Univ., Columbus, OH

11:45 **1554** Entomology for anglers: Bringing fly fishing to college students. **George C. Hamilton** (hamilton@aesop.rutgers.edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

Workshop: Creating Safe and Productive Environments for All Entomologists through Inclusive Leadership

Meeting Room 201 (Convention Centre)

Moderators and Organizers: Lina Bernaola¹, Rayda K. Krell² and Michelle Smith³, ¹Louisiana State Univ., Baton Rouge, LA, ²Western Connecticut State Univ., Danbury, CT, ³Dow AgroSciences, Indianapolis, IN

10:00 AM - 12:00 PM

Workshop: Extension Entomology Share Fair

West Exhibit Hall A (Convention Centre)

Moderators and Organizers: Erin Hodgson¹ and Brian McCormack², ¹Iowa State Univ., Ames, IA, ²Plant Biosecurity Cooperative Research Centre, Bruce, Australia

1555 Entomology education and entertainment with podcasts. **Jonathan Larson** (jonathan.larson@unl.edu)¹ and Jody Green², ¹Univ. of Nebraska, Omaha, NE, ²Univ. of Nebraska, Lincoln, NE

1556 A world café. **Jeffrey Bradshaw** (jbradshaw2@unl.edu), Univ. of Nebraska, Scottsbluff, NE

1557 myFields demonstration. **Wendy Johnson** (wendyann@k-state.edu)¹ and Brian McCormack², ¹Kansas State Univ., Manhattan, KS, ²Plant Biosecurity Cooperative Research Centre, Bruce, Australia

1558 Insects don't tweet, you should. **Dalton Ludwick** (dclmrd@mail.missouri.edu), Univ. of Missouri, Columbia, MO

1559 Holy macro - my phone can do what? **Nancy Miorelli** (miorelln@gmail.com), Univ. of Georgia, Athens, GA

1560 Taking the world behind the scenes with Periscope. **Isa Betancourt** (betancourt@ansp.org), The Academy of Natural Sciences of Drexel Univ., Philadelphia, PA

1561 Agricultural, urban, and retail extension at the University of California Statewide IPM Program. **David R. Haviland** (dhaviland@ucdavis.edu)¹, Andrew Sutherland², Karey Windbiel-Rojas³ and Jim Farrar³, ¹Univ. of California Cooperative Extension, Bakersfield, CA, ²Univ. of California Cooperative Extension, Hayward, CA, ³Univ. of California, Davis, CA

1562 Popenoe Rodeo: People riding bugs! **Stephen Losey** (slosey88@ksu.edu)¹, Grace Craigie¹ and Brian McCormack², ¹Kansas State Univ., Manhattan, KS, ²Plant Biosecurity Cooperative Research Centre, Bruce, Australia

1563 Stick 'em up! Large group reflections. **Randall Cass** (randall@iastate.edu) and Erin Hodgson, Iowa State Univ., Ames, IA

1564 Survey says...use Qualtrics to measure extension impacts. **Erin Hodgson** (ewh@iastate.edu), Iowa State Univ., Ames, IA

1565 Field heroes: Spreading the word on beneficial insects. **John Gavloski** (john.gavloski@gov.mb.ca), Manitoba Agriculture, Food & Rural Development, Carman, MB, Canada

1566 There's an app for that: Using apps in ag extension. **Tracey Baute** (tracey.baute@omafra.gov.on.ca)¹ and Hannah Fraser², ¹Ontario Ministry of Agriculture, Food and Rural Affairs, Ridgeway, ON, Canada, ²Ontario Ministry of Agriculture, Food and Rural Affairs, Guelph, ON, Canada

1567 Insect queries and quizzes: How well do you know your bugs? **Terri Billeisen** (tlhctor@ncsu.edu), North Carolina State Univ., Raleigh, NC

1568 Using Facebook as a tool for science communication and outreach. **Joan King** (joanie_king@tamu.edu), Texas A&M Univ., College Station, TX

1569 Casting in clay. **Maxwell Helmberger** (helmberg@msu.edu), Michigan State Univ., East Lansing, MI

TUESDAY, NOVEMBER 13 • AFTERNOON

Lunch and Learn: Funding Opportunities at the National Science Foundation

City Foyer (Level 2) (Convention Centre)

Moderators and Organizers: César R. Nufio¹, Daniel Gruner², Katharina Dittmar³ and Michelle M. Elekonich⁴, ¹Univ. of Colorado, Boulder, CO, ²Univ. of Maryland, College Park, MD, ³Brigham Young Univ., Provo, UT, ⁴National Science Foundation, Alexandria, VA

12:15 PM - 1:15 PM

Lunch and Learn: Insect Pollinators and Real-World Science: Getting Undergraduates Excited about Insects

Meeting Room 302/303 (Convention Centre)

Moderator and Organizer: Rachael Bonoan, Tufts Univ., Medford, MA

12:15 PM - 1:15 PM

Lunch and Learn: Be a Better Peer Reviewer

Meeting Room 201 (Convention Centre)

Moderators and Organizers: Lisa Junker¹, Andrea Joyce², Dana Naydych³, Erin Scully³, Nan-Yao Su⁴ and Eric Rebeck⁵, ¹Entomological Society of America, Annapolis, MD, ²Univ. of California, Merced, CA, ³USDA - ARS, Manhattan, KS, ⁴Univ. of Florida, Davie, FL, ⁵Oklahoma State Univ., Stillwater, OK

12:30 PM - 1:30 PM

Student Debates

West Ballroom ABC (Convention Centre)

Moderator and Organizer: Casey Parker, Univ. of Florida, Vero Beach, FL

1:00 **1570** Entomology in the 21st Century: Tackling insect invasions, promoting advancements in technology and using effective science communication. **Casey Parker** (caseyparker@ufl.edu)¹ and Jocelyn R. Holt², ¹Univ. of Florida, Vero Beach, FL, ²Texas A&M Univ., College Station, TX

1:10 **1571** Topic 1, Unbiased introduction: What is the most harmful invasive insect species in the world? **Lina Bernaola** (lbernaola@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

1:15 **1572** Topic 1, Team 1: Washington State University (faculty advisor - Jeb Own). **Benjamin Lee** (benjamin.w.lee@wsu.edu)¹, Abigail Hayes¹, Abigail Cohen¹, Adrian Marshall² and James Hepler², ¹Washington State Univ., Pullman, WA, ²Washington State Univ., Wenatchee, WA

1:22 Cross-examination of WSU by OSU

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1:25 **1573** Topic 1, Team 2: The Ohio State University (faculty advisor - Joe Raczkowski). **Adrian Pekarciak** (pekarciak.4@osu.edu)¹, Emily Justus¹, Kendall King², Tae-Young Lee³ and Carlos Esquivel¹, ¹The Ohio State Univ., Wooster, OH, ²Smithsonian Institution, Washington, DC, ³The Ohio State Univ., Columbus, OH

1:32 Cross-examination of OSU by WSU

1:35 First rebuttal by OSU

1:38 First rebuttal by WSU

1:41 Second rebuttal by OSU

1:44 Second rebuttal by WSU

1:47 Questions from judges and audience

1:57 Break

2:07 **1574** Topic 2, Unbiased introduction: How can scientists diffuse the stigma or scare factor surrounding issues that become controversial? **Kayleigh Hauri** (haurikay@msu.edu), Michigan State Univ., East Lansing, MI

2:12 **1575** Topic 2, Team 1: Virginia Tech (faculty advisor - Douglas Pfeiffer). **Christopher McCullough** (ctmccull@vt.edu)¹, Whitney Hadden², Max Ragozzino¹ and Morgan Roth¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²Virginia Polytechnic Institute and State Univ., Winchester, VA

2:19 Cross-examination of VT by LSU

2:22 **1576** Topic 2, Team 2: Louisiana State University (faculty advisor - Blake Wilson). **James Michael Villegas** (jamesvillegas12@gmail.com), Emily Kraus, Michael Becker, Megan Mulcahy and Rui Chen, Louisiana State Univ., Baton Rouge, LA

2:29 Cross-examination of LSU by VT

2:32 First rebuttal by LSU

2:35 First rebuttal by VT

2:38 Second rebuttal by LSU

2:41 Second rebuttal by VT

2:44 Questions from judges and audience

2:54 Break

3:04 **1577** Topic 3, Unbiased introduction: What new/emerging technologies have the potential to revolutionize entomology (other than CRISPR)? **Priyanka Mittapelly** (mittapelly.1@buckeyemail.osu.edu), The Ohio State Univ., Wooster, OH

3:09 **1578** Topic 3, Team 1: University of Illinois Urbana-Champaign (faculty advisor - Marianne Alleyne). **C. Scott Clem** (carlc2@illinois.edu)¹, Rachel Skinner¹, Tanya Josek¹, Daniel Pearlstein¹ and Jonathan Tettie², ¹Univ. of Illinois, Champaign, IL, ²Concordia College, Moorhead, MN

3:16 Cross-examination of UIUC by UM

3:19 **1579** Topic 3, Team 2: University of Minnesota (faculty advisor - Sujaya Rao). **Anh K. Tran** (aktran@umn.edu)¹, Anthony Auletta¹, Edwin Benkert III¹ and Dylan Tussey², ¹Univ. of Minnesota, St. Paul, MN, ²Univ. of Florida, Gainesville, FL

3:26 Cross-examination of UM by UIUC

3:29 First rebuttal by UM

3:32 First rebuttal by UIUC

3:35 Second rebuttal by UM

3:38 Second rebuttal by UIUC

3:41 Questions from judges and audience

3:51 Concluding remarks

Program Symposium: Citizen Science in a Changing World: Successes and Challenges Across Projects and Institutions

Meeting Room 217/218/219 (Convention Centre)

Moderators and Organizers: Daniela Sorger¹, Jenna Florio² and Sean Ryan³, ¹North Carolina Museum of Natural Sciences, Raleigh, NC, ²California Academy of Sciences, San Francisco, CA, ³Univ. of Tennessee, Knoxville, TN

1:30 Welcoming remarks

1:35 **1580** From ivory towers to prison towers: Challenges and benefits of engaging diverse partners in research, education, and conservation. **Nalini Nadkarni** (nalini.nadkarni@utah.edu), Univ. of Utah, Salt Lake City, UT

2:05 **1581** The pros and pitfalls of public-facing science: Exploring arthropod diversity in houses and on faces. **Michelle Trautwein** (mtrautwein@calacademy.org), California Academy of Sciences, San Francisco, CA

2:20 **1582** The USA National Phenology Network: Tools and data for entomological monitoring and research by professional and citizen scientists. **Jake Weltzin** (jweltzin@usgs.gov), US Geological Survey, Tucson, AZ

2:35 **1583** Dragonfly detectives: Turning North Carolina's kids into citizen scientists. **Christine Goforth** (chris.goforth@naturalsciences.org), North Carolina Museum of Natural Sciences, Raleigh, NC

2:50 **1584** Kitchens, schools, and backyard swimming pools: Citizen science with the backyard biodiversity project. **Jenna Florio** (jflorio@calacademy.org)¹, Brian L. Fisher¹ and Neil Tsutsui², ¹California Academy of Sciences, San Francisco, CA, ²Univ. of California, Berkeley, CA

3:05 **1585** Citizen science compliments directed surveillance for ticks and tick-borne pathogens. **Nathan Nieto** (nathan.nieto@nau.edu)¹, W. Tanner Porter¹, Julie Wachara¹, Peter Motyka¹ and Daniel Salkeld², ¹Northern Arizona Univ., Flagstaff, AZ, ²Colorado State Univ., Fort Collins, CO

3:20 Break

3:35 **1586** Scaling entomological science through public participation: Lessons from iNaturalist. **Scott Loarie** (loarie@gmail.com), California Academy of Sciences, San Francisco, CA

3:50 **1587** Lessons from the Lost Ladybug Project: Citizen scientists facilitate finding causes, consequences, and opportunities for Coccinellid conservation. **John Losey** (jel27@cornell.edu), Cornell Univ., Ithaca, NY

4:05 **1588** Contributions of citizen scientists to arthropod vector data in the age of digital epidemiology: The case of kissing bugs and Chagas disease in the southern United States. **Sarah Hamer** (shamer@cvm.tamu.edu), Rachel Curtis-Robles and Gabriel Hamer, Texas A&M Univ., College Station, TX

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- 4:20 **1589** The role of citizen science in the history and future of agriculture. **Sean Ryan** (ecophylio@gmail.com), North Carolina State Univ., Raleigh, NC; Univ. of Tennessee, Knoxville, TN
- 4:35 **1590** What's in a name? Successes and challenges of the ZomBee Watch Project. **John Hafernik** (hafernik@sfsu.edu), San Francisco State Univ., San Francisco, CA
- 4:50 **1591** Reaching millions through citizen science in the K-12 classroom. **Daniela Sorger** (dmsorger@ncsu.edu), North Carolina Museum of Natural Sciences, Raleigh, NC; North Carolina State Univ., Raleigh, NC
- 5:05 Summary remarks
- 5:10 Panel discussion

Program Symposium: Undergraduate, Graduate Students, and Early Career Professionals: Preparing to Address the Grand Challenges Facing Entomology/Agriculture in a Changing Campus/Workplace Environment

Meeting Room 109/110 (Convention Centre)

Moderator and Organizer: Michael Parrella, Univ. of Idaho, Moscow, ID

- 1:30 Welcoming remarks
- 1:35 **1592** Addressing issues of harassment in pursuing career goals. Sharron Quisenberry¹ and **Shirley Luckhart**², ¹Iowa State University (Professor Emeritus), Tifton, GA, ²University of Idaho, Moscow, ID
- 2:05 **1593** Campus culture, training students and the success of early career professionals. **Bruce A. McPheron** (mcpferon.24@osu.edu), The Ohio State Univ., Columbus, OH
- 2:35 **1594** Entomology in the age of Millennials. **Christopher Buddle** (chris.buddle@mcgill.ca), McGill Univ., Ste-Anne-de-Bellevue, QC, Canada
- 2:55 **1595** Training students to address grand challenges facing agriculture in China. **Xue-xin Chen** (xxchen@zju.edu.cn), Zhejiang Univ., Hangzhou, China
- 3:15 **1596** Turning life science students toward agriculture by diminishing department silos. **John Zenger** (zengerj@byui.edu), Brigham Young Univ., Rexburg, ID
- 3:35 Break
- 4:05 **1597** Training for impact in agriculture: Priorities and values to emphasize for R&D professionals. **Scott Hutchins** (shhutchins@dow.com), Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN
- 4:35 **1598** Issues facing early career faculty in pursuing their career goals. **Susan J. Weller** (susan.weller@unl.edu), Univ. of Nebraska, Lincoln, NE
- 5:05 **1599** Preparing students/early career professionals for success in a shifting campus climate. **Rick Roush** (rtr10@psu.edu), Pennsylvania State Univ., University Park, PA
- 5:25 Concluding remarks

PBT Section Symposium: Juvenile Hormone: From Discovery to Applications

Meeting Room 208/209 (Convention Centre)

Moderators and Organizers: Alexander Raikhel¹ and Subba Reddy Palli², ¹Univ. of California, Riverside, CA, ²Univ. of Kentucky, Lexington, KY

- 1:30 Introductory remarks
- 1:35 **1600** *Rhodnius*, golden oil, and *Met*: History of juvenile hormone research. **Lynn M. Riddiford** (lrm@uw.edu), Univ. of Washington, Seattle, WA
- 2:05 **1601** What makes the juvenile hormone receptor tick. **Marek Jindra** (jindra@entu.cas.cz), Czech Academy of Sciences, České Budějovice, Czech Republic
- 2:35 **1602** Epigenetic regulation of juvenile hormone action. **Subba Reddy Palli** (rpalli@uky.edu), Univ. of Kentucky, Lexington, KY
- 2:50 **1603** Juvenile hormone and insect metamorphosis. **David Martin** (david.martin@ibe.upf-csic.es), Institute of Evolutionary Biology IBE, Barcelona, Spain
- 3:05 **1604** Molecular mechanisms of juvenile hormone regulation in female reproduction of the migratory locust, *Locusta migratoria*. **Shutang Zhou** (szhou@henu.edu.cn), Henan Univ., Henan, China
- 3:20 Break
- 3:30 **1605** Regulation of mosquito reproduction and metabolism: The role of juvenile hormone. **Alexander Raikhel** (araiikhel@ucr.edu), Univ. of California, Riverside, CA
- 3:45 **1606** Juvenile hormone-regulated alternative splicing of the taiman gene primes the ecdysteroid response in adult mosquitoes. Pengcheng Liu, Xiaonan Fu and **Jinsong Zhu** (zhujin@vt.edu), Virginia Polytechnic Institute and State Univ., Blacksburg, VA
- 4:00 **1607** Juvenile hormone influences transcriptional regulatory network plasticity in the honey bee brain. Gene Robinson and **Adam Hamilton** (arhamil2@illinois.edu), Univ. of Illinois, Champaign, IL
- 4:30 **1608** Juvenile hormone signaling regulates developmental plasticity in the American cockroach. **Sheng Li** (lisheng@scnu.ac.cn), South China Normal Univ., Guangzhou, China
- 4:45 **1609** Lepidopteran farnesyl diphosphate synthase-2 as a biorational target site: The role in juvenile hormone biosynthesis, x-ray crystal structure and inhibitor design. **Michel Cusson** (michel.cusson@canada.ca), Univ. Laval, Québec City, QC, Canada
- 5:00 **1610** Mosquito control using pyriproxyfen. **Reina Koganemaru** (koganemaru@sc.sumitomo-chem.co.jp), Sumitomo Chemical Company, Takarazuka-city, Japan
- 5:15 Concluding remarks

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P-IE Section Symposium: Environmental Risk Assessment of Genetically Modified Crops and Insects: Lessons Learned from the Past and Next Steps in a Changing World

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Tony Shelton¹, Jörg Romeis² and Ana Vélaz³, ¹Cornell Univ., Geneva, NY, ²Agroscope, Zürich, Switzerland, ³Univ. of Nebraska, Lincoln, NE

1:30 **1611** Evolution of environmental risk assessment for GM crops. **Paul Jepson** (paul.jepson@oregonstate.edu), Oregon State Univ., Corvallis, OR

2:00 **1612** Assessing the risk of *Bt* crops to arthropod natural enemies: A tri-trophic perspective. **Steven Naranjo** (steve.naranjo@ars.usda.gov)¹, Anthony Shelton², Junce Tian³, Jörg Romeis⁴ and Richard Hellmich⁵, ¹USDA - ARS, Maricopa, AZ, ²Cornell Univ., Geneva, NY, ³Zhejiang Univ., Hangzhou, China, ⁴Agroscope, Zürich, Switzerland, ⁵USDA - ARS, Ames, IA

2:15 **1613** Systematically reviewing non-target effects of *Bt* maize on arthropods in field studies: Pitfalls and opportunities of meta-analysis. **Michael Meissle** (michael.meissle@agroscope.admin.ch)¹, Steven Naranjo² and Jörg Romeis¹, ¹Agroscope, Zürich, Switzerland, ²USDA - ARS, Maricopa, AZ

2:30 **1614** Risk assessment of RNAi and gene editing in pest management. **Ana Vélaz** (avelezarango2@unl.edu), Univ. of Nebraska, Lincoln, NE

2:45 **1615** Gene drive: An overview for pest management. **Timothy Harvey-Samuel** (timothy.harvey-samuel@pirbright.ac.uk), Pirbright Institute, Surrey, United Kingdom

3:00 **1616** Role of population modification in the malaria eradication agenda. **Anthony James** (aajames@uci.edu), Univ. of California, Irvine, CA

3:15 Break

3:30 **1617** The US system for regulating GE organisms in agriculture. **Lisa Knolhoff** (lisa.knolhoff@aphis.usda.gov), USDA - APHIS, Riverdale, MD

3:45 **1618** The global perspective on ERA regulations for GE crops and insects. **Morven McLean** (mmclean@ilsr.org)¹ and Andrew F. Roberts², ¹International Life Sciences Institute Research Foundation, Washington, DC, ²Center for Environmental Risk Assessment, Washington, DC

4:00 **1619** The Cornell-Oxitec project: The first release of self-limiting insects in North America. **Anthony Shelton** (ams5@cornell.edu)¹ and Neil Morrison², ¹Cornell Univ., Geneva, NY, ²Oxitec Ltd, Abingdon, United Kingdom

4:15 **1620** Fall armyworm in Africa: Can GE technologies be part of the solution? **Joseph E. Huesing** (jhuesing@usaid.gov) and Regina Eddy, United States Agency For International Development, Washington, DC

4:30 **1621** Biological control of human diseases and crop pests with GM insects. Brad Shurdut¹ and **Neil Morrison** (neil.morrison@oxitec.com)², ¹Intrexon Corporation, Fishers, IN, ²Oxitec Ltd, Abingdon, United Kingdom

4:45 **1622** Managing GM crop dominated landscapes: Case of the monarch butterfly. **Richard Hellmich** (richard.hellmich@ars.usda.gov), USDA - ARS, Ames, IA

5:00 Panel discussion

P-IE Section Symposium: Invasion Ecology, Population Dynamics and Sustainable Management of the Emerald Ash Borer

Meeting Room 111/112 (Convention Centre)

Moderators and Organizers: Krista Ryall¹, Leah S. Bauer², Jian Duan³, Clifford Sadof⁴ and Chris MacQuarrie¹, ¹Natural Resources Canada, Sault Ste. Marie, ON, Canada, ²USDA - Forest Service, Lansing, MI, ³USDA - ARS, Newark, DE, ⁴Purdue Univ., West Lafayette, IN

1:30 Welcoming remarks

1:35 **1623** The emerald ash borer (*Agrilus planipennis*) invasion wave: Linking emerald ash borer dynamics and management options. **Deborah McCullough** (mccullo6@msu.edu)¹, Rodrigo Mercader² and Nathan Siegert³, ¹Michigan State Univ., East Lansing, MI, ²Washburn Univ., Topeka, KS, ³USDA - Forest Service, Durham, NH

1:50 **1624** Take off, eh: Population dynamics of emerald ash borer (*Agrilus planipennis*) in the great white north. **Chris MacQuarrie** (christian.macquarrie@canada.ca), Krista Ryall and Jeff Fidge, Natural Resources Canada, Sault Ste. Marie, ON, Canada

2:05 **1625** Polar plunge for emerald ash borer (*Agrilus planipennis*): Is there a place that is too cold? **Robert Venette** (rvenette@fs.fed.us)¹, Lindsey Christianson² and Mark Abrahamson³, ¹USDA - Forest Service, St. Paul, MN, ²Univ. of Minnesota, Grand Rapids, MN, ³Minnesota Dept. of Agriculture, St. Paul, MN

2:20 **1626** Assessing resistance to emerald ash borer (*Agrilus planipennis*) for breeding North American ash (*Fraxinus*) species. **Mary E. Mason** (mmason@fs.fed.us)¹, David Carey², Therese Poland³, Kathleen S. Knight², Charles Tubensing⁴, Roger Gettig⁴ and Jennifer Koch², ¹The Ohio State Univ., Delaware, OH, ²USDA - Forest Service, Delaware, OH, ³USDA - Forest Service, Lansing, MI, ⁴Holden Arboretum, Kirkland, OH

2:35 **1627** Chemical control options for the emerald ash borer (*Agrilus planipennis*) in the United States and Canada. **Clifford Sadof** (csadof@purdue.edu) and Matthew Ginzel, Purdue Univ., West Lafayette, IN

2:50 **1628** Monitoring ash (*Fraxinus*) decline and managing emerald ash borer (*Agrilus planipennis*) in cities. **Matthew Ginzel** (mginzel@purdue.edu) and Clifford Sadof, Purdue Univ., West Lafayette, IN

3:05 **1629** Estimating larval density and survival from non-destructive field surveys to gauge the potential of management strategies to reduce local *Agrilus planipennis* population growth. **Rodrigo Mercader** (rodrigo.mercader@washburn.edu)¹, Nathan Siegert² and Deborah McCullough³, ¹Washburn Univ., Topeka, KS, ²USDA - Forest Service, Durham, NH, ³Michigan State Univ., East Lansing, MI

SD1630 Evaluation of sampling methods used to detect and monitor for *Oobius agrili* Zhang and Huang (Hymenoptera: Encyrtidae), an introduced egg parasitoid of emerald ash borer (*Agrilus planipennis*) biocontrol. **Toby R. Petrice** (tpetrice@fs.fed.us)¹, Leah S. Bauer¹, Therese Poland¹ and Forrest Ravlin², ¹USDA - Forest Service, Lansing, MI, ²Michigan State Univ., East Lansing, MI

SD1631 Evaluation of different traps, lures, and strategies for detection of emerald ash borer (*Agrilus planipennis*) infestations. **Therese Poland** (tpoland@fs.fed.us)¹, Deborah McCullough² and Toby R. Petrice¹, ¹USDA - Forest Service, Lansing, MI, ²Michigan State Univ., East Lansing, MI

SD1632 Inter and intraspecific variation in diapause maintenance and termination of emerald ash borer (*Agrilus planipennis*) egg parasitoids: Implications for biological control introduction. **Kristi Larson** (klarson@udel.edu) and Jian Duan, USDA - ARS, Newark, DE

SD1633 Assessment of the systems approach for the phytosanitary treatment of ash wood infested with emerald ash borer (*Agrilus planipennis*). Chris MacQuarrie¹, Robert Lavallée² and **Leland Humble** (lhumble@nrcan.gc.ca)³, ¹Natural Resources Canada, Sault Ste. Marie, ON, Canada, ²Natural Resources Canada, Québec City, QC, Canada, ³Natural Resources Canada, Victoria, BC, Canada

SD1634 Plasticity in the cold tolerance of emerald ash borer (*Agrilus planipennis*). Robert Venette¹, **Charles Flower** (charlesflower@fs.fed.us)² and Kathleen S. Knight², ¹USDA - Forest Service, St. Paul, MN, ²USDA - Forest Service, Delaware, OH

SD1635 Parasitoids of the emerald ash borer (*Agrilus planipennis*): An update on the rearing, release, and recovery. **Benjamin Slager** (benjamin.h.slager@aphis.usda.gov), USDA - APHIS, Brighton, MI

SD1636 Cold storage of *Spathius galinae*: Progress in mass production. Benjamin Slager¹, **Andrea Anulewicz** (andreaa@msu.edu)¹, Jian Duan² and Jonathan Schmude², ¹USDA - APHIS, Brighton, MI, ²USDA - ARS, Newark, DE

SD1637 The effects of emerald ash borer (*Agrilus planipennis*) density and tree condition on parasitism by the introduced biocontrol wasp, *Tetrastichus planipennis*. **Breanne Aflague** (aflaguebreanne@gmail.com)¹, Juli Gould² and Jeff Garnas¹, ¹Univ. of New Hampshire, Durham, NH, ²USDA - APHIS, Buzzards Bay, MA

SD1638 Augmenting populations of North American parasitoids for biological control of emerald ash borer. **Justin Gaudon** (justin.gaudon@utoronto.ca) and Sandy Smith, Univ. of Toronto, Toronto, ON, Canada

SD1639 Interspecific competition between *Spathius agrili* and *Spathius galinae*, two larval parasitoids of emerald ash borer. **Max Ragozzino** (maxri@vt.edu)¹, Jian Duan² and Scott Salom¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²USDA - ARS, Newark, DE

SD1640 Disseminating knowledge to professionals and the wider public about emerald ash borer management and control using a recorded webinar format. **Elizabeth Barnes** (barne175@purdue.edu)¹, Robin Osborne², Amy Stone³, Deborah McCullough² and Clifford Sadof¹, ¹Purdue Univ., West Lafayette, IN, ²Michigan State Univ., East Lansing, MI, ³The Ohio State Univ., Columbus, OH

SD1641 Diet optimization for adult emerald ash borer using orthogonal arrays. **Molly A. Robinett** (molly.a.robinett@aphis.usda.gov)¹, Allen C. Cohen², Hannah Nadel³ and Benjamin Slager¹, ¹USDA - APHIS, Brighton, MI, ²North Carolina State Univ., Raleigh, NC, ³USDA - APHIS, Buzzards Bay, MA

3:20 Break & poster session

3:45 **1642** Development of a biocontrol program to manage emerald ash borer (*Agrilus planipennis*) in North America. **Leah S. Bauer** (lbauer@fs.fed.us)¹, Jian Duan², Juli Gould³ and Roy Van Driesche⁴, ¹USDA - Forest Service, Lansing, MI, ²USDA - ARS, Newark, DE, ³USDA - APHIS, Buzzards Bay, MA, ⁴Univ. of Massachusetts, Amherst, MA

4:00 **1643** Management of emerald ash borer (*Agrilus planipennis*) using biological control: Progress and challenges in the United States. **Jian Duan** (jian.duan@ars.usda.gov)¹, Leah S. Bauer², Roy Van Driesche³ and Juli Gould⁴, ¹USDA - ARS, Newark, DE, ²USDA - Forest Service, Lansing, MI, ³Univ. of Massachusetts, Amherst, MA, ⁴USDA - APHIS, Buzzards Bay, MA

4:15 **1644** Early evidence of impact of introduced parasitoids on emerald ash borer (*Agrilus planipennis*) in Canada. **Krista Ryall** (krista.ryall@canada.ca)¹, Jian Duan² and Chris MacQuarrie¹, ¹Natural Resources Canada, Sault Ste. Marie, ON, Canada, ²USDA - ARS, Newark, DE

4:30 **1645** Phenology of emerald ash borer (*Agrilus planipennis*) and its introduced parasitoids in New York State. **Melissa K. Fierke** (mkfierke@esf.edu)¹, Michael I. Jones¹ and Juli Gould², ¹State Univ. of New York, Syracuse, NY, ²USDA - APHIS, Buzzards Bay, MA

4:45 **1646** Gene silencing technology may facilitate emerald ash borer (*Agrilus planipennis*) management. Thais B. Rodrigues^{1,2}, S. Ramya¹, Flavia Pampolini¹ and **Lynne Rieske-Kinney** (lrieske@uky.edu)¹, ¹Univ. of Kentucky, Lexington, KY, ²Greenlight Biosciences, St. Louis, MO

5:00 **1647** Integrating biological control and insecticide treatments to control emerald ash borer (*Agrilus planipennis*) in urban environments. **Juli Gould** (juli.r.gould@aphis.usda.gov)¹, Melissa K. Fierke², John Kaltenbach³, Fredric D. Miller⁴ and Michael I. Jones², ¹USDA - APHIS, Buzzards Bay, MA, ²State Univ. of New York, Syracuse, NY, ³Colorado Dept. of Agriculture, Broomfield, CO, ⁴Morton Arboretum, Lisle, IL

5:15 **1648** Development of an integrated approach to managing the invasive emerald ash borer (*Agrilus planipennis*) in Maryland: Progress and challenges. **Kristopher Abell** (abellkris@gmail.com)¹, Jian Duan², David E. Jennings² and Paula M. Shrewsbury¹, ¹Univ. of Maryland, College Park, MD, ²USDA - ARS, Newark, DE

5:30 Poster session

P-IE Section Symposium: Let's Do Something! Implementing Collaborative Solutions for Pollinators in the Agricultural Landscape

Meeting Room 114/115 (Convention Centre)

Moderators and Organizers: Keri Carstens¹ and Caydee Savinelli², ¹DuPont Pioneer, Johnston, IA, ²Syngenta Plant Protection, Greensboro, NC

1:30 Welcoming remarks

1:35 **1649** Pollinator health in California almonds - a collaborative effort. **Bob Curtis** (rcurtis@almondboard.com), Almond Board of California, Modesto, CA

2:05 **1650** The Science Policy Field Tour concept for promoting evidence-based policy: Pollinators in Mississippi and beyond. **Melissa Siebert** (mwillrichsiebert@dow.com)¹, Rayda K. Krell², Jeff Gore³ and Jeffrey Harris⁴, ¹Dow AgroSciences, Greenville, MS, ²Western Connecticut State Univ., Danbury, CT, ³Mississippi State Univ., Stoneville, MS, ⁴USDA - ARS, Baton Rouge, LA

2:20 **1651** Report on national cooperative efforts to address bee health issues in Canada. **Rod Scarlett** (chc-ccm@honeycouncil.ca), Canadian Honey Council, Sherwood Park, AB, Canada

2:35 **1652** Tools for *Varroa* mite management - The Honey Bee Health Coalition. **Bob Sears** (robt.sears@gmail.com), Eastern Missouri Beekeepers Association, St. Louis, MO

2:50 **1653** The Sentinel Apiary Program: Collaborating with beekeepers to improve regional colony health and management. **Kelly Kulhanek** (kkulhane@umd.edu) and Dennis vanEngelsdorp, Univ. of Maryland, College Park, MD

3:05 **1654** FieldWatch: Improving stewardship & communication through the use of mapping systems. **Bob Walters** (bob.walters@fieldwatch.com)¹ and Stephanie Regagnon², ¹Field Watch, Inc., Zionsville, IN, ²Field Watch, Inc., West Lafayette, IN

3:20 Break

3:35 **1655** The Honey Bee Health Coalition - Bee integrated demonstration project. **Keri Carstens** (keri.carstens@pioneer.com), DuPont Pioneer, Johnston, IA

3:50 **1656** Native bee communities in a southern agroecosystem. **Katherine Parys** (katherine.parys@ars.usda.gov)¹ and Terry Griswold², ¹USDA - ARS, Stoneville, MS, ²USDA - ARS, Logan, UT

4:05 **1657** Ecology and economics of pollinator habitat: Using a landscape-scale experiment to determine cost-effective restoration strategies for beneficial insects. **Daniel Cariveau** (dcarivea@umn.edu) and Christina Herron-Sweet, Univ. of Minnesota, St. Paul, MN

4:20 **1658** The art and science of creating great pollinator habitat. **Pete Berthelsen** (pberthelsen@beeandbutterflyfund.org), Bee & Butterfly Habitat Fund, Elba, NE

4:35 **1659** Recent research on the mitigation and habitat selection of the monarch butterfly (*Danaus plexippus*) in Canada. **Ryan Norris** (rnorris@uoguelph.ca)¹, Paul Hoekstra², Samantha Knight¹, Grace Pitman¹ and Tyler Flockhart¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Syngenta Canada Inc., Guelph, ON, Canada

4:50 **1660** Prairie STRIPS, a collaboration that provides more than just forage for bees. **Matthew O'Neal** (oneal@iastate.edu)¹, Amy Toth¹, Lisa A. Schulte¹, Ashley St. Clair¹, Ge Zhang¹, Adam Dolezal², John Tyndall¹, Steven Bradbury¹ and Erin Hodgson¹, ¹Iowa State Univ., Ames, IA, ²Univ. of Illinois, Champaign, IL

5:05 **1661** Blueberry pollination and honey bee health in Canada. **Marta Guarna** (marta.guarna@canada.ca)¹, Heather Higo², Leonard Foster², Alison McAfee², Bradford Vinson², Jeffery Pettis³, Stephen Pernal¹ and Abdullah Ibrahim¹, ¹Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ²The Univ. of British Columbia, Vancouver, BC, Canada, ³Pettis and Associates LLC, Salisbury, MD

5:20 Concluding remarks

Member Symposium: 1st International Symposium on the Elateroidea

Meeting Room 207 (Convention Centre)

Moderators and Organizers: Vinicius Ferreira¹, Oliver Keller² and Hume Douglas³, ¹Montana State Univ., Bozeman, MT, ²Univ. of Florida, Gainesville, FL, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

1:30 **1662** Firefly genomes illuminate parallel origins of bioluminescence in beetles. **Sarah Lower** (ses425@cornell.edu)¹, Timothy Fallon², Ching-Ho Chang³, Manabu Bessho-Uehara⁴, Gavin Martin⁵, Adam Bewick⁶, Megan Behringer⁷, Humberto Debat⁸, Isaac Wong³, John Day⁹, Anton Suvorov⁵, Christian Silva³, Kathrin Stanger-Hall⁶, David Hall⁶, Robert Schmitz⁶, David R. Nelson¹⁰, Sara Lewis¹¹, Shuji Shigenobu¹², Seth M. Bybee⁵, Amanda Larracuent³, Yuichi Oba⁴ and Jing-Ke Weng¹³, ¹Bucknell Univ., Lewisburg, PA, ²Whitehead Institute for Biomedical Research, Cambridge, MA, ³Univ. of Rochester, Rochester, NY, ⁴Chubu Univ., Kasugai, Japan, ⁵Brigham Young Univ., Provo, UT, ⁶Univ. of Georgia, Athens, GA, ⁷Arizona State Univ., Tempe, AZ, ⁸National Institute of Agricultural Technology, Cordoba, Argentina, ⁹Centre for Ecology and Hydrology, Wallingford, United Kingdom, ¹⁰Univ. of Tennessee, Memphis, TN, ¹¹Tufts Univ., Medford, MA, ¹²National Institute for Basic Biology, Okazaki, Japan, ¹³Massachusetts Institute of Technology, Cambridge, MA

1:45 **1663** The generic reclassification of *Limonius* Eschscholtz, 1829 (Coleoptera: Elateridae) *sensu* Candeze 1865, based on morphological and genetic insights. **Frank Etzler** (etzler.frank@gmail.com), Montana State Univ., Bozeman, MT

2:00 **1664** Fireflies (Coleoptera: Lampyridae) of the West Indies and an update on the genera *Heterophotinus* and *Robopus*. **Oliver Keller** (okeller1977@gmail.com) and Marc Branham, Univ. of Florida, Gainesville, FL

2:15 **1665** The evolution of the firefly flash pattern: New evidence for an aposematic function against bats. **Marc Branham** (marcbran@ufl.edu)¹, Brian Leavell² and Jesse R. Barber³, ¹Univ. of Florida, Gainesville, FL, ²Purdue Univ., West Lafayette, IN, ³Boise State Univ., Boise, ID

2:30 **1666** Illumination: Stories in firefly evolution. **Gavin Martin** (gavin.jon.martin@gmail.com)¹, Kathrin Stanger-Hall², Marc Branham³ and Seth M. Bybee¹, ¹Brigham Young Univ., Provo, UT, ²Univ. of Georgia, Athens, GA, ³Univ. of Florida, Gainesville, FL

2:45 **1667** Changes to the genera of Cardiophorinae (Coleoptera: Elateridae). **Hume Douglas** (hume.douglas@agr.gc.ca)¹, Robin Kundrata² and Karine Savard¹, ¹Agriculture and Agri-Food Canada, Ottawa, ON, Canada, ²Palacky Univ., Olomouc, Czech Republic

3:00 **1668** The evolution of light signals in North American fireflies. **Kathrin Stanger-Hall** (ksh@uga.edu)¹, Sarah Lower², David Hall¹, Karolina Heyduk¹, Stephanie Archer-Hartmann¹ and Daniel Dolinski¹, ¹Univ. of Georgia, Athens, GA, ²Bucknell Univ., Lewisburg, PA

3:15 Break

3:30 **1669** A revision of the family Omethidae (Coleoptera, Elateroidea): Where are we at? **Vinicius Ferreira** (vinicius.sfb@gmail.com) and Michael Ivie, Montana State Univ., Bozeman, MT

3:45 **1670** Ecological impacts of artificial light at night on bioluminescent fireflies (Coleoptera: Lampyridae). **Avalon Owens** (avalon.owens@tufts.edu) and Sara Lewis, Tufts Univ., Medford, MA

4:00 **1671** *Photinus* generic complex (Coleoptera: Lampyridae). **Santiago Zaragoza-Caballero** (zaragoza@ib.unam.mx) and Ishwari Gutiérrez-Carranza, Univ. Nacional Autónoma de México, Ciudad de México, Mexico

4:15 **1672** Natural history, ecology and diversity patterns in Mexican soldier beetles (Coleoptera: Elateroidea: Cantharidae). **Cisteil Pérez-Hernández** (cxinum@gmail.com), Univ. Nacional Autónoma de México, Ciudad de México, Mexico

4:30 **1673** Current state and future perspectives in Phengodidae systematics. **André Silva Roza** (andreroza1993@gmail.com) and José Ricardo Mermudes, Univ. Federal do Rio de Janeiro, Rio de Janeiro, Brazil

4:45 **1674** Seasonal turnover of fireflies (Coleoptera, Lampyridae) in a tropical landscape. **Luiz Silveira** (silveira.lfi@gmail.com)¹, Gabriel Khattar², Margarete Macedo³, Ricardo Monteiro³ and José Ricardo Mermudes³, ¹Univ. of Georgia, Athens, GA, ²Concordia Univ., Montréal, QC, Canada, ³Univ. Federal do Rio de Janeiro, Rio de Janeiro, Brazil

5:00 **1675** The expanding distribution of revolutionary lampyrids in the Greater Antilles: New insights into *Cheguevaria*. **Michael Ivie** (mie@montana.edu)¹, Vinicius Ferreira¹ and Oliver Keller², ¹Montana State Univ., Bozeman, MT, ²Univ. of Florida, Gainesville, FL

Member Symposium: A Changing World in Education: Creating Engaging Undergraduate Learning Experiences

Meeting Room 204 (Convention Centre)

Moderator and Organizer: Carly M. Tribull, Farmingdale State College, Farmingdale, NY

1:30 Welcoming remarks

1:35 **1676** Teaching study skills and engaging non-major biology students: Lessons learned as a young professor. **Carly M. Tribull** (cmtribull@gmail.com), Farmingdale State College, Farmingdale, NY

1:50 **SP1677** Deploying student learning researchers as agents of formative assessment in large enrollment STEM courses. **Jonathan Cox** (jtcoc@email.arizona.edu), Katelyn Southard, Young Ae Kim, Paul Blowers, Lisa Elfring and Vicente Talanquer, Univ. of Arizona, Tucson, AZ

2:00 **SP1678** From the chalkboard and the overhead to blackboard and the digital age: Crossing borders isn't easy. **Jerome Grant** (jgrant@utk.edu), Univ. of Tennessee, Knoxville, TN

2:10 **1679** Engaging entomo-phobic and entomo-apatetic non-majors in the importance of entomology. **W. Wyatt Hoback** (whoback@okstate.edu), Oklahoma State Univ., Stillwater, OK

2:25 **1680** Changing the standards: Incorporation of scientific research into the classroom. **Tanya Josek** (tanyajosek@gmail.com)¹, Barbara Hug¹ and Natasha Capell², ¹Univ. of Illinois, Champaign, IL, ²Academy High School, Champagne, IL

2:40 **1681** Using insects to engage undergraduates with the scientific method. **Robert Zinna** (zinnar@email.arizona.edu), Univ. of Arizona, Tucson, AZ

2:55 **1682** An entomologically-inspired game for teaching core concepts in evolutionary ecology. **Mark Asplen** (mark.asplen@metrostate.edu), Metropolitan State Univ., St. Paul, MN

3:10 **1683** Best practices for teaching and learning online. **Cara Gibson** (cara.m.gibson@gmail.com), Univ. of Arizona, Tucson, AZ; Independent, Victoria, BC, Canada

3:25 Break

3:35 **1684** The forest is a classroom: High impact teaching and experiential science learning in the tropical rain forest. **Nina Zitani** (nzitani@uwo.ca), Western Univ., London, ON, Canada

3:50 **1685** A day at the body farm. **Sibyl Bucheli** (bucheli@shsu.edu), Sam Houston State Univ., Huntsville, TX

4:05 **1686** Community-based insect ecology capstone research, at a university without entomology classes. **Kaitlin Stack Whitney** (kxwsbi@rit.edu), Rochester Institute of Technology, Rochester, NY

4:20 **1687** Over hill and dale: Inspiring aspiring entomologists via field experiences and more. **Derek Woller** (derek.a.woller@aphis.usda.gov), USDA - APHIS, Phoenix, AZ

4:35 **1688** Engaging undergraduates in the INHS Insect Collection. **Thomas McElrath** (tmcelrat@uga.edu), Illinois Natural History Survey, Champaign, IL

4:50 **SP1689** The Broward College Insect Collection (BROW: BCIC): A vehicle for creating undergraduate research and learning opportunities at a 100% teaching undergraduate institution. **David Serrano** (dserrano@broward.edu), Broward College, Davie, FL

5:00 **1690** Incorporating social justice and intersectionality into biology classrooms. **Michelle Duennes** (maduennes@gmail.com), Univ. of California, Riverside, CA

5:15 Workshop: Diversifying field biology: Overcoming obstacles toward URM empowerment

Member Symposium: Brain and Behaviour

Meeting Room 205 (Convention Centre)

Moderators and Organizers: Fabio Manfredini and Elli Leadbeater, Royal Holloway Univ. of London, Egham, United Kingdom

1:30 **1691** Deciphering gene-environment interplay. **Marla Sokolowski** (marla.sokolowski@utoronto.ca)^{1,2} and Ina Anreiter^{1,2}, ¹Univ. of Toronto, Toronto, ON, Canada, ²Canadian Institute for Advanced Research, Toronto, ON, Canada

1:45 **1692** Genomic and neurogenetic approaches reveal a role of Dpr- and DIP-expressing neurons for courtship behaviors. **Michelle Arbeitman** (michelle.arbeitman@med.fsu.edu), Florida State Univ., Tallahassee, FL

2:00 **1693** Expanding the genetic toolkit for the mechanistic understanding of the insect brain beyond *Drosophila*. **Yehuda Ben-Shahar** (benshahary@wustl.edu), Washington Univ., St. Louis, MO

2:15 **1694** Experience-dependent mushroom body plasticity in butterflies: Consequences of search complexity and host range. Laura van Dijk, Niklas Janz, Alexander Schäfers, Gabriella Gamberale-Stille and **Mikael Carlsson** (mikael.carlsson@zoologi.su.se), Stockholm Univ., Stockholm, Sweden

2:30 **1695** Parasite-mediated brain plasticity in the social wasp *Polistes dominula*. Allison Rozanski¹, Kristine Gandia¹, Taylor Lopreto¹, Alessandro Cini², Federico Cappa², Irene Pepicciello², Laura Beani², Rita Cervo² and **Floria Uy** (f.uy@miami.edu)¹, ¹Univ. of Miami, Coral Gables, FL, ²Univ. of Florence, Florence, Italy

2:45 **1696** Caste and developmental effects on brain structure in dampwood termites. **Sean O'Donnell** (so356@drexel.edu)¹ and Barbara L. Thorne², ¹Drexel Univ., Philadelphia, PA, ²Univ. of Maryland, College Park, MD

3:00 Break

3:15 **1697** The molecular basis for waggle dance communication in the honey bee *Apis mellifera*. **Fabio Manfredini** (fmanfredini79@gmail.com)¹, Yannick Wurm² and Elli Leadbeater¹, ¹Royal Holloway Univ. of London, Egham, United Kingdom, ²Queen Mary Univ., London, United Kingdom

3:30 **1698** Is low honey bee aggression a sickness behavior? Molecular evaluation in the brain and peripheral tissues. **Clare Rittschof** (clare.rittshof@uky.edu) and Joseph Palmer, Univ. of Kentucky, Lexington, KY

3:45 **1699** Exposure of *Apis mellifera* to fipronil reduces synaptic density in the mushroom bodies. **Susan E. Fahrbach** (fahrbach@wfu.edu)¹ and James Privitt², ¹Wake Forest Univ., Winston-Salem, NC, ²Cornell Univ., Ithaca, NY

4:00 **1700** Possible roles and evolution of kenyon cell subtypes in the brains of hymenopteran insects. Hiroki Kohno, Satoyo Oya and **Takeo Kubo** (stkubo@bs.s.u-tokyo.ac.jp), Univ. of Tokyo, Tokyo, Japan

4:15 **1701** Juvenile hormone is a central regulator of social physiology in the bumblebee *Bombus terrestris*. **Guy Bloch** (guy.bloch@mail.huji.ac.il), The Hebrew Univ., Jerusalem, Israel

4:30 **1702** Individual and colony level responses to specific resource demand: How individuals contribute to colony flexibility. **Elizabeth Franklin** (elizabeth.franklin@uoguelph.ca)¹, Karen O'Riordan² and Nigel Raine¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Royal Holloway Univ. of London, Egham, United Kingdom

4:45 **SP1703** Eco-Evo-Devo: the evolutionary trade-off between vision and olfaction across the genus *Drosophila*. **Ian W. Keeseey** (ikeeseey@ice.mpg.de)¹, Veit Grabe¹, Sarah Koerte¹, Grant Bolton², Bruce A. Barrett², Markus Knaden¹ and Bill S. Hansson¹, ¹Max Planck Institute for Chemical Ecology, Jena, Germany, ²Univ. of Missouri, Columbia, MO

4:55 **SP1704** Mating and socially regulated changes in fire ant queen brain transcriptomes. **Travis Calkins** (tcalkins@tamu.edu), Cecilia Tamborindeguy and Patricia Pietrantonio, Texas A&M Univ., College Station, TX

5:05 **SP1705** Social brains and solitary bees: A test of the social brain hypothesis in sweat bees. **Adam Smith** (adam_smith@gwu.edu)¹, Marc Seid², Sarah Jaumann³ and Sarah Pahlke¹, ¹George Washington Univ., Washington, DC, ²The Univ. of Scranton, Scranton, PA, ³Univ. of Minnesota, St. Paul, MN

5:15 **SP1706** Representation of human odor in the brain of *Aedes aegypti*. **Genevieve Tauxe** (gtauxe1@jhu.edu) and Conor McMeniman, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

Member Symposium: Fifty Shades of Fuscus: An Intimate Look at Staphylinidae

Meeting Room 206 (Convention Centre)

Moderators and Organizers: Michael Ferro¹ and Brittany Owens², ¹Clemson Univ., Clemson, SC, ²Louisiana State Univ., Baton Rouge, LA

1:30 **1707** The type of *Nicrophorus chryseus* Mazokhin-Porshnyakov, 1953 (Coleoptera: Silphidae) rediscovered and a commentary on "accidental taxonomy". **Derek Sikes** (dssikes@alaska.edu)¹ and Maxwell Barclay², ¹Univ. of Alaska, Fairbanks, AK, ²Natural History Museum, London, United Kingdom

1:45 **1708** Data and images of the types of the Brazilian fauna - Staphylinidae. **Edilson Caron** (caron@ufpr.br), Federal Univ. of Paraná, Palotina, Brazil

2:00 **1709** Are these new genera? A morphological phylogenetic analysis of Xanthopygina. **Stylianos Chatzimanolis** (stylianos-chatzimanolis@utc.edu)¹ and Adam Brunke^{2,3}, ¹Univ. of Tennessee, Chattanooga, TN, ²Natural History Museum, Vienna, Austria, ³Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, ON, Canada

2:15 **1710** Morphology and behavior related to secondary sexual characters in the genus *Batrissodes* Reitter, 1882 (Coleoptera: Staphylinidae: Pselaphinae) in North America, north of Mexico. **Laura Vásquez-Vélez** (lvasque@g.clemson.edu), Clemson Univ., Clemson, SC

2:30 **1711** Diversification in the palaeartic genus *Leptobium* Casey (Coleoptera, Staphylinidae, Paederinae). **Vladimir Gusarov** (vladimir.gusarov@nhm.uio.no)¹ and Sinan Anlaş², ¹Natural History Museum, Oslo, Norway, ²Celal Bayar Univ., Alaşehir, Turkey

2:45 Break

3:00 **1712** Revision of the New Zealand Pselaphini (Staphylinidae: Pselaphinae): Diversity and biogeographic implications. **Brittany Owens** (brittanyowens@gmail.com) and Christopher E. Carlton, Louisiana State Univ., Baton Rouge, LA

3:15 **1713** Re-evaluating holarctic species: Cryptic diversity in *Quedionuchus plagiatus* (Coleoptera: Staphylinidae). **Adam Brunke** (adam.j.brunke@gmail.com)¹, Alexey Solodovnikov², M. Salnitska^{2,3}, Aslak Hansen², A. Zmudzinska¹ and A. Smetana¹, ¹Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, ON, Canada, ²Natural History Museum of Denmark, Copenhagen, Denmark, ³St. Petersburg State Univ., St. Petersburg, Russian Federation

3:30 **1714** The phylogeny of the 'stenine group', with special reference to fossils. **Dave Clarke** (djclarke@memphis.edu), Univ. of Memphis, Memphis, TN

3:45 **1715** Tachyporinae revisited: Phylogeny, evolution, and higher classification based on morphology (Coleoptera: Staphylinidae). **Shuhei Yamamoto** (s.yamamoto.64@gmail.com), Kyushu Univ., Fukuoka, Japan; Field Museum of Natural History, Chicago, IL

4:00 Break

4:15 **1716** Molecular basis of social symbiosis in aleocharine rove beetles. **Joseph Parker** (joep@caltech.edu), California Institute of Technology, Pasadena, CA

4:30 **1717** Little roves on the prairie: The rove beetle (Coleoptera: Staphylinidae) captures of a baited pitfall trap experiment in the endangered tall grass prairie ecosystem. **Reid Miller** (millerrb@myumanitoba.ca), Univ. of Manitoba, Winnipeg, MB, Canada

4:45 **1718** Diversity, phylogenetic community structure, and elevation: Rove beetles (Coleoptera, Staphylinidae) in the neotropics. **Sarah Dolson** (dolsons@uoguelph.ca)¹, Daniel H. Janzen², Winnie Hallwachs² and M. Alex Smith¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Univ. of Pennsylvania, Philadelphia, PA

5:00 **1719** The amazing success or spectacular failure of StaphMeeting 2018: A workshop on rove beetles. **Michael Ferro** (spongymesophyll@gmail.com)¹ and Brittany Owens², ¹Clemson Univ., Clemson, SC, ²Louisiana State Univ., Baton Rouge, LA

5:15 Discussion

Member Symposium: Hosts, Strains, and Regulatory Challenges

Meeting Room 202 (Convention Centre)

Moderators and Organizers: James Young¹ and Jason Hansen², ¹USDA - APHIS, Riverdale, MD, ²USDA - APHIS, Los Indios, TX

1:30 Welcoming remarks

1:45 **1720** A history of U.S. regulations and inspection practices. **Ethan Kane** (ethan.c.kane@aphis.usda.gov), USDA - APHIS, Riverdale, MD

2:00 **1721** The science behind how treatments are determined. **Woodward Bailey** (woodward.d.bailey@aphis.usda.gov), USDA - APHIS, Miami, FL

2:15 **1722** Squish 'em or leave 'em: Assessing the potential risk of exotic insects. **Ron Weeks** (ron.d.weeks@aphis.usda.gov), USDA - APHIS, Raleigh, NC

2:30 **1723** The magic and mystery of DNA in an AQI environment. **Cheryle O'Donnell** (cheryle.a.odonnell@aphis.usda.gov), USDA - APHIS, Beltsville, MD

2:45 **1724** How to get a new pest confirmed. **Stephen Bullington** (stephen.w.bullington@aphis.usda.gov), USDA - APHIS, Riverdale, MD

3:00 **1725** Diagnostic challenges of some true fruit flies (Diptera: Tephritidae: Dacinae): Let's keep them OFF. **Jung Kim** (jung.w.kim@aphis.usda.gov), USDA - APHIS, Washington, DC

3:15 **1726** Dealing with sibling species and look-a-likes on an international border. **Jason Hansen** (jason.a.hansen@aphis.usda.gov), USDA - APHIS, Los Indios, TX

3:30 **1727** Painful Plusiinae problems. **Michelle DaCosta** (michelle.dacosta@aphis.usda.gov)¹, Paul Goldstein², Steven Passoa³, James Young⁴ and Todd Gilligan⁵, ¹USDA - APHIS, Miami, FL, ²USDA - ARS, Washington, DC, ³USDA - APHIS, Columbus, OH, ⁴USDA - APHIS, Riverdale, MD, ⁵USDA - APHIS, Fort Collins, CO

3:45 Break

4:00 **1728** Assessing the population structure and phylogenomic relationships of gypsy moths and related species using genotyping-by-sequencing. **Bryan Brunet** (bryan.brunet@canada.ca)¹ and Reza Zahir², ¹Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, ON, Canada, ²Canadian Food Inspection Agency, Ottawa, ON, Canada

4:15 **1729** The taxonomic challenges of exotic species introductions. **James R. LaBonte** (jlabonte@oda.state.or.us), Oregon Dept. of Agriculture, Salem, OR

4:30 **1730** The new normal: Responding to invasive species threats with a multi-faceted nursery IPM extension program. **Robin Rosetta** (robin.rosetta@oregonstate.edu), Oregon State Univ., Aurora, OR

4:45 **1731** Safeguarding paradise: Foreign and domestic quarantine challenges in Hawai'i. **Christine Lynch** (christine.a.lynch@aphis.usda.gov), USDA - APHIS, Honolulu, HI

5:00 **1732** *Carposina sasakii*, *C. nipoensis* and *C. ottawana*: Species, synonyms, or subspecies. **James Young** (jim.d.young@aphis.usda.gov)¹, James A. Robertson² and Jean-François Landry³, ¹USDA - APHIS, Riverdale, MD, ²USDA - APHIS, Beltsville, MD, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

Member Symposium: Insect Ecology, Evolution, and Economics in the Plant Family Cucurbitaceae: Opportunities, Insights, and Challenges Presented By Insects (and Their Microbiomes)

Meeting Room 122 (Convention Centre)

Moderators and Organizers: D. Susan Chan¹ and Margarita López-Urbe^{2,3,4}, ¹Univ. of Guelph, Guelph, ON, Canada, ²North Carolina State Univ., Raleigh, NC, ³Pennsylvania State Univ., University Park, PA, ⁴Cornell Univ., Ithaca, NY

1:30 Welcoming remarks and introduction

1:35 **1733** Squash anyone? Prehistorical mysteries, remarkable resources, and exceptional adaptations of squash bees, herbivores, and vectored pathogens. **James H. Cane** (jim.cane@ars.usda.gov), USDA - ARS, Logan, UT

2:05 **1734** Wild bees in eastern *Cucurbita* agroecosystems. **Carley M. McGrady** (rxm452@psu.edu)¹, James Strange², Amber Tripodi² and Shelby J. Fleischer¹, ¹Pennsylvania State Univ., University Park, PA, ²USDA - ARS, Logan, UT

2:20 **1735** Evaluating insecticide exposure scenarios for the hoary squash bee *Peponapis pruinosa* on farms in Ontario, Canada. **D. Susan Willis Chan** (dchan05@uoguelph.ca)¹, Nigel Raine¹, Ryan Prosser¹ and Jose Rodriguez-Gil², ¹Univ. of Guelph, Guelph, ON, Canada, ²Univ. of Ottawa, Ottawa, ON, Canada

SD1736 Recent emergence of an insect-transmitted cucurbit pathogen. **Lori Shapiro** (lori.r.shapiro@gmail.com), Harvard Univ., Cambridge, MA; North Carolina State Univ., Raleigh, NC

SD1737 Crop domestication and the evolution of floral trait phenotypes. **Margarita López-Urbe** (mml64@psu.edu) and Kristen Brochu, Pennsylvania State Univ., University Park, PA

SD1738 The impact of ant activity on pollination services provided by bees on *Cucurbita* crops. **Aaron Fairweather** (fairweaa@uoguelph.ca), D. Susan Willis Chan, Nigel Raine and Jonathan Schmidt, Univ. of Guelph, Guelph, ON, Canada

2:35 Break and poster session

2:45 **1739** Understanding plant virus biodiversity and impacts on cucurbit hosts in extreme habitats. **Kerry Mauck** (kerry.mauck@ucr.edu), Tessa Shates and Penglin Sun, Univ. of California, Riverside, CA

3:00 **1740** The role of *Cucurbita pepo* (Cucurbitaceae) microclimate and floral morphology in their interaction with squash bees (*Peponapis pruinosa*). **Patricia Nunez-Silva** (silvap@uoguelph.ca), D. Susan Willis Chan and Peter Kevan, Univ. of Guelph, Guelph, ON, Canada

3:15 **1741** Love it or leave it: Digestive adaptations of specialist and generalist bees on cucurbits. **Kristen Brochu** (kb532@cornell.edu) and Bryan N. Danforth, Cornell Univ., Ithaca, NY

3:30 **1742** Specialist foraging in a polluted world: Can specialists of cucurbita cope with ozone-altered scents of their host plant? **Brynn Cook** (bsc8tn@virginia.edu) and T'ai Roulston, Univ. of Virginia, Boyce, VA

3:45 Break and poster session

3:55 **1743** The role of cucurbit domestication on the evolutionary history of squash bees [Hymenoptera: Apidae: *Eucera* (*Peponapis*) and (*Xenoglossa*)]. **Shelby Kilpatrick** (skk30@psu.edu), Margarita López-Urbe and Heather Himes, Pennsylvania State Univ., University Park, PA

4:10 **1744** Relative roles of pesticide management and landscape context in determining pest pressure, predator abundance, and pollinator visitation in pumpkin fields. **Keng-Lou Hung** (kenglou.hung@gmail.com)¹, Ian Kaplan², Laura Ingwell² and Keng-Lou Hung¹, ¹The Ohio State Univ., Columbus, OH, ²Purdue Univ., West Lafayette, IN

4:25 **1745** Pollination of pumpkin and winter squash (*Cucurbita pepo* and other *Cucurbita* species) on organic, IPM, and experimental farms in Connecticut. **Kimberly Stoner** (kimberly.stoner@ct.gov) and Brian D. Eitzer, Connecticut Agricultural Experiment Station, New Haven, CT

4:40 **SP1746** Effects of climate and atmospheric change on floral resources in two insect-pollinated plants. **Elsa Youngsteadt** (ekyoung@ncsu.edu)¹, Laura A. Burkle², Danesha Seth Carley¹, Steven D. Frank¹, Rebecca E. Irwin¹, Thomas Ruffy¹ and Justin Runyon³, ¹North Carolina State Univ., Raleigh, NC, ²Montana State Univ., Bozeman, MT, ³USDA - Forest Service, Bozeman, MT

4:50 Panel discussion

5:05 Concluding remarks

TUESDAY, NOVEMBER 13 / MARDI 13 NOVEMBRE

Member Symposium: Know Your Weevils, Fear No Weevil: Synthesizing Weevil Biology across Continents

Meeting Room 203 (Convention Centre)

Moderators and Organizers: Elizabeth Long¹ and Douglas Richmond², ¹The Ohio State Univ., Wooster, OH, ²Purdue Univ., West Lafayette, IN

1:30 Introductory remarks

1:35 **1747** Really know your weevils: Cryptic species and the challenges they present. **Paul F. Rugman-Jones** (paulrj@ucr.edu) and Richard Stouthamer, Univ. of California, Riverside, CA1:50 **1748** Grass-feeding billbugs: A complex and changing management landscape. **Douglas Richmond** (drichmond@purdue.edu)¹, Alexandra Duffy², Laramy Enders¹ and Marian Rodriguez-Soto¹, ¹Purdue Univ., West Lafayette, IN, ²Brigham Young Univ., Provo, UT2:05 **1749** Managing *Listronotus bonariensis*, an introduced pest of New Zealand ryegrass (*Lolium* spp) pastures, using a fungal endophyte and a parasitoid. **Alison Popay** (alison.popay@agresearch.co.nz)¹ and Stephen Goldson², ¹AgResearch Ltd., Hamilton, New Zealand, ²AgResearch Ltd., Christchurch, New Zealand2:20 **1750** Synthesizing annual bluegrass weevil (*Listronotus maculicollis*) reproductive phenology and entomopathogenic nematode persistence studies to improve biological control programs in turfgrass. **Benjamin McGraw** (bam53@psu.edu), Pennsylvania State Univ., University Park, PA2:35 **1751** A multi-life stage management strategy for the pervasive tree fruit pest, the plum curculio, *Conotrachelus nenuphar* (Herbst), in apple orchards. **Tracy Leskey** (tracy.leskey@ars.usda.gov)¹, David Shapiro-Ilan², John Cullum³, Jaime Pinero⁴, Anne Nielsen⁵ and Cesar Rodriguez-Saona⁶, ¹USDA - ARS, Kearneysville, WV, ²USDA - ARS, Byron, GA, ³Virginia Polytechnic Institute and State Univ., Winchester, VA, ⁴Lincoln Univ., Jefferson City, MO, ⁵Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, ⁶Rutgers, The State Univ. of New Jersey, New Brunswick, NJ2:50 **1752** Effect of soil type on carrot weevil movement behavior. Olga Bykova and **Suzanne Blatt** (suzanne.blatt@agr.gc.ca), Agriculture and Agri-Food Canada, Kentville, NS, Canada

3:05 Break

3:20 **1753** Exploring interactions between the timing, movement, and efficacy of soil-applied insecticides against the carrot weevil in fresh parsley. **Elizabeth Long** (long.1541@osu.edu) and Emily Justus, The Ohio State Univ., Wooster, OH3:35 **1754** Plant-mediated indirect interactions between weevils and aphids promotes the spread of a plant virus. **David Crowder** (dcrowder@wsu.edu), Washington State Univ., Pullman, WA3:50 **1755** Presentation withdrawn4:05 **1756** Pepper weevil (*Anthonomus eugenii* Cano): A plant disease of peppers? **Joseph Ingerson-Mahar** (mahar@njaes.rutgers.edu), Rutgers, The State Univ. of New Jersey, New Brunswick, NJ4:20 **1757** Integration of farmer and scientist perspectives to manage alfalfa weevil. **Randa Jabbour** (rjabbour@uwyo.edu), Makenzie Pellissier and Shiri Noy, Univ. of Wyoming, Laramie, WY4:35 **1758** Presentation withdrawn4:50 **1759** Functions of stone cells in the conifer defense syndrome. **Justin Whitehill** (whiteh5@mssl.ubc.ca), Macaire Yuen and Joerg Bohlmann, The Univ. of British Columbia, Vancouver, BC, Canada**Member Symposium: Plant Metabolism in Plant-Herbivore Interactions: Crossing the Borders between Primary and Secondary Metabolism**

Meeting Room 121 (Convention Centre)

Moderators and Organizers: Fiona L. Goggin¹, Christine Foyer² and Colin M. Orians³, ¹Univ. of Arkansas, Fayetteville, AR, ²Univ. of Leeds, Leeds, United Kingdom, ³Tufts Univ., Medford, MA

1:30 Introductory remarks

1:35 **1760** Potential impacts of climate change on plant metabolism and insect resistance. Evan DeLucia¹ and **Linus Gog** (goglinus@msu.edu)², ¹Univ. of Illinois, Champaign, IL, ²Michigan State Univ., East Lansing, MI1:50 **1761** Lipid metabolism and defense in plant-aphid interactions. **Fiona L. Goggin** (fgoggin@uark.edu), Junhuan Xu, Janithri Wickramanayake and Hillary Fischer, Univ. of Arkansas, Fayetteville, AR2:05 **1762** Interacting invasive hemipteran herbivores on hemlock: Effects on chemistry and growth. **Colin M. Orians** (colin.orians@tufts.edu)¹, Robert Schaeffer^{1,2}, Chad Rigby³ and Evan Preisser⁴, ¹Tufts Univ., Medford, MA, ²Washington State Univ., Pullman, WA, ³Bartlett Tree Experts, Charlotte, NC, ⁴Univ. of Rhode Island, Kingston, RI2:20 **1763** The role of phytochemical diversity on multi-trophic interactions. **Lora Robinson** (lorar@unr.edu), Univ. of Nevada, Reno, NV

2:35 Break

2:50 **1764** Manipulation of plant primary metabolism by a galling insect, grape phylloxera. **Paul Nability** (pauln@ucr.edu), Univ. of California, Riverside, CA3:05 **1765** Redox control of aphid resistance through altered cell wall composition and nutritional quality. **Christine Foyer** (c.foyer@leeds.ac.uk), Univ. of Leeds, Leeds, United Kingdom3:20 **1766** The influence of chloroplast signaling on host plant responses to a root-feeding herbivore. **Tessa Burch-Smith** (tburchsm@utk.edu), Elena Ganusova, Jessica Fernandez and Tarik Hewezi, Univ. of Tennessee, Knoxville, TN3:35 **1767** Maize tolerance to the western corn rootworm. **Richard Ferrieri** (ferrieri@missouri.edu), Univ. of Missouri, Columbia, MO

3:50 Break

4:05 **1768** Diving into the metabolic space: A systematic exploration in herbivory-induced coyote tobacco populations. **Dapeng Li** (dli@ice.mpg.de)¹, Emmanuel Gaquerel² and Ian Baldwin¹, ¹Max Planck Institute for Chemical Ecology, Jena, Germany, ²Univ. of Heidelberg, Heidelberg, Germany4:20 **1769** Plant responses to wounding at elevated CO₂ and fertilization regimes. **Jacqueline Bede** (jacquie.bede@mcgill.ca), McGill Univ., Montréal, QC, Canada4:35 **1770** Wild parsnip (*Pastinaca sativa*) expanded defense response against the parsnip webworm (*Depressaria pastinacella*). **Bernarda Calla** (calla2@illinois.edu), Mary Schuler and May Berenbaum, Univ. of Illinois, Champaign, IL

4:50 **1771** Terpenoid defense systems in conifers. **Jose Celedon** (jceledon@msl.ubc.ca) and Joerg Bohlmann, The Univ. of British Columbia, Vancouver, BC, Canada

5:05 Panel discussion

SD1772 Radioisotope flux analysis aids in identifying rapid and persistent changes in plant metabolism that are linked to defense priming. **Rich Ferrieri** (rferrieri@bnl.gov), Univ. of Missouri, Columbia, MO

SD1773 Interactive effects of drought and herbivory on the volatile and non-volatile metabolites of tea. **Eric Scott** (eric.scott@tufts.com), Nicole Kfoury, Joshua Morimoto, Albert Robbat and Colin M. Orians, Tufts Univ., Medford, MA

SD1774 Infection by the sugar beet cyst nematode responds to chloroplast-generated signals. Jessica Fernandez, Elena Ganusova, Tarik Hewezi and **Tessa Burch-Smith** (tburchsm@utk.com), Univ. of Tennessee, Knoxville, TN

SD1775 Aphids and primary metabolites in maize. **Hillary Fischer** (hdfische@uark.edu), Junhuan Xu and Fiona L. Goggin, Univ. of Arkansas, Fayetteville, AR

SD1776 Influence of defensive plant elicitor peptides on plant growth and development. **Fiona L. Goggin** (fgoggin@uark.edu)¹, Janithri Wickramanayake¹ and Argelia Lorence², ¹Univ. of Arkansas, Fayetteville, AR, ²Arkansas State Univ., Jonesboro, AR

5:15 Poster session

Late-Breaking Symposium: The New US Exotick: *Haemaphysalis longicornis*

Meeting Room 119/120 (Convention Centre)

Moderators and Organizers: Denise Bonilla¹, Adalberto A. Pérez de León² and Dina M. Fonseca³, ¹USDA - APHIS, Fort Collins, CO, ²USDA - ARS, Kerrville, TX, ³Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

1:30 **1777** *Haemaphysalis longicornis* is the U.S.: A status report. Denise Bonilla¹, **Adalberto A. Pérez de León** (betoperezdeleon@ars.usda.gov)² and Dina M. Fonseca³, ¹USDA - APHIS, Fort Collins, CO, ²USDA - ARS, Kerrville, TX, ³Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

1:45 **1778** Global ecology of the longhorned tick: USDA Veterinary Service public outreach activities on the long horn tick. **Angela M. James** (angela.m.james@aphis.usda.gov) and Morgan E. Wehtje, USDA - APHIS, Fort Collins, CO

2:00 **1779** Landscape invasions by the longhorned tick: A global perspective. **Morgan E. Wehtje** (morgan.e.wehtje@aphis.usda.gov) and Angela M. James, USDA - APHIS, Fort Collins, CO

2:15 **1780** Preliminary studies on exotic *Haemaphysalis longicornis* ticks detected in New Jersey: Field surveys, genetics and pathogen testing. **Andrea Egizi** (andrea.egizi@co.monmouth.nj.us)^{1,2}, James Occi² and Dina Fonseca², ¹Monmouth County Mosquito Control Division, Tinton Falls, NJ, ²Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

2:30 **1781** Tracking an invader: Wildlife surveillance for *Haemaphysalis longicornis* in the eastern U.S. **Stacey Vigil** (svigil@uga.edu)¹, Michael J. Yabsley¹, Adam R. Randall², Jan Lovy³, David Shaw¹, Seth White¹, Peach VanWick¹, Ernesto Dominguez¹ and Mark Ruder¹, ¹Univ. of Georgia, Athens, GA, ²USDA - APHIS, Lebanon, NJ, ³New Jersey Division of Fish & Wildlife, Oxford, NJ

2:45 **1782** Surveillance of *Haemaphysalis longicornis* in South Korea. **Terry Klein** (terry.a.klein2.civ@mail.mil), US Army, South Korea

3:00 **1783** A new exotic tick in the US: What are the concerns? **Dina M. Fonseca** (dina.fonseca@rutgers.edu)¹, Denise Bonilla² and Adalberto A. Pérez de León³, ¹Rutgers, The State Univ. of New Jersey, New Brunswick, NJ, ²USDA - APHIS, Fort Collins, CO, ³USDA - ARS, Kerrville, TX

3:15 Discussion

Organized Meeting: SOGA Weevil Workers

Meeting Room 210 (Convention Centre)

Moderators and Organizers: Robert S. Anderson¹ and Maria Lourdes Chamorro², ¹Canadian Museum of Nature, Ottawa, ON, Canada, ²USDA - ARS, Washington, DC

1:30 **1784** Charlie O'Brien: A life spent with weevils. **Robert S. Anderson** (randerson@mus-nature.ca), Canadian Museum of Nature, Ottawa, ON, Canada

1:45 **1785** Cretaceous amber fossils and the phylogeny of weevils. **Dave Clarke** (djclarke@memphis.edu)¹, Rolf Oberprieler² and Duane McKenna¹, ¹Univ. of Memphis, Memphis, TN, ²CSIRO, Canberra, Australia

2:00 **1786** An integrated management approach for South American palm weevil, *Rhynchophorus palmarum*, an invasive pest of ornamental palms in Southern California. **Ivan Milosavljević** (ivanm@ucr.edu) and Mark Hoddle, Univ. of California, Riverside, CA

2:15 **1787** Illustrated interactive and synoptic keys to *Conotrachelus* of North American north of Mexico: Diagnosing the diversity of an agriculturally important genus. **Natasha Young** (natashayoungest@gmail.com)¹ and Maria Lourdes Chamorro², ¹Smithsonian Institution, National Museum of Natural History, Washington, DC, ²USDA - ARS, Washington, DC

2:30 **1788** Systematics and biogeography of the Mesoamerican weevil genus *Plumolepilius* Barrios-Izás and Anderson. **Manuel Barrios Izás** (manuelbarriosgt@gmail.com)^{1,2}, Bob Anderson³ and Juan Morrone Lupi¹, ¹Univ. Nacional Autónoma de México, Mexico, Mexico, ²Centro Univ.rio de Zacapa, Zacapa, Guatemala, ³Canadian Museum of Nature, Ottawa, ON, Canada

2:45 **1789** Comparative bending mechanics and morphology of the snout in *Curculio* Linnaeus 1756. **Michael Andrew Jansen** (entojansen@gmail.com), Arizona State Univ., Tempe, AZ

3:00 Break

3:15 **1790** Preliminary investigations on the mimicry complexes of conoderine weevils (Curculionidae: Conoderinae). **Salvatore S. Anzaldo** (sanzaldo@asu.edu), Pennsylvania State Univ., University Park, PA

3:30 **1791** A study of the weevils of Bariditae (Curculionidae: Conoderinae) in Mississippi. **Ryan Whitehouse** (r.whitehouse@msstate.edu), Mississippi State Univ., Mississippi State, MS

3:45 **1792** On the diversity of Neotropical broad-nosed weevils (Curculionidae: Entiminae) and the "Age of Empires syndrome". **Jennifer C. Giron** (jcgiron@ku.edu), The Univ. of Kansas, Lawrence, KS

4:00 **1793** A phylogenetic revision of the blue-green citrus weevils (*Pachnaeus* Schoenherr, 1826). **Brian Reily** (bhreily@asu.edu) and Nico Franz, Arizona State Univ., Tempe, AZ

4:15 **1794** A revision of the southeast Asian xyleborini (Coleoptera: Curculionidae: Scolytinae) fauna. **Sarah Smith** (campptocerus@gmail.com)¹, Roger A. Beaver² and Anthony Cognato¹, ¹Michigan State Univ., East Lansing, MI, ²Chiangmai, Thailand

4:30 **1795** Molecular taxonomy and identification of southeast Asian xyleborine ambrosia beetles (Curculionidae: Scolytinae). **Anthony Cognato** (cognato@msu.edu)¹, Gina Sari¹, Sarah Smith¹, Jiri Hulcr², Hisashi Kajimura³, You Li², Thai Pham⁴, Wisut Sittichaya⁵ and Sudhir Singh⁶, ¹Michigan State Univ., East Lansing, MI, ²Univ. of Florida, Gainesville, FL, ³Nagoya Univ., Nagoya, Japan, ⁴Vietnam National Museum of Nature, Hanoi, Vietnam, ⁵Prince of Songkla Univ., Hat Yai, Thailand, ⁶Forest Research Institute, Dehradun, India

4:45 **1796** How much do we know about Canadian weevils? An assessment based on taxonomic and DNA barcode diversity. **Pat Bouchard** (patrice.bouchard@acr.gc.ca)¹, Robert S. Anderson², Hume Douglas¹ and Mikko Pentinsaari³, ¹Agriculture and Agri-Food Canada, Ottawa, ON, Canada, ²Canadian Museum of Nature, Ottawa, ON, Canada, ³Univ. of Guelph, Guelph, ON, Canada

Organized Meeting: WERA 1021: Multi-State Research Collaborations Accelerate Solutions for Spotted-Wing *Drosophila* (*Drosophila suzukii*) Management

Meeting Room 116/117 (Convention Centre)

Moderator and Organizer: William D. Hutchison, Univ. of Minnesota, St. Paul, MN

1:30 Introductory remarks

1:35 **1797** SCRI update: Developing and implementing sustainable strategies to manage spotted-wing drosophila in United States fruit crops. **Hannah Burrack** (hjburrac@ncsu.edu)¹, Ashfaq Sial², Rufus Isaacs³, Frank Zalom⁴, Brian Gress⁴, Philip Fanning³, Steven Van Timmeren³, Nathan Spaulding², Joseph Disi², Oscar Liburd⁵, Francis A. Drummond⁶, Kelly Hamby⁷, Cesar Rodriguez³ and Lauren Diepenbrock¹, ¹North Carolina State Univ., Raleigh, NC, ²Univ. of Georgia, Athens, GA, ³Michigan State Univ., East Lansing, MI, ⁴Univ. of California, Davis, CA, ⁵Univ. of Florida, Gainesville, FL, ⁶Univ. of Maine, Orono, ME, ⁷Univ. of Maryland, College Park, MD, ⁸Rutgers, The State Univ. of New Jersey, Chatsworth, NJ

1:50 **1798** OREI Update: Development and implementation of systems based organic management strategies for spotted-wing drosophila. **Ashfaq Sial** (ashsial@uga.edu)¹, Rufus Isaacs², Matt Grieshop², Christelle Guédot³, Kelly Hamby⁴, Vaughn Walton⁵, Mary Rogers⁶, Oscar Liburd⁷, Donn Johnson⁸, Frank Zalom⁹, Hannah Burrack¹⁰, Jana Lee¹¹ and Tracy C. Leskey¹², ¹Univ. of Georgia, Athens, GA, ²Michigan State Univ., East Lansing, MI, ³Univ. of Wisconsin, Madison, WI, ⁴Univ. of Maryland, College Park, MD, ⁵Oregon State Univ., Corvallis, OR, ⁶Univ. of Minnesota, St. Paul, MN, ⁷Univ. of Florida, Gainesville, FL, ⁸Univ. of Arkansas, Fayetteville, AR, ⁹Univ. of California, Davis, CA, ¹⁰North Carolina State Univ., Raleigh, NC, ¹¹USDA - ARS, Corvallis, OR, ¹²USDA - ARS, Kearneysville, WV

2:05 **1799** Overwintering biology of spotted-wing drosophila: The effect of gradual cooling on physiogenesis and survival outcomes. **Dara Stockton** (dara.stockton@cornell.edu) and Gregory Loeb, Cornell Univ., Geneva, NY

2:20 **1800** Spatial and temporal distribution of *Drosophila suzukii* in raspberries. **Benjamin Jaffe** (bjaffe2@wisc.edu) and Christelle Guédot, Univ. of Wisconsin, Madison, WI

2:35 **1801** Protected high tunnel systems for spotted-wing drosophila: IPM advantages of poly and exclusion netting strategies. **Mary Rogers** (roge0168@umn.edu), Andrew Petran, Eric C. Burkness, Claire Flavin and William D. Hutchison, Univ. of Minnesota, St. Paul, MN

2:50 **1802** Excluding *Drosophila suzukii* from New York raspberries and blueberries with netting. **Gregory Loeb** (gme1@cornell.edu)¹, Stephen P. Hesler¹, Dara Stockton¹, Anna K. Wallingford¹ and Tracy C. Leskey², ¹Cornell Univ., Geneva, NY, ²USDA - ARS, Kearneysville, WV

3:00 Break

3:30 **1803** Impact of pruning on crop microclimate and *Drosophila suzukii*. **Kelly Hamby** (kahamby@umd.edu)¹, Daniel Dalton², Vaughn Walton², Andrew Petran³, Mary Rogers³, Lauren Diepenbrock⁴, Heather Leach⁵, Steven Van Timmeren⁶, Philip Fanning⁶, Rufus Isaacs⁶, Brian Gress⁷, Mark Bolda⁸, Frank Zalom⁷, Craig Roubos⁹, Richard Evans⁹ and Ashfaq Sial⁹, ¹Univ. of Maryland, College Park, MD, ²Oregon State Univ., Corvallis, OR, ³Univ. of Minnesota, St. Paul, MN, ⁴North Carolina State Univ., Raleigh, NC, ⁵Pennsylvania State Univ., University Park, PA, ⁶Michigan State Univ., East Lansing, MI, ⁷Univ. of California, Davis, CA, ⁸Univ. of California, Watsonville, CA, ⁹Univ. of Georgia, Athens, GA

3:45 **1804** An update on insecticide resistance monitoring for SWD in berry crops. **Rufus Isaacs** (isaacs@msu.edu)¹, Ashfaq Sial², Frank Zalom³, Brian Gress³, Steven Van Timmeren¹, Nathan Spaulding², Joseph Disi², Oscar Liburd⁴, Francis A. Drummond⁵, Kelly Hamby⁶, Cesar Rodriguez⁷, Lauren Diepenbrock⁸, Hannah Burrack⁹ and Nupur Sarkar⁴, ¹Michigan State Univ., East Lansing, MI, ²Univ. of Georgia, Athens, GA, ³Univ. of California, Davis, CA, ⁴Univ. of Florida, Gainesville, FL, ⁵Univ. of Maine, Orono, ME, ⁶Univ. of Maryland, College Park, MD, ⁷Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, ⁸North Carolina State Univ., Raleigh, NC

4:00 **1805** Modeling SWD population dynamics: Insights into biology and management. **Vaughn Walton** (vaughn.walton@oregonstate.edu)¹, Daniel T. Dalton¹, Serhan Mermer¹, Gabriella Tait², Dalila Rendon¹, Cherre Bezerra Da Silva¹, Kyoo Park¹, Marco Valerio Stacconi¹, Alberto Grassi³, Claudio Ioriatti³, Gianfranco Anfora³ and Ferdinand Pfab⁴, ¹Oregon State Univ., Corvallis, OR, ²Udine Univ., Udine, Italy, ³Edmund Mach Foundation, San Michele all'Adige, Italy, ⁴Trento Univ., Trento, Italy

4:15 **1806** Effect of non-nutritive sugar formulations on spotted-wing drosophila and honeybee. Man-Yeon Choi¹, **Jana Lee** (jana.lee@ars.usda.gov)¹ and Ramesh Sagili², ¹USDA - ARS, Corvallis, OR, ²Oregon State Univ., Corvallis, OR

4:25 **1807** Current advances on Sterile Insect Technique for *Drosophila suzukii*. **Annabelle Firlej** (annabelle.firlej@irda.qc.ca), Institut de recherche et de développement en agroenvironnement, Saint-Bruno-de-Montarville, QC, Canada

4:35 **1808** Intercropping for spotted-wing drosophila management: Research outcomes and potential approaches. **Juli Carrillo** (juli.carrillo@ubc.ca)¹, Audrey Debonnel² and Chelsea Gowton¹, ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²AgroSup Dijon, Dijon, France

4:45 Concluding remarks

10-min: MUVE, Urban Pests: Ants

Meeting Room 301 (Convention Centre)

Moderators: David Oi¹ and Abe Perez², ¹USDA - ARS, Gainesville, FL, ²Case Western Reserve Univ., Cleveland, OH

- 1:30 **1809** Field suppression of tawny crazy ants, *Nylanderia fulva*, using liquid bait. **David Oi** (david.oi@ars.usda.gov)¹, Sedonia Steinger² and Katy Lawson², ¹USDA - ARS, Gainesville, FL, ²USDA - ARS, Gainesville, FL
- 1:40 **1810** Prey-baiting as a novel tool to control invasive ants. **Grzegorz Buczkowski** (gbuczkow@purdue.edu), Purdue Univ., West Lafayette, IN
- 1:50 **1811** Size matters: Tawny crazy ants are more aggressive against larger ant species. **Edward Vargo** (ed.vargo@tamu.edu), Andrew Davitt, Pierre Lesne and Aaron Tarone, Texas A&M Univ., College Station, TX
- 2:00 **1812** Efficacy of several insecticidal baits against red imported fire ant in southern California. **Siavash Taravati** (staravati@ucanr.edu)¹ and Kathleen Campbell², ¹Univ. of California, Alhambra, CA, ²Univ. of California, Riverside, CA
- 2:10 **1813** Exploiting interkingdom communication for red imported fire ant management. **Robert Puckett** (rpuck@tamu.edu), Jeffery K. Tomberlin and Jennifer H. Sweeney, Texas A&M Univ., College Station, TX
- 2:20 **1814** Pyridine alkaloids in imported fire ants. **Jian Chen** (jian.chen@ars.usda.gov)¹, Likun Wang² and Jinhao Zhao^{2,3}, ¹USDA - ARS, Stoneville, MS, ²Zhejiang Univ., Hangzhou, China, ³China
- 2:30 **1815** Ant (Formicidae) species composition and abundance in anthropogenic disturbed environments and examination of factors affecting ant communities of Las Cruces, New Mexico. **Nisael Nieves-Lopez** (njinieves@nmsu.edu) and Alvaro Romero, New Mexico State Univ., Las Cruces, NM
- 2:40 **1816** Temperature-dependent competition drives spatial patterns of sister species of ants across urban landscapes. **Abe Perez** (abeperez@case.edu), Matthew Garvin and Sarah Diamond, Case Western Reserve Univ., Cleveland, OH

10-min: P-IE, Biocontrol, Pathogens and Predators

Meeting Room 215/216 (Convention Centre)

Moderators: Khawaga Rasool¹ and Narin Srei², ¹King Saud Univ., Riyadh, Saudi Arabia, ²Québec Univ., Laval, QC, Canada

- 1:30 **1817** Horizontal transmission in emerald ash borer adult population of a fungal isolate through an autodissemination device. **Narin Srei** (narin.srei@iaf.inrs.ca)¹, Robert Lavallée² and Claude Guertin¹, ¹Québec Univ., Laval, QC, Canada, ²Natural Resources Canada, Québec City, QC, Canada
- 1:40 **1818** Infection mechanism of *Fusarium* and *Aspergillus* species as entomopathogens against whitefly (*Bemisia tabaci*). **Muhammad Nasir Subhani** (nasirsubhani.iags@pu.edu.pk), Waheed Anwar and Kiran Nawaz, Univ. of the Punjab, Lahore, Pakistan
- 1:50 **1819** Assessing the efficacy and mass production of fungal entomopathogens associated with *Macrotermes bellicosus* (Isoptera: Termitidae). **Funmilola Omoya** (fomoya@yahoo.com)¹ and Kelly Babatunde², ¹Federal Univ. of Technology, Akure, Nigeria, ²Wesley Univ., Ondo, Nigeria
- 2:00 **1820** Better to be a jack of all trades or a master of one: Generalist and specialist baculoviruses in pest outbreaks. **Michael Garvey** (mgarvey@purdue.edu) and Bret Elder, Louisiana State Univ., Baton Rouge, LA
- 2:10 **1821** Persistence and dispersal of a classical biological control agent, *Steinernema scapterisci* (Rhabditida: Steinernematidae), of invasive mole crickets. **Nicole Benda** (nbenda@ufl.edu), Pablo Allen and Adam Dale, Univ. of Florida, Gainesville, FL
- 2:20 **1822** Velifer®: BASF's new bioinsecticide offering. **Diana Londoño** (diana.londono@basf.com) and Shaun Berry, BASF Corporation, Durham, NC
- 2:30 **1823** Can codling moth granulosis virus also control *Cydia latiferreana*? **Heather Andrews** (heather.andrews@oregonstate.edu), Anthony Mugica, Erica Rudolph and Nik G. Wiman, Oregon State Univ., Aurora, OR
- 2:40 **1824** *Beauveria bassiana* for control of the potato beetle, *Leptinotarsa decemlineata*. **Manuel Campos** (mcampos@biosafesystems.com), BioSafe Systems, East Hartford, CT
- 2:50 Break
- 3:00 **1825** Role of a mutualistic fungus, *Periglandula* species to protect Convolvulaceae against psyllids. **Navneet Kaur** (navneet.kaur2@ars.usda.gov)¹, William Rodney Cooper¹, Jennifer Durringer², Ismael E. Badillo-Vargas³, Gabriela Esparza-Díaz⁴, Arash Rashed⁵ and David R. Horton¹, ¹USDA - ARS, Wapato, WA, ²Oregon State Univ., Corvallis, OR, ³Texas A&M AgriLife Research, Weslaco, TX, ⁴Amerstem, Inc., Camarillo, CA, ⁵Univ. of Idaho, Moscow, ID
- 3:10 **1826** Presentation withdrawn
- 3:20 **1827** Efficacy of attraction and retention of green lacewing, *Chrysoperla* spp., using different plant volatile combinations and oviposition surfaces on the reduction of azalea lace bug, *Stephanitis pyrioides*. **Katerina Graham** (grahkate@oregonstate.edu)¹ and Jana Lee², ¹Oregon State Univ., Corvallis, OR, ²USDA - ARS, Corvallis, OR
- 3:30 **1828** Occurrence of the fungus *Hesperomyces virescens* Thaxter on species of Coccinellidae (Coleoptera) in Mexico. **J. Isabel López-Arroyo** (lopez.jose@inifap.gob.mx)¹, Santos Díaz-Martínez², Raúl Rodríguez-Guerra¹, Kenzy Peña-Carrillo¹ and Sergio Sánchez-Peña³, ¹Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, General Terán, Mexico, ²Colegio de Postgraduados, Texcoco, Mexico, ³Univ. Autónoma Agraria Antonio Narro, Saltillo, Mexico
- 3:40 **1829** Biological Control of the Banks grass mite, *Oligonychus pratensis* (Banks), on dates with the predator *Gallendromus flumenis* (Chant). **Thomas M. Perring** (thomas.perring@ucr.edu) and Fatemeh Ganjissaffar, Univ. of California, Riverside, CA
- 3:50 **1830** Effects of sequestered insecticidal toxins in eggs of resistant herbivores on beneficial insects. **Mitchell Baker** (mitchell.baker@qc.cuny.edu)¹, Donald C. Weber², Jasmin Alim³, Daniel Rivera³ and Andleeb Tanvir³, ¹City Univ. of New York Queens College, Flushing, NY, ²USDA - ARS, Beltsville, MD, ³Queens College, City College of New York, Flushing, NY
- 4:00 **1831** Evaluation of natural additives to enhance the persistence of *Spodoptera littoralis* nucleopolyhedrovirus (SpliMNPV) under Saudi field conditions. **Khawaja Rasool** (gkhawaja@ksu.edu.sa)¹, Koko Sutanto¹, Said El Salamouny², Sukirno Sukirno¹, Muhammad Tufail¹ and Abdulrahman Aldawood¹, ¹King Saud Univ., Riyadh, Saudi Arabia, ²Cairo Univ., Giza, Egypt

10-min: P-IE, Chemical Ecology

Meeting Room 214 (Convention Centre)

Moderators: Christopher Frost¹ and Jaime Pinero², ¹Univ. of Louisville, Louisville, KY, ²Univ. of Massachusetts, Amherst, MA

- 1:30 **1832** Volatile-mediated defense priming in plant-herbivore interactions depends on the identity of the herbivore. **Christopher Frost** (chris.frost@louisville.edu) and Grace Freundlich, Univ. of Louisville, Louisville, KY
- 1:40 **1833** Choosing what to eat: Monarch larval preferences for milkweeds varying in pesticide residues. **Paola Olaya Arenas** (polayaar@purdue.edu) and Ian Kaplan, Purdue Univ., West Lafayette, IN
- 1:50 **1834** Triterpenoids are the determinants of *Betula pendula* Roth phytochemical resistance against *Lymantria dispar* L. **Sergey Pavlushin** (sergey-pavlushin@mail.ru)¹, Irina Belousova¹, Elena Chernyak², Sergey Morozov² and Vyacheslav Martemyanov¹, ¹Institute of Systematics and Ecology of Animals, Novosibirsk, Russia, ²Novosibirsk Institute of Organic Chemistry, Novosibirsk, Russia
- 2:00 **1835** Is defense priming in goldenrod defense against an herbivore, manipulation of the host plant, or ... both? **Eric Yip** (ecy7@cornell.edu)¹, Consuelo De Moraes², Mark Mescher² and John Tooker¹, ¹Pennsylvania State Univ., University Park, PA, ²ETH Zurich, Zurich, Switzerland
- 2:10 **1836** Molecular studies of gypsy moth (*Lymantria dispar*) pheromone olfaction. Mailyn Terrado, Govardhana Pinnelli and **Erika Plettner** (plettner@sfu.ca), Simon Fraser Univ., Burnaby, BC, Canada
- 2:20 **1837** Domestication reduces the attraction of a vinegar fly to fruit volatiles. **Kevin Cloonan** (rayneclonnan@gmail.com)¹ and Cesar Rodriguez-Saona², ¹Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, ²Rutgers, The State Univ. of New Jersey, New Brunswick, NJ
- 2:30 **1838** Impact of microbiomes in plant-aphid interactions: From specific origins to diverse targets. **Frederic Francis** (frederic.francis@uliege.be), Univ. of Liege, Gembloux, Belgium
- 2:40 **1839** Phytochemical diversity of tomato plants influence oviposition preference of a specialist moth, *Manduca sexta*. **Andrea Glassmire** (glssmr33@gmail.com) and William Wetzel, Michigan State Univ., East Lansing, MI
- 2:50 Break
- 3:00 **1840** Repellent effects of methyl anthranilate on western corn rootworm larvae. **Elisa Bernklau** (bernklau@colostate.edu)¹, Bruce Hibbard² and Louis Bjostad¹, ¹Colorado State Univ., Fort Collins, CO, ²USDA - ARS, Columbia, MO
- 3:10 **1841** Annual variation in chemical defense of two sympatric checkerspot butterfly species. **M. Deane Bowers** (deane.bowers@colorado.edu), Univ. of Colorado, Boulder, CO
- 3:20 **1842** Histology of the potentially producer structures of pheromones of *Cyclocephala lunulata* (Coleoptera: Melolonthidae). **Juan Cibrian** (jcibrian@colpos.mx) and Luz Benitez-Herrera, Colegio de Postgraduados, Montecillo, Mexico
- 3:30 **1843** Two noctuid species differentially alter their flight muscle protein structure and flight-related fitness traits in response to variation in host plant defense. **Scott Portman** (scott.portman@ars.usda.gov), USDA - ARS, Albany, CA

3:40 **1844** Exploiting an inducible and constitutive plant volatile semiochemicals for ecologically-sustainable insect pest management. **Amanuel Tamiru** (atamiru@icipe.org)¹, Toby Bruce², Baldwin Torto¹ and Zeyaur Khan¹, ¹International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya, ²Keele Univ., Keele, United Kingdom

3:50 **1845** Improved trapping for *Halyomorpha halys* (Stahl) using long lasting insecticide netting (LLIN). **John Pote** (pote30@gmail.com) and Larry Gut, Michigan State Univ., East Lansing, MI

4:00 **1846** Male annihilation technique application density against *Bactrocera dorsalis*: How low can we go? **Nicholas Manoukis** (nicholas.manoukis@ars.usda.gov), USDA - ARS, Hilo, HI

4:10 **1847** Detecting the conspecific: Are female fall armyworm moths exploiting plant volatiles to avoid progeny competition? **Ivan Hiltbold** (hiltbold@udel.edu)¹, David Ingber¹, Shawn Christensen² and Hans Alborn², ¹Univ. of Delaware, Newark, DE, ²USDA - ARS, Gainesville, FL

4:20 Break

4:30 **1848** Electrophysiological and behavioral responses of female African armyworm, *Spodoptera exempta* Walker (Lepidoptera: Nuctuidae), to host plant volatiles. **Emmanuel Ogah** (emmamarg2005@yahoo.com)^{1,2} and Toby Bruce¹, ¹Rothamsted Research, Harpenden, United Kingdom, ²Ebonyi State Univ., Abakaliki, Nigeria

4:40 **1849** Cheating on Atkins: High-carbohydrate diet extends lifespan in the Senegalese locust, *Oedaleus senegalensis*. **Marion Le Gall** (marionlegall314@gmail.com) and Arianne Cease, Arizona State Univ., Tempe, AZ

4:50 **1850** B-cyclocitral synergizes the response of adult *Drosophila suzukii* (Diptera: Drosophilidae) to fruit juices and isoamyl acetate in a sex-dependent manner. **Jaime Pinero** (jpinero@umass.edu)¹, Bruce A. Barrett², Grant Bolton² and Peter Follett³, ¹Univ. of Massachusetts, Amherst, MA, ²Univ. of Missouri, Columbia, MO, ³USDA - ARS, Hilo, HI

5:00 **1851** Domestication of *Zea attenuates* plants' direct and indirect defenses against the fall armyworm. Natalia Naranjo-Guevara¹, Maria Peñaflor², **Diego Silva** (diegobs182@yahoo.com.br)¹ and José Mauricio Bento¹, ¹Univ. de São Paulo, Piracicaba, Brazil, ²Univ. Federal de Lavras, Lavras, Brazil

10-min: P-IE, Climate Effects and Climate Change

Meeting Room 213 (Convention Centre)

Moderators: Erica Kistner-Thomas¹ and Charles Midega², ¹USDA - ARS, Ames, IA, ²International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya

1:30 **1852** Interactive impacts of drought and nitrogen on herbivore performance and soil communities. **David Branson** (dave.branson@ars.usda.gov) and Zachary Sylvain, USDA - ARS, Sidney, MT

1:40 **1853** Simulating the potential global distribution of the Japanese beetle under current climate and RCP 8.5 scenario. **Erica Kistner-Thomas** (ekistnerphd2014@gmail.com), USDA - ARS, Ames, IA

1:50 **1854** Can next-generation biofuel crops support native insect communities and meet energy needs? **Jackson Helms** (jacksonhelmsiv@gmail.com)¹, Selassie Ijelu² and Nick Haddad¹, ¹Michigan State Univ., Hickory Corners, MI, ²Univ. of Saint Francis, Fort Wayne, IN

2:00 **1855** Increased atmospheric CO₂ concentration affects aphid biology and efficiency of virus transmission: A field and plant growth chamber study. **Piotr Trebicki** (piotr.trebicki@ecodev.vic.gov.au)¹, Narelle Nancarrow¹, Mohammad Aftab¹, Nilisa A. Bosque-Pérez², Brendan Rodoni³ and Glenn Fitzgerald¹, ¹Agriculture Victoria Research, Horsham, Australia, ²Univ. of Idaho, Moscow, ID, ³Agriculture Victoria Research, Bundoora, Australia

2:10 **1856** Quantifying climate change impacts on mountain pine beetle demography across its range in North America within Earth System Models. Devin Goodsmann¹, Liang Wei¹, **Chonggang Xu** (cxu@lanl.gov)¹, Brian Aukema², Katherine Bleiker³, Ryan Knox⁴, Rosie Fisher⁵, Charlie Koven⁴ and Nate McDowell⁶, ¹Los Alamos National Laboratory, Los Alamos, NM, ²Univ. of Minnesota, St. Paul, MN, ³Natural Resources Canada, Victoria, BC, Canada, ⁴Lawrence Berkeley National Lab, Berkeley, CA, ⁵US National Center for Atmospheric Research, Boulder, CO, ⁶Pacific Northwest National Laboratory, Richland, WA

2:20 **1857** Life history traits in wild bees predict responses to climate change. **Gabriella Pardee** (gabriellapardee@gmail.com)¹, Sean Griffin², Michael Stemkovski³, Tina Harrison⁴, David Inouye^{5,6} and Rebecca Irwin⁷, ¹Univ. of Minnesota, St. Paul, MN, ²Michigan State Univ., Hickory Corners, MI, ³Utah State Univ., Logan, UT, ⁴Univ. of California, Davis, CA, ⁵Rocky Mountain Biological Laboratory, Gothic, CO, ⁶Univ. of Maryland, College Park, MD, ⁷North Carolina State Univ., Raleigh, NC

2:30 Break

2:40 **1858** Mixing the message: Can homogenizing substrates confound scientific results? **Fallon Fowler** (fefowler@ncsu.edu), Steve Denning, Shuijin Hu, Vivek Fellner, Marcé Lorenzen, Robert Dunn and Wes Watson, North Carolina State Univ., Raleigh, NC

2:50 **1859** Relative importance of long-term changes in climate and land use on the phenology and abundance of legume crop specialist and generalist aphids. **Martin Luquet** (martin.luquet@agrocampus-ouest.fr)¹, Maurice Hullé², Jean-Christophe Simon², Nicolas Parisey², Christelle Buchard², Edgar Ferrieu³, Julie Jaquière² and Bruno Jaloux¹, ¹Agrocampus Ouest, Angers, France, ²INRA, Le Rheu, France, ³Agrocampus Ouest, Rennes, France

3:00 **1860** Monarch butterfly winter mortality at the sanctuary of Sierra Chincua 2016. **David Mota-Sanchez** (motasanc@msu.edu)¹, Oscar Castaneda¹ and Osval Montesinos-López², ¹Michigan State Univ., East Lansing, MI, ²Univ. de Colima, Colima, Mexico

3:10 **1861** Early-winter extreme weather dominates dynamics of alpine *Parnassius smintheus* butterflies in the Rocky Mountains of Canada. **Jens Roland** (jroland@ualberta.ca)¹ and Stephen Matter², ¹Univ. of Alberta, Edmonton, AB, Canada, ²Univ. of Cincinnati, Cincinnati, OH

3:20 **1862** Use of thermal refugia by monarchs in the arid northwest. **Cameron Thomas** (cameron.thomas@wsu.edu)¹, Elizabeth Crone² and Cheryl Schultz¹, ¹Washington State Univ., Vancouver, WA, ²Tufts Univ., Medford, MA

3:30 **1863** A climate-adapted push-pull system effectively controls *Spodoptera frugiperda* (J. E. Smith) in east Africa. Charles Midega¹, John Pickett², Jimmy Pittchar¹, Girma Hailu¹ and **Zeyaur Khan** (zkhan@icipe.org)¹, ¹International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya, ²Cardiff Univ., Cardiff, United Kingdom

10-min: P-IE, Invasive Species

Meeting Room 221/222 (Convention Centre)

Moderators: Susanna Acheampong¹ and Helena Avila-Arias², ¹British Columbia Ministry of Agriculture, Kelowna, BC, Canada, ²Purdue Univ., West Lafayette, IN

1:30 **1864** Brown marmorated stink bug, *Halyomorpha halys*, detections and spread in interior British Columbia, Canada. **Susanna Acheampong** (susanna.acheampong@gov.bc.ca)¹ and Paul Abram², ¹British Columbia Ministry of Agriculture, Kelowna, BC, Canada, ²Agriculture and Agri-Food Canada, Agassiz, BC, Canada

1:40 **1865** Global and regional patterns of spread of invasive insects on eucalypts. **Brett Hurley** (brett.hurley@fabr.up.ac.za)¹, Mesfin Wondafra^{1,2} and Bernard Slippers¹, ¹Forestry and Agricultural Biotechnology Institute (FABI), Pretoria, South Africa, ²Haramaya Univ., Dire Dawa, Ethiopia

1:50 **1866** Increased understanding of vine mealybug (*Planococcus ficus* Signoret) invasion of Napa County informs management strategies. **Tyler E. Scharrel** (tylersch@ucr.edu)¹, Monica Cooper² and Matt Daugherty¹, ¹Univ. of California, Riverside, CA, ²Univ. of California, Napa, CA

2:00 **1867** The line of defense: Over two decades of bark and ambrosia beetle monitoring and action in the Dalles, Oregon. **Dan Clark** (dclark@oda.state.or.us), Oregon Dept. of Agriculture, Salem, OR

2:10 **1868** Early season biology, physiology, and ecology of brown marmorated stink bug (*Halyomorpha halys*). **Danielle Kirkpatrick** (danielle.kirkpatrick@ars.usda.gov), Demian Nunez and Tracy C. Leskey, USDA - ARS, Kearneysville, WV

2:20 **1869** Experimental tests of oviposition constraints and damage of the brown marmorated stink bug (*Halyomorpha halys*) on nursery trees. **Holly Martinson** (hmartinson@mcdaniel.edu)¹ and Michael Raupp², ¹McDaniel College, Westminster, MD, ²Univ. of Maryland, College Park, MD

2:30 **1870** Cross border effects and management of fall armyworm (FAW), *Spodoptera frugiperda* (J. E. Smith) on maize in a changing world. **Ismaila Aderolu** (adeisma@yahoo.com) and Nafisat Bello, Kwara State Univ., Ilorin, Nigeria

2:40 Break

2:50 **1871** A trait-based approach to predicting spread rates of invasive forest insects. **Brian Van Hezewijk** (brian.vanzezewijk@canada.ca) and Lara van Akker, Natural Resources Canada, Victoria, BC, Canada

3:00 **1872** How (not) to eradicate Japanese beetle in Oregon. **Chris Hedstrom** (chedstrom@oda.state.or.us), Clinton Burfitt and Helmuth Rogg, Oregon Dept. of Agriculture, Salem, OR

3:10 **1873** Effect of introduced honey bees (*Apis mellifera*) on native bee visitation and native plant fitness. **Catherine Cumberland** (ccumberland@unm.edu), Univ. of New Mexico, Albuquerque, NM

3:20 **1874** Hosts, distribution, and management of lobate lac scale, a recently established landscape pest in Hawai'i. **Zhiqiang Cheng** (cheng241@hawaii.edu), Matthew Kellar, Bishnu Bhandari and Mason Russo, Univ. of Hawai'i, Honolulu, HI

3:30 **1875** Effects of Asian longhorned beetle eradication efforts on native cerambycid community composition. **Emily Franzen** (franzene2@xavier.edu)¹ and Ann Ray², ¹Xavier Univ., Cincinnati, OH, ²Univ. of California, Riverside, CA

TUESDAY, NOVEMBER 13 / MARDI 13 NOVEMBRE

3:40 **1876** Infestation of the invasive roseau cane scale, *Nipponaclerda biwakoensis* (Hemiptera: Acleridae) in the Mississippi River Delta and Coastal Louisiana. **Ian Knight** (iknight@agcenter.lsu.edu), Leslie Aviles, James T. Cronin, Rodrigo Diaz, Madeline Gill, John Nyman, Keyla Pruett and Blake Wilson, Louisiana State Univ., Baton Rouge, LA

3:50 **1877** Modeling the potential distribution of non-native pests: an example using a “core” envelope approach. **Kishan Sambaraju** (kishan.sambaraju@canada.ca), Rémi Saint-Amant, Chantal Côté and Benoit Filion, Natural Resources Canada, Québec City, QC, Canada

4:00 **1878** Spotted lanternfly arrives in Virginia: Phenology and response. **Douglas G. Pfeiffer** (dgpfeiff@vt.edu), Eric R. Day and Scott Salom, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

4:10 Break

4:20 **1879** Assessing the threat of *Bemisia tabaci* MED to Florida agriculture. **Hugh A. Smith** (hughasmith@ufl.edu) and Deepak Shrestha, Univ. of Florida, Wimauma, FL

4:30 **1880** Presentation withdrawn

4:40 **1881** The USA is getting a bad (trade) deal! **Joshua Vlach** (jvlach@oda.state.or.us), Oregon Dept. of Agriculture, Salem, OR

4:50 **1882** Decision support systems for risk assessment and mitigation of forest invasive alien species: Challenges and opportunities. **Valentine Lafond** (valentine.lafond@ubc.ca), Gregory Paradis, Vivek Srivastava, Stefanie Lumnitz and Verena Griess, The Univ. of British Columbia, Vancouver, BC, Canada

5:00 **1883** Soil microbial diversity and substrate utilization patterns in host soil and the alimentary tract of Japanese beetle, *Popillia japonica* Newman, larvae. **Helena Avila-Arias** (favilaar@purdue.edu)¹, Michael Scharf¹, Ronald Turco¹, Robert Williamson² and Douglas Richmond¹, ¹Purdue Univ., West Lafayette, IN, ²Univ. of Wisconsin, Madison, WI

5:10 **1884** Allium leafminer: A new invasive threat to Allium crops in North America. **Shelby J. Fleischer** (sjf4@psu.edu)¹, Timothy Elkner², Carley M. McGrady¹, Dana Roberts¹, Brian A. Nault³, Teresa Rusinek⁴, Ethan Grundberg⁵, Jared Ali¹, Swayamjit Ray¹ and Brandon Lingbeek¹, ¹Pennsylvania State Univ., University Park, PA, ²Pennsylvania State Univ., Manheim, PA, ³Cornell Univ., Geneva, NY, ⁴Cornell Cooperative Extension, Highland, NY, ⁵Cornell Univ., Middletown, NY

10-min: P-IE, IPM, Field Crops

Meeting Room 220 (Convention Centre)

Moderators: Joanna Bloese¹ and Muhammad Afzal², ¹Univ. of California, Davis, CA, ²Univ. of Sargodha, Sargodha, Pakistan

1:30 **1885** Determining an economic threshold for the alfalfa weevil (Coleoptera: Curculionidae), in desert alfalfa hay. **Kyle Harrington** (kharrington@email.arizona.edu) and Ayman Mostafa, Univ. of Arizona, Phoenix, AZ

1:40 **1886** Exploring the relationship between temperature and growth rate for tadpole shrimp (*Triops longicaudatus*) and its implications for California rice farmers. **Joanna Bloese** (jbbloese@ucdavis.edu), Kevin Goding and Larry Godfrey, Univ. of California, Davis, CA

1:50 **1887** Presentation withdrawn

2:00 **1888** Distribution pattern and movements of wireworms in Québec corn fields. **Sébastien Boquel** (sebastien.boquel@cerom.qc.ca), Alexis Latraverse, Patrice Hamelin, Jennifer De Almeida and Julien Saguez, CÉROM, Saint-Mathieu-de-Beloeil, QC, Canada

2:10 **1889** Insecticide termination for rice stink bug, *Oebalus pugnax*, in Arkansas rice. **Aaron Cato** (ajcato@uark.edu)¹, Gus Lorenz², Jarrod T. Hardke³, Nick Bateman⁴, Tara Clayton⁵, Nicki Taillon², Andrew Plummer², Kevin Mcpherson⁶, Joseph Black² and Layton McCullars¹, ¹Univ. of Arkansas, Fayetteville, AR, ²Univ. of Arkansas, Lonoke, AR, ³Univ. of Arkansas, Stuttgart, AR, ⁴Mississippi State Univ., Mississippi State, MS, ⁵Univ. of Arkansas Division of Agriculture, Stuttgart, AR, ⁶Univ. of Arkansas Division of Agriculture, Lonoke, AR

2:20 **1890** Effects of seeding rates on N fixation, and seed production of red clover in interaction with effects of IPM in controlling lesser clover leaf weevils and the impacts on pollinators. **Dan Malamura** (dan.malamura@usask.ca), Sean Prager and Bill Biliget, Univ. of Saskatchewan, Saskatoon, SK, Canada

2:30 **1891** Management of a polyphagous insect pest (*Spodoptera exigua* Hubner) by controlling its populations on auxiliary hosts within cotton agroecosystem. **Faheem Ahmad** (faheem.ahmad@comsats.edu.pk)¹ and Qamar Saeed², ¹COMSATS Institute of Information Technology, Islamabad, Pakistan, ²Bahauddin Zakariya Univ., Multan, Pakistan

2:40 **1892** Dual ecosystem services from crop margin vegetation: benefits for cabbage pest management. **Blankson Amoabeng** (bamoabeng@csu.edu.au)^{1,2}, Moses Mochiah², Philip Stevenson³, Kwesi Asare⁴ and Geoff Gurr¹, ¹Charles Sturt Univ., Orange, Australia, ²Council for Scientific and Industrial Research Crops Research Institute, Kumasi, Ghana, ³Univ. of Greenwich, Chatham, United Kingdom, ⁴Kumasi Technical Univ., Kumasi, Ghana

2:50 Break

3:00 **1893** The road to an IPM program for alfalfa aphids in the southwestern U.S.A: Sampling, threshold, selective insecticides and biological control. **Ayman Mostafa** (ayman@email.arizona.edu) and Kyle Harrington, Univ. of Arizona, Phoenix, AZ

3:10 **1894** Relative parasitoid and predator suppression of sugarcane aphid on susceptible and resistant sorghum hybrids. **Ashleigh Faris** (ashleigh.faris@ag.tamu.edu)¹, Norman Elliott² and Michael Brewer³, ¹Texas A&M Univ., Corpus Christi, TX, ²USDA - ARS, Stillwater, OK, ³Texas A&M AgriLife Research, Corpus Christi, TX

3:20 **1895** Modeling the combined impacts of host plant resistance and parasitism on wheat stem sawfly population dynamics. **Courtney Richmond** (richmond@rowan.edu)¹ and Tatyana Rand², ¹Rowan Univ., Glassboro, NJ, ²USDA - ARS, Sidney, MT

3:30 **1896** Validation of an economic threshold for canola flea beetles in the prairies. **Tharshinidevy Nagalingam** (kstlk2001@yahoo.com)¹, Héctor Cárcamo², Tyler Wist³, Jennifer Otani⁴, John Gavloski⁵, Rob Duncan¹, Jordan Bannerman¹ and Alejandro Costamagna¹, ¹Univ. of Manitoba, Winnipeg, MB, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ³Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ⁴Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ⁵Manitoba Agriculture, Food & Rural Development, Carman, MB, Canada

3:40 **1897** Field performance monitoring of single and pyramided *Bt* corn against *Spodoptera frugiperda* in Brazil and Argentina. Antonio Santos¹, **Luiz Marques** (ldmarques@dow.com)² and Boris Castro³, ¹Corteva Agriscience, Agriculture Division of DowDuPont, São Paulo, Brazil, ²Corteva Agriscience, Agriculture Division of DowDuPont, Mogi Mirim, Brazil, ³Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

3:50 **1898** Presentation withdrawn

4:00 **1899** The overwintering biology of *Aphelinus certus*, an adventive parasitoid of soybean aphid. **Carl Stenoien** (sten0364@umn.edu)¹, Lindsey Christianson², Kelton Welch¹, Keith Hopper³ and George Heimpel¹, ¹Univ. of Minnesota, St. Paul, MN, ²Univ. of Minnesota, Grand Rapids, MN, ³USDA - ARS, Newark, DE

4:10 **1900** Does whitefly cause damage to soybeans? **Inana Schutze** (inana.schutze@usp.br), Lucas Barros and Pedro Yamamoto, Univ. de São Paulo, Piracicaba, Brazil

4:20 Break

4:30 **1901** The impact of fall armyworm, *Spodoptera frugiperda*, on rice yield. **Layton McCullars** (ldmccull@uark.edu)¹, Gus Lorenz², Nick Bateman³, Jarrod T. Hardke³, Aaron Cato¹, Ben Thrash², Nicki Taillon², Kevin Mcpherson⁴, Tara Clayton⁵, Andrew Plummer² and Joseph Black², ¹Univ. of Arkansas, Fayetteville, AR, ²Univ. of Arkansas, Lonoke, AR, ³Univ. of Arkansas, Stuttgart, AR, ⁴Univ. of Arkansas Division of Agriculture, Lonoke, AR, ⁵Univ. of Arkansas Division of Agriculture, Stuttgart, AR

4:40 **1902** Invasive pest and host plant dynamics across a heterogeneous landscape: Insights from three years of area-wide monitoring of coffee berry borer on Hawai'i Island. **Melissa Johnson** (melissa.johnson@ars.usda.gov) and Nicholas Manoukis, USDA - ARS, Hilo, HI

4:50 **1903** Integrated pest management practices for alfalfa weevil control in California. **Rachael Long** (rflong@ucanr.edu), Univ. of California Cooperative Extension, Woodland, CA

5:00 **1904** Residual testing study of Sefina™ on soybean aphid. Erin Hodgson¹, Christa Eilers-Kirk², Greg VanNostrand¹ and **Ashley Dean** (adean@iastate.edu)¹, ¹Iowa State Univ., Ames, IA, ²BASF Corporation, Research Triangle Park, NC

5:10 **1905** Predicting crop damage using land use data: The spatially explicit model for mapping hazard, and its extrapolation. **Ken Tabuchi** (tabuchik@affrc.go.jp)¹, Akihiko Takahashi^{1,2} and Ryuji Uesugi¹, ¹National Agriculture and Food Research Organization, Iwate, Japan, ²National Agriculture and Food Research Organization, Niigata, Japan

5:20 **1906** Field efficacy of synthetic insecticides against *Spodoptera litura* (Lepidoptera: Noctuidae) in fodder crops. **Muhammad Afzal** (chafzal64@yahoo.com), Asad Abdullah, Muhammad Irfan Ullah, Nimra Altaf, Syed Ali Zahid and Saba Kouser, Univ. of Sargodha, Sargodha, Pakistan

10-min: P-IE, IPM, Horticulture

Meeting Room 224 (Convention Centre)

Moderators: Justin Renkema¹ and Marco Valerio Stacconi², ¹Univ. of Florida, Wimauma, FL, ²Oregon State Univ., Corvallis, OR

1:30 **1907** Pest management benefits of sweet alyssum plantings in strawberry fields: Examples from Ontario and Florida. **Justin Renkema** (justin.renkema@ufl.edu)¹, Iris Strzyzewski² and Karol Krey¹, ¹Univ. of Florida, Wimauma, FL, ²Univ. of Florida, Quincy, FL

1:40 **1908** A survey of *Halyomorpha halys* and its natural enemies in southeastern fruit production systems. **Brett Blaauw** (bblaauw@uga.edu)¹ and P. Glynn Tillman², ¹Univ. of Georgia, Athens, GA, ²USDA - ARS, Tifton, GA

1:50 **1909** Optimizing management guidelines for the non-native azalea lace bug, *Stephanitis pyrioides* (Scott), on *Rhododendron* species in western Washington. **Ryan Garrison** (rgarris@uw.edu) and Patrick Tobin, Univ. of Washington, Seattle, WA

2:00 **1910** Effects of methyl salicylate as a repellent to *Xylosandrus germanus* ambrosia beetle infestations in apple trees. **Arthur Agnello** (ama4@cornell.edu)¹, Dave Combs¹ and Kenneth Lamm², ¹Cornell Univ., Geneva, NY, ²Bowdoin College, Brunswick, ME

2:10 **1911** Development and field validation of an 'attract and kill' strategy for controlling Asian citrus psyllid on residential citrus. **Andrew Chow** (andrew.chow@tamuk.edu)¹, Darek Czokjlo², Joseph Patt³ and Mamoudou Setamou¹, ¹Texas A&M Univ., Weslaco, TX, ²Alpha Scents, Inc., West Linn, OR, ³USDA - ARS, Fort Pierce, FL

2:20 **1912** Management of pepper weevil (*Anthonomus eugenii* Cano) using reduced risk insecticides in combination with sex-pheromone. **Dakhshina Seal** (dseal3@ufl.edu), Univ. of Florida, Homestead, FL

2:30 **1913** Phenyl propionate and kairomone blend for monitoring navel orangeworm in and near almonds and pistachios under mating disruption. **Charles Burks** (charles.burks@ars.usda.gov)¹, Bradley Higbee² and John Beck³, ¹USDA - ARS, Parlier, CA, ²Trece, Inc., Bakersfield, CA, ³USDA - ARS, Gainesville, FL

2:40 **1914** Ambrosia beetle-associated rapid apple decline (RAD) in North Carolina apples. **Jim Walgenbach** (jim_walgenbach@ncsu.edu) and Sara Villani, North Carolina State Univ., Mills River, NC

2:50 Break

3:00 **1915** The importance of reviewing IPM programs using carrot weevil as a case study. **Zachariah Telfer** (ztelfer@uoguelph.ca), Alexandra Stinson, Cynthia Scott-Dupree and Mary Ruth McDonald, Univ. of Guelph, Guelph, ON, Canada

3:10 **1916** Impact of pupal depth, duration of flooding, and soil type on a picture-winged fly (Diptera: Ulidiidae) pest of sweet corn. **Julien Beuzelin** (jbeuzelin@ufl.edu), Annie Mills and Donna Larsen, Univ. of Florida, Belle Glade, FL

3:20 **1917** Investigation of the effects of pecan hedging on pecan insect pest management. **Angelita Acebes-Doria** (aacebes@uga.edu)¹, William Hudson² and Lenny Wells¹, ¹Univ. of Georgia, Tifton, GA, ²Univ. of Georgia, Athens, GA

3:30 **1918** Integrating application technology and population dynamics for better control of navel orangeworm (*Amyelois transitella*) in California tree nuts. **Joel Siegel** (joel.siegel@ars.usda.gov), USDA - ARS, Parlier, CA

3:40 **1919** Alternative tactics to manage azalea lace bug (Hemiptera: Tingidae). **Shimat Villanassery Joseph** (svjoseph@uga.edu), Univ. of Georgia, Griffin, GA

3:50 **1920** Bio-solutions product update by Isagro USA, Inc. **Julie Longland** (jlongland@isagro.com) and Michael Allan, Isagro USA, Inc., Morrisville, NC

4:00 **1921** Effect of neem-based botanicals and abamectin against *Phyllocnistis citrella* (Lepidoptera: Gracillariidae) in *Citrus reticulata* (Rutaceae) nursery plantations. **Muhammad Irfan Ullah** (mirfanullah@uos.edu.pk), Muhammad Arshad, Muhammad Afzal, Saba Kouser, Sana Majeed and Zahoor Hussain, Univ. of Sargodha, Sargodha, Pakistan

4:10 Break

4:20 **1922** Effects of low temperature duration, rearing temperature, humidity and photoperiod on eclosion of diapausing western cherry fruit fly, *Rhagoletis indifferens*. **Lisa Neven** (lisa.neven@ars.usda.gov) and Wee Yee, USDA - ARS, Wapato, WA

4:30 **1923** Fruitfly prediction model by using male annihilation technique with different types of cost effective traps in guava orchards under three districts of Punjab. **Abdul Ghaffar** (ghafaragri1460@gmail.com) and Muneer Abbas, Arid Zone Research Institute, Bhakkar, Pakistan

4:40 **1924** Attractiveness of symbiotic yeast to *Drosophila suzukii* as influenced by background fruit odor. **Juan Huang** (huangju@msu.edu)¹, Kyria Boundy-Mills² and Larry Gut¹, ¹Michigan State Univ., East Lansing, MI, ²Univ. of California, Davis, CA

4:50 **1925** Insects and mites of export concern in fresh citrus - ecology, biology, significance, and management options. **Sandipa Gautam** (sangautam@ucanr.edu)¹, Yuling Ouyang², Ping Gu¹ and Elizabeth E. Grafton-Cardwell¹, ¹Univ. of California, Riverside, CA, ²Univ. of California, Parlier, CA

5:00 **1926** Implementing a food grade attractant as a novel management tool for spotted-wing drosophila. **Marco Valerio Stacconi** (marco.stacconi@oregonstate.edu)¹, Gabriella Tait², Clive Kaiser³, Daniel Dalton¹, Gianfranco Anfora⁴ and Vaughn Walton¹, ¹Oregon State Univ., Corvallis, OR, ²Udine Univ., Udine, Italy, ³Oregon State Univ., Milton Freewater, OR, ⁴Edmund Mach Foundation, San Michele all'Adige, Italy

5:10 **1927** Effect of adoption of macro propagation technology on plantain and banana farmers' livelihood in southwest Nigeria. **Latifat Salawu** (latifaht22@yahoo.com)¹, Israel Ogunlade², Ismaila Aderolu¹ and Funmilayo Omotesho², ¹Kwara State Univ., Ilorin, Nigeria, ²Univ. of Ilorin, Ilorin, Nigeria

10-min: SysEB, Biodiversity, Systematics, and Morphology of Lepidoptera

Meeting Room 212 (Convention Centre)

Moderators: Rebecca B. Simmons¹ and Daniel Rubinoff², ¹Univ. of North Dakota, Grand Forks, ND, ²Univ. of Hawai'i, Honolulu, HI

1:30 **1928** Phylogeography and population structure of the Mediterranean corn borer *Sesamia nonagrioides* (Lefebvre) (Lepidoptera, Noctuidae) across its geographical range. **Muluken Gofitshu** (mulukengofitshu@yahoo.com), Haramaya Univ., Dire Dawa, Ethiopia

1:40 **1929** Hochenwarth's moth and Jamrach's rhinoceros: Tales from the collision of systematics and ego. **Stephen Heard** (stephen.heard@unb.ca), Univ. of New Brunswick, Fredericton, NB, Canada

1:50 **1930** New genera for old fern-feeders: Taxonomic wildcards among New World pteridivores (Lepidoptera: Noctuidae). **Paul Z. Goldstein** (paul.goldstein@ars.usda.gov)¹, Daniel H. Janzen² and Winnie Hallwachs², ¹USDA - ARS, Washington, DC, ²Univ. of Pennsylvania, Philadelphia, PA

2:00 **1931** New noctuid species of the genus *Leucania* Ochsenheimer (Hadeninae:Noctuidae) from district Muzafarghar, Punjab, Pakistan. **Zahid Sarwar** (zmsarwar@bzu.edu.pk), Bahauddin Zakariya Univ., Multan, Pakistan

2:10 **1932** Use of three loci to understand generic relationships within the Noctuini (Lepidoptera: Noctuidae). **Rebecca B. Simmons** (rebecca.simmons@und.edu)¹, Melissa S. Sisson¹, Matthew J. Flom¹ and Janna L. Mabey², ¹Univ. of North Dakota, Grand Forks, ND, ²Univ. of North Texas, Denton, TX

2:20 **1933** Desert jewels of the American southwest: Species-level phylogenetic hypothesis for *Stiriina* (Lepidoptera, Noctuidae) along with examination of host specialization and life history traits. **Kevin Keegan** (kevin.keegan@uconn.edu)¹, David Wagner¹ and Niklas Wahlberg², ¹Univ. of Connecticut, Storrs, CT, ²Lund Univ., Lund, Sweden

2:30 **1934** Bright hindwings and *Catocala* diversity (Lepidoptera, Erebidae, Erebiniae, Catocalini). **Nicholas Homziak** (nhomziak@ufl.edu) and Akito Kawahara, Univ. of Florida, Gainesville, FL

2:40 **1935** The discovery of the male of *Synpalamides estherae* Miller, 1976 (Lepidoptera: Castniidae: Castiinae), including a comparative discussion of the taxonomy and bionomics of related species. Jorge M. Gonzalez¹, Bernardo Lopez G., John Phill Huerta, Fernando Hernandez-Baz³ and **Jackie Miller** (jmiller@flmnh.ufl.edu)⁴, ¹California State Univ., Fresno, CA, ²Univ. Veracruzana, Xalapa, Mexico, ³Univ. of Florida, Gainesville, FL

2:50 **1936** Natural history of cave Lepidoptera in the Pacific region. **Matthew J. Medeiros** (matt.j.medeiros@gmail.com)¹ and Francis G. Howarth², ¹Univ. of California, Berkeley, CA, ²Bishop Museum, Honolulu, HI

3:00 Break

3:10 **1937** Female responses to conspecific and heterospecific male wing pheromones in *Heliconius* butterflies. **Kelsey Byers** (kjrpb2@cam.ac.uk), Univ. of Cambridge, Cambridge, United Kingdom

3:20 **1938** Diversification dynamics in metalmark moths (Lepidoptera: Choreutidae): What is more important – colonizing a new area or a new host plant? **Jadranka Rota** (jadranka.rota@biol.lu.se), Lund Univ., Lund, Sweden

3:30 **1939** Breeding phenology of monarch butterflies in western North America. **Elizabeth Crone** (elizabeth.crone@tufts.edu)¹, Emma Pelton², Cameron Thomas³, Stephanie McKnight², Sarina Jepson² and Cheryl Schultz³, ¹Tufts Univ., Medford, MA, ²The Xerces Society for Invertebrate Conservation, Portland, OR, ³Washington State Univ., Vancouver, WA

3:40 **1940** Monarch butterfly (*Danaus plexippus*) larva seasonal distribution, host use, and landscape risk assessment for the south-central US. **James Tracy** (jamestracy@tamu.edu), Tuula Kantola and Robert Coulson, Texas A&M Univ., College Station, TX

3:50 **1941** Long-term population trends of butterflies in the Chicago metropolitan area. **Allen Lawrance** (alawrance@naturemuseum.org) and Douglas Taron, Peggy Notebaert Nature Museum, Chicago, IL

4:00 **1942** Genomic revelations regarding the origins of Hawaii's most ecologically diverse adaptive radiation, the fancy case caterpillars (Cosmopterigidae: *Hyposmocoma*). **Daniel Rubinoff** (rubinoff@hawaii.edu)¹, Julian Dupuis¹ and Scott Geib², ¹Univ. of Hawai'i, Honolulu, HI, ²USDA - ARS, Hilo, HI

4:10 **1943** Tracheae porosity facilitated the evolution and elongation of the lepidopteran proboscis: Supportive evidence for the hypothesis of oxygen limitation on insect gigantism. **Matthew Lehnert** (mlehner1@kent.edu)¹, Qi-Huo Wei¹, Miao Jiang¹, Valerie Kramer¹ and Kristen Reiter², ¹Kent State Univ., North Canton, OH, ²Univ. of Illinois, Champaign, IL

4:20 **1944** Smooth proboscises of Lepidoptera facilitate feeding from flowers. **Jamie Shell** (jshell1@kent.edu), Daytona Hedrick and Matthew Lehnert, Kent State Univ., North Canton, OH

4:30 **1945** Capillarity in c-shaped conduits: Fluid rise in split proboscises of Lepidoptera without action of the sucking pump. **Daytona Hedrick** (dhedric3@kent.edu)¹, Jianing Wu², Ashley Lash¹ and Matthew S. Lehnert¹, ¹Kent State Univ., North Canton, OH, ²Georgia Institute of Technology, Atlanta, GA

10-min: SysEB, Diversity, Evolution, and Biology of Ants

Meeting Room 306 (Convention Centre)

Moderators: Corrie Moreau¹ and Bonnie Blaimer², ¹Field Museum of Natural History, Chicago, IL, ²North Carolina State Univ., Raleigh, NC

1:30 **1946** Phylogenomic diversity and community structure of *Camponotus* (Hymenoptera: Formicidae) in Madagascar. **Gabriela Camacho** (gpcamach@ncsu.edu)¹, Ana Carolina Loss², Brian L. Fisher² and Bonnie Blaimer¹, ¹North Carolina State Univ., Raleigh, NC, ²California Academy of Sciences, San Francisco, CA

1:40 **1947** Spatial biodiversity patterns of the Madagascar ant genus *Camponotus* (Hymenoptera: Formicidae). **Ana Carolina Loss** (carol.loss@gmail.com)¹, Gabriela Camacho², Bonnie Blaimer² and Brian L. Fisher¹, ¹California Academy of Sciences, San Francisco, CA, ²North Carolina State Univ., Raleigh, NC

1:50 **1948** Genetic differences between males and females of the tawny crazy ant highlight its unusual reproductive strategy. **Pierre-Andre Eyer** (pieyer@live.fr) and Edward Vargo, Texas A&M Univ., College Station, TX

2:00 **1949** Genetics and ecology of variation in social organisation in the yellow meadow ant, *Lasius flavus*. **Gino Brignoli** (g.brignoli@qmul.ac.uk), Emeline Favreau and Yannick Wurm, Queen Mary Univ., London, United Kingdom

2:10 **1950** Comparison between SNP and UCE data for North American *Aphaenogaster* species (Hymenoptera: Formicidae). **Bernice DeMarco** (demarcob@si.edu) and Ted Schultz, Smithsonian Institution, Washington, DC

2:20 **1951** Comparative transcriptomics of caste development across multiple origins of eusociality. **Michael Warner** (warnerm@sas.upenn.edu)¹, Alexander Mikheyev² and Timothy A. Linksvayer¹, ¹Univ. of Pennsylvania, Philadelphia, PA, ²Okinawa Institute of Science and Technology, Onna, Japan

2:30 **1952** Ant colony size is correlated with genome-wide rates of molecular evolution and constraint on DNA repair genes. **Benjamin Rubin** (berubin@princeton.edu), Princeton Univ., Princeton, NJ

2:40 Break

2:50 **1953** Seasonal variation and species association in a Pennsylvania leaf litter ant community. **Michael Balas** (mbalas@thiel.edu), Brooke Gates, Lyndsay Krut, Christopher Simpson and Hunter Young, Thiel College, Greenville, PA

3:00 **1954** Ant diversity and social interaction collapse along an increased urbanization gradient. **Kok Boon Neoh** (neohkokboon@yahoo.com) and Chieh-Yen Tsai, National Chung Hsing Univ., South District, Taiwan

3:10 **1955** The organization of tawny crazy ant (*Nylanderia fulva*) societies in their native and introduced range: Nature of intercolonial aggression. **Edward LeBrun** (edwardlebrun@austin.utexas.edu)¹, Robert Plowes¹, PJ Folgarait², Martin Bollazzi³ and Lawrence Gilbert¹, ¹Univ. of Texas, Austin, TX, ²Univ. Nacional de Quilmes, Bernal, Argentina, ³Univ. of the Republic, Montevideo, Uruguay

3:20 **1956** Intraspecific cooperation persists as populations differentiate: Insights from a non-invasive North American ant (*Formica exsectoides* Forel) on the evolution and maintenance of uniclonality. **Jonathan Brown** (brownj@grinnell.edu)¹ and Jessica Purcell², ¹Grinnell College, Grinnell, IA, ²Univ. of California, Riverside, CA

3:30 **1957** Growth, survival and the complex effects of mating frequency in the western harvester ant, *Pogonomyrmex occidentalis*. **Blaine Cole** (bcole@uh.edu) and Diane Wiernasz, Univ. of Houston, Houston, TX

3:40 **1958** Spine and dine: Are competitive and predator-prey interactions mediated by a morphological trait-based trade-off in spiny ants? **Benjamin Blanchard** (bblanchard@fieldmuseum.org)^{1,2}, Akihiro Nakamura³, Min Cao³ and Corrie Moreau¹, ¹Field Museum of Natural History, Chicago, IL, ²Univ. of Chicago, Chicago, IL, ³Chinese Academy of Sciences, Menglung, China

3:50 **1959** Identification of sex attractant pheromones from queens of slave-making ants in the genus *Polyergus*. **Jocelyn G. Millar** (jocelyn.millar@ucr.edu)¹, Les Greenberg¹, Christine A. Johnson², James Trager³, J. Steven McElfresh¹ and Joshua Rodstein¹, ¹Univ. of California, Riverside, CA, ²American Museum of Natural History, New York, NY, ³Shaw Nature Reserve, Gray Summit, MO

4:00 Break

4:10 **1960** Integrative taxonomy of the ant genus *Discothyrea* in the Malagasy region. **Flavia A. Esteves** (flaviaesteves@gmail.com)¹, Sándor Csósz² and Brian L. Fisher¹, ¹California Academy of Sciences, San Francisco, CA, ²MTA-ELTE-MTM Ecology Research Group, Budapest, Hungary

4:20 **1961** The evolution of ant-plant interactions and their macroevolutionary consequences. **Matthew Nelsen** (mnelsen@fieldmuseum.org), Richard Ree and Corrie Moreau, Field Museum of Natural History, Chicago, IL

4:30 **1962** Bacterial communities differ between workers and brood in the neotropical arboreal trap-jawed ant, *Daceton armigerum*. **Manuela Ramalho** (manuramalho2010@gmail.com)¹, Christophe Duplais², Jérôme Orivel², Andrew Suarez³ and Corrie Moreau¹, ¹Field Museum of Natural History, Chicago, IL, ²CNRS - UMR, Cayenne, France, ³Univ. of Illinois, Champaign, IL

4:40 **1963** Evidence for the contribution of gut symbionts to the cuticle formation in herbivorous turtle ants *Cephalotes varians* through NMR spectroscopy. Corrie Moreau¹, Vincent Sarou-Kanian², Dominique Massiot², Yannick Estevez³, Jacob Russell⁴, Estelle Martineau^{5,6}, Patrick Giraudeau^{5,7}, Jonathan Farjon⁵ and **Christophe Duplais** (christophe.duplais@ecofog.gf)³, ¹Field Museum of Natural History, Chicago, IL, ²CNRS - UMR, Orléans, France, ³CNRS - UMR, Cayenne, France, ⁴Drexel Univ., Philadelphia, PA, ⁵Univ. de Nantes, Nantes, France, ⁶Spectromaitrise, Nantes, France, ⁷Institut Univ. de France, Paris, France

4:50 **1964** Phylogeny and ecology predict the taxonomic and functional composition of ants' symbiotic microbiota. **Jacob Russell** (jar337@drexel.edu)¹, Yi Hu¹, Piotr Lukasik², Catherine D'Amelio³, Brian Wray⁴, Andrew Suarez⁵, Narayan Wong⁶, Jon G. Sanders⁷ and Corrie Moreau⁴, ¹Drexel Univ., Philadelphia, PA, ²University of Montana, Missoula, MT, ³Univ. of Alaska, Anchorage, AK, ⁴Field Museum of Natural History, Chicago, IL, ⁵Univ. of Illinois, Champaign, IL, ⁶Rochester Institute of Technology, Rochester, NY, ⁷Univ. of California, La Jolla, CA

5:00 **1965** Fungal symbiont diversity and bacterial microbiomes of North American fungus-gardening ants. **Jon Seal** (trachymyrmex@gmail.com), Univ. of Texas, Tyler, TX

5:10 **1966** Brain size and evolution: What's different with ants down under? **Marc Seid** (seidm2@scranton.edu)¹ and Ajay Narendra², ¹The Univ. of Scranton, Scranton, PA, ²Macquarie Univ., Sydney, Australia

Organized Meeting: IOBC NRS Meeting and Mixer

Meeting Room 304/305 (Convention Centre)

Moderator and Organizer: James Nechols, Kansas State Univ., Manhattan, KS

2:00 Welcoming remarks

2:10 Business meeting

3:00 Presentation of awards

3:10 **1967** The transformative role of conservation biological control in cotton IPM: A brief history of time. **Steven Naranjo** (steve.naranjo@ars.usda.gov), USDA - ARS, Maricopa, AZ

3:40 **1968** Natural enemies from cornfields in Nebraska: What's there and how can we utilize them against the western corn rootworm? **Camila Hofman** (camila.o.hofman@gmail.com), Univ. of Nebraska, Lincoln, NE

4:00 Mixer

10-min: MUVE, Structural Pests

Meeting Room 301 (Convention Centre)

Moderators: Neil Spomer¹ and Brian Weiss², ¹Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN, ²Yale Univ., New Haven, CT

3:00 **1969** Using Trelona® advance termite bait system and Termidor® Dry Termiticide to protect live trees infested with *Coptotermes formosanus* (Isoptera: Rhinotermitidae). **Phillip Shults** (ptshults@tamu.edu)¹, Edward Vargo¹, Bob Davis², Janis Reed¹ and Tony Keefer¹, ¹Texas A&M Univ., College Station, TX, ²BASF Corporation, Pflugerville, TX

3:10 **1970** Subterranean termite infestation rates on the University of Georgia, Athens, GA campus. **Brian Forschler** (bfor@uga.edu), Univ. of Georgia, Athens, GA

3:20 **1971** Masking feeding deterrence of bait toxicants with phagostimulants. **Nan-Yao Su** (nysu@ufl.edu) and Aaron Mullins, Univ. of Florida, Davie, FL

3:30 **1972** The use of volatile essential oils to improve heat treatments for the western drywood termite. **Daniel Perry** (dperr006@ucr.edu) and Dong-Hwan Choe, Univ. of California, Riverside, CA

3:40 **1973** Shifts in gut microbiota and thermal tolerance physiology in the eastern subterranean termite, *Reticulitermes flavipes* (Kollar), after exposure to three different temperature-acclimation treatments. **Rachel Arango** (rarango@fs.fed.us)¹, Sean Schoville², Cameron Currie² and Camila Carlos-Shanley³, ¹USDA - Forest Service, Madison, WI, ²Univ. of Wisconsin, Madison, WI, ³Texas State Univ., San Marcos, TX

3:50 **1974** Hit rate and efficacy of field aged Recruit™ HD when re-deployed in termite active areas. **Joe DeMark** (jjdemark@dow.com)¹, Joe Eger² and Neil Spomer³, ¹Corteva Agriscience, Agriculture Division of DowDuPont, Fayetteville, AR, ²Dow AgroSciences (Retired), Tampa, FL, ³Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

4:00 **1975** Laboratory performance of field aged Recruit™ HD from U.S. commercial sites. **Mary Rushton** (mrushton@dow.com)¹, Neil Spomer¹, Eva Chin-Heady¹ and Joe DeMark², ¹Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN, ²Corteva Agriscience, Agriculture Division of DowDuPont, Fayetteville, AR

4:10 **1976** An automated system DEMINL for remote monitoring of termite activities. Junfeng Shen¹ and **Dayu Zhang** (zhangdayu@zafu.edu.cn)², ¹Zhejiang Deken Environmental Technology Co. Ltd., Jiaxin, China, ²Zhejiang A&F Univ., Hangzhou, China

Organized Meeting: International Branch Meeting

Meeting Room 302/303 (Convention Centre)

Moderators and Organizers: Maya Evenden¹ and Livy Williams², ¹Univ. of Alberta, Edmonton, AB, Canada, ²USDA - ARS, Charleston, SC

3:30 Welcoming remarks

3:35 Introductory remarks

3:40 **1977** International Branch Early Career Research and Leadership Award winner presentation. **Boyd Mori** (boyd.mori@canada.ca), Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

4:10 **1978** International Branch Distinguished Scientist Award winner presentation. Silvia Dorn (silvia.dorn@ipw.agr.ethz.ch), ETH Zürich, Zürich, Switzerland

4:25 **1979** International Branch John Henry Comstock Award winner presentation: Down to earth defence: How mutualistic fungi augment silicon-based defence against above- and belowground insect pests. **Ximena Cibils-Stewart** (xcibils@inia.org.uy)^{1,2}, Scott Johnson¹ and Jeff Powell², ¹Western Sydney Univ., Sydney, Australia, ²INIA (Instituto Nacional de Investigacion Agropecuaria), Colonia, Uruguay

4:40 Recognition of newly elected officers

4:45 News from the Governing Board and Treasurer's report

4:55 Update from committee chairs

5:05 Introduction of ESA President, Michael Parrella

5:10 Announcement of virtual symposium 2019

5:15 International Branch social

10-min: P-IE, Transgenic Crops

Meeting Room 213 (Convention Centre)

Moderators: James Bing¹ and Andre Crespo², ¹Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN, ²Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

3:40 **1980** Field Efficacy of pyramided *Bt* maize expressing Cry1F, Cry1A.105, Cry2Ab2 and Vip3Aa20 against *Helicoverpa zea* (Lepidoptera: Noctuidae) and secondary tropical lepidopteran pests in Brazil. Boris Castro¹, Luiz Marques², Antonio Santos³ and **James Bing** (jwbing@dow.com)¹, ¹Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN, ²Corteva Agriscience, Agriculture Division of DowDuPont, Mogi Mirim, Brazil, ³Corteva Agriscience, Agriculture Division of DowDuPont, São Paulo, Brazil

3:50 **1981** Vip3A resistance in *Spodoptera frugiperda*: Inheritance, cross-resistance, and fitness costs. **Fei Yang** (fyang@tamu.edu)¹, Graham P. Head², David Kerns¹, Marlin Rice³, Fangneng Huang⁴ and Xuan Chen¹, ¹Texas A&M Univ., College Station, TX, ²Monsanto Company, St. Louis, MO, ³Syngenta Crop Protection, Greensboro, NC, ⁴Louisiana State Univ., Baton Rouge, LA

4:00 **1982** Pest spectrum and mode of action of an engineered Cry1B protein. **Denny Bruck** (denny.bruck@pioneer.com), Adane Kassa, Lisa Procyk, Albert Lu, Gary Sandahl, Mark Nelson, John Mathis, Airene Millsap, Carol Pilcher, Kelsey Swedberg, Kaley Gade, Anastacia Books, Jian-Zhou (Joe) Zhao and Gusui Wu, Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

4:10 **1983** An engineered Cry1B protein active on *Helicoverpa zea*. **Virginia Crane** (virginia.crane@pioneer.com)¹, Takashi Yamamoto², Michi Izumi Willcoxson³, Jingtong Hou², Albert Lu¹, Gary Sandahl¹, Mark Nelson¹, John Mathis¹, Zhenglin Hou¹ and Gusui Wu², ¹Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA, ²Corteva Agriscience, Agriculture Division of DowDuPont, Hayward, CA, ³Second Genome, Inc., South San Francisco, CA

4:20 Break

4:30 **1984** Pink boll worm refuge strategy resulting in instantaneous reduction in genetic resistance against single toxin expressing transgenic cotton. **Zunnuraen Akhtar** (zunnuraen@gmail.com), Univ. of Agriculture, Faisalabad, Pakistan

4:40 **1985** Cry1Ja applications in transgenic insect control: Insights into mode of action and spectrum on lepidopteran pest species. John Mathis¹, Catherine Clark¹, **Gilda Rauscher** (gilda.rauscher@pioneer.com)¹, Mark Nelson¹ and Gusui Wu², ¹Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA, ²Corteva Agriscience, Agriculture Division of DowDuPont, Hayward, CA

4:50 **1986** Discovery of a corn rootworm specific insecticidal protein from plants. **Amy Lum** (amy.lum@pioneer.com), DuPont Pioneer, Hayward, CA

5:00 **1987** Field efficacy of pyramided *Bt* maize expressing Cry1F, Cry1A.105, Cry2Ab2 and Vip3Aa20 against *Spodoptera frugiperda* in Brazil. **Antonio Santos** (acsantos1@dow.com)¹, Boris Castro² and Luiz Marques³, ¹Corteva Agriscience, Agriculture Division of DowDuPont, São Paulo, Brazil, ²Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN, ³Corteva Agriscience, Agriculture Division of DowDuPont, Mogi Mirim, Brazil

5:10 **1988** Characterization of southwestern corn borer resistance to Cry1F in Cochise, AZ and management recommendations. **Andre Crespo** (andre.crespo@pioneer.com), Jian-Zhou (Joe) Zhao, Jean Dyer, Dianna Gillespie, Carl Walker, Emily Huang and Amit Sethi, Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

TUESDAY, NOVEMBER 13 • EVENING

Organized Meeting: Korean Young Entomologists (KYE)

Meeting Room 221/222 (Convention Centre)

Moderators and Organizers: June-Sun Yoon¹, Donghun Kim^{2,3} and Dong-Hwan Choe⁴, ¹Univ. of Kentucky, Lexington, KY, ²Pennsylvania State Univ., University Park, PA, ³Kyungpook National Univ., Sangju, South Korea, ⁴Univ. of California, Riverside, CA

6:00 Introductory remarks

6:05 **1989** Revealing the factors for successful RNA interference in coleopteran insects. **June-Sun Yoon** (june.yoon@uky.edu), Univ. of Kentucky, Lexington, KY

6:20 **1990** Key transport and ammonia recycling genes involved in aphid symbiosis respond to host-plant specialization. **Dohyup Kim** (dkim291@illinois.edu) and Allison Hansen, Univ. of California, Riverside, CA

6:35 **1991** Relationships between overwintering *Riptortus pedestris* (Hemiptera: Alydidae) and their gut-symbiont *Burkholderia* sp. in soil under field conditions. **Minhyung Jung** (alsgud_11@naver.com), Jung-Wook Kho, Soowan Kim and Doo-Hyung Lee, Gachon Univ., Seongnam, South Korea

6:50 **1992** Identification and RNA interference of inhibition of apoptosis-related genes in *Tribolium castaneum*: Its potential in pest management applications. **Jinmo Koo** (hemosu1710@naver.com)^{1,2}, June-Sun Yoon², Smitha George² and Subba Reddy Palli², ¹Kyungpook National Univ., Daegu, South Korea, ²Univ. of Kentucky, Lexington, KY

7:05 **1993** How do scale insects affect the growth of persimmon trees? Hyeon Jeong An, Hyun Guk Kim, **Yoon Suk Cha** (19105131@naver.com), Mun Gi Jung, Hee Been Na and DongWoon Lee, Kyungpook National Univ., Sangju, South Korea

7:20 **1994** Effects of *Protaetia brevitarsis seulensis* ingestion and voluntary exercise training on fat metabolism. **Yiseul Kim** (ratsnjoy@gmail.com) and Taedong Kwon, Kyungpook National Univ., Sangju, South Korea

7:35 Break

7:50 **1995** Insects in traditional Korean poem, Sijo. **DongWoon Lee** (whitegrub@knu.ac.kr) and Chul Youm, Kyungpook National Univ., Sangju, South Korea

8:05 **1996** Behavioral, molecular and biochemical characterization of wild-type female fruit flies exposed to sublethal amounts of ivermectin. Yusuf Ali¹, Ki-Bae Hong¹, John Clark², Barry R. Pittendrigh³, Si-Hyeock Lee⁴ and **Kyong Yoon** (kyoon@siue.edu)¹, ¹Southern Illinois Univ., Edwardsville, IL, ²Univ. of Massachusetts, Amherst, MA, ³Michigan State Univ., East Lansing, MI, ⁴Seoul National Univ., Seoul, South Korea

8:20 **1997** Applications of new techniques to better understand dispersal ecology of important arthropod pests. **Doo-Hyung Lee** (dl343@gachon.ac.kr), Gachon Univ., Seongnam, South Korea

8:35 **1998** Female-dependent stenogamy mating behavior in the mosquito, *Culex pipiens* complex species. **Cheolho Sim** (cheolho_sim@baylor.edu) and Sungshil Kim, Baylor Univ., Waco, TX

8:50 **1999** Insecticidal activity of plant essential oils and enhanced permethrin toxicity against *Aedes aegypti*. **Jun-hyung Tak** (saturnpg7@yahoo.com)¹ and Jeffrey Bloomquist², ¹Seoul National Univ., Seoul, South Korea, ²Univ. of Florida, Gainesville, FL

9:05 **2000** Delivery of Cas9 via ReMOT (Receptor-Mediated Ovary Transduction of Cargo) for gene editing in disease vectors. **Donghun Kim**^{1,2} (kp5091@gmail.com), Duverney Chaverra-Rodriguez¹, Vanessa Macias¹ and Jason Rasgon¹, ¹Pennsylvania State Univ., University Park, PA, ²Kyungpook National Univ., Sangju, South Korea

9:20 Concluding remarks

ESA and ESC Student Awards Ceremony*West Ballroom ABC (Convention Centre)***Moderator and Organizer:** Casey Parker, Univ. of Florida, Vero Beach, FL**6:30 PM - 7:30 PM****Organized Meeting: IUSSI North American Section Business Meeting***Meeting Room 220 (Convention Centre)***Moderators and Organizers:** Jay Evans¹, Jennifer M. Jandt² and James C. Nieh³, ¹USDA - ARS, Beltsville, MD, ²Univ. of Otago, Dunedin, New Zealand, ³Univ. of California, La Jolla, CA

7:00 Introductory remarks

7:15 Secretary's report

7:30 Treasurer's report

7:45 **2001** Student Award Presentation: Personality in the field: What harvester ants tell us. **Maya Reese** (mjreese@uh.edu) and Blaine Cole, Univ. of Houston, Houston, TX8:00 **2002** Student award presentation. **Reina Tong** (reinat@ufl.edu), Univ. of Florida, Davie, FL

8:15 Other business

8:45 Concluding remarks

Organized Meeting: North American Dipterists Society (NADS) Meeting*Meeting Room 215/216 (Convention Centre)***Moderator and Organizer:** Matthew Bertone, North Carolina State Univ., Raleigh, NC7:00 **2003** Identifying the freeloaders: Revision of nearctic *Paramyia* (Diptera: Milichiidae). Valerie Levesque-Beaudin¹ and **Julia Mlynarek** (julia.mlynarek@canada.ca)², ¹Centre for Biodiversity Genomics, Guelph, ON, Canada, ²Agriculture and Agri-Food Canada, Harrow, ON, Canada7:15 **2004** Flies and flytraps: What, if any, are the relationships between Diptera and *Dionaea*? **Clyde E. Sorenson** (clyde_sorenson@ncsu.edu), Laura Hamon, Elsa Youngsteadt, Rebecca E. Irwin and Matthew Bertone, North Carolina State Univ., Raleigh, NC7:30 **2005** New adventures in ecology: Carrion-breeding Diptera associated bacteriophage discovery. **Meaghan Pimsler** (mlpimsler@ua.edu), B. Matthew Kiszla and Asma Hatoum, Univ. of Alabama, Tuscaloosa, AL7:45 **2006** Can barcodes recapitulate phylogeny? Exploring DNA barcodes through the lens of higher level Diptera classification. **Morgan Jackson** (morgandjackson@gmail.com), Univ. of Guelph, Guelph, ON, Canada8:00 **2007** Diptera of Palmyra Atoll: New survey, new discoveries. **Matthew Bertone** (matt_bertone@ncsu.edu)¹ and Rachel Behm², ¹North Carolina State Univ., Raleigh, NC, ²Univ. of California, Santa Barbara, CA**Organized Meeting: Society of Overseas Nepalese Entomologists Meeting***Meeting Room 214 (Convention Centre)***Moderators and Organizers:** Deepak Shrestha¹, Sudip Gaire², Govinda Shrestha³ and Babu Panthi¹, ¹Univ. of Florida, Wimauma, FL, ²Purdue Univ., West Lafayette, IN, ³Montana State Univ., Conrad, MT

7:00 Welcoming remarks

7:05 **2008** Entomological research, teaching, and extension: SONE's role in global outreach. **Megha Parajulee** (mparajul@ag.tamu.edu), Texas A&M Univ., Lubbock, TX

7:35 2-3 minutes student presentation

8:00 Break

8:10 Award ceremony

8:20 Business meeting

8:40 Panel discussion

8:55 Concluding remarks

Organized Meeting: The Coleopterists Society General Meeting*Meeting Room 217/218/219 (Convention Centre)***Moderator and Organizer:** Derek Sikes, Univ. of Alaska, Fairbanks, AK

8:00 Introductory remarks

8:05 **2009** Cohabitation with Coleoptera: The evolution and diversity of extraordinary beetle inquilines. **Ainsley Seago** (ainsley.seago@dpi.nsw.gov.au), New South Wales Dept. of Primary Industries, Orange, Australia

8:50 Question and answer

9:05 Necrology

9:10 New members

9:15 Approval of 2017 AGM minutes

9:20 Executive Council changes

9:25 Editor's report

9:30 Treasurer's report

9:35 President's report

9:40 Awards

9:45 Announcements

9:50 Future meetings

WEDNESDAY, NOVEMBER 14 • POSTERS

Poster: MUVE, Veterinary and General

West Exhibit Hall A (Convention Centre)

D3424 Pest Airways: Itineraries of windborne insects in the Sahel. **Laura Verú** (laura.veru@nih.gov)¹, Jenna Florio¹, Adama Dao², Alpha Yaro², Charles Bartlett³, Maria Lourdes Chamorro⁴, Moussa Diallo², Zana Sonogo², Samake Djibril², J. Howard Frank⁵ and Tovi Lehmann¹, ¹National Institutes of Health, Rockville, MD, ²International Center for Excellence in Research, Bamako, Mali, ³Univ. of Delaware, Newark, DE, ⁴USDA - ARS, Washington, DC, ⁵Univ. of Florida, Gainesville, FL

D3425 Efficacy of various commercially available lotions, soaps and personal care products in repelling *Aedes aegypti* (Diptera: Culicidae) and *Aedes albopictus* (Diptera: Culicidae). **Stacy D. Rodriguez** (stacyr@nmsu.edu), Yashoda Kandel and Immo Hansen, New Mexico State Univ., Las Cruces, NM

D3426 Survival of healthy larvae and *O. popilliae*-infected larvae in field plots. **Michael Piombino IV** (mickpiombino@gmail.com) and David Smitley, Michigan State Univ., East Lansing, MI

D3427 Effectiveness of combinations of *Beauveria bassiana* (Hypocreales: Clavicipitaceae) and the artificial sweeteners erythritol and xylitol against adult house flies (Diptera: Muscidae). **Christopher Geden** (chris.geden@ars.usda.gov)¹, Edwin Burgess² and Dana Johnson³, ¹USDA - ARS, Gainesville, FL, ²Northern Illinois Univ., DeKalb, IL, ³Univ. of Florida, Gainesville, FL

D3428 Spatial and contact repellency of medium chain fatty acids and their methyl esters against stable flies, *Stomoxys calcitrans*. **Gwang Hyun Roh** (roh.gwanghyun82@gmail.com)¹, Steven Cermak², James Kenar² and Junwei Zhu¹, ¹USDA - ARS, Lincoln, NE, ²USDA - ARS, Peoria, IL

D3429 Increasing surveillance of key invasive species at Hawaii's ports of entry. **Leyla V. Kaufman** (leyla@hawaii.edu), Hawaii's Invasive Species Council, Honolulu, HI

D3430 Detection of two new invasive mosquito species in the United States, *Culex panocossa* and *Aedeomyia squamipennis*. **Kristin Sloyer** (ksloyer@ufl.edu)¹, Erik Blosser², Lawrence Reeves¹ and Nathan Burkett-Cadena¹, ¹Univ. of Florida, Vero Beach, FL, ²Univ. of California, Davis, CA

D3431 Difference of insect pest occurrence patterns between smart farms and conventional greenhouses growing tomatoes, and comparison of several eco-friendly organic agricultural materials against *Bemisia tabaci*. Heon Yoon, Younghwan Kwak, Seo Yeong Bae, Hye-Ri Kwon, Yong-Man Yu and **Young Nam Youn** (youngnam@cnu.ac.kr), Chungnam National Univ., Daejeon, South Korea

D3432 Engaging school nurses to promote integrated pest management. **Kathy Murray** (kathy.murray@maine.gov), Maine Dept. of Agriculture, Conservation and Forestry, Augusta, ME

D3433 Phylogenetic analysis of the ghost ant, *Tapinoma melanocephalum* (F.), using mitochondrial and ribosomal genes. **Christopher Scocco** (chris.scocco@ufl.edu), Brian Bahder, Ericka Helmick and Rudolf Scheffrahn, Univ. of Florida, Fort Lauderdale, FL

D3434 Insecticide resistance management in German cockroaches (*Blattella germanica* (L.)) in low-income multi-family housings. **Mahsa Fardisi** (mfardisi@purdue.edu), Ameya Gondhalekar, Aaron Ashbrook and Michael Scharf, Purdue Univ., West Lafayette, IN

D3435 Widespread insecticide resistance in *Aedes aegypti* from New Mexico, U.S. Yashoda Kandel, Stacy D. Rodriguez, Kathryn Hanley and **Immo Hansen** (immoh@nmsu.edu), New Mexico State Univ., Las Cruces, NM

D3436 Evaluation of *Beauveria bassiana* (Balsamo) Vuillemin and SilicoSec against lesser grain borer on rice and maize grains. **Tahira Riasat** (tahirariasat@yahoo.com), Government College Univ., Lahore, Pakistan; Univ. of Agriculture, Faisalabad, Pakistan

D3437 Prevalence of Q fever agent in ticks collected in animal clinics and shelters in southeastern Georgia. **Quentin Fang** (qfang@georgiasouthern.edu), Georgia Southern Univ., Statesboro, GA

D3438 Antisense oligos (ASO): Advanced RNA silencing technology to reduce pathogens and ectoparasites of livestock. Wayne Hunter¹, Jackie Metz², Kevin B. Temeyer³, **Adalberto A. Pérez de León** (beto.perezdeleon@ars.usda.gov)³, John M. Tomich⁴ and Veenu Aishwarya², ¹USDA - ARS, Fort Pierce, FL, ²AUM LifeTech, Inc., Philadelphia, PA, ³USDA - ARS, Kerrville, TX, ⁴Kansas State Univ., Manhattan, KS

D3439 Sexual dimorphism of the pupae of the mosquito, *Culex pipiens*. **Patricia Kamanda** (patricia_kamanda1@baylor.edu) and Cheolho Sim, Baylor Univ., Waco, TX

D3440 Fever tick (*Boophilus microplus*) infestations on Nilgai antelope are habitat related. **Don Thomas** (donald.thomas@ars.usda.gov)¹ and Pia Olafson², ¹USDA - ARS, Edinburg, TX, ²USDA - ARS, Kerrville, TX

D3441 Changing phenology in residential *Rhipicephalus sanguineus* infestations: Model development. **Cynthia C. Lord** (clord@ufl.edu)¹, Yuexun Tian^{1,2}, Emma Weeks², Sandra A. Allan³, Jebidiah Light¹ and Phillip Kaufman², ¹Univ. of Florida, Vero Beach, FL, ²Univ. of Florida, Gainesville, FL, ³USDA - ARS, Gainesville, FL

D3442 Tea tree (*Melaleuca alternifolia*) oil for the treatment of lesions in cattle caused by buffalo fly (*Haematobia exigua*) feeding. **Peter James** (p.james1@uq.edu.au), Univ. of Queensland, Dutton Park, Australia

D3443 A visual guide to *Culicoides* (Diptera: Geratopogonidae) species of the southeastern United States. **Stacey Vigil** (svigil@uga.edu), Univ. of Georgia, Athens, GA

D3444 Presentation withdrawn

D3445 Effects of host blood meal source on gut physiology and reproductive output on West Nile virus vector *Culex quinquefasciatus*. **Aparna Telang** (atelang@usf.edu) and Jessica Skinner, Univ. of South Florida, Sarasota, FL

D3446 Effect of blood meal temperature on physiological responses of *Culicoides sonorensis* biting midges. **Paula Rozo-Lopez** (paularozo@ksu.edu)¹, Yoonseong Park¹, Berlin Londono¹ and Barbara Drolet², ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS

D3447 Genetic analysis of the New World screwworm fly *Cochliomyia hominivorax* (Diptera: Calliphoridae) on the outskirts of the Amazon region. Luana Bergamo¹, Júlia Costa¹, Livio Costa-Junior², Robin Madueño³ and **Ana Maria Azeredo-Espin** (azeredo@unicamp.br)¹, ¹Univ. of Campinas, Campinas, Brazil, ²Univ. Federal do Maranhão, São Luis, Brazil, ³SENASA, Lima, Peru

D3448 Population genomics of *Culiseta melanura*, the principal vector of eastern equine encephalitis virus in the United States. **Goudarz Molaei** (goudarz.molaei@ct.gov)^{1,2}, John Soghigian³ and Theodore Andreadis^{1,2}, ¹Connecticut Agricultural Experiment Station, New Haven, CT, ²Yale School of Public Health, New Haven, CT, ³North Carolina State Univ., Raleigh, NC

Poster: PBT, Resistance Management, Molecular, and Other

West Exhibit Hall A (Convention Centre)

D3449 CRISPR-Cas9 knockout of transformer in *Cochliomyia hominivorax* causes masculinization of XX flies. **Alex Arp** (dralexparp@gmail.com)¹, Daniel Paulo², Carolina Concha³ and Max Scott⁴, ¹Comision Panamá Estados Unidos para la Erradicacion y Prevencion del Gusano Barrenador del Ganado, Pacora, Panama, ²Univ. of Campinas, Campinas, Brazil, ³Smithsonian Tropical Research Institute, Panama City, Panama, ⁴North Carolina State Univ., Raleigh, NC

D3450 Two single-point mutations shift the ligand selectivity of a pheromone receptor between two closely related species, *Helicoverpa assulta* and *Helicoverpa armigera*. Ke Yang, Ling-Qiao Huang, Chao Ning and **Chen-Zhu Wang** (czwang@ioz.ac.cn), Chinese Academy of Sciences, Beijing, China

D3451 More than meets the eye? Protective functions of red pigments in endemic Hawaiian damselflies (*Megalagrion*). **Jonathan Brown** (brownj@grinnell.edu)¹ and Idelle Cooper², ¹Grinnell College, Grinnell, IA, ²James Madison Univ., Harrisonburg, VA

D3452 Evidence for the oxidative metabolism of nicotine by the cabbage looper, *Trichoplusia ni* (Hübner). Brett Saremba, Nazli Hassanpour and **Mark Rheault** (mark.rheault@ubc.ca), The Univ. of British Columbia, Kelowna, BC, Canada

D3453 Molecular and biochemical characterization of the bed bug salivary gland cholinesterase as an acetylcholine-sequestering enzyme. Ju Hyeon Kim¹, Chae Eun Hwang², **Kyungjae Yoon** (kongbob89@snu.ac.kr)³, Keon Mook Seong⁴, Jonghwa Lee³, Jeong Han Kim³ and Si Hyeock Lee³, ¹Univ. of Massachusetts, Amherst, MA, ²National Institute of Ecology, Seocheon, South Korea, ³Seoul National Univ., Seoul, South Korea, ⁴Michigan State Univ., East Lansing, MI

D3454 Molecular cloning and characterization of GABA receptor and GluCl genes in the western flower thrips, *Frankliniella occidentalis*. **Jianjun Wang** (wangjj@yzu.edu.cn), Yangzhou Univ., Yangzhou, China

D3455 Spoxy™360SC insecticide: A novel combination of Spinetoram and Methoxyfenozide for chewing pest control on vegetable and fruit in China and Taiwan. Ta-i Huang¹, Peng Wang² and **Xinpei Huang** (jxhuang@dow.com)³, ¹Dow AgroSciences, Taipei, Taiwan, ²Dow AgroSciences, Shanghai, China, ³Dow AgroSciences, Indianapolis, IN

D3456 Inert granite dust for pest management: A preliminary study. **Samantha Macpherson** (133207m@acadiau.ca), Nicoletta Faraone and Kirk Hillier, Acadia Univ., Wolfville, NS, Canada

D3457 Gut microbiome from *Galleria mellonella* and role in polyethylene degradation. Samuel Latour, Louise Carlier, Frank Delvigne and **Frederic Francis** (frederic.francis@uliege.be), Univ. of Liege, Gembloux, Belgium

D3458 Determinants of RNAi efficiency in lepidopteran insects. **Dhandapani Gurusamy** (dhandapani.gurusamy@uky.edu) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

D3459 Method of molecular sexing of Lepidoptera. Irina Belousova¹, Nikita Ershov², **Sergey Pavlushin** (sergey-pavlushin@mail.ru)¹, Yury Ilinsky² and Vyacheslav Martemyanov¹, ¹Institute of Systematics and Ecology of Animals, Novosibirsk, Russia, ²Institute of Cytology and Genetics SB RAS, Novosibirsk, Russian Federation

D3460 Trunk injection: A discriminating delivery system for managing foliar pests in fruit orchards. **Charles Coslor** (ccoslor@gmail.com), Christine Vandervoort and John Wise, Michigan State Univ., East Lansing, MI

D3461 Yeast expression system of *Grapholita molesta* sex pheromones. **Yonggyun Kim** (hosanna@anu.ac.kr), Andong National Univ., Andong, South Korea

D3462 Lethality impact of diatomaceous earth and kaolin on the larvae of beet armyworm, *Spodoptera exigua* (Hübner) (Lep.: Noctuidae). **Reza Sadeghi** (rsadeghi@ut.ac.ir)¹ and Asgar Ebadollahi², ¹Univ. of Tehran, Tehran, Iran, ²Univ. of Mohaghegh, Ardabil, Iran

D3463 Chitin biosynthesis inhibitors in *Euschistus heros* Fabr. (Hemiptera: Pentatomidae): Morphometric alterations in the nuclei of testicular accessory cells. Paulo Cremones, Daniela Pinheiro and **Pedro Neves** (pedroneves@uel.br), Londrina State Univ., Londrina, Brazil

D3464 Insect-based food resources with *Rhinoceros* beetle larvae and *Gryllus bimaculatus*. **Yeojin Kim** (yeojin.kim@cj.net) and Sujin Bae, CJ CheilJedang, Seoul, South Korea

D3465 Sensitivity of *Drosophila melanogaster* and *Drosophila suzukii* to the chemicals released from the fermentation environment. YiSeul Kim, Sungho Lee, YeongHo Kim and **Young Ho Kim** (yhkim05@knu.ac.kr), Kyungpook National Univ., Sangju, South Korea

D3466 Sublethal benefits of rapid cold hardening in Antarctica's only endemic insect. **Nicholas Teets** (n.teets@uky.edu)¹, Yuta Kawarasaki², Leslie Potts¹, J.D. Gantz³, Benjamin N. Philip³, David L. Denlinger⁴ and Richard E. Lee³, ¹Univ. of Kentucky, Lexington, KY, ²Gustavus Adolphus College, Saint Peter, MN, ³Miami Univ., Oxford, OH, ⁴The Ohio State Univ., Columbus, OH

D3467 Hemolymph PCO₂/pH and the production of discontinuous gas exchange cycles in blaberid cockroaches. **Tormod Rowe** (ttcrowe@zoology.ubc.ca) and Philip Matthews, The Univ. of British Columbia, Vancouver, BC, Canada

D3468 Efficacy of newer formulation of Fipronil 0.8 G against yellow stem borer of paddy *Scirphophga incertulas* (Crambidae: Lepidoptera). **Ayyasamy Regupathy** (ayyasamy.regu@gmail.com)¹ and Guruprasad S², ¹Annamalai Univ., Chidambaram, India, ²Syngenta India Ltd, Coimbatore, India

D3469 Gross morphology of diseased tissues in *Nezara viridula* (L.) (Hemiptera: Pentatomidae) and molecular characterization of associated microorganisms. **Michael Grodowitz** (michael.grodowitz@ars.usda.gov)¹, Brad Elliott¹, Adam Rivers², Margaret Allen¹, Mark Weaver¹, M. Guadalupe Rojas¹ and Juan Morales-Ramos¹, ¹USDA - ARS, Stoneville, MS, ²USDA - ARS, Gainesville, FL

D3470 Genome editing in the fall armyworm, *Spodoptera frugiperda*: CRISPR/Cas9 mediated one-step generation of gene knock out with multiple sgRNAs. **Guan-Heng Zhu** (gzh247@uky.edu) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

D3471 Species-specific multi-functionality of cicada wings is achieved through distinct physical and chemical organization of cuticular surface structures. Jessica Roman¹, Junho Oh², Catherine Dana², Sungmin Hong¹, Julian Reed¹, Jacob Hoffman¹, Andrew Gonsalves¹, Kyoo Jo¹, Donald M. Cropek¹, Nenad Miljkovic² and **Marianne Alleyne** (vanlaarh@illinois.edu)², ¹US Army, Champaign, IL, ²Univ. of Illinois, Champaign, IL

D3472 The role of juvenile hormone in the reproductive development of the male desert locust, *Schistocerca gregaria*. **Michiel Holtof** (michiel.holtof@kuleuven.be), Elisabeth Marchal and Jozef Vandenbroeck, Katholieke Univ., Leuven, Belgium

D3473 Altering the intake of protein and carbohydrates does not significantly affect Cry1F susceptibility in *Spodoptera frugiperda*.

Ashley Tessnow (atessnow@tamu.edu), Spence Behmer and Gregory Sword, Texas A&M Univ., College Station, TX

D3474 CYP6BQ25, a second cytochrome P450 mediating the detoxification of deltamethrin in pollen beetle (*Brassicogethes aeneus*). **Debora Boaventura** (debora.boaventura.ext@bayer.com)^{1,2}, Angel David Popa Baez³, Benjamin Buer¹, Oliver Gutbrod¹, Maxie Kohler¹, Denise Steinbach¹ and Ralf Nauen¹, ¹Bayer CropScience AG, Monheim, Germany, ²Univ. of Bonn, Bonn, Germany, ³Macquarie Univ., Sydney, Australia

D3475 Identification and interaction of multiple genes resulting in DDT resistance in the 91-R strain of *Drosophila melanogaster* by RNAi approaches. **Ju Hyeon Kim** (kentomology@gmail.com)¹, Joseph Moreau¹, Jake Zina¹, Lalita Mazgaen², Kyong Yoon², Barry R. Pittendrigh³ and John Clark¹, ¹Univ. of Massachusetts, Amherst, MA, ²Southern Illinois Univ., Edwardsville, IL, ³Michigan State Univ., East Lansing, MI

D3476 Metabolomics approach reveals the complexity of western corn rootworm resistance to *Bt* corn. **Man Huynh** (mphd32@mail.missouri.edu)¹, Bruce Hibbard², Van Ho¹, Thomas Coudron² and Kent S. Shelby², ¹Univ. of Missouri, Columbia, MO, ²USDA - ARS, Columbia, MO

D3477 Differentially expressed microRNAs associated with changes of transcript levels in detoxification pathways and DDT-resistance in the *Drosophila melanogaster* strain 91-R. **Keon Mook Seong** (seongkeo@msu.edu)¹, Brad Coates², Dohyup Kim³, Allison Hansen³ and Barry R. Pittendrigh¹, ¹Michigan State Univ., East Lansing, MI, ²USDA - ARS, Ames, IA, ³Univ. of California, Riverside, CA

D3478 Insecticide resistance action committee (IRAC) mode of action classification: Adapting to a changing landscape in pest management. **Frank Wessels** (fjwessels@dow.com), Dow AgroSciences, Indianapolis, IN

D3479 Exploring diverse environmental sources for novel insecticidal proteins. **Marie Encarnacion** (mencarnacion@agbiome.com), Hai Tran and Ryan Gerber, AgBiome, Inc., Research Triangle Park, NC

D3480 The microbiome of *Trogoderma granarium*: First report on the presence of *Spiroplasma* bacteria. **Diana Wilches** (dm.wilchescorreal@uleth.ca)¹, Kevin Floate², Robert Laird¹, Paul Fields³ and Paul Coghlin², ¹Univ. of Lethbridge, Lethbridge, AB, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ³Agriculture and Agri-Food Canada, Winnipeg, MB, Canada

D3481 Lethality and physiological actions of fatty acid esters and related potassium Kv2 channel blockers on *Anopheles gambiae*. **Fabien Demares** (fabien.demares@ufl.edu)¹, Quentin Cocquerel¹, Gary Richoux¹, Kenneth J. Linthicum² and Jeffrey Bloomquist¹, ¹Univ. of Florida, Gainesville, FL, ²USDA - ARS, Gainesville, FL

D3482 Molecular mechanism of *miR-9b-ABCG4-insulin* regulated wing formation in aphid. **Feng Shang** (fengshang1994@yahoo.com)¹, Jin-zhi Niu¹, Bi-yue Ding¹, Chao Ye¹, Guy Smagghe^{1,2} and Jin-Jun Wang¹, ¹Southwest Univ., Chongqing, China, ²Ghent Univ., Ghent, Belgium

D3483 Some traits of RNAi mechanism in pea aphid (*Acyrtosiphon pisum*). **Chao Ye** (yechao5150317@163.com)¹, Jin-zhi Niu¹, Feng Shang¹, Olivier Christiaens², Guy Smagghe^{1,2} and Jin-Jun Wang¹, ¹Southwest Univ., Chongqing, China, ²Ghent Univ., Ghent, Belgium

D3484 The expression pattern of ecdysteroid biosynthesis and signaling genes during molting process in spider mite. **Gang Li** (gangli9090@yahoo.com)¹, Jin-zhi Niu¹, Guy Smagghe^{1,2} and Jin-Jun Wang¹, ¹Southwest Univ., Chongqing, China, ²Ghent Univ., Ghent, Belgium

D3485 Genome-wide annotation of cuticular proteins in the oriental fruit fly (*Bactrocera dorsalis*), changes during pupariation and expression analysis of CPAP3 protein genes in response to environmental stresses. **Er-Hu Chen** (erhuchen1104@yahoo.com)¹, Wei Dou¹, Guy Smagghe^{1,2} and Jin-Jun Wang¹, ¹Southwest Univ., Chongqing, China, ²Ghent Univ., Ghent, Belgium

D3486 Characterization and function of glutamine synthetase genes in *Bactrocera dorsalis* (Hendel): Evaluating the target for pest management. **Dong Wei** (dong_wei1988@yahoo.com)¹, Meng-Yi Zhang¹, Yu-Yei Liu¹, Guy Smagghe^{1,2} and Jin-Jun Wang¹, ¹Southwest Univ., Chongqing, China, ²Ghent Univ., Ghent, Belgium

D3487 Tyrosine hydroxylase coordinates larval-pupal tanning and immunity in *Bactrocera dorsalis* (Hendel). **Jin-Jun Wang** (wangjinjun@swu.edu.cn) and Er-Hu Chen, Southwest Univ., Chongqing, China

D3488 The short neuropeptide F modulates the mobility in beetles through regulating the octopamine biosynthesis. **Hongbo Jiang** (jhb8342@swu.edu.cn), Li Zu and Jin-Jun Wang, Southwest Univ., Chongqing, China

D3489 The discovery of RNA viruses in citrus pests. **Jin-zhi Niu** (jinzhiu@swu.edu.cn), Wei Zhang, Teng-Yu Chang, Li Yang and Jin-Jun Wang, Southwest Univ., Chongqing, China

D3490 Krüppel homolog 1 mediates the reproduction of female *Bactrocera dorsalis* (Hendel). **Wei Dou** (douwei80@swu.edu.cn), Yong Yue and Jin-Jun Wang, Southwest Univ., Chongqing, China

D3491 Characterization and function study of three α -amylase in a pupal endoparasitoid, *Pteromalus puparum*. **Beibei Wang** (wangbeizju@163.com), Yi Yang, Qi Fang, Mingming Liu, Lei Yang and Gongyin Ye, Zhejiang Univ., Hangzhou, China

D3492 Identification of the venom proteins in an ectoparasitoid *Pachycrepoideus vindemmiae*. **Lei Yang** (yanglei@zju.edu.cn)¹, Yi Yang¹, Mingming Liu¹, Qi Fang¹, John H. Weren² and Gongyin Ye¹, ¹Zhejiang Univ., Hangzhou, China, ²Univ. of Rochester, Rochester, NY

D3493 Identification and function analysis of eight chitinase genes of the cotton mealybug *Phenacoccus solenopsis*. **Mohammed A. A. Omar** (dr.abdelwanees@alexu.edu.eg)^{1,2}, Yan Ao¹, Jinqing Guo¹, Kang He¹, Meizhen Li¹, Le Hu¹, Haojie Tong¹ and Fei Li¹, ¹Zhejiang Univ., Hangzhou, China, ²Alexandria Univ., Alexandria, Egypt

D3494 Longevity regulating pathways and their components of the endoparasitoid, *Pteromalus puparum*. **Shijiao Xiong** (xiongshijiao@zju.edu.cn)¹, Kaili Yu¹, Qi Fang¹, Yi Deng¹, Qisheng Song², David Stanley³ and Gongyin Ye¹, ¹Zhejiang Univ., Hangzhou, China, ²Univ. of Missouri, Columbia, MO, ³USDA - ARS, Columbia, MO

D3495 The genomic features of parasitism, polyembryony and immune evasion in the endoparasitic wasp *Macrocentrus cingulum*. Chuanlin Yin¹, **Meizhen Li** (limeizhen@zju.edu.cn)¹, Jian Hu², Kun Lang¹, Qiming Chen², Jinding Liu³, Dianhao Guo^{1,3}, Kang He¹, Yipei Dong², Jiapen Luo¹, Zhenkun Song², Jamie Walters⁴, Wenqing Zhang², Fei Li¹ and Xue-xin Chen¹, ¹Zhejiang Univ., Hangzhou, China, ²Sun Yat-Sen Univ., Guangzhou, China, ³Nanjing Agricultural Univ., Nanjing, China, ⁴Univ. of Kansas, Lawrence, KS

D3496 Challenges in understanding the structure-function relationship of new pore forming toxins. **Vimbai M. Chikwana** (vmchikwana@dow.com), Marc Zack, Megan S. Sopko, Jennifer M. Arruda, Ted J. Letherer and Ken Narva, Corteva Agriscience, Agriculture Division of DowDuPont, Indianapolis, IN

D3497 Metabolic rates in aggressive hybrid honey bees. **Joshua Gibson** (jgibson@georgiasouthern.edu)¹, Claudia García-Figueroa², Francisco J. Ramírez-Ramírez², Jocelyn I. Ávila-Paredes², Miguel E. Arechavaleta-Velasco² and Greg J. Hunt³, ¹Georgia Southern Univ., Statesboro, GA, ²Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, Ajuchitlan, Mexico, ³Purdue Univ., West Lafayette, IN

Poster: P-IE, Pollinators, Ecology, and Other

West Exhibit Hall A (Convention Centre)

D3498 Importance of DNA meta-barcoding for improving plant-pollinator interaction networks: A case study of the impacts of mass-flowering crops on pollinator floral fidelity. **Victoria A. Reynolds** (v.reynolds@uq.edu.au), Univ. of Queensland, Brisbane, Australia

D3499 Survey of forage plants by *Apis mellifera adansonii* at Ejigbo and Osogbo Districts, South West, Nigeria. **Kamilu Fasasi** (ayo.fasasi@uniosun.edu.ng) and Mariam Afolabi, Osun State Univ., Osogbo, Nigeria

D3500 Examining *Nosema* spp. in honey bee hives under different management practices. **Brenna Traver** (bet12@psu.edu)¹, Kaitlin Alemany¹, Alyssa Hatter¹, Marla Stoner¹, Robyn Underwood², Parry Kietzman³, Kathleen Evans² and Margarita López-Urbe², ¹Pennsylvania State Univ., Schuylkill Haven, PA, ²Pennsylvania State Univ., University Park, PA, ³Appalachian Beekeeping Collective, Lewisburg, WV

D3501 Understanding the effect of landscape on honey bee hives in Wisconsin. **Hannah Gaines Day** (hgaines@gmail.com), Sainath Suryanarayanan and Claudio Gratton, Univ. of Wisconsin, Madison, WI

D3502 Disentangling honey bee (*Apis mellifera*) recruitment pathways using network-based diffusion analysis. Matthew Hasenjager¹, William Hoppitt² and **Elli Leadbeater** (elli.leadbeater@rhul.ac.uk)¹, ¹Royal Holloway Univ. of London, Egham, United Kingdom, ²Leeds Univ., Leeds, United Kingdom

D3503 Variation in floret size explains differences in wild bee visitation to cultivated sunflowers. **Jarrad Prasifka** (jarrad.prasifka@ars.usda.gov) and Zoe Portias, USDA - ARS, Fargo, ND

D3504 Providing pollination services and protecting bees in one of the last areas in NA free of introduced parasites. **Peggy Dixon** (peggy.dixon@agr.gc.ca), Carolyn Parsons and Todd Power, Agriculture and Agri-Food Canada, St. John's, NF, Canada

D3505 A survey of pollinators contributing to fava bean success in Saskatchewan. **Samantha Morrice** (sem789@mail.usask.ca) and Sean Prager, Univ. of Saskatchewan, Saskatoon, SK, Canada

D3506 Minnesota initiatives to protect insect pollinators. **Rajinder Mann** (rajinder.mann@state.mn.us), Minnesota Dept. of Agriculture, St. Paul, MN

D3507 How a novel mechanism of honey bee (*Apis mellifera*) pollination interacts with varietal differences in flower morphology. **George Hoffman** (george.hoffman@oregonstate.edu)¹, Claire Lande¹ and Sujaya Rao², ¹Oregon State Univ., Corvallis, OR, ²Univ. of Minnesota, St. Paul, MN

D3508 Evaluation of sampling methods to determine pollinator community on invasive *Pyrus calleryana*. **Abby Levitt** (levitt@findlay.edu) and Benjamin Dolan, Univ. of Findlay, Findlay, OH

D3509 Biodiversity, ecosystem services, and pollinator benefits associated with native bees in a cotton agroecosystem. **Isaac Esquivel** (iesqu002@tamu.edu)¹, Robert Coulson¹ and Michael Brewer², ¹Texas A&M Univ., College Station, TX, ²Texas A&M AgriLife Research, Corpus Christi, TX

D3510 Monoculture vs. non-monoculture effects on reproductive performance of the alfalfa leafcutting bee, *Megachile rotundata*. **Kayla Earls** (kayla.earls@ndsu.edu)¹, Monique Porter², Joseph P. Rinehart³ and Kendra Greenlee¹, ¹North Dakota State Univ., Fargo, ND, ²Pennsylvania State Univ., University Park, PA, ³USDA - ARS, Fargo, ND

D3511 Pollen resource use and foraging range of *Bombus impatiens* in Michigan farm landscapes. **Logan Rowe** (roweloga@msu.edu)¹, Kelsey Graham¹, James Hagler², James Strange³ and Rufus Isaacs¹, ¹Michigan State Univ., East Lansing, MI, ²USDA - ARS, Maricopa, AZ, ³USDA - ARS, Logan, UT

D3512 Pollen resources used by *Bombus atratus* (Hymenoptera: Apidae) colonies during ergonomic and sexual phase. **Deicy Alarcon-Prado** (alarcon.anfi@gmail.com), Melissa Guerrero, Diego Riaño and Jose Cure Hakim, Univ. Militar Nueva Granada, Cajicá, Colombia

D3513 Viral survival in bee communities. **Briana Ezray** (bde125@psu.edu)¹ and Heather Hines², ¹Pennsylvania State Univ., University Park, PA, ²Univ. of Illinois, Champaign, IL

D3514 Loss of butterfly abundance and varying species' population trends in Ohio, USA over 18 years. **Tyson Wepprich** (tyson.wepprich@oregonstate.edu)¹ and Nick Haddad², ¹Oregon State Univ., Corvallis, OR, ²Michigan State Univ., Hickory Corners, MI

D3515 Collecting pollinators from right-of-ways (ROWs): A comparison of three commonly used collecting methods. **Joshua Campbell** (jwc0062@auburn.edu)¹, Anthony Abbate² and Geoffrey Williams¹, ¹Auburn Univ., Auburn, AL, ²Univ. of Florida, Davie, FL

D3516 Direct and interactive effects of nutrition and pesticide stressors on the solitary bee *Osmia lignaria*. **Clara Stuligross** (cstuligross@ucdavis.edu) and Neal M. Williams, Univ. of California, Davis, CA

D3517 Disabled Insecticidal Proteins, a novel tool for the discovery of mode-of-action relationships. James Baum¹, **Agoston Jerga** (agoston.jerga@monsanto.com)¹, Artem Evdokimov², Farhad Moshiri¹, Brian McNulty¹, Robert Moore¹, Coralie Halls¹, Crystal Kretzler¹, William Clinton¹, Bin Li¹, Autumn Nance¹, Michael Pleau¹, Timothy Rydel¹, Meiyong Zheng¹ and Jeff Haas¹, ¹Monsanto Company, Chesterfield, MO, ²HarkerBIO, Buffalo, NY

D3518 Functional characteristics of chemosensory proteins in the sawyer beetle *Monoctonus alternatus* Hope. **Saqib Ali** (saqib.ali@webmail.hzau.edu.cn), Huazhong Agricultural Univ., Wuhan, China

D3519 Birds hitchhike plant's scent of distress to locate insect prey. **Ivan Hiltbold** (hiltbold@udel.edu) and Greg Shriver, Univ. of Delaware, Newark, DE

D3520 Red-sticky traps: A more user friendly method for capturing the spotted-wing drosophila. **Kevin Cloonan** (raynecloonan@gmail.com)¹ and Cesar Rodriguez-Saona², ¹Rutgers, The State Univ. of New Jersey, Chatsworth, NJ, ²Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

D3521 The effect of wireworm *Limoniopsis agonus* feeding on buckwheat roots. Sophie Krolikowski¹, Yeritza Bohorquez², Tim McDowell¹, Justin Renaud¹ and **Ian Scott** (ian.scott@agr.gc.ca)¹, ¹Agriculture and Agri-Food Canada, London, ON, Canada, ²Univ. of Western Ontario, London, ON, Canada

- D3522** A toxin occurring in the roots of switchgrass is active against larvae of the western corn rootworm. **Elisa Bernklau** (bernklauc@colostate.edu)¹, Bruce Hibbard² and Louis Bjostad¹, ¹Colorado State Univ., Fort Collins, CO, ²USDA - ARS, Columbia, MO
- D3523** Quantification of metal ions in the ovipositors of two wood-boring sawfly species (Hymenoptera: Siricidae and Xiphydriidae). **Karen Sime** (karen.sime@oswego.edu)¹, Abigail Jago² and Paul Tomascak¹, ¹State Univ. of New York, Oswego, NY, ²State Univ. of New York, Syracuse, NY
- D3524** Mitigating vicinity effects in pest suppression using aggregation pheromones: Concepts, tactics, and examples. **Donald C. Weber** (don.weber@ars.usda.gov)¹, Anna K. Wallingford^{1,2} and Thomas P. Kuhar², ¹USDA - ARS, Beltsville, MD, ²Virginia Polytechnic Institute and State Univ., Blacksburg, VA
- D3525** Priming of rice anti-herbivore defense by silicon. **YuanYuan Song** (yyuansong@163.com)¹, Mao Ye², Xiaoying Wu¹ and Rensen Zeng¹, ¹Fujian Agriculture and Forestry Univ., Fuzhou, China, ²South China Agricultural Univ., Guangzhou, China
- D3526** Tree mortality due to record drought and outbreaks of native bark beetles in the central and southern Sierra Nevada, California, U.S. **Christopher J. Fettig** (cfettig@fs.fed.us)¹ and Leif Mortenson², ¹USDA - Forest Service, Davis, CA, ²USDA - Forest Service, Placerville, CA
- D3527** Influences of climate change on the phenology of black pine bast scale (*Matsucoccus thunbergiana*) (Hemiptera: Margarodidae). **Kyoung Sik Kang** (kks0528@korea.kr)¹, Won Il Choi¹, Youngwoo Nam², Dong Soo Kim³ and Deok Jea Cha³, ¹National Institute of Forest Science, Jeju, South Korea, ²Division of Forest Insect Pests & Diseases, Seoul, South Korea, ³National Institute of Forest Science, Jinju, South Korea
- D3528** Phenological mismatches in Baltimore checkerspot butterflies and their nectar plants. **June Arriens** (june.arriens@tufts.edu), Leone Brown and Elizabeth Crone, Tufts Univ., Medford, MA
- D3529** Extreme weather events and disappearance of rare lepidopteran species in a tropical plant-caterpillar-parasitoid community. **Danielle Salcido** (danisalcido@gmail.com)¹, Lee Dyer¹, Angela Smilanich¹, Lora Richards¹ and Humberto Garcia², ¹Univ. of Nevada, Reno, NV, ²La Selva Biological Research Station, San Jose, Costa Rica
- D3530** Seasonal preference of darkling beetles (Tenebrionidae) for shrub vegetation due to high temperatures, not predation or food availability. **Aaron Bartholomew** (abartholomew@aus.edu) and Jeanine El Moghrabi, American Univ. of Sharjah, Sharjah, United Arab Emirates
- D3531** Diet breadth and performance-preference comparison in two closely related *Spodoptera* spp. pest moths on crop and wild plants. **Amit Roy** (roy@fld.czu.cz)¹, Nicole Wäschke², Sophie Chattington³, Mattias Larsson², Peter Anderson², David Heckel⁴ and Fredrik Schlyter¹, ¹Czech Univ. of Life Sciences, Prague, Czech Republic, ²Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, ³Univ. Bremen, Bremen, Germany, ⁴Max Planck Institute for Chemical Ecology, Jena, Germany
- D3532** Effect of fire severity on spatial distribution of two *Monochamus* beetle species in *Pinus densiflora* forests. **Jong Kook Jung** (jk82811@korea.kr), Youngwoo Nam and Sang Hyun Koh, National Institute of Forest Science, Seoul, South Korea
- D3533** Ecological interactions between *Drosophila suzukii* and yeast. **Amrita Chakraborty** (amrita.chakraborty@slu.se)¹, Joelle Lemmen-Lechelt¹, Boyd Mori², Sebastian Håkansson³, Peter Witzgall¹ and Paul Becher¹, ¹Swedish Univ. of Agricultural Sciences, Alnarp, Sweden, ²Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ³Swedish Univ. of Agricultural Sciences, Uppsala, Sweden
- D3534** Diptera of the Palmyra Atoll. **Rachel Behm** (behrachel@yahoo.com)¹, Matthew Bertone² and Katja Seltmann¹, ¹Univ. of California, Santa Barbara, CA, ²North Carolina State Univ., Raleigh, NC
- D3535** Goldenrod ball galls as nesting sites for solitary bees (Hymenoptera: Megachilidae). **Carol Mapes** (mapes@kutztown.edu), Julia Falkowski, Kelly Tessier, Jenna Ruoss and Roberta Beard, Kutztown Univ. of Pennsylvania, Kutztown, PA
- D3536** Pollination and seed set in Michaux's sumac, a rare dioecious shrub in the southeastern US. **Elsa Youngsteadt** (ekyoung@ncsu.edu) and Clyde E. Sorenson, North Carolina State Univ., Raleigh, NC
- D3537** Presentation withdrawn
- D3538** Pollinator associations with urban plants in Georgia. **Kris Braman** (kbraman@uga.edu)¹, Benjamin Gochnour² and Becky Griffin², ¹Univ. of Georgia, Athens, GA, ²Univ. of Georgia, Griffin, GA
- D3539** The response of bumble bees to fire revealed via genetic mark-recapture. **John Mola** (johnmmola@gmail.com), Sean O'Rourke, Michael Miller and Neal M. Williams, Univ. of California, Davis, CA
- D3540** Acquisition of cold tolerance in mountain pine beetle (*Dendroctonus ponderosae*) larvae requires extended time. **Katherine Bleiker** (katherine.bleiker@canada.ca) and Gregory Smith, Natural Resources Canada, Victoria, BC, Canada
- D3541** The birds, the bees and the Boeings: Managing insect prey to reduce bird strikes. **Sean McCann** (smmccann@sfu.ca)¹, David Bradbeer² and Jenny Cory¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Vancouver Airport Authority, Richmond, BC, Canada
- D3542** Biases and implications in the analysis of orchid bee populations as bioindicators of conservation, through diversity indexes. **Yostin Añino** (yostin0660@gmail.com), Univ. de Panamá, Panamá City, Panamá
- D3543** Plant diversity predicts pest management interventions in urban residential landscapes. **Christopher Riley** (riley.595@osu.edu)¹, Michael J. Raupp², Kelby L. Fite³ and Mary Gardiner¹, ¹The Ohio State Univ., Columbus, OH, ²Univ. of Maryland, College Park, MD, ³Bartlett Tree Experts, Charlotte, NC
- D3544** Localization of auxin and cytokinin within gall-inducing insect *E. solidaginis*. **Gabriela Ponce** (gabrielaeponce@gmail.com) and Edward Connor, San Francisco State Univ., San Francisco, CA
- D3545** Gall parasitism and hyperparasitism in a threatened hostplant for an endangered butterfly. **Cameron Thomas** (cameron.thomas@wsu.edu), Washington State Univ., Vancouver, WA
- D3546** The Million Leaf Project: A citizen science initiative for assessing herbivory. **Christopher Frost** (chris.frost@louisville.edu), Univ. of Louisville, Louisville, KY
- D3547** Insect diversity in an aromatic intercrop: Predators, pests, and pollinators. **Cesar Cabra** (cesar.cabra@alumni.ubc.ca) and Juli Carrillo, The Univ. of British Columbia, Vancouver, BC, Canada
- D3548** Survey of insect and mite fauna associated with medusahead (*Taeniatherum caput-medusae*) in California. **Nastaran Tofangsazi** (ntofangsazi@ucdavis.edu)¹ and Paul Pratt², ¹Univ. of California, Davis, CA, ²USDA - ARS, Albany, CA
- D3549** Interaction between ants and fleshy seeds in a neotropical savanna: Species-specific effects on seeds and seedlings of a primarily bird-dispersed tree. **Paulo S. Oliveira** (pso@unicamp.br), Verônica B. Magalhães, Nádia B. Espírito Santo, Luis F. P. Salles and Hélio Soares Jr., Univ. Estadual de Campinas, Campinas, Brazil

D3550 Transgene expression in wild cotton affect the foliar nectar production and the structure and composition of ants associated. **Valeria Vázquez Barrios** (vale.vbv@gmail.com) and Ana Laura Wegier Briuolo, Univ. Nacional Autónoma de México, Ciudad de México, Mexico

D3551 Developing an area-wide approach to management of the brown marmorated stink bug *Halyomorpha halys* (Stål) in Georgian hazelnuts, a cooperative effort of industry, university, and USDA personnel. **Phil Mulder** (phil.mulder@okstate.edu)¹, Bill Lingren², Chris Bergh³, Kim Hoelmer⁴ and Greg Krawczyk⁵, ¹Oklahoma State Univ., Stillwater, OK, ²Trece, Inc., Adair, OK, ³Virginia Polytechnic Institute and State Univ., Winchester, VA, ⁴USDA - ARS, Newark, DE, ⁵Pennsylvania State Univ., Biglerville, PA

D3552 Changes in the assembly of the community of arthropods associated with cotton with transgenes. **Javier Pérez López** (fjplopez@ciencias.unam.mx) and Ana Laura Wegier Briuolo, Univ. Nacional Autónoma de México, Ciudad de México, Mexico

D3553 Do reasons for keeping bees dictate *Varroa* management by hobbyist beekeepers? **Hannah Penn** (hannahjpenn@gmail.com) and Kristen Healy, Louisiana State Univ., Baton Rouge, LA

D3554 Study and outreach of IPM and food production methods in an Amish community in western Kentucky. **Raul T. Villanueva** (raul.villanueva@uky.edu)¹, Yaziri Gonzalez¹ and Izabela Gomes², ¹Univ. of Kentucky, Princeton, KY, ²Univ. of Kentucky, Lexington, KY

D3555 Traits and factors of non-native phytophagous insects in North America: The TRAFAC database. **Kathryn Thomas** (kathryn_a_thomas@usgs.gov)¹, Angela Mech², Angela Hoover¹ and Patrick Tobin³, ¹US Geological Survey, Tucson, AZ, ²Western Carolina Univ., Cullowhee, NC, ³Univ. of Washington, Seattle, WA

D3556 Determining the damage potential of *Atherigona reversura* (Diptera: Muscidae) in Bermudagrass hayfields. Lisa Baxter¹, Dennis Hancock², William F. Anderson³ and **William Hudson** (wghudson@uga.edu)², ¹Univ. of Georgia, Tifton, GA, ²Univ. of Georgia, Athens, GA, ³USDA - ARS, Tifton, GA

D3557 A review of invasive, exotic true bugs (Hemiptera) of phytosanitary concern to Canada. **Abdullahi Ameen** (abdullahi.ameen@inspection.gc.ca) and Martin Damus, Canadian Food Inspection Agency, Ottawa, ON, Canada

D3558 Novel Pacific Northwest host plants of the lily leaf beetle (*Liloceris lili*). **Maggie Freeman** (mfreeman@agr.wa.gov)¹, Chris Looney¹ and David Crowder², ¹Washington State Dept. of Agriculture, Olympia, WA, ²Washington State Univ., Pullman, WA

D3559 Two alien beetles, *Callidiellum rufipenne* (Cerambycidae) and *Pyrrethalia viburni* (Chrysomelidae), expand their distributional range in Connecticut. **Chris Maier** (chris.maier@ct.gov), Connecticut Agricultural Experiment Station, New Haven, CT

D3560 Response and management of the new invasive, spotted lanternfly, in grape. **Heather Leach** (leachhea@msu.edu)¹, Michela Centinari¹, David Biddinger² and Julie Urban¹, ¹Pennsylvania State Univ., University Park, PA, ²Pennsylvania State Univ. Fruit Research and Extension Center, Biglerville, PA

D3561 Protecting North American plant resources from invasive pests while facilitating safe trade: The North American Plant Protection Organization (NAPPO). **Alonso Suazo** (alonso.suazo@nappo.org) and Stephanie Bloem, North American Plant Protection Organization, Raleigh, NC

D3562 PCR-RFLP analysis of mitochondrial DNA to identify Japanese *Lymantria* species (Lepidoptera: Lymantriidae). **Makoto Arimoto** (arimoto@affrc.go.jp)¹ and Ren Iwaizumi², ¹National Agriculture and Food Research Organization, Tsukuba, Japan, ²Ministry of Agriculture, Forestry and Fisheries, Yokohama, Japan

D3563 Should I eat or should I go? Acridid grasshoppers and their novel host plants: Implications for biotic resistance. **Alina Avanesyan** (alina@umd.edu), Univ. of Maryland, College Park, MD

D3564 Comparison of the effects of little fire ant, *Wasmannia auropunctata* (Hymenoptera: Formicidae), on invertebrates in Micronesia and Costa Rica. **Joyce Santos** (joycemarielle.santos@gmail.com)¹, Ross Miller¹, Maia Raymundo², Hannah White³ and Jamie McBryde⁴, ¹Univ. of Guam, Mangilao, Guam, ²Univ. of Queensland, Brisbane, Australia, ³Oklahoma State Univ., Stillwater, OK, ⁴Colorado State Univ., Fort Collins, CO

D3565 Evaluation of systemic insecticide and fungicide for protection of sycamore from polyphagous shot hole borer / Fusarium dieback. **Don Grosman** (dgrosman@arborjet.com), Arborjet, Inc., Woburn, MA

D3566 Sequential changes in dominant forest insect pests in Korea during recent 50 years with special reference to pests of Korean red pine. **Won Il Choi** (wchoi71@korea.kr)¹, Kyoung Sik Kang¹, Sung Hyuk Kang¹ and Youngwoo Nam², ¹National Institute of Forest Science, Jeju, South Korea, ²Division of Forest Insect Pests & Diseases, Seoul, South Korea

D3567 Ecological characteristics and attraction effect of *Metcalfa pruinos* red pepper cultivation area, in Korea. **Hwayoung Seo** (hys1218@korea.kr) and YongSeok Choi, Chuncheonnamdo Agricultural Research & Extension Services, Yesan, South Korea

D3568 Host suitability of spotted lanternfly, *Lycorma delicatula*. Kelly Murman¹, Isaiah Canlas², Longwa Zhang³, Matthew S. Wallace¹, Jacob D. Wickham⁴, Emelie Swackhamer⁵, Daniel Carrillo⁶, Nathan Derstine⁷ and **Miriam Cooperband** (miriam.f.cooperband@aphis.usda.gov)⁷, ¹East Stroudsburg Univ., East Stroudsburg, PA, ²USDA - APHIS, Buzzards Bay, MA, ³Anhui Agricultural Univ., Hefei, China, ⁴Chinese Academy of Sciences, Beijing, China, ⁵Pennsylvania State Univ., Collegeville, PA, ⁶Univ. of Florida, Homestead, FL, ⁷USDA - APHIS, Buzzards Bay, MA

D3569 Invasive ambrosia beetle populations in central and western Kentucky: Some strategies to deter their attack. **Zenaida Vilorio** (zenaida.vilorio@uky.edu)¹, Raul T. Villanueva¹, Ric Bessin², Winston Dunwell¹, Ginny Travis¹ and Christopher Ranger³, ¹Univ. of Kentucky, Princeton, KY, ²Univ. of Kentucky, Lexington, KY, ³USDA - ARS, Wooster, OH

D3570 Update on southern pine beetle, *Dendroctonus frontalis*, introduction and trapping in Connecticut. **Niklas Lowe** (lowenitw@my.ccsu.edu)¹, Claire E. Rutledge² and Alicia Bray¹, ¹Central Connecticut State Univ., New Britain, CT, ²Connecticut Agricultural Experiment Station, New Haven, CT

D3571 Survey of wood-boring beetle composition in Connecticut forests. **Alicia Bray** (brayalic@gmail.com) and Niklas Lowe, Central Connecticut State Univ., New Britain, CT

D3572 Molecular cloning of CSP2s, PBP1 and PBP2 genes of *Rhyzopertha dominica*. **Suliman Ali** (suliman@webmail.hzau.edu.cn)^{1,2}, Mory Diakite², Saqib Ali² and Wang Ali², ¹Agricultural Research Corporation, Wad Medani, Sudan, ²Huazhong Agricultural Univ., Wuhan, China

D3573 Microsatellite analysis of genetic variation in cotton aphid, *Aphis gossypii* Glover (Hemiptera: Aphididae), populations in Korea and some Asian countries. **Hwa Yeun Nam** (jessienam@snu.ac.kr), Yujeong Park and Joon-Ho Lee, Seoul National Univ., Seoul, South Korea

D3574 Broflanilide: A new insecticide active ingredient for Canada and the US. **H. Alejandro Arevalo** (alejandros.arevalo@basf.com), Clark Klein and Rebecca Willis, BASF Corporation, Research Triangle Park, NC

D3575 RNAi research and development in relation to crop protection in Europe: The iPlanta COST action activities. **Salvatore Arpaia** (salvatore.arpaia@enea.it)¹, Jeremy Sweet² and Bruno Mezzetti³, ¹Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Rotondella, Italy, ²JT Environmental Consultants Ltd, Cambridge, United Kingdom, ³Univ. Politecnica delle Marche, Ancona, Italy

D3576 CropCoat™: Crop protection and mite population effects of this novel film technology based on bioassay and field trials. Matheus Ribeiro¹, **Eric Flora** (efflora@crop-enhancement.com)¹, Ki Kim², Damian Hajduk¹ and Kevin Chen¹, ¹Crop Enhancement, Inc., San Jose, CA, ²Florida Ag Research, Thonotosassa, FL

D3577 Activity of the novel insecticide cyclaniliprole (Cyclapryn®) against insect pests of fruits. **Ryota Isowa** (r-isowa@iskweb.co.jp)¹, Chiaki Takeda¹, Shigeru Mitani¹ and Masayuki Morita², ¹Ishihara Sangyo Kaisha, Ltd., Kusatsu, Japan, ²Ishihara Sangyo Kaisha, Ltd., Osaka, Japan

D3578 HOOK Tuta, an effective long-lasting pheromone attract-and-kill system for *Tuta absoluta* (Lepidoptera: Gelechiidae). **Rodrigo Silva** (rodrigo.silva@iscatech.com)¹, Rafael Borges², Sergio Benvenega³, Fabio Scheidt⁴, Leonardo Mallman⁴, Revilee Lake¹, William Urrutia¹, Marco Carrillo¹ and Agenor Mafrá-Neto¹, ¹ISCA Technologies, Inc., Riverside, CA, ²ISCA Tecnologias Ltda, Ijuí, Brazil, ³INSPECTA, Descalvado, Brazil, ⁴Hortigranjeiros Mallman, Mogi Guacu, Brazil

D3579 Insecticidal effect of a snake venom on immature forms of the sugarcane borer *Diatraea saccharalis*. **Alexandre Cardoso** (amcardoso@ifsp.edu.br)¹, Luiz Tucci² and Antonio Primo³, ¹Instituto Federal de Educação, Ciência e Tecnologia de São Paulo, Barretos, Brazil, ²Univ. de São Paulo, Ribeirão Preto, Brazil, ³Instituto Federal de Educação, Ciência e Tecnologia de São Paulo, Matão, Brazil

D3580 Can terpenes of cardamom and clove used to control *Rhynchophorus ferrugineus*? **Mona Al Dawsari** (wisdom1425@yahoo.com), Prince Sattam Bin Abdel Aziz Univ., Al Kharj, Saudi Arabia

D3581 Field evaluation of insect resistance management plans for delaying *Bt* toxin resistance in western bean cutworm (*Striacosta albicosta*) populations in field corn. **Katharine Swoboda Bhattarai** (kswoboda3@unl.edu)¹, Brad Coates², Julie Peterson¹, Sarah Zukoff³ and Thomas Hunt⁴, ¹Univ. of Nebraska, North Platte, NE, ²USDA - ARS, Ames, IA, ³Kansas State Univ., Garden City, KS, ⁴Univ. of Nebraska, Concord, NE

D3582 Insecticide resistance in the glassy-winged sharpshooter (*Homalodisca vitripennis*: Hemiptera: Cicadellidae): Mechanisms and implications. **Richard Redak** (richard.redak@ucr.edu) and Frank J. Byrne, Univ. of California, Riverside, CA

D3583 Genomic monitoring of *Bt* resistance in the corn earworm, *Helicoverpa zea*, in North America. **Megan Fritz** (mfritz13@umd.edu)¹, Rong Guo¹, Alexandra DeYonke² and Fred Gould², ¹Univ. of Maryland, College Park, MD, ²North Carolina State Univ., Raleigh, NC

D3584 Effect of seed blend refuge plantings on larval survival and reproduction of the corn earworm. **Jianguo Guo** (jguo1001@163.com)¹, Sebe Brown², Marlin Rice³, Isaac/Olatunji Oyediran⁴, Marcelo Dimase⁵ and Fangneng Huang⁵, ¹Louisiana State Univ. AgCenter, Baton Rouge, LA, ²Louisiana State Univ., Winnsboro, LA, ³Syngenta Crop Protection, Greensboro, NC, ⁴Syngenta Crop Protection, Research Triangle Park, NC, ⁵Louisiana State Univ., Baton Rouge, LA

D3585 Attraction of a suite of stored product insects to experimental semiochemical-based lures in wind tunnel assays. **Matt Hamblin** (mkhamblin@ksu.edu)¹, Rob Morrison² and James Campbell², ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS

D3586 Evaluating botanicals to control maize weevil, *Sitophilus zeamais*, in stored sorghum grain. Hame Abdou Kadi Kadi¹ and **Bonnie Pendleton** (bpendleton@wtamu.edu)², ¹INRA, Niamey, Niger, ²West Texas A&M Univ., Canyon, TX

D3587 Evaluation of aerosols against stored product insects by using meta-analysis of multiple studies. **Srinivas Lanka** (slanka@ksu.edu)¹, James Campbell², Frank Arthur² and Kun Yan Zhu¹, ¹Kansas State Univ., Manhattan, KS, ²USDA - ARS, Manhattan, KS

D3588 Reduced-risk methyl benzoate as a possible alternative fumigant for stored product insects. **Rob Morrison** (william.morrison@ars.usda.gov)¹, Nicholas Larson² and Aijun Zhang², ¹USDA - ARS, Manhattan, KS, ²USDA - ARS, Beltsville, MD

D3589 Ability of *Aleurotrachelus trachoides* Back to acquire and transmit tomato yellow leaf curl virus. **Cindy McKenzie** (cindy.mckenzie@ars.usda.gov)¹, Lance Osborne² and Jane Polston³, ¹USDA - ARS, Fort Pierce, FL, ²Univ. of Florida, Apopka, FL, ³Univ. of Florida, Gainesville, FL

D3590 Potential insect vectors of grapevine red blotch associated virus in Missouri vineyards. **Harper Smith** (hfs5h4@mail.missouri.edu), Dean Volenberg and Debbie Finke, Univ. of Missouri, Columbia, MO

D3591 Bacterial endosymbionts identified from psyllids (Hemiptera: Trioziidae) using PacBio sequencing. **William Rodney Cooper** (rodney.cooper@ars.usda.gov)¹, David R. Horton¹, Ismael E. Badillo-Vargas², Gabriela Esparza-Díaz³ and Kylie Swisher¹, ¹USDA - ARS, Wapato, WA, ²Texas A&M AgriLife Research, Weslaco, TX, ³Texas A&M Univ., Weslaco, TX

D3592 Soybean vein necrosis virus modifies feeding behavior of its thrips vector, *Neohydatothrips variabilis*. **Punya Nachappa** (punya.nachappa@colostate.edu)¹, GERALD N McGEE², Sarah Moh², Jinlong Han³ and Vamsi Nalam¹, ¹Colorado State Univ., Fort Collins, CO, ²Purdue Univ., Fort Wayne, IN, ³North Carolina State Univ., Raleigh, NC

D3593 Using metabarcoding to examine diet breadth of phytophagous insect pests of potato. **Victoria Skillman** (skillmav@onid.orst.edu), Xiaoping Li and Kenneth E. Frost, Oregon State Univ., Hermiston, OR

D3594 Survey of possible insect vectors of *Xylella fastidiosa* in olive orchards of southeastern Brazil. Joyce Froza, Flavia Correr and **Joao Lopes** (jrslopes@usp.br), Univ. de São Paulo, Piracicaba, Brazil

D3595 Modeling impact of thousand cankers disease in the eastern U.S. in a changing climate. **Gregory J. Wiggins** (wiggybug@utk.edu)¹, Monica Papes¹, Brianna Alred¹, Benjamin Reber², Benjamin Schenck³ and Jerome Grant¹, ¹Univ. of Tennessee, Knoxville, TN, ²Houghton College, Houghton, NY, ³College of William and Mary, Williamsburg, VA

D3596 Johnsongrass ecotype dependent susceptibility to pest and volatile induced *R. madi* host plant choice. **Peter Klein** (pklein@ksu.edu) and C. Michael Smith, Kansas State Univ., Manhattan, KS

D3597 Developing a bioassay to screen bacteria against aphids. **Amber McGuire** (amcguire@agbiome.com), Mary Kroner, Sinnikka Smith, Lynn Dickey and Kira Bulazel Roberts, AgBiome, Inc., Research Triangle Park, NC

D3598 Herbivore specific induction of defense response on primed plant. **Bipana Paudel Timilsena** (bpp5121@psu.edu), Irmgard Seidl-Adams and James Tumlinson, Pennsylvania State Univ., University Park, PA

D3599 Integration of predation potential and demographic characteristics for evaluating the efficacy of *Orius strigicollis* (Hemiptera: Anthocoridae) as a biocontrol agent against *Frankliniella intonsa* (Thysanoptera: Thripidae). **Shu-Jen Tuan** (sjtuan@dragon.nchu.edu.tw)¹, Han-Yan Ding¹, Li-Cheng Tang¹, Remzi Atlihan² and Hsin Chi³, ¹National Chung Hsing Univ., Taichung, Taiwan, ²Univ. of Yuzuncu Yil, Van, Turkey, ³National Chung Hsing Univ. (Retired), Taichung, Taiwan

D3600 Quantitative analysis of 16SrIV-D phytoplasma titer in *Sabal palmetto* and *Syagrus romanzoffiana*. **Lidia Komondy** (lkomondy@ufl.edu) and Brian Bahder, Univ. of Florida, Fort Lauderdale, FL

D3601 The principles of ecostacking. **Heikki Hokkanen** (heikki.hokkanen@helsinki.fi), Univ. of Helsinki, Helsinki, Finland

D3602 Plant resistance against aphids under elevated CO₂. **Hui-Juan Guo** (guohj@ioz.ac.cn) and Yu-Cheng Sun, Chinese Academy of Sciences, Beijing, China

D3603 Ethical aspects in ecostacking - lost in translation? **Ingeborg Menzler-Hokkanen** (ingeborg.menzler-hokkanen@helsinki.fi), Univ. of Helsinki, Helsinki, Finland

Poster: SysEB, Social Insects and Other

West Exhibit Hall A (Convention Centre)

D3604 Revisiting prehistoric honey hunting at Bicorp, Spain. **Gene Kritsky** (cdarwin@aol.com), Mount St. Joseph Univ., Cincinnati, OH

D3605 Waxborne honey bee (*Apis mellifera*) virus response to E-beam irradiation. **Megan Colwell** (colwellm@myumanitoba.ca)¹, Stephen Pernal² and Rob Currie¹, ¹Univ. of Manitoba, Winnipeg, MB, Canada, ²Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

D3606 The microbiota associated with healthy and diseased larvae of the honey bee (*Apis mellifera*). Kirk E. Anderson¹, **Amy Floyd** (amyfloyd@email.arizona.edu)² and Brendon Mott¹, ¹USDA - ARS, Tucson, AZ, ²Univ. of Arizona, Tucson, AZ

D3607 Enhancing pollinator diversity in livestock pasture ecosystem. Roshani Sharma Acharya¹, Emily Fitting², Joan Burke³ and **Neelendra Joshi** (nkjoshi@uark.edu)¹, ¹Univ. of Arkansas, Fayetteville, AR, ²Henderson State Univ., Arkadelphia, AR, ³USDA - ARS, Booneville, AR

D3608 Field and laboratory comparisons of fungus-gardening ant bacterial microbial communities. **Katrin Kellner** (antkatrina@gmail.com)¹, Ulrich G. Mueller² and Heather Ishak², ¹Univ. of Texas, Tyler, TX, ²Univ. of Texas, Austin, TX

D3609 Reproductive biology and cuticular hydrocarbon chemistry of *Euglossa hyacinthina*. **Callum Kingwell** (callumkingwell@gmail.com), Cornell Univ., Ithaca, NY

D3610 Mexican honey wasps host a reduced assemblage of bumble bee gut bacteria. **Jo-anne Holley** (jo.holley@utexas.edu), Julie Perreau and Nancy Moran, Univ. of Texas, Austin, TX

D3611 Enforced quasi-sociality elicits kinship effects in a naturally sub-social parasitoid. **Mohamed Khadar Mohamed** (siyaad93@hotmail.com), Univ. of Nottingham, Nottingham, United Kingdom

D3612 New state records and an overview of the Hawaiian lady beetle fauna. **Louis Hesler** (louis.hesler@ars.usda.gov)¹, William Perreira², Dana Anne Yee² and Joshua Silva³, ¹USDA - ARS, Brookings, SD, ²Dana Anne Yee Foundation, Honolulu, HI, ³Univ. of Hawai'i, Pearl City, HI

D3613 Presentation withdrawn

D3614 Ecological evaluation of dung beetles in cacao, coffee and forest plots from the Andean Chocó, Pichincha, Ecuador. **Edgar Villamarin-Cortez** (svillamarin@nevada.unr.edu), Univ. of Nevada, Sparks, NV

D3615 Improving knowledge about biological control of scale insects in ornamentals: The French COCHORTI project. Valérie Balmès¹, Philippe Kreiter², Vinciane Lepinay³, Nicolas Ris², Sylvie Warot², George Japoshvili⁴, Bruno Paris⁵, Fabien Robert³, Serge Graverol⁵, Séverine Doise², Christine Poncet², **Philippe Reynaud** (philippe.reynaud@anses.fr)¹ and Jean-François Germain¹, ¹Anses, Montferrier-sur-Lez, France, ²INRA, Sophia-Antipolis, France, ³ASTREDHOR, Paris, France, ⁴Invertebrate Research Center, Tbilisi, Georgia, ⁵Chambre d'Agriculture, Aix-en-Provence, France

D3616 Systematic functional gene annotation pipeline for application to broad insect species. **Hidemasa Bono** (bono@dbcls.rois.ac.jp)¹ and Hiroko Tabunoki², ¹Database Center for Life Science, Mishima, Japan, ²Tokyo Univ. of Agriculture and Technology, Fuchu, Japan

D3617 Luna ID: Mobile apps for instant insect identification using machine learning and computer vision. **Jarrett Blair** (jblair@uoguelph.ca) and Charles-Etienne Ferland, Univ. of Guelph, Guelph, ON, Canada

D3618 Waterston's Organ, developments in insect morphology through modern microscopy. **Jonah Ulmer** (jonah.ulmer@gmail.com), István Mikó and Andrew Deans, Pennsylvania State Univ., University Park, PA

D3619 The Dynastine scarab beetles (Coleoptera: Scarabaeidae) of Ecuador. **Ronald Cave** (rdcave@ufl.edu)¹, Brett Ratcliffe² and Aura Paucar-Cabrera³, ¹Univ. of Florida, Fort Pierce, FL, ²Univ. of Nebraska, Lincoln, NE, ³Univ. of Nebraska State Museum, Lincoln, NE

D3620 Fifteen years, 47 states, and 1.6 million aquatic macroinvertebrates: A priceless collection finds a new home with the University of Minnesota Insect Collection. James Walker, **Correy Hildebrand** (dukes021@umn.edu), Robin Thomson and Ralph Holzenthal, Univ. of Minnesota, St. Paul, MN

D3621 High resolution imaging of North American *Listronotus* (Curculionidae, Cyclominae) genitalia, with comparison to historically published drawings. **Guy Hanley** (ghanley701@gmail.com), Northern Plains Entomology, Minot, ND

D3622 Songs of speciation: Finding the genetic causes of speciation in green lacewings (Neuroptera: *Chrysoperla*). **Elizabeth Wade** (elizabeth.wade@post03.curry.edu), Curry College, Milton, MA

D3623 Revision of *Utamphorophora* Knowlton (Aphididae: Macrosiphini) and testing generic boundaries within Macrosiphini with phylogeny and convolutional neural networks. **Christopher Owen** (christopher.owen@ars.usda.gov) and Gary L. Miller, USDA - ARS, Beltsville, MD

D3624 A customizable framework to integrate undergraduate research and natural history collections. **Luciana Musetti** (musetti.2@osu.edu), Natalia Molotievskiy and Norman Johnson, The Ohio State Univ., Columbus, OH

D3625 Presentation withdrawn

D3626 Descriptive simulation model of diamondback moth for the pesticide resistance management. **Takehiko Yamanaka** (apple@affrc.go.jp)¹, Satoshi Kitabayashi², Masaaki Sudo³ and Atsushi Yamamoto⁴, ¹National Agriculture and Food Research Organization, Tsukuba, Japan, ²Nagano Vegetable and Ornamental Crops Experiment Station, Shiojiri, Japan, ³National Agriculture and Food Research Organization, Shimada, Japan, ⁴Odawara Research Center, Odawara, Kanagawa, Japan

D3627 Molecular analyses of *Ceratitis capitata* (Mediterranean fruit fly) captures made in California during 2010-2018 reveal strain ID and geographic source. **Raul Ruiz-Arce** (raul.a.ruiz@aphis.usda.gov)¹, Terrance Todd¹, Erin Schuenzel², Robert Mier², Norman Barr¹, Scott Geib³ and Sheina Sim³, ¹USDA - APHIS, Edinburg, TX, ²Univ. of Texas, Edinburg, TX, ³USDA - ARS, Hilo, HI

D3628 Leafhopper, treehopper and planthopper diversity in and around vineyards of the Niagara peninsula, Ontario. Jean-Philippe Parent, **Lori Bittner** (lori.bittner@agr.gc.ca) and Joel Kits, Agriculture and Agri-Food Canada, Vineland, ON, Canada

D3629 Local insect biodiversity has decreased despite increases in invasive species. Casey Patmore^{1,2}, **Alice Zhou**¹, Jacky Hsu¹, Stephanie Lee¹, Vivian Morley¹, Anne Mae Tee¹, Karen Needham³ and Michelle Tseng¹, ¹Univ. of British Columbia, Vancouver, BC, Canada, ²Univ. College Dublin, Dublin, Ireland, ³Beaty Biodiversity Museum, Vancouver, BC, Canada

D3630 Two new species of Heteropteron Brullé (Hymenoptera: Braconidae), from Area de Conservación Guanacaste, Northwestern Costa Rica, with the first host records for the genus. **Elizabeth Dabek** (dabek@umd.edu)¹, James Whitfield¹, Daniel H. Janzen², Winnie Hallwachs² and M. Alex Smith³, ¹Univ. of Illinois, Champaign, IL, ²Univ. of Pennsylvania, Philadelphia, PA, ³Univ. of Guelph, Guelph, ON, Canada

D3631 Reliability and the waggle dance: Honest honey bees dance more and attract more followers than dishonest bees. **Karmi L. Oxman** (karmi.oxman@gmail.com)¹, Ofer Feinerman² and Sharoni Shafir¹, ¹The Hebrew Univ., Rehovot, Israel, ²Weizmann Institute of Science, Rehovot, Israel

D3632 Landscape-scale patterns of US freshwater macroinvertebrate community diversity and abundance. **Kaitlin Stack Whitney** (kxwsbi@rit.edu) and Sofie Christie, Rochester Institute of Technology, Rochester, NY

D3633 Evaluation of bacteriophages on mosquito larval development. **Tiffany Pan** (tpan8@jhu.edu), Chinmay Vijay Tikhe and George Dimopoulos, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

Virtual Posters

West Exhibit Hall A (Convention Centre)

Virtual Posters displayed on Wednesday will be the same as those displayed on Tuesday, VP36-VP64. See pages 164 and 165 for titles and authors.

WEDNESDAY, NOVEMBER 14 • MORNING

Closing Plenary with Ryan Church

West Ballroom ABC (Convention Centre)

Moderators and Organizers: Michael Parrella¹, Pat Bouchard² and Jenny Cory³, ¹Univ. of Idaho, Moscow, ID, ²Agriculture and Agri-Food Canada, Ottawa, ON, Canada, ³Simon Fraser Univ., Burnaby, BC, Canada

8:00 Introductory Remarks

8:05 **2010** 2019 ESBC Presidential Address. **Lisa Poirier** (poirierl@unbc.ca), Univ. of Northern British Columbia, Prince George, BC, Canada

8:20 **2011** 2019 ESC Presidential Address. **Kevin Floate** (kevin.floate@agr.gc.ca), Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

8:35 **2012** 2019 ESA Presidential Address. **Robert K. D. Peterson** (bpeterson@montana.edu), Montana State Univ., Bozeman, MT

8:50 Introduction of Ryan Church

8:55 **2013** Plenary Address by Ryan Church. **Ryan Church**, Independent Graphic Artist, Los Angeles, CA

9:30 Concluding Remarks

Program Symposium: Borderless Parasites, Borderless Pollinators: Broadening Our Understanding of Pollinator and Parasite Communities

Meeting Room 211 (Convention Centre)

Moderators and Organizers: Amber Tripodi, Ellen Klinger and James Strange, USDA - ARS, Logan, UT

9:30 Welcoming remarks

9:35 **2014** Borderless pollinators. **James Strange** (james.strange@ars.usda.gov), USDA - ARS, Logan, UT

9:50 **2015** Borderless parasites. **Amber Tripodi** (ambertripodi@gmail.com), USDA - ARS, Logan, UT

10:05 **2016** Assessing fly parasitism risk across castes for several bumble bees (*Bombus* spp.) in northern Virginia. **Amber Slatosky** (ads6d@virginia.edu) and T'ai Roulston, Univ. of Virginia, Boyce, VA

10:20 **2017** Costs and benefits of resistance and tolerance of parasites and pathogens in the eusocial honey bee. **Rob Currie** (rob.currie@umanitoba.ca), Univ. of Manitoba, Winnipeg, MB, Canada

10:35 **2018** Infection effects on bee thermoregulatory strategies. **Hannah Stewart** (hus60@psu.edu) and Ruud Schilder, Pennsylvania State Univ., University Park, PA

10:50 Break

11:00 **2019** *Crithidia bombi* infects megachilid bees. **Quinn McFrederick** (quinn.mcfrederick@ucr.edu), Kaleigh Russell and Evan Palmer-Young, Univ. of California, Riverside, CA

11:15 **2020** Connected but conflicted: Pollinator health in agricultural landscapes. **Ethel Villalobos** (emv@hawaii.edu)¹, Scott Nikaido¹, Jessika Santamaria¹, Zhening Zhang¹, C. Scott Clem², Javier Lugo-Pérez³ and Olgaly Ramos-Rodríguez³, ¹Univ. of Hawaii, Manoa, HI, ²Univ. of Illinois, Champaign, IL, ³Univ. de Puerto Rico, Utuado, PR

11:30 **2021** Parasites of *Apis mellifera*: Unintended consequences of global transport. **Stephen Pernal** (steve.pernal@agr.gc.ca), Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada

11:45 **2022** Pollinators and viruses: What are the borders to infections and their impacts? **Diana Cox-Foster** (diana.cox-foster@ars.usda.gov), USDA - ARS, Logan, UT

12:00 **2023** Chalkbrood disease and host specificity: What we know and what we need to know for the future of pollinator health. **Ellen Klinger** (ellen.klinger@ars.usda.gov), USDA - ARS, Logan, UT

12:15 Panel discussion

MUVE Section Symposium: Predicting Vector-Borne Disease Spread in Changing Natural and Social Landscapes

Meeting Room 122 (Convention Centre)

Moderators and Organizers: Heidi Brown¹ and Luigi Sedda², ¹Univ. of Arizona, Tucson, AZ, ²Lancaster Univ., Lancaster, United Kingdom

9:30 **2024** Climate influences on the distribution of mosquito vectors. **Heidi Brown** (heidibrown@email.arizona.edu), Univ. of Arizona, Tucson, AZ

10:00 **SP2025** Shift in seasonal activity of insect vectors driven by site-specific climate change. **Christopher Sanders** (christopher.sanders@pirbright.ac.uk)¹, Chris Shortall², Marion England¹, Richard Harrington², Bethan Purse³, Laura Burgin⁴, Simon Carpenter¹ and Simon Gubbins¹, ¹The Pirbright Institute, Woking, United Kingdom, ²Rothamsted Research, Harpenden, United Kingdom, ³Centre for Ecology and Hydrology, Wallingford, United Kingdom, ⁴Met Office, Exeter, United Kingdom

10:10 **SP2026** Wind-borne migration of mosquitoes and pathogens: Potential for bio-surveillance. **Tovi Lehmann** (tlehmann@niaid.nih.gov)¹, Alpha Yaro², Moussa Diallo², Zana Sanogo³, Samake Djibril², Diana L. Huestis¹, Yvonne-Marie Linton⁴, Roy Faiman¹, Asha Krishna¹, Laura Veru¹, Jenna Florio⁵, Benjamin Krajacich¹, Jason Chapman⁶, Don Reynolds⁷, David Weetman⁸, Martin Donnelly⁸, Elijah Talamas⁹, Maria Lourdes Chamorro¹⁰, Udi Strobach¹¹ and Adama Dao², ¹National Institutes of Health, Rockville, MD, ²International Center for Excellence in Research, Bamako, Mali, ³Malaria Research and Training Center, Bamako, Mali, ⁴Walter Reed Biosystematics Unit, Suitland, MD, ⁵California Academy of Sciences, San Francisco, CA, ⁶Univ. of Exeter, Penryn, United Kingdom, ⁷Univ. of Greenwich, Chatham, United Kingdom, ⁸Liverpool School of Tropical Medicine, Liverpool, United Kingdom, ⁹Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ¹⁰USDA - ARS, Washington, DC, ¹¹National Oceanic and Atmospheric Administration, College Park, MD

10:20 **2027** *Aedes aegypti* flight simulation over an area with ovitraps. **Lidia Mrad** (lrad@math.arizona.edu), Univ. of Arizona, Tucson, AZ

10:35 **2028** Optimal control and temperature variations of malaria transmission dynamics. **Folashade Augusto** (fbagusto@ku.edu), The Univ. of Kansas, Lawrence, KS

10:50 **2029** Can the ecological niche concepts and models account for human exposure? **Sophie Vanwambeke** (sophie.vanwambeke@uclouvain.be), Univ. catholique de Louvain, Louvain-la-Neuve, Belgium

11:05 **2030** Modeling the spread of vector-borne diseases on regional transportation networks. **Joceline Lega** (lega@email.arizona.edu), Univ. of Arizona, Tucson, AZ

11:20 Break

11:30 **2031** Getting beyond vector abundance maps: Mapping population dynamics. **Luigi Sedda** (l.sedda@lancaster.ac.uk), Lancaster Univ., Lancaster, United Kingdom

11:45 **2032** Vectorial capacity dynamics in changing landscapes: Population genomics, price decomposition, and causal graphs. **Claudio Struchiner** (claustru@gmail.com)^{1,2}, Bruno Arcà³ and Jose Ribeiro⁴, ¹Fundação Getúlio Vargas, Rio de Janeiro, Brazil, ²Fundação Oswaldo Cruz, Rio de Janeiro, Brazil, ³Sapienza Università di Roma, Rome, Italy, ⁴National Institutes of Health, Rockville, MD

12:00 Discussion

12:20 Predicting vector-borne disease spread in changing natural and social landscapes

MUVE Section Symposium: Training the Next Generation of Vector Biologists

Meeting Room 109 (Convention Centre)

Moderator and Organizer: Rajeev Vaidyanathan, Clarke, St. Charles, IL

9:30 Introductory remarks

9:40 **2033** The invasive mosquito project: Using citizen science for mosquito sampling. Julie Tsecouras^{1,2} and **Lee Cohnstaedt** (lee.cohnstaedt@ars.usda.gov)³, ¹Univ. of California, Riverside, CA, ²Pacific Southwest Center of Excellence in Vector-Borne Diseases, Riverside, CA, ³USDA - ARS, Manhattan, KS

9:55 **2034** Urban ecosystems project: Elementary and middle school public health entomologists. **Lyric Bartholomay** (lyric.bartholomay@wisc.edu), Iowa State Univ., Ames, IA

10:10 **2035** Vector biology: Enlightenment in the shadows. **Jennifer A. Henke** (jhenke@cvmvcd.org), Coachella Valley Mosquito and Vector Control District, Indio, CA

10:25 **2036** Public health entomology: An academic program to prepare the next generation of practitioners. **Laura Harrington** (lch27@cornell.edu), Cornell Univ., Ithaca, NY

10:40 **2037** The American Mosquito Control Association Young Professionals: Retaining talent by creating community. **Kristy Burkhalter** (ktb3@cdc.gov), US Centers for Disease Control and Prevention, Fort Collins, CO

10:55 **2038** Welding together a multi-stage workforce pipeline: A southeastern US dossier. Christopher Bibbs and **Rui-De Xue** (xueamcd@gmail.com), Anastasia Mosquito Control District, St. Augustine, FL

11:10 **2039** I know what you did last summer: Creating an operational mosquito control internship between university and industry partners. **Rajeev Vaidyanathan** (rvaidyanathan@clarke.com), SRI International, Harrisonburg, VA

11:25 **2040** Entomology through entertainment: Inspiring interest and action in budding vector biologists. **Brendan Dunphy** (bmdunphy@iastate.edu), Iowa State Univ., Ames, IA

PBT Section Symposium: Teaching Insect Physiology in a Changing World: Crossing Borders Between Traditional and Integrative Pedagogy

Meeting Room 212 (Convention Centre)

Moderators and Organizers: Dan Hahn¹ and Mark Brown², ¹Univ. of Florida, Gainesville, FL, ²Univ. of Georgia, Athens, GA

9:30 **2041** The landscape of teaching insect physiology in North America - an introduction to the symposium. **Mark Brown** (mrbrown@uga.edu), Univ. of Georgia, Athens, GA

9:45 **2042** Inspired by insects and physiologists that study them. **Marianne Alleyne** (vanlaarh@life.illinois.edu), Univ. of Illinois, Champaign, IL

10:00 **2043** Engaging a diverse population of graduate students in insect physiology in person, by videoconference, and asynchronous online delivery. **Dan Hahn** (dahahn@ufl.edu), Univ. of Florida, Gainesville, FL

10:15 **2044** Implementing authentic research experiences in a graduate insect physiology laboratory course: The highs and lows of a first year teaching. **Megan E. Meuti** (meuti.1@osu.edu), Kenyon College, Gambier, OH

10:30 **2045** A One Health approach to teaching insect physiology. **Troy Anderson** (tanderson44@unl.edu), Univ. of Nebraska, Lincoln, NE

10:45 Break

11:00 **2046** Insects as models for laboratories in physiology courses. **Angela Lange** (angela.lange@utoronto.ca), Univ. of Toronto, Mississauga, ON, Canada

11:15 **2047** Teaching insect physiology to undergraduates using digital storytelling. **Spencer Behmer** (s-behmer@tamu.edu), Texas A&M Univ., College Station, TX

11:30 **2048** From concept to practice: Teaching how concepts in insect physiology work in the real world. **Goggy Davidowitz** (goggy@email.arizona.edu), Univ. of Arizona, Tucson, AZ

11:45 **2049** Class: Insecta - insect physiology in the high school science curriculum. **Jennifer Broo** (jbroo@saintursula.org), St. Ursula Academy High School, Cincinnati, OH

12:00 **2050** Teaching insect physiology in the molecular and genomics era: Some ideas from first year teaching. **Henry Chung** (hwchung@msu.edu), Michigan State Univ., East Lansing, MI

12:15 Panel discussion

P-IE Section Symposium: A Changing World: Biotechnology and the Future of Pest Control

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Raul F. Medina¹ and Jennifer Kuzma², ¹Texas A&M Univ., College Station, TX, ²North Carolina State Univ., Raleigh, NC

9:30 Welcoming remarks

9:35 **2051** Prospects and challenges of genetic pest control. **Megan Williamson** (mewilli9@ncsu.edu), North Carolina State Univ., Raleigh, NC

9:50 **2052** Locally acting gene drives: Balancing invasiveness and control. **Phil Leftwich** (philip.leftwich@pirbright.ac.uk), The Pirbright Institute, Pirbright, United Kingdom

10:05 **2053** Laboratory containment of genetically-modified arthropods: Gene drive and beyond. **Zach Adelman** (zachadel@tamu.edu), Texas A&M Univ., College Station, TX

10:20 **2054** Assessing risks of emerging technologies in pest management through expert elicitation. **Johanna Elsensohn** (jeelsens@ncsu.edu), Hannah Burrack and Jason Delborne, North Carolina State Univ., Raleigh, NC

10:35 **2055** Responsible innovation in genetic engineering research: What does it mean for graduate researchers? **Nicole Gutzmann** (negutzma@ncsu.edu), North Carolina State Univ., Raleigh, NC

10:50 Break

11:05 **2056** Value systems and responsible innovation for biotechnology and pest control. **Jennifer Kuzma** (jkuzma@ncsu.edu) and John Roberts, North Carolina State Univ., Raleigh, NC

11:20 **2057** What does the U.S. public think about using gene drives in agriculture? And what do they want to know? **Zachary Brown** (zsbrown2@ncsu.edu), North Carolina State Univ., Raleigh, NC

11:35 **2058** Genetically modified mosquitoes: Ok in Brazil, but not the US. Do policy narratives about genetically modified mosquitoes have an influence on release decisions? **Jayce Sudweeks** (jdsudwee@ncsu.edu), North Carolina State Univ., Raleigh, NC

11:50 **2059** Governance of emerging biotechnologies: Mapping an integrative approach. **Larissa Rudenko** (lrudenko@mit.edu), Massachusetts Institute of Technology, Cambridge, MA

12:05 **2060** Biotechnology, pest control and responsible innovation: Ethics and moral imagination. **Paul Thompson** (thom@anr.msu.edu), Michigan State Univ., East Lansing, MI

12:20 Panel discussion

P-IE Section Symposium: Bugging Insects: Methods and Applications of Sensor-Based Monitoring of Insect Colonies and Populations

Meeting Room 121 (Convention Centre)

Moderators and Organizers: William Meikle¹, John Adamczyk² and Mohamed Alburaki³, ¹USDA - ARS, Tucson, AZ, ²USDA - ARS, Poplarville, MS, ³The Univ. of Southern Mississippi, Hattiesburg, MS

9:30 Welcoming remarks

9:35 **2061** Changing places: Continuous monitoring of honey bees in different environments. **William Meikle** (william.meikle@ars.usda.gov), Milagra Weiss and Eli Beren, USDA - ARS, Tucson, AZ

9:50 **2062** Honey bee foraging in the City of Neighborhoods: Two years of colony weight monitoring reveal spatial and temporal patterns of floral availability. **Doug Sponsler** (dbs31@psu.edu)¹, Don Shump² and Christina M. Grozinger¹, ¹Pennsylvania State Univ., University Park, PA, ²Philadelphia Bee Company, Philadelphia, PA

10:05 **2063** Understanding bumble bee responses to spatiotemporal resource availability using automated colony scales. **Jeremy Hemberger** (hemberger@wisc.edu) and Claudio Gratton, Univ. of Wisconsin, Madison, WI

10:20 **2064** Bugging hidden insect activity: Use of acoustic signal patterns to infer hidden insect larval and adult insect behaviors. **Richard Mankin** (richard.mankin@ars.usda.gov), USDA - ARS, Gainesville, FL

10:35 **2065** The use of Quick Response Code (QR Code) for tracking honey bee activity. **Charles Stuhl** (charles.stuhl@ars.usda.gov), USDA - ARS, Gainesville, FL

10:50 **2066** Use of machine vision technologies to detect and diagnose biotic plant stressors. **Christian Nansen** (chrnansen@ucdavis.edu), Univ. of California, Davis, CA

SD2067 Metabolites changes in rice (9Y6H and 5ARX49) with nitrogen fertilizer, herbivore pest (*Nilaparvata lugens*) damage and a natural enemy (*Anagrus nilaparvatae*). **Jean Willy Nduwimana** (jeanwillynduwimana@yahoo.fr), Huazhong Agricultural Univ., Wuhan, China; Univ. of Burundi, Bujumbura, Burundi

SD2068 Evaluating protein tags for mass marking and tracking of mosquitoes. **L. Graber** (lea.graber@nih.gov)¹, James Hagler² and Tovi Lehmann¹, ¹National Institutes of Health, Rockville, MD, ²USDA - ARS, Maricopa, AZ

11:05 Break and poster session

11:15 **2069** Long-term monitoring of honey bee colony growth and performance in pesticide studies. **Theotime Colin** (Theotime.Colin@gmail.com), Macquarie Univ., Sydney, Australia

11:30 **2070** Honey bee recognition in video bee traffic monitoring: Convolutional neural networks vs. random forests. **Vladimir Kulyukin** (vladimir.kulyukin@aggiemail.usu.edu), Utah State Univ., Logan, UT

11:45 **2071** Monitoring honey bees in the lab: Cluster temperature and pesticides. **John Adamczyk** (john.adamczyk@ars.usda.gov), USDA - ARS, Poplarville, MS

12:00 **2072** RFID monitoring of worker honey bee activities: Tracking colony level impacts of honey bee stressors one individual at a time. **Mark J. Carroll** (mark.carroll@ars.usda.gov) and Nicholas Brown, USDA - ARS, Tucson, AZ

12:15 **2073** Technology serving honey bee research. **Mohamed Alburaki** (mohamed.alburaki@usm.edu)¹, Shahid Karim¹ and Scott Stewart², ¹The Univ. of Southern Mississippi, Hattiesburg, MS, ²Univ. of Tennessee, Jackson, TN

P-IE Section Symposium: Crossing International Borders: Foreign Exploration and Classical Biological Control of Invasive Pests

Meeting Room 114/115 (Convention Centre)

Moderators and Organizers: Sam Houston Wilson¹, Mark S. Hoddle², Peter Mason³ and Kent Daane¹, ¹Univ. of California, Parlier, CA, ²Univ. of California, Riverside, CA, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

9:30 Introductory remarks

9:35 **2074** Teasing apart biotypes of a candidate classical biocontrol agent for invasive hawkweeds: Combining life history, ecological and molecular data. **Chandra Moffat** (chandra.moffat@canada.ca)^{1,2}, Rosemarie De Clerck-Floate³, Jason Pither², Robert Lalonde², Kyle Gardner⁴, Gitta Grosskopf-Lachat⁵, Ghislaine Cordat⁵ and Kevin Floate³, ¹Agriculture and Agri-Food Canada, Summerland, BC, Canada, ²The Univ. of British Columbia, Kelowna, BC, Canada, ³Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ⁴Agriculture and Agri-Food Canada, Fredericton, NB, Canada, ⁵CABI, Delémont, Switzerland

9:50 **2075** Biocontrol of dog strangling vine: Collaborating for establishment of *Hypena opulenta* despite borders. **Rob Bourchier** (robert.bourchier@agr.gc.ca)¹, Lisa Tewksbury², Naomi Cappuccino³, Alicia Rochette³, Sandy Smith⁴, Andre Gassmann⁵ and Richard Casagrande², ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²Univ. of Rhode Island, Kingston, RI, ³Carleton Univ., Ottawa, ON, Canada, ⁴Univ. of Toronto, Toronto, ON, Canada, ⁵CABI, Delémont, Switzerland

10:05 **2076** Biocontrol of houndstongue: How an agent can create challenges and opportunities for cross-border collaboration. **Rosemarie De Clerck-Floate** (rosemarie.declerck-floate@agr.gc.ca) and Haley Catton, Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

10:20 **2077** Control of the cereal leaf beetle by a parasitoid – a North American example of successful biocontrol and cross-border collaboration. **Vincent Hervet** (vincent.hervet@gmail.com)¹, Héctor Cárcamo² and Haley Catton², ¹Univ. of Toronto, Toronto, ON, Canada, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

10:35 **2078** Biological control of winter moth, *Operophtera brumata*, in the northeastern US. **Joseph Elkinton** (elkinton@ent.umass.edu), George Boettner and Hannah Broadley, Univ. of Massachusetts, Amherst, MA

10:50 **2079** Tracking *Trichomalus perfectus*, an adventive ectoparasitoid of cabbage seedpod weevil. **Tara Garipey** (tara.garipey@agr.gc.ca)¹, Tim Haye², Gary A. P. Gibson³ and Peter Mason³, ¹Agriculture and Agri-Food Canada, London, ON, Canada, ²CABI, Delémont, Switzerland, ³Agriculture and Agri-Food Canada, Ottawa, ON, Canada

11:05 Break

11:15 **2080** Classical biological control of invasive wood-boring insect pests: Importance of international cooperations. **Julian Golec** (jgolec@ncsu.edu)¹, Jian Duan² and Xiao-Yi Wang³, ¹North Carolina State Univ., Mills River, NC, ²USDA - ARS, Newark, DE, ³Chinese Academy of Forestry, Beijing, China

11:30 **2081** Evaluating egg parasitoids for the control of *Bagrada hilaris*, an invasive stink bug in the Americas. **René Sforza** (rsforza@ars-ebcl.org)¹, Guillaume Martel², Marie-Claude Bon³ and Lincoln Smith³, ¹USDA - ARS, Saint Gély du Fesc, France, ²European Biological Control Laboratory, St. Gely du Fesc, France, ³USDA - ARS, Montferrier-sur-Lez, France

11:45 **2082** Systematics of *Gryon* and *Trissolcus* in the saga of taxonomy and biological control of invasive stink bugs. **Elijah Talamas** (elijah.talamas@freshfromflorida.com), Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

12:00 **2083** Classical biocontrol of Asian citrus psyllid in backyard citrus to mitigate threats to commercial citrus. **Mark Hoddle** (mark.hoddle@ucr.edu), Univ. of California, Riverside, CA

12:15 **2084** Biological control of olive fruit fly in California – an international effort. **Kent Daane** (kdaane@ucanr.edu)¹, Floriane Chardonnet², Marie-Claude Bon³, Arnaud Blanchet², Charles Pickett⁴, Xingeng Wang¹, Diego J. Nieto⁵, Kim Hoelmer⁶, Francesca Marini⁷, Lincoln Smith⁸, Beatrice Hurlt⁸ and Michelangelo La Spina⁹, ¹Univ. of California, Parlier, CA, ²USDA - ARS, Montpellier, France, ³USDA - ARS, Montferrier-sur-Lez, France, ⁴California Dept. of Food and Agriculture, Sacramento, CA, ⁵Driscoll's, Watsonville, CA, ⁶USDA - ARS, Newark, DE, ⁷Biotechnology and Biological Control Agency, Rome, Italy, ⁸European Biological Control Laboratory, St. Gely du Fesc, France, ⁹Vineland Research and Innovation Centre, Vineland Station, ON, Canada

P-IE Section Symposium: Current Research and Future Perspectives on Native and Invasive Buprestid Pests in North America and Europe

Meeting Room 111/112 (Convention Centre)

Moderators and Organizers: Christiane Helbig¹, Krista Ryall² and Michael Müller¹, ¹Technische Univ., Tharandt, Germany, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada

9:30 Welcoming remarks

9:35 **2085** Chemical ecology of *Agrilus* species (Coleoptera: Buprestidae), including host volatiles and pheromones. **Peter Silk** (psilk@nrca.gc.ca)¹, Krista Ryall², Lucas Roscoe¹, Claire E. Rutledge³, Troy Kimoto⁴, Gaetan LeClair¹ and Peter Mayo¹, ¹Natural Resources Canada, Fredericton, NB, Canada, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada, ³Connecticut Agricultural Experiment Station, New Haven, CT, ⁴Canadian Food Inspection Agency, Burnaby, BC, Canada

9:50 **2086** Further investigations into detecting early infestation of emerald ash borer using pheromone-baited traps. **Katie Blain** (katie.blain@forestry.gsi.gov.uk)¹, Peter Silk² and Krista Ryall³, ¹Forestry Commission UK, Bristol, United Kingdom, ²Natural Resources Canada, Fredericton, NB, Canada, ³Natural Resources Canada, Sault Ste. Marie, ON, Canada

10:05 **2087** Biology and natural enemy complex of *Agrilus fleischeri* infesting two different species of polar trees in Northeast China. **Yan-Xia Yao** (yanxia.yao1@gmail.com)¹, Xiao-Yi Wang¹ and Jian Duan², ¹Chinese Academy of Forestry, Beijing, China, ²USDA - ARS, Newark, DE

10:20 **2088** Biology and management of buprestids on coniferous tree species in Germany: *Phaenops cyanea* and *P. formaneki* on Scots pine. **Michael Müller** (michael.mueller@tu-dresden.de), Technische Univ., Tharandt, Germany

10:35 Break

10:50 **2089** Biology and management of buprestids on broadleaf tree species in Germany: *Agrilus biguttatus* on oak and *A. viridis* on beech. **Christiane Helbig** (chr.helbig@web.de) and Michael Müller, Technische Univ., Tharandt, Germany

11:05 **2090** *Agrilus auroguttatus*, the gold spotted oak borer, on oak in the U.S. **Steven Seybold** (sjseybold@gmail.com)¹, Tom W. Coleman² and Laurel J. Haavik³, ¹USDA - Forest Service, Davis, CA, ²USDA - Forest Service, Albuquerque, NM, ³USDA - Forest Service, St. Paul, MN

11:20 **2091** Early detection and monitoring strategies for buprestids. **Jon Sweeney** (jsweeney@nrca.gc.ca)¹, Peter Silk¹, Peter Mayo¹, Krista Ryall², Daniel Miller³, Cory Hughes¹, Kate Van Rooyen¹, Jerzy Gutowski⁴, Qingfan Meng⁵, Yan Li⁶, Joseph Francese⁶ and Davide Rassati⁷, ¹Natural Resources Canada, Fredericton, NB, Canada, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada, ³USDA - Forest Service, Athens, GA, ⁴Forest Research Institute, Bialowieza, Poland, ⁵Beihua Univ., Jilin Province, China, ⁶USDA - APHIS, Buzzards Bay, MA, ⁷Univ. of Padova, Padova, Italy

11:35 **2092** Using *Cerceris fumipennis* wasps as a biosecurity monitor against introduced buprestid beetles in Hawaii: A novel proposal. **Robert Hollingsworth** (rghollin@ncsu.edu), North Carolina State Univ., Raleigh, NC

11:50 **SP2093** Rapid detection methods for invasive species, a case study of *Anoplolepis gracilipes* based on SS-PCR technology. **Fang-Zhou Ma** (mfz@nies.org)¹ and Yan-Jing Zhang², ¹Nanjing Institute of Environmental Sciences, Nanjing, China, ²Nanjing Normal Univ., Nanjing, China

12:00 Concluding remarks

P-IE Section Symposium: Stressors Across Space and Time: Energy Sources, Enemies, and Environmental Influences

Meeting Room 119/120 (Convention Centre)

Moderators and Organizers: Ruud Schilder¹, Sara Hermann² and Jared Ali¹, ¹Pennsylvania State Univ., University Park, PA, ²Michigan State Univ., East Lansing, MI

9:30 **2094** Introduction: Stressors across space and time. **Michael Sheriff** (mjsheriff80@gmail.com)¹, Sara Hermann², Jared Ali¹ and Ruud Schilder¹, ¹Pennsylvania State Univ., University Park, PA, ²Michigan State Univ., East Lansing, MI

9:45 **2095** Effects of predation risk on insect behavior and physiology. **Sara Hermann** (slh@msu.edu) and Douglas A. Landis, Michigan State Univ., East Lansing, MI

10:00 **2096** Larval environmental exposure affects adult infection susceptibility and performance traits. **Ruud Schilder** (rjs360@psu.edu), Pennsylvania State Univ., University Park, PA

10:15 **2097** From cells to populations: Towards an integrative understanding of how insects cope with low temperature stress. **Nicholas Teets** (n.teets@uky.edu), Mark Garcia and Emily Nadeau, Univ. of Kentucky, Lexington, KY

10:30 **2098** Detecting the signatures of change: When external stressors meet internal regulation of population cycling. **Christie Bahlai** (cbahlai@msu.edu), Kent State Univ., North Canton, OH

10:45 Break

10:55 **2099** Aphid-parasitoid interactions under stress. **Debbie Finke** (finked@missouri.edu)¹, Kathryn Ingerslew² and Jessica Kansman¹, ¹Univ. of Missouri, Columbia, MO, ²Purdue Univ., West Lafayette, IN

11:10 **2100** The influence of a changing nutritional environment on locust growth, survival, and migratory plasticity: A global comparison of four species. **Arianne Cease** (acease@asu.edu)¹, Rick Overton¹, Marion Le Gall¹, Douglas Lawton¹, Alioune Bèye², Shuguang Hao³, Eduardo Trumper⁴ and Cathy Waters⁵, ¹Arizona State Univ., Tempe, AZ, ²Direction de la Protection des Végétaux, Dakar, Senegal, ³Chinese Academy of Sciences, Beijing, China, ⁴INTA - CONICET, Buenos Aires, Argentina, ⁵Orange Agricultural Institute, Orange, Australia

11:25 **2101** Responses of trophic interactions to stress at different spatial and temporal scales. **Lee A. Dyer** (nolaclimber@gmail.com) and Danielle Salcido, Univ. of Nevada, Reno, NV

11:40 **2102** The seasonal timing of extreme weather events influences the long-term ecological dynamics of plant-insect interactions. **William Wetzel** (wcowetzel@msu.edu), Michigan State Univ., East Lansing, MI

P-IE Student Section Symposium: Pollinator and Invasive Species Science Policy Field Tours: A Melting Pot of Efforts Promoting Protection of our Food Supply

Meeting Room 116/117 (Convention Centre)

Moderators and Organizers: Carlos Esquivel¹, Johanna Elsensohn², Lindsay Iglesias³, Jessica Kansman⁴ and Obiratanea da Silva Queiroz⁵, ¹The Ohio State Univ., Wooster, OH, ²North Carolina State Univ., Raleigh, NC, ³Univ. of Florida, Gainesville, FL, ⁴Univ. of Missouri, Columbia, MO, ⁵Univ. of Minnesota, St. Paul, MN

9:30 **2103** Integrated approaches to bee health: Reflections from Honey Bee Health Coalition-ESA P-IE 2018 Field Tour. **Julie Shapiro** (jshapiro@keystone.org), Keystone Center, Keystone, CO

10:00 **2104** Ecological and trophic impacts of invasions: Challenges in detection, quantification and management. **Erin Wilson Rankin** (erin.rankin@ucr.edu), Univ. of California, Riverside, CA

10:30 **2105** Science Policy Pollinator Field Tour: Collaborative approaches for pollinator protection and productive agriculture. **Luis Gomez** (egomez2@dow.com), Dow AgroSciences, Indianapolis, IN

10:45 **2106** The 2018 Invasive Species Security Field Tour: Issues, learnings, opportunities. **Thomas Anderson** (tom@entoniche.com), Entoniche Consulting, LLC, Clayton, NC

11:00 **2107** Integrating management and extension techniques across invaders: Lessons learned from the Invasive Species Field Tour. **Heather Leach** (leachhea@msu.edu), Pennsylvania State Univ., University Park, PA

11:15 **2108** Learning how to engage diverse stakeholders in challenging issues through the Entomological Society of America Plant-Insect Ecosystem (ESA P-IE) science policy tours. **Anna Howell** (adhowell@ucanr.edu), Univ. of California, Ventura, CA

11:30 **2109** Consensus building amongst stakeholders related to pollinator intersections with production agriculture. **Joseph Belsky** (jebelsky@email.uark.edu), Univ. of Arkansas, Fayetteville, AR

Member Symposium: Biodiversity, Systematics, and Behavioral Research in Aquatic Entomology

Meeting Room 217/218/219 (Convention Centre)

Moderators and Organizers: Paul Frandsen¹, Seth M. Bybee¹ and Jessica Ware², ¹Brigham Young Univ., Provo, UT, ²Rutgers, The State Univ. of New Jersey, Newark, NJ

9:30 Welcoming remarks

9:35 **2110** Evolution of color in Odonata. **Seth M. Bybee** (seth.bybee@gmail.com), Brigham Young Univ., Provo, UT

9:50 **2111** Ecomorphological diversification in caddisflies: Insights from phylogenomic approaches. **Steffen Pauls** (steffen.pauls@senckenberg.de), Senckenberg Museum, Frankfurt, Germany

10:05 **2112** The evolution and phylogeny of mayflies (Ephemeroptera): Insights derived from phylogenomic data. **T. Heath Ogden** (heath.ogden@uvu.edu)¹, Jesse Breinholt², Seth M. Bybee³, Michel Sartori⁴ and Michael F. Whiting³, ¹Utah Valley Univ., Orem, UT, ²Univ. of Florida, Gainesville, FL, ³Brigham Young Univ., Provo, UT, ⁴Univ. de Lausanne, Lausanne, Switzerland

10:20 **2113** Comparative phylogenetic of circumboreal dragonflies. Göran Sählen¹ and **Manpreet Kohli** (mkk24@njit.edu)², ¹Halmstad Univ., Halmstad, Sweden, ²Rutgers, The State Univ. of New Jersey, Newark, NJ

10:35 **2114** Diversification rate shifts in lentic and lotic dragonflies. **Jessica Ware** (jware42@newark.rutgers.edu), Rutgers, The State Univ. of New Jersey, Newark, NJ

10:50 Break

11:05 **2115** A sticky situation: The evolution of caddisfly (Insecta: Trichoptera) silk genes. **Paul Frandsen** (paul_frandsen@byu.edu), Brigham Young Univ., Provo, UT

11:20 **2116** Aquatic insects of Cerrado, the Amazon and the Atlantic forest of Brazil. **Rhainer Guillermo** (rhainerguillermo@gmail.com), Univ. Federal de São Carlos, São Carlos, Brazil

11:35 **2117** Are the aquatic invertebrate communities in bromeliads functionally convergent across the neotropics? **Diane S. Srivastava** (srivast@zoology.ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

11:50 **2118** Trichoptera divergence time estimation. **Jessica Thomas** (jessicaathomas@gmail.com)¹ and Paul Frandsen², ¹Australia National Univ., Canberra, Australia, ²Brigham Young Univ., Provo, UT

12:05 **2119** True peace? Odonata from protected areas in Colombia with new records and description of *Cora verapax* sp. nov. (Zygoptera: Polythoridae). **Melissa Sánchez Herrera** (melsanc@gmail.com), Rutgers, The State Univ. of New Jersey, Newark, NJ

12:20 Concluding remarks

Member Symposium: Celebrating Michener's 100th and What the Next Decade of Melittology Brings

Meeting Room 207 (Convention Centre)

Moderators and Organizers: Sandra Rehan¹ and Brock Harpur², ¹Univ. of New Hampshire, Durham, NH, ²Univ. of Toronto, Toronto, ON, Canada

9:30 Welcoming remarks

9:30 **2120** Charles Michener, kin recognition, and the evolution of eusociality. **Michael Breed** (michael.breed@colorado.edu), Univ. of Colorado, Boulder, CO

10:00 **2121** New insights into bee phylogeny -- Charles Michener was (almost) always right. **Bryan N. Danforth** (bnd1@cornell.edu), Cornell Univ., Ithaca, NY

10:15 **2122** Untangling the recent evolution of the "morphologically monotonous" but highly color polymorphic bumble bees. **Heather M. Hines** (hmh19@psu.edu), Pennsylvania State Univ., University Park, PA

10:30 **2123** Biogeography of honey bees: The pollen-pigs you thought you knew. **Deborah Smith** (deborahsmith@ku.edu), The Univ. of Kansas, Lawrence, KS

10:45 **2124** New bees: There's still plenty of opportunity to discover remarkable new bees through fieldwork. **Laurence Packer** (xeromelissa@mail.com), York Univ., Toronto, ON, Canada

11:00 Break

11:15 **2125** Solitary bee species richness vs. density, and the North American warm desert fauna. **Robert Minckley** (rminckle@mail.rochester.edu), Univ. of Rochester, Rochester, NY

11:30 **2126** What bees can teach us about the evolution of worker sterility. **Isobel Ronai** (isobel.ronai@sydney.edu.au), Univ. of Sydney, Sydney, Australia

11:45 **2127** The evolution of casteless societies: Insights from allodapine bees. **Rebecca Dew** (rebecca.dew@unh.edu), Univ. of New Hampshire, Durham, NH

12:00 **2128** Historical biogeography and comparative sociobiology of small carpenter bees. **Sandra Rehan** (sandra.rehan@gmail.com), Univ. of New Hampshire, Durham, NH

12:15 Discussion

Member Symposium: Climate Change: Shifts in the Geographical Ranges and Outbreak Dynamics of Forest Insect Pests and Impacts on Forest Health

Meeting Room 208/209 (Convention Centre)

Moderators and Organizers: Kyle J. Haynes¹, Patrick Tobin² and Allan L. Carroll³, ¹Univ. of Virginia, Blandy, VA, ²Univ. of Washington, Seattle, WA, ³The Univ. of British Columbia, Vancouver, BC, Canada

9:30 **2129** Insect-damaged fossil leaves reveal food-web responses to climate change and extinction in deep time. **Peter Wilf** (pwilf@psu.edu)¹, Ellen Currano², Michael Donovan³ and Conrad Labandeira³, ¹Pennsylvania State Univ., University Park, PA, ²Univ. of Wyoming, Laramie, WY, ³Smithsonian Institution, National Museum of Natural History, Washington, DC

10:00 **2130** Life history and habitat explain variation among insect pest populations subject to global change. **Jonathan Walter** (jaw3es@virginia.edu)^{1,2,3}, Anthony R. Ives⁴, John Tooker⁵ and Derek Johnson¹, ¹Virginia Commonwealth Univ., Richmond, VA, ²The Univ. of Kansas, Lawrence, KS, ³Univ. of Virginia, Charlottesville, VA, ⁴Univ. of Wisconsin, Madison, WI, ⁵Pennsylvania State Univ., University Park, PA

10:15 **2131** Understanding the effects of elevated temperature on ecological interactions between forest insect pests and host tree species. **Mary Jamieson** (mjamieson@oakland.edu)¹, Kenneth Raffa², Peter Reich³ and Richard L. Lindroth², ¹Oakland Univ., Rochester, MI, ²Univ. of Wisconsin, Madison, WI, ³Univ. of Minnesota, St. Paul, MN

10:30 **2132** Detection and attribution of shifts in larch budmoth (*Zeiraphera diniana* Guénéée) outbreak patterns to 20th century warming in the European Alps. **Derek Johnson** (dmjohnson@vcu.edu)¹, Fidel González-Rouco², Jürg Luterbacher³ and Ulf Büntgen⁴, ¹Virginia Commonwealth Univ., Richmond, VA, ²Univ. Complutense, Madrid, Spain, ³Justus Liebig Univ., Gießen, Germany, ⁴Univ. of Cambridge, Cambridge, United Kingdom

10:45 **2133** Climate change exacerbates landscape-scale outbreaks by an invasive defoliator. **Samuel J. Fahrner** (fahr0051@umn.edu) and Brian Aukema, Univ. of Minnesota, St. Paul, MN

11:00 Break

11:15 **2134** In the pursuit of synchrony: Shifts in early season folivore outbreaks in a warming environment. **Allan Carroll** (allan.carroll@ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

11:30 **2135** Persistence or extinction? Quantifying the fate of an eruptive herbivore in novel habitats following climate change-induced range expansion. **Stanley Pokorny** (spokorny@mail.ubc.ca) and Allan Carroll, The Univ. of British Columbia, Vancouver, BC, Canada

11:45 **2136** Ecosystem transitions following a geographical range expansion of a forest pest in northern-boreal birch forest. **Jane Jepsen** (jane.jepsen@nina.no)¹, Ole-Petter Vindstad² and Rolf Ims², ¹Norwegian Institute for Nature Research, Tromsø, Norway, ²Arctic Univ. of Norway, Tromsø, Norway

12:15 Discussion

Member Symposium: Coastline Insects and Spiders: Living on the Land-Sea Border

Meeting Room 203 (Convention Centre)

Moderator and Organizer: Joel Gibson, Royal British Columbia Museum, Victoria, BC, Canada

9:30 **2137** Islands of biodiversity – insects and spiders of coastal British Columbia. **Joel Gibson** (jgibson@royalbcmuseum.bc.ca), Royal British Columbia Museum, Victoria, BC, Canada

9:45 **2138** Insects in estuarine food webs in Howe Sound, British Columbia. **Colin Levings** (cklevings@shaw.ca)¹ and Tamara Romanuk², ¹Fisheries and Oceans Canada (Retired), West Vancouver, BC, Canada, ²Dalhousie Univ., Halifax, NS, Canada

10:00 **2139** Bees and other insects at risk in the coastal sand ecosystems of British Columbia. **Jennifer Heron** (jennifer.heron@gov.bc.ca)¹ and Cory Sheffield², ¹British Columbia Ministry of Environment, Vancouver, BC, Canada, ²Royal Saskatchewan Museum, Regina, SK, Canada

10:15 **2140** Bumblebees of Galiano Island, BC. **Andrew Simon** (biodiversity.galiano@gmail.com), Univ. of Victoria, Victoria, BC, Canada

10:30 **2141** The food is great, but the place is a mess: How seagoing mammals transform invertebrate habitat and diversity on coastal island shorelines. **Christopher Ernst** (crystal_ernst@sfu.ca)¹, John Reynolds² and Chris Darimont³, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Hakai Institute, Heriot Bay, BC, Canada, ³Univ. of Victoria, Victoria, BC, Canada

10:45 **2142** Coexistence and differentiation of coastline *Lasiopegon* may be aided by ecological character displacement. **Tristan McKnight** (tristan.mcknight@gmail.com), St. Lawrence Univ., Canton, NY

11:00 Break

11:15 **SP2143** The ants on Georgia's barrier island dunes, a model island biogeography system. **Charlie Braman** (cabraman@uga.edu) and Brian T. Forschler, Univ. of Georgia, Athens, GA

11:25 **SP2144** Revised molecular phylogeny of the coastal *Cafius* complex (Coleoptera: Staphylinidae: Staphylininae). **Jeong-Hun Song** (jhsong0817@gmail.com), In-Seong Yoo and Kee-Jeong Ahn, Chungnam National Univ., Daejeon, South Korea

11:35 **SP2145** Blocking allochthonous aquatic resources alters arthropod food webs by influencing predator diet and abundance in a subarctic grassland. David Hoekman¹, **Matthew McCary** (matt.mccary@gmail.com)², Jamin Dreyer³ and Claudio Gratton², ¹Southern Nazarene Univ., Bethany, OK, ²Univ. of Wisconsin, Madison, WI, ³Strategic Analysis, Inc., Arlington, VA

11:45 **SP2146** Can beach debris reveal long distance dispersal events for Oribatid mites on Haida Gwaii? **Zoë Lindo** (zlindo@uwo.ca), Western Univ., London, ON, Canada

11:55 **SP2147** Out on the edge of the range: *Omus audouini* (Coleoptera: Carabidae) populations in coastal habitats of southwestern Canada. **Robert McGregor** (mcgregorr@douglascollege.ca), Elinor Matheson and Nathan Pennykid, Douglas College, New Westminster, BC, Canada

12:05 **SP2148** Characterization of the tomato leafminer, *Tuta absoluta* (Meyrick, 1917) (Lepidoptera: Gelechiidae) resistance to chlorantraniliprole in Brazil. **Herbert Siqueira** (herbert.siqueira@ufrpe.br), Jefferson Silva, Lilian Ribeiro, Natalia Arias and Paolo Silva, Univ. Federal Rural de Pernambuco, Recife, Brazil

Member Symposium: Current Research on the Biology and Management of Insect Pests in Corn: Crossing Borders from Genes to Populations

Meeting Room 205 (Convention Centre)

Moderators and Organizers: Aaron J. Gassmann¹ and Dominic Reising², ¹Iowa State Univ., Ames, IA, ²North Carolina State Univ., Plymouth, NC

9:30 **2149** Corn earworm development on *Bt* corn in the southeastern U.S. **Francis Reay-Jones** (freayjo@clmson.edu)¹, Thomas Bilbo¹, Dominic Reising² and Fred Musser³, ¹Clemson Univ., Florence, SC, ²North Carolina State Univ., Plymouth, NC, ³Mississippi State Univ., Mississippi State, MS

9:45 **2150** Challenges and opportunities for managing corn insect pests with *Bt* crop technology in the southeast. **G. David Buntin** (gbuntin@uga.edu)¹, Xinzhi Ni², Michael Toews³, Francis Reay-Jones⁴ and Gregg Nuessly⁵, ¹Univ. of Georgia, Griffin, GA, ²USDA - ARS, Tifton, GA, ³Univ. of Georgia, Tifton, GA, ⁴Clemson Univ., Florence, SC, ⁵Univ. of Florida, Belle Glade, FL

10:00 **2151** The role of corn and other crops in the population dynamics of corn earworm: Potential impact on resistance. **Jeff Gore** (jgore@drec.msstate.edu)¹, Tyler Towles², Angus Catchot² and Don Cook¹, ¹Mississippi State Univ., Stoneville, MS, ²Mississippi State Univ., Mississippi State, MS

10:15 **2152** Western corn rootworm resistance to Cry3Bb1 in Nebraska: Current perspectives. **Lance Meinke** (lmeinke1@unl.edu), David S. Wangila and Jordan Reinders, Univ. of Nebraska, Lincoln, NE

10:30 **2153** Round up the usual suspects: Detecting *Bt* resistance in Illinois western corn rootworm populations. **Joseph Spencer** (spencer1@illinois.edu) and Sarah Hughson, Univ. of Illinois, Champaign, IL

10:45 **2154** Optimizing refuges for corn rootworms in *Bt* systems – can current refuges work? **Sally Taylor** (svtaylor@vt.edu)¹ and Christian Krupke², ¹Virginia Polytechnic Institute and State Univ., Suffolk, VA, ²Purdue Univ., West Lafayette, IN

11:00 Break

11:15 **2155** Biological control of corn soil insects: Single inoculation of native persistent entomopathogenic nematodes for multi-year suppression. **Elson J. Shields** (es28@cornell.edu) and Antonio Testa, Cornell Univ., Ithaca, NY

11:30 **2156** Potency paradox: Changing patterns of insecticide use in U.S. corn production. **Margaret Douglas** (douglasm@dickinson.edu)¹, Doug Sponsler² and Christina M. Grozinger², ¹Dickinson College, Carlisle, PA, ²Pennsylvania State Univ., University Park, PA

11:45 **2157** Using the western bean cutworm (*Striacosta albicosta*) to evaluate the efficacy of insect resistance management plans for delaying *Bt* toxin resistance in ear-feeding lepidopteran pests of corn. **Katharine Swoboda Bhattarai** (kswoboda3@unl.edu)¹, Thomas Hunt², Julie Peterson¹, Brad Coates³ and Sarah Zukoff⁴, ¹Univ. of Nebraska, North Platte, NE, ²Univ. of Nebraska, Concord, NE, ³USDA - ARS, Ames, IA, ⁴Kansas State Univ., Manhattan, KS

12:00 **2158** The very complex interaction between lepidopteran insect damage to corn ears and *Fusarium* mycotoxins. **Arthur Schaafsma** (aschaafs@uoguelph.ca) and Jocelyn Smith, Univ. of Guelph, Ridgetown, ON, Canada

12:15 **2159** Genomics of western corn rootworm response to insecticidal toxins. **Brad Coates** (bsc6994@hotmail.com)¹, Aaron Gassmann², Thomas Guillemaud³ and Hugh M. Robertson⁴, ¹USDA - ARS, Ames, IA, ²Iowa State Univ., Ames, IA, ³INRA, Sophia-Antipolis, France, ⁴Univ. of Illinois, Champaign, IL

12:30 **2160** Biological implications of resistance to *Bt* corn in fall armyworm. **Heba Abdelgaffar** (habdelga@utk.edu)¹, Alvar Carlson² and Juan Luis Jurat-Fuentes¹, ¹Univ. of Tennessee, Knoxville, TN, ²Vesteron, Kalamazoo, MI

Member Symposium: Evolutionary Ecology of *Drosophila*-parasitoid Food Webs: From Molecules to Ecosystems

Meeting Room 202 (Convention Centre)

Moderators and Organizers: Mariana Mateos¹, Chia-Hua Lue², Shubha Govind³ and Todd Schlenke⁴, ¹Texas A&M Univ., College Station, TX, ²Czech Academy of Sciences, České Budějovice, Czech Republic, ³City Univ. of New York, New York, NY, ⁴Univ. of Arizona, Tucson, AZ

9:30 Introductory Remarks

9:40 **2161** Global patterns of species richness in *Drosophila* parasitoids. **Chia-Hua Lue** (chiachia926@gmail.com)¹, Matthew Buffington² and Jan Hrcek¹, ¹Czech Academy of Sciences, České Budějovice, Czech Republic, ²USDA - ARS, Washington, DC

9:55 **2162** Phylogenetics and species limits of *Leptopilina* and *Ganaspis* wasps, specialist endoparasitoids of *Drosophila* spp. **Matthew Buffington** (matt.buffington@ars.usda.gov)¹, Chia-Hua Lue², Mattias Forshage³, Emilio Guerrieri⁴, Massimo Giorgini⁴, Kent Daane⁵, Xingeng Wang⁵, Kim Hoelmer⁶ and Keith Hopper⁶, ¹USDA - ARS, Washington, DC, ²Czech Academy of Sciences, České Budějovice, Czech Republic, ³Swedish Museum of Natural History, Stockholm, Sweden, ⁴National Research Council, Turin, Italy, ⁵Univ. of California, Parlier, CA, ⁶USDA - ARS, Newark, DE

10:10 **2163** Parasitoid wasps in the Brazilian savanna: Adding complexity to the *Drosophila*-fruit system. Dariane Schneider and **Rosana Tidon** (rotidon@gmail.com), Univ. de Brasília, Brasília, Brazil

10:25 **2164** Behavioral defenses flies use against parasitoids. **Todd Schlenke** (schlenke@email.arizona.edu), Univ. of Arizona, Tucson, AZ

10:40 Break

10:55 **2165** *Drosophila* immunity and parasitoid virulence factors: The host parasitoid interface. **Shubha Govind** (sgovind@ccny.cuny.edu), City Univ. of New York, New York, NY

11:10 **2166** Virus domestication in *Drosophila* parasitoids. **Julien Varaldi** (julien.varaldi@univ-lyon1.fr), Deborah Di Giovanni and David Lepetit, Univ. Lyon 1, Lyon, France

11:25 **2167** The influence of heritable symbionts in *Drosophila*-parasitoids interactions. **Mariana Mateos** (mmateos@tamu.edu), Texas A&M Univ., College Station, TX

11:40 **2168** Modelling interaction frequencies and preferences in *Drosophila*-parasitoid communities using networks. **Phillip Staniczenko** (pstaniczenko@sesync.org), National Socio-Environmental Synthesis Center, Annapolis, MD

11:55 **2169** Establishing rainforest *Drosophila*, their parasitoids, and symbionts as model in community ecology. **Jan Hrcek** (janhrcek@gmail.com), Czech Academy of Sciences, České Budějovice, Czech Republic

12:10 **SP2170** Hemomucin as a key determinant of host-parasitoid interactions? **Kevin Ferro** (kferro@email.arizona.edu) and Todd Schlenke, Univ. of Arizona, Tucson, AZ

12:20 Discussion

Member Symposium: Identifying and Overcoming Challenges to Integrating Tree Chemistry into Our Understanding of Forest Insect Dynamics

Meeting Room 204 (Convention Centre)

Moderator and Organizer: Nadir Erbilgin, Univ. of Alberta, Edmonton, AB, Canada

9:30 Introductory remarks

9:35 **2171** Genomics of conifer defense systems. **Joerg Bohlmann** (bohlmann@msl.ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

10:05 **2172** Breakthroughs and bottlenecks in evaluating tree defense metabolites in the post-genomic era. **C. Peter Constabel** (cpc@uvic.ca), Univ. of Victoria, Victoria, BC, Canada

10:35 **2173** The ups and downs of studying tree chemistry effects on bark beetle - microbial complexes: Challenges arising from interacting scales of biological organization. **Kenneth Raffa** (kfraffa@wisc.edu), Univ. of Wisconsin, Madison, WI

11:05 **2174** Specificity in the resistance-related metabolomic responses of pines to bark beetle-vectored fungi. **Jonathan Cale** (jacale@ualberta.ca), Jennifer Klutsch and Nadir Erbilgin, Univ. of Alberta, Edmonton, AB, Canada

11:20 **2175** Phenotypic variation in a *Populus* model system: Implications for plant-insect interactions across scales of size, space, and time. **Richard L. Lindroth** (richard.lindroth@wisc.edu)¹, Olivia Cope¹, Kennedy Rubert-Nason¹, John Couture¹, Christopher Cole¹, Michael Eisenring² and Eric Kruger¹, ¹Univ. of Wisconsin, Madison, WI, ²Agroscope, Zürich, Switzerland

11:50 **2176** Secondary chemistry variation in the Salicaceae and its implications for forest insect herbivores. **Ken Keefover-Ring** (ken.keefoverring@wisc.edu)¹, Muhammad Azeem², Samantha Harrow¹, Craig Carlson³, Sandy Simon⁴, Larry Smart³, Steve DeFazio⁴ and Matt Olson⁵, ¹Univ. of Wisconsin, Madison, WI, ²COMSATS Institute of Information Technology, Abbottabad, Pakistan, ³Cornell Univ., Geneva, NY, ⁴West Virginia Univ., Morgantown, WV, ⁵Texas Tech Univ., Lubbock, TX

12:05 **2177** Challenges with understanding the spatial and temporal patterns of tree constitutive and induced chemical defences. **Luis Sampedro** (lsampedro@mbg.csic.es), Xosé López-Goldar, Estefanía Suárez-Vidal, Carla Vázquez-González and Rafael Zas, Misión Biológica de Galicia (Spanish National Research Council), Pontevedra, Spain

12:20 Concluding remarks

Member Symposium: Leveling the Playing Field: How Entomologists Can Work to Reduce Bias and Create Safe Workplaces

Meeting Room 215/216 (Convention Centre)

Moderators and Organizers: Kyndall Dye-Braumuller¹, Katelyn Kesheimer², Hannah J. Penn³ and Gail Kampmeier⁴, ¹Harris County Public Health, Houston, TX, ²Texas A&M Univ., Lubbock, TX, ³Miami Univ., Oxford, OH, ⁴Illinois Natural History Survey, Champaign, IL

9:30 Introductory remarks

9:40 **2178** Journals and gender: How gender ratios vary throughout the publishing world. **Charles W. Fox** (fox@uky.edu), Univ. of Kentucky, Lexington, KY

9:55 **2179** Is it time to abolish letters of recommendation? **Gail Kampmeier** (gkamp@illinois.edu), Illinois Natural History Survey, Champaign, IL

10:10 **2180** The gender playing field is significantly lopsided: Underemployment of female entomologists. **Karen Walker** (karen.a.walker@aphis.usda.gov), USDA - APHIS, Riverdale, MD

10:25 Discussion

10:45 Break

11:00 Session 2: Short introductory remarks

11:05 **2181** Navigating murky social situations: Keeping your wits about you at scientific conferences. **Katelyn Kesheimer** (katelyn.kesheimer@ag.tamu.edu), Texas A&M Univ., Lubbock, TX

11:20 **2182** Boots on the ground: Being conscious of human needs in the field. **Hannah J. Penn** (hannahjpenn@gmail.com)¹ and Katelyn Kesheimer², ¹Miami Univ., Oxford, OH, ²Texas A&M Univ., Lubbock, TX

11:35 **2183** Leadership in science: Following new paths and breaking the mold. **Michelle Smith** (mssmith@dow.com), Dow AgroSciences, Indianapolis, IN

11:50 Panel discussion

12:20 Concluding remarks

Member Symposium: National Assessment of Invasive Species in Forests and Grasslands of the U.S.: Discussing the Current State of Invasive Species Science and Research in the U.S.

Meeting Room 206 (Convention Centre)

Moderators and Organizers: Vanessa Lopez¹ and Toral Patel-Weynand², ¹USDA - Forest Service, Fort Collins, CO, ²USDA - Forest Service, Washington, DC

9:30 Introductory remarks

9:35 **2184** Impacts of invasive species in terrestrial and aquatic systems in the USA. **Albert Mayfield** (amayfield02@fs.fed.us), USDA - Forest Service, Asheville, NC

9:50 **2185** Impacts of invasive species on forest and grassland ecosystem processes in the US. **Chelcy Miniati** (cfminiat@fs.fed.us), USDA - Forest Service, Otto, NC

10:05 **2186** Effects of climate change on invasive species. Deborah Finch and **Francis Kilkenny** (ffkilkenny@fs.fed.us), USDA - Forest Service, Albuquerque, NM

10:20 **2187** Management of landscapes for established invasive species. **Therese Poland** (tpoland@fs.fed.us)¹ and Robert Rabaglia², ¹USDA - Forest Service, Lansing, MI, ²USDA - Forest Service, Washington, DC

10:35 Break

10:50 **2188** Rehabilitation and restoration of landscapes and habitat impacted by established invasive species. **Jennifer Koch** (jkoch@fs.fed.us), USDA - Forest Service, Delaware, OH

WEDNESDAY, NOVEMBER 14 /
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- 11:05 **2189** Social and cultural dynamics of non-native invasive species. **John Schelhas** (jschelhas@fs.fed.us), USDA - Forest Service, Athens, GA
- 11:20 **2190** Regional impacts of invasive species in the western United States. **Andrew Graves** (adgraves@fs.fed.us)¹ and Steven Seybold², ¹USDA - Forest Service, Albuquerque, NM, ²USDA - Forest Service, Davis, CA
- 11:35 **2191** Regional impacts of invasive species in the eastern United States. **Noel Schneeberger** (nschneeberger@fs.fed.us), USDA - Forest Service, Newtown Square, PA
- 11:50 Concluding remarks

Member Symposium: USDA's APHIS - PPQ Identifiers: The Vanguard of Defense Against Invasive Pests

Meeting Room 110 (Convention Centre)

Moderators and Organizers: Julieta Brambila¹ and John Leavengood², ¹USDA - APHIS, Gainesville, FL, ²USDA - APHIS, Tampa, FL

- 9:30 Introductory remarks
- 9:45 **2192** PPQ's role and responsibility in safeguarding agriculture, and the significance of a pest. **John Leavengood** (john.m.leavengood@aphis.usda.gov) and Kevin Johns, USDA - APHIS, Tampa, FL
- 10:00 **2193** Using DNA data to improve identifications: Examples from *Helicoverpa* interceptions at U.S. ports of entry. **Todd Gilligan** (todd.m.gilligan@aphis.usda.gov), USDA - APHIS, Fort Collins, CO
- 10:15 **SP2194** A duplex ddPCR assay for simultaneously detecting *Ips sexdentatus* and *Ips typographus* (Coleoptera:Curculionidae) from bulk trap samples. **Frida Zink** (frida.zink@colostate.edu)¹, Luke Tembrock¹, Alicia Timm¹ and Todd Gilligan², ¹Colorado State Univ., Fort Collins, CO, ²USDA - APHIS, Fort Collins, CO
- 10:25 **SP2195** Phylogeography of *Helicoverpa armigera* (Lepidoptera: Noctuidae) dispersal into the Caribbean Basin and the Florida peninsula. **Luke Tembrock** (tembrock@colostate.edu)¹, Alicia Timm¹, Frida Zink¹ and Todd Gilligan², ¹Colorado State Univ., Fort Collins, CO, ²USDA - APHIS, Fort Collins, CO

SD2196 Key to Argyrogrammatini (Lepidoptera: Noctuidae: Plusiinae) intercepted on herbs and cut flowers at Miami International Airport. **Michelle DaCosta** (michelle.dacosta@aphis.usda.gov)¹, Paul Goldstein², Steven Passoa³, James Young⁴ and Todd Gilligan⁵, ¹USDA - APHIS, Miami, FL, ²USDA - ARS, Washington, DC, ³USDA - APHIS, Columbus, OH, ⁴USDA - APHIS, Riverdale, MD, ⁵USDA - APHIS, Fort Collins, CO

- 10:35 Intermission & poster session
- 10:50 **2197** Results from domestic surveys for the early detection of *Chilo partellus*, Crambidae. **Julieta Brambila** (julieta.brambila@aphis.usda.gov)¹, Todd Gilligan² and James Hayden³, ¹USDA - APHIS, Gainesville, FL, ²USDA - APHIS, Fort Collins, CO, ³Florida Dept. of Agriculture and Consumer Services, Gainesville, FL
- 11:05 **2198** A study using morphological and molecular methods to determine the identity of immature *Leucothrips* (Thysanoptera: Thripidae) intercepted from *Codiaeum variegatum* plants. **Thomas Skarliinsky** (thomas.l.skarliinsky@aphis.usda.gov), USDA - APHIS, Miami, FL

- 11:20 **2199** Improving the current diagnostic capacity for fruit flies belonging to the genus *Anastrepha* Schiner (Diptera: Tephritidae). **Raul Ruiz-Arce** (raul.a.ruiz@aphis.usda.gov)¹, Terrance Todd¹, Brian Wiegmann², Brian Casse², Gary Steck³, Matthew Moore⁴, Marc Branham⁴, Erick Rodriguez³, Bruce Sutton³ and Allen Norrbom⁵, ¹USDA - APHIS, Edinburg, TX, ²North Carolina State Univ., Raleigh, NC, ³Florida Dept. of Agriculture and Consumer Services, Gainesville, FL, ⁴Univ. of Florida, Gainesville, FL, ⁵USDA - ARS, Washington, DC
- 11:35 **2200** SITC's use of regulatory entomology. **Amanda Elkhateeb** (amanda.m.elkhateeb@aphis.usda.gov), USDA - APHIS, Fort Collins, CO
- 11:50 Concluding remarks & discussion

Organized Meeting: Developing International Consensus Towards Better Management of Invasive Arthropods: A Grand Challenge

Meeting Room 210 (Convention Centre)

Moderators and Organizers: Frank Zalom¹, Tracy Hueppelsheuser², Sandy Smith³ and Chris Stelzig⁴, ¹Univ. of California, Davis, CA, ²British Columbia Ministry of Agriculture, Abbotsford, BC, Canada, ³Univ. of Toronto, Toronto, ON, Canada, ⁴Entomological Society of America, Annapolis, MD

- 9:30 Recapping the Invasive Species Summit: An introduction
- 9:40 **2201** Invasive species management - prevention. **Frank Zalom** (fgzalom@ucdavis.edu), Univ. of California, Davis, CA
- 9:55 **2202** Invasive species management – detection. **Leland Humble** (lhumble@nrcan.gc.ca), Natural Resources Canada, Victoria, BC, Canada
- 10:10 **2203** Invasive species management – response management. Sandy Smith¹ and Tracy Hueppelsheuser (tracy.hueppelsheuser@gov.bc.ca)², ¹Univ. of Toronto, Toronto, ON, Canada, ²British Columbia Ministry of Agriculture, Abbotsford, BC, Canada
- 10:25 **2204** Invasive species management – trade, policy, and international agreements. **Helén Spafford** (hspafford@hawaii.edu), Univ. of Hawai'i, Honolulu, HI
- 10:40 **2205** GCAFE International: An outcome report from the Brazilian Congress of Entomology summit. **Eliane Quintela** (eliane.quintela@embrapa.br), Embrapa Arroz e Feijão, Santo Antônio de Goiás, Brazil

10:55 Seeking to build international consensus of the challenges and solutions: A town hall discussion

10-min: MUVE, Veterinary Pests

Meeting Room 301 (Convention Centre)

- Moderators:** Nancy C. Hinkle¹ and Amy Murillo², ¹Univ. of Georgia, Athens, GA, ²Univ. of California, Riverside, CA
- 9:30 **2206** Using on-animal sensors to assess northern fowl mite effects on poultry behavior and welfare. **Amy C. Murillo** (alock001@ucr.edu)¹, Alireza Abdoli¹, Richard Blatchford² and Alec Gerry¹, ¹Univ. of California, Riverside, CA, ²Univ. of California, Davis, CA
- 9:40 **2207** Insecticide resistance development in adult house flies (Diptera: Muscidae) due to larval population exposures to commercially-available bait formulations. **Jimmy Pitzer** (jimmy.pitzerjr@csus.edu), California State Univ., Sacramento, CA

9:50 **2208** Survival and reproduction of *Culicoides sonorensis* (Diptera: Ceratopogonidae) orally infected with epizootic hemorrhagic disease virus serotype 2. **Dinesh Erram** (derram@ufl.edu) and Nathan Burkett-Cadena, Univ. of Florida, Vero Beach, FL

10:00 **2209** Control of northern fowl mite (*Ornithonyssus sylviarum*) on chickens using a Fluralaner solution administered to birds through drinking water. **Alec Gerry** (alec.gerry@ucr.edu), Univ. of California, Riverside, CA

10:10 **2210** Horse exposure to urticating caterpillar setae and reducing the risk of abortions. **Myron Zalucki** (m.zalucki@uq.edu.au), Univ. of Queensland, Brisbane, Australia

10:20 **2211** Development of an attract and kill device for stable flies, *Stomoxys calcitrans*. **Jerome Hogsette** (jerry.hogsette@ars.usda.gov), USDA - ARS, Gainesville, FL

10:30 **2212** IMO swine production reduces noxious odors attractive to filth flies. **Jonathan A. Cammack** (jcammack_07@tamu.edu)¹, Jennifer Pechal², Heather Jordan³, Ashleigh Farris⁴, Tawni L. Crippen⁵, Stephen Sweet¹, Anthony Knap¹, M. Eric Benbow², Michael DuPonte⁶ and Jeffery K. Tomberlin¹, ¹Texas A&M Univ., College Station, TX, ²Michigan State Univ., East Lansing, MI, ³Mississippi State Univ., Mississippi State, MS, ⁴Texas A&M Univ., Corpus Christi, TX, ⁵USDA - ARS, College Station, TX, ⁶Univ. of Hawai'i, Hilo, HI

10:40 **2213** Effects of temperature and diet quality on development of immature stable flies (Diptera: Muscidae). **David Taylor** (dave.taylor@ars.usda.gov)¹, Melina Florez-Cuadros² and Dennis Berkebile¹, ¹USDA - ARS, Lincoln, NE, ²North Carolina State Univ., Raleigh, NC

10:50 Break

11:00 **2214** Finding the trait in the pasture: Some cattle ARE resistant to *Haematobia irritans* and producers are willing to pay for the trait. **Rebecca Trout Fryxell** (rfryxell@utk.edu)¹, Pia Olafson², S. Schexnayder¹, K. DeLong¹, L. McKay¹, A. Griffith¹, Kristina Friesen³, David Taylor³, John Keele⁴, Larry Kuehn⁴, Margaret Staton¹ and E. Psota⁵, ¹Univ. of Tennessee, Knoxville, TN, ²USDA - ARS, Kerrville, TX, ³USDA - ARS, Lincoln, NE, ⁴USDA - ARS, Clay Center, NE, ⁵Univ. of Nebraska, Lincoln, NE

11:10 **2215** *Rhipicephalus appendiculatus* ticks can transmit *Theileria parva* from infected cattle in the absence of detectable parasitemia: Implications for *T. parva* surveillance and epidemiology. **Cassandra Olds** (cassandraolds@uidaho.edu)¹, Kathy Mason² and Glen Scoles², ¹Univ. of Idaho, Moscow, ID, ²USDA - ARS, Pullman, WA

11:20 **2216** Bloody hard: Deciphering function in tick symbiosis. **Yuval Gottlieb** (gottlieb.yuval@mail.huji.ac.il), The Hebrew Univ., Rehovot, Israel

11:30 **2217** Effect of tick infestation and epidemiological risk factors on the prevalence of *Theileria lestoquardi* and *Theileria ovis* infection in goats from Multan, Pakistan. **Muhammad Mudasser Nazir** (mudasser.nazir@bzu.edu.pk)¹, Masood Akhtar¹, Muhammad Mazhar Ayaz¹, Atif Ahmed¹, Muhammad Oneeb² and David Lindsay³, ¹Bahauddin Zakariya Univ., Multan, Pakistan, ²Univ. of Veterinary and Animal Sciences, Lahore, Pakistan, ³Virginia Polytechnic Institute and State Univ., Blacksburg, VA

11:40 **2218** Effects of geraniol spray repellent on the dispersal of horn fly (*Haematobia irritans*). **David Watson** (wwatson@ncsu.edu) and Steve Denning, North Carolina State Univ., Raleigh, NC

11:50 **2219** Long-lasting repellent compounds discovered from coconut oil against blood-sucking insects. **Junwei Zhu** (jerry.zhu@ars.usda.gov)¹, Steven Cermak², James Kenar², Gary Brewer³, David Boxler⁴, Kenneth Haynes⁵, Andrew Li⁶, Uli Bernier⁷, Rui-De Xue⁸, David Taylor¹ and Ligia Borges⁹, ¹USDA - ARS, Lincoln, NE, ²USDA - ARS, Peoria, IL, ³Univ. of Nebraska, Lincoln, NE, ⁴Univ. of Nebraska, North Platte, NE, ⁵Univ. of Kentucky, Lexington, KY, ⁶USDA - ARS, Beltsville, MD, ⁷USDA - ARS, Gainesville, FL, ⁸Anastasia Mosquito Control District, St. Augustine, FL, ⁹Univ. Federal de Goiás, Goiânia, Brazil

12:00 **2220** Optimizing limited options for insecticide-resistant horn fly control. **Nancy C. Hinkle** (nhinkle@uga.edu)¹, Raymond Fitzpatrick², Richard Evans¹, Greg Pittman³, Caitlin Jackson⁴ and David Daniel⁵, ¹Univ. of Georgia, Athens, GA, ²Univ. of Georgia, Carnesville, GA, ³Univ. of Georgia, Jefferson, GA, ⁴Univ. of Georgia, Forsyth, GA, ⁵Univ. of Georgia, Greensboro, GA

10-min: P-IE, Apiculture

Meeting Room 224 (Convention Centre)

Moderators: Ramesh Sagili¹ and Julie Williamson², ¹Oregon State Univ., Corvallis, OR, ²Koppert Biological Systems, Inc., Howell, MI

9:30 **2221** Role of larval nutritional status in selection of larvae for queen rearing in honey bees (*Apis mellifera*) during emergency queen rearing. **Ramesh Sagili** (ramesh.sagili@oregonstate.edu)¹, Bradley Metz², Hannah Lucas¹, Priyadarshini Chakrabarti¹ and Carolyn Breece¹, ¹Oregon State Univ., Corvallis, OR, ²North Carolina State Univ., Raleigh, NC

9:40 **2222** Gene expression analysis of key antioxidant genes in reproductive tissue of *Apis mellifera* queens reared in pesticide-laden beeswax. **Juliana Rangel** (jrangel@tamu.edu), Elizabeth Walsh and Tonya Shepherd, Texas A&M Univ., College Station, TX

9:50 **2223** Effects of comb irradiation on colony performance, *Varroa* mite population, and viral load in bees, *Varroa* mites and wax. **Lilia I. de Guzman** (lilia.deguzman@ars.usda.gov), Michael Simone-Finstrom, Amanda M. Frake and Philip Tokarz, USDA - ARS, Baton Rouge, LA

10:00 **2224** Effect of pathogen load, environment, and their interactions on colony-level traits. **Renata Borba** (renata.borba@canada.ca)¹, Shelley Hoover², Pierre Giovenazzo³, Rob Currie⁴, Stephen Pernal¹, Amro Zayed⁵ and Leonard Foster⁶, ¹Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada, ²Alberta Agriculture and Forestry, Lethbridge, AB, Canada, ³Univ. Laval, Québec City, QC, Canada, ⁴Univ. of Manitoba, Winnipeg, MB, Canada, ⁵York Univ., Toronto, ON, Canada, ⁶The Univ. of British Columbia, Vancouver, BC, Canada

10:10 **2225** The impact of landscape and pollen diet composition on neonicotinoid exposure for honey bees in intensive agriculture. **Thomas Wood** (woodtho4@msu.edu)¹, Ian Kaplan², Laura Ingwell² and Zsafia Szendrei¹, ¹Michigan State Univ., East Lansing, MI, ²Purdue Univ., West Lafayette, IN

10:20 **2226** Impact of native, perennial forage on the health of honey bee colonies (*Apis mellifera*) in an annual crop landscape. **Harmen P. Hendriksma** (harmenhendriksma@gmail.com)¹, Ashley St. Clair¹, Ge Zhang¹, Randall Cass¹, David Stein¹, Erin Hodgson¹, Adam Dolezal², Matthew O'Neal¹ and Amy Toth¹, ¹Iowa State Univ., Ames, IA, ²Univ. of Illinois, Champaign, IL

10:30 **2227** Longitudinal study of risk factors that result in honey bee colony losses. **Frank Rinkevich** (frank.rinkevich@ars.usda.gov)¹, Robert G. Danka¹, Michael Simone-Finstrom¹, Kristen Healy² and Daniel Swale², ¹USDA - ARS, Baton Rouge, LA, ²Louisiana State Univ., Baton Rouge, LA

- 10:40 Break
- 10:50 **2228** Seasonality of honey bee (*Apis mellifera*) micronutrient supplementation and environmental limitation. **Rachael Bonoan** (rachael.bonoan@tufts.edu), Luke O'Connor and Philip Starks, Tufts Univ., Medford, MA
- 11:00 **2229** Presentation withdrawn
- 11:10 **2230** *Nosema ceranae* parasitism affects olfactory behavior and neurochemistry in the honey bee, *Apis mellifera*. **Stephanie Gage** (stephanie.gage@ars.usda.gov), Emily Watkins de Jong, Nicholas Ziolkowski, Angela Rivera, Angela Tulk, Mark Carroll and Gloria DeGrandi-Hoffman, USDA - ARS, Tucson, AZ
- 11:20 **2231** Automated monitoring of honey bee activity to detect effects of sub-lethal pesticide exposure. **Jon Zawislak** (jzawislak@uaex.edu)¹, Gus Lorenz², John Adamczyk³ and Neelendra Joshi⁴, ¹Univ. of Arkansas Division of Agriculture, Little Rock, AR, ²Univ. of Arkansas, Lonoke, AR, ³USDA - ARS, Poplarville, MS, ⁴Univ. of Arkansas, Fayetteville, AR
- 11:30 **2232** Residues of neonicotinoid in Arizona honey bee and its products. **Gadelhak Ahmed** (gadelhakg@email.arizona.edu), Kyle Harrington and Ayman Mostafa, Univ. of Arizona, Phoenix, AZ
- 11:40 **2233** The response of honey bees to two potential pollination attractants, Polynate and SPLAT Bloom. **Julie Williamson** (jwilliamson@koppert.com), Koppert Biological Systems, Inc., Howell, MI; Michigan State Univ., East Lansing, MI
- 11:50 **2234** Variation in learning behavior underlies exploration and recruitment by scout honey bees. **Chelsea N. Cook** (cncook1@asu.edu)¹, Thiago Mosqueiro², Cahit Ozturk¹, Jürgen Gadau¹, Brian Smith¹ and Noa Pinter-Wollman², ¹Arizona State Univ., Tempe, AZ, ²Univ. of California, Los Angeles, CA

10-min: P-IE, Behavior

Meeting Room 220 (Convention Centre)

Moderators: Célia Bordier¹ and Ian Grettenberger², ¹Univ. of New Hampshire, Durham, NH, ²Univ. of California, Davis, CA

9:30 **2235** Impact of landscape management on foraging ecology and nesting behavior of the facultatively social bee, *Ceratina calcarata*. **Célia Bordier** (celia.bordier@gmail.com) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

9:40 **2236** Behavioral manipulation of *Drosophila suzukii*: Immediate and long-term effects of different oviposition substrates exposure. **Rachele Nieri** (nierir@oregonstate.edu)¹, Vaughn Walton², Marco Valerio Stacconi² and Nik G. Wiman¹, ¹Oregon State Univ., Aurora, OR, ²Oregon State Univ., Corvallis, OR

9:50 **2237** Monitoring acoustic behavior and mortality of *Sitophilus oryzae* L. (Coleoptera: Curculionidae) and *Callosobruchus maculatus* (F.) (Coleoptera: Chrysomelidae: Bruchinae) under oxygen deprivation. **Anastasia Njoroge** (annwanjiru608@gmail.com)¹, Richard Mankin² and Dieudonne Baributsa¹, ¹Purdue Univ., West Lafayette, IN, ²USDA - ARS, Gainesville, FL

10:00 **2238** Habitat cues synergize to elicit chemically-mediated landing behavior in a specialist phytophagous insect, the grape berry moth, *Paralobesia viteana*. **Michael Wolf** (mvw5315@psu.edu)¹, Ronald Chilson², Dong H. Cha³, Gregory Loeb⁴ and Charles E. Linn⁴, ¹Pennsylvania State Univ., University Park, PA, ²Penn Yan Academy High School, Penn Yan, NY, ³USDA - ARS, Hilo, HI, ⁴Cornell Univ., Geneva, NY

10:10 **2239** Visual detection and avoidance of epiphytic pathogens by aphids. **Tory Hendry** (th572@cornell.edu), Russell Ligon and Melanie Smee, Cornell Univ., Ithaca, NY

10:20 **2240** A framework for determining pesticide effects on bee behaviour. **Felicity Muth** (fmuth@unr.edu) and Anne Leonard, Univ. of Nevada, Reno, NV

10:30 **2241** Racemic candidate pheromone blends for mating disruption desensitize male swede midge (*Contarinia nasturtii*) (Diptera: Cecidomyiidae). **Elisabeth Hodgdon** (ehodgdon@uvm.edu)¹, Rebecca Hallett² and Yolanda Chen¹, ¹Univ. of Vermont, Burlington, VT, ²Univ. of Guelph, Guelph, ON, Canada

10:40 **2242** Foraging and dispersal behavior of *Osmia cornifrons* in an apple orchard ecosystem. **Neelendra Joshi** (nkjoshi@uark.edu)¹, Edwin Rajotte², Kusum Naithani¹ and David Biddinger³, ¹Univ. of Arkansas, Fayetteville, AR, ²Pennsylvania State Univ., University Park, PA, ³Pennsylvania State Univ. Fruit Research and Extension Center, Biglerville, PA

10:50 Break

11:00 **2243** A survey of non-crop plants as alternative hosts to raspberries for *Drosophila suzukii* (spotted-wing drosophila). **Bennur Agbaba** (bennuragbaba@gmail.com)¹ and Ulas Cinar², ¹Apricot Research Institute, Malatya, Turkey, ²Transitional Zone Agricultural Research Institute, Eskisehir, Turkey

11:10 **2244** Effects of environmental conditions on evasive behaviors of periodical cicadas, *Magicicada septendecim* and *M. cassini*. **Michael Raupp** (mraupp@umd.edu)¹ and Holly Martinson², ¹Univ. of Maryland, College Park, MD, ²McDaniel College, Westminster, MD

11:20 **2245** Turning the tide: Parasitoids show attraction to the defensive oral secretion of host larvae. **Tolulope Morawo** (tom0002@auburn.edu) and Henry Fadamiro, Auburn Univ., Auburn, AL

11:30 **2246** Response of two *Bactrocera* species (Diptera: Tephritidae) to fruit volatiles. **Waqar Jaleel** (waqar4me@yahoo.com)¹, Yurong He¹ and Lihua Lu², ¹South China Agricultural Univ., Guangzhou, China, ²Guangdong Academy of Agricultural Science, Guangzhou, China

11:40 **2247** Temperature and photoperiod dependent pupation behavior of *Drosophila suzukii* larvae. **Kyoo Park** (parkk@oregonstate.edu), Cherre Bezerra Da Silva and Vaughn Walton, Oregon State Univ., Corvallis, OR

11:50 **2248** Context matters: Contrasting ladybird beetle responses to urban environments across two US regions. **Monika Egerer** (megeger@ucsc.edu)¹, Kevin Li² and Theresa Ong³, ¹Univ. of California, Santa Cruz, CA, ²Univ. of Göttingen, Göttingen, Germany, ³Princeton Univ., Princeton, NJ

12:00 **2249** Understanding distributions of non-native insects in suburban southern California: Aridity as a key component of ecological resistance. **Wallace Meyer** (wallace_meyer@pomona.edu)¹ and Weston Staubus², ¹Pomona College, Claremont, CA, ²Western Washington Univ., Bellingham, WA

12:10 **2250** Why mate so often? Examining the reproductive behavior of the bagrada bug. **Ian Grettenberger** (imgrettenberger@ucdavis.edu), Brian Gress and Frank Zalom, Univ. of California, Davis, CA

10-min: P-IE, Biocontrol, General

Meeting Room 213 (Convention Centre)

Moderators: Aaron David¹ and Yoram Yerushalmi², ¹USDA - ARS, Fort Lauderdale, FL, ²Inspiring Insects, Tivon, Israel9:30 **2251** Biological control mite (*Floracarus perrepae*) alters plant architecture of invasive old world climbing fern (*Lygodium microphyllum*) in south Florida. **Aaron David** (aaron.david@ars.usda.gov) and Ellen C. Lake, USDA - ARS, Fort Lauderdale, FL9:40 **2252** Impacts of *Metarhizium brunneum* F52 infection on the flight capacity of Asian longhorned beetle (*Anoplophora glabripennis*). **Eric Clifton** (eclifton88@gmail.com), Jason Cortell, Linqi Ye and Ann E. Hajek, Cornell Univ., Ithaca, NY9:50 **2253** Integrating a biocontrol agent into an actively managed environment. **Ashley Goode** (ashley.goode@ars.usda.gov)¹, Philip Tipping¹ and Lyn Gettys², ¹USDA - ARS, Fort Lauderdale, FL, ²Univ. of Florida, Davie, FL10:00 **2254** Disturbance of spotted knapweed and the impact on survival of larval *Larinus minutus*. **Beth Ferguson** (mef005@email.uark.edu) and Robert N. Wiedenmann, Univ. of Arkansas, Fayetteville, AR10:10 **2255** Know thy natural enemy: Ecology and impact of natural enemies in blueberry production. **Chris Cutler** (chris.cutler@dal.ca), Dalhousie Univ., Truro, NS, Canada10:20 **2256** Progress towards biological control of hydrilla, *Hydrilla verticillata*. **Matthew Purcell** (matthew.purcell@csiro.au)¹, Nathan Harms², Michael Grodowitz³ and Dean A. Williams⁴, ¹CSIRO, Brisbane, Australia, ²US Army, Vicksburg, MS, ³USDA - ARS, Stoneville, MS, ⁴Texas Christian Univ., Ft Worth, TX10:30 **2257** Will biological control agents of *Lilioceris lili*, lily leaf beetle, parasitize congeneric weed biological control agents for air potato? **Ellen C. Lake** (ellen.lake@ars.usda.gov)¹, Lisa Tewksbury², Melissa Smith¹, F. Allen Dray Jr.¹, Min Rayamajhi¹ and Richard Casagrande², ¹USDA - ARS, Fort Lauderdale, FL, ²Univ. of Rhode Island, Kingston, RI10:40 **2258** Presentation withdrawn

10:50 Break

11:00 **2259** Using targeted and non-targeted metabolic profiling in host range testing for biological control agents. **Gaylord Desurmont** (gdesurmont@ars-ebcl.org)¹, John Gaskin², Gaetan Glauser³, Urs Schaffner⁴, Ted Turlings³ and Harriet Hinz⁴, ¹USDA - ARS, Montpellier, France, ²USDA - ARS, Sidney, MT, ³Univ. of Neuchâtel, Neuchâtel, Switzerland, ⁴CABI, Delémont, Switzerland11:10 **2260** Locally-adapted diapause decisions of biological control agents affect insect voltinism and host plant damage. **Tyson Wepprich** (tyson.wepprich@oregonstate.edu), Fritz Grevstad and Leonard Coop, Oregon State Univ., Corvallis, OR11:20 **2261** A possible case of gall wasp speciation induced by endosymbiotic bacteria. **Kevin Floate** (kevin.floate@agr.gc.ca) and Rosemarie De Clerck-Floate, Agriculture and Agri-Food Canada, Lethbridge, AB, Canada11:30 **2262** Quarantine host range and natural history of *Gadirtha fusca*, a potential biological control agent of Chinese tallowtree (*Triadica sebifera*) in North America. **Gregory Wheeler** (greg.wheeler@ars.usda.gov), USDA - ARS, Fort Lauderdale, FL11:40 **2263** Walnut pests and their management by entomopathogens in a changing world: A case study of Kashmir Himalaya. **Tariq Ahmad** (drtariqento@kashmiruniversity.ac.in)^{1,2} and Dietrich Stephan², ¹Univ. of Kashmir, Srinagar, India, ²Julius Kuhn Institute, Darmstadt, Germany11:50 **2264** Sugar cane weevils' detection and monitoring in Tabasco, Mexico. **Obdulia Segura-León** (sleon@colpos.mx), Humberto Sánchez-Bolón and Juan Cibrian-Tovar, Colegio de Postgraduados, Texcoco, Mexico12:00 **2265** Israel national center for the expression of beneficial insects. **Yoram Yerushalmi** (yoram.yerushalmi@gmail.com), Inspiring Insects, Tivon, Israel**10-min: P-IE, IPM, Forests and General**

Meeting Room 214 (Convention Centre)

Moderators: Norman Leppla¹ and Elizabeth P. Benton², ¹Univ. of Florida, Gainesville, FL, ²Univ. of Georgia, Tifton, GA9:30 **2266** Agricultural producers increasingly depend on professional IPM practitioners to effectively manage crop pests. **Norman Leppla** (ncleppla@ufl.edu), Amanda Hodges, Morgan Pinkerton and Sage Thompson, Univ. of Florida, Gainesville, FL9:40 **2267** Shake'em if you got'em: Use of sound and vibration to disrupt aphids. **Jean-Philippe Parent** (jean-philippe.parent@agr.gc.ca)¹ and Paul Abram², ¹Agriculture and Agri-Food Canada, Vineland, ON, Canada, ²Agriculture and Agri-Food Canada, Agassiz, BC, Canada9:50 **2268** Local or landscape? Features influencing bumblebee (*Bombus* spp.) bycatch in bertha armyworm (*Mamestra configurata*) pheromone-baited monitoring traps in Alberta, Canada. **Nicholas Grocock** (grocock@ualberta.ca) and Maya Evenden, Univ. of Alberta, Edmonton, AB, Canada10:00 **2269** An ecoinformatics approach to pest management in California citrus. **Bodil Cass** (bncass@ucdavis.edu)¹, Hanna Kahl¹, Tobias Mueller¹, Elizabeth E. Grafton-Cardwell² and Jay Rosenheim¹, ¹Univ. of California, Davis, CA, ²Univ. of California, Riverside, CA10:10 **2270** Risk management: A missing piece in IPM decision making? **Fred Musser** (fm61@msstate.edu), Mississippi State Univ., Mississippi State, MS10:20 **2271** Sprayer type and water volume influences insecticide coverage and control of flower thrips in blueberries. **Craig Roubos** (craig.roubos@uga.edu)¹, Brian Little¹, William Lovett², Glen Rains³ and Ashfaq Sial¹, ¹Univ. of Georgia, Athens, GA, ²Univ. of Georgia, Alma, GA, ³Univ. of Georgia, Tifton, GA10:30 **2272** Managing arthropod pests in zucchini with chemical and non-chemical pesticides. **Surendra Dara** (skdara@ucdavis.edu)¹, Sumanth S. R. Dara², Suchitra S. Dara² and Edwin Lewis³, ¹Univ. of California Cooperative Extension, San Luis Obispo, CA, ²Global Agricultural Solutions, Bakersfield, CA, ³Univ. of Idaho, Moscow, ID

10:40 Break

10:50 **2273** Repelling *Contarinia nasturtii* (Diptera: Cecidomyiidae), a specialist pest of brassica crops, using non-host essential oils. **Chase Stratton** (castratt@uvm.edu)¹, Cesar Rodriguez-Saona² and Yolanda Chen¹, ¹Univ. of Vermont, Burlington, VT, ²Rutgers, The State Univ. of New Jersey, New Brunswick, NJ

11:00 **2274** Economic evaluation of insect-pest management in water-deficit cotton production. **Abdul Hakeem** (abdul.hakeem@ag.tamu.edu)¹ and Megha Parajulee², ¹Texas A&M Univ., Lubbock, TX, ²Texas A&M AgriLife Research and Extension Center, Lubbock, TX

11:10 **2275** Plant available water and soil nutrients altered host acceptance and reproduction of mountain pine beetle in the novel host jack pine. **Altaf Hussain** (altaf2@ualberta.ca), Gail Classens, Sydne Guevara-Rozo and Nadir Erbilgin, Univ. of Alberta, Edmonton, AB, Canada

11:20 **2276** Impact of larval diet on disease severity in forest tent caterpillar, *Malacosoma disstria* Hübner (Lepidoptera: Lasiocampidae). **Leah Flaherty** (flaherty@macewan.ca)¹, Chris MacQuarrie², Amanda Roe² and Maya Evenden³, ¹MacEwan Univ., Edmonton, AB, Canada, ²Natural Resources Canada, Sault Ste. Marie, ON, Canada, ³Univ. of Alberta, Edmonton, AB, Canada

11:30 **2277** Phenology of host susceptibility to eastern spruce budworm. **Emma Despland** (despland@alcor.concordia.ca), Concordia Univ., Montréal, QC, Canada

11:40 **2278** Eastern hemlock, endangered persistent trillium, and pollinators: Risks and benefits of imidacloprid use for conservation purposes. **Elizabeth P. Benton** (ebenton@uga.edu)¹, Richard Cowles², Anthony Lagalante³ and Carrie Radcliffe⁴, ¹Univ. of Georgia, Tifton, GA, ²Connecticut Agricultural Experiment Station, Windsor, CT, ³Villanova Univ., Villanova, PA, ⁴Atlanta Botanical Garden, Atlanta, GA

11:50 **2279** Effect of mesh size on preventing ambrosia beetle (Curculionidae: Scolytinae) attacks on ornamental trees using insecticidal netting. **Chris Werle** (chris.werle@ars.usda.gov)¹, Karla Addresso², Jason Oliver², Peter B. Schultz³, Christopher Ranger⁴, Michael Reding⁴, Juang-Horng Chong⁵ and Blair Sampson¹, ¹USDA - ARS, Poplarville, MS, ²Tennessee State Univ., McMinnville, TN, ³Virginia Polytechnic Institute and State Univ., Virginia Beach, VA, ⁴USDA - ARS, Wooster, OH, ⁵Clemson Univ., Clemson, SC

12:00 **2280** Attracting spotted-wing drosophila, *Drosophila suzukii*, using acetoin blend in the field. **Aijun Zhang** (aijun.zhang@ars.usda.gov), Yan Feng and Nicholas Larson, USDA - ARS, Beltsville, MD

12:10 **2281** Early intervention strategy for spruce budworm: Can we contain outbreak spread? **Robert Johns** (rob.johns@canada.ca)¹, Véronique Martel², Sara Edwards³, Emily Owens¹ and Deepa S. Pureswaran², ¹Natural Resources Canada, Fredericton, NB, Canada, ²Natural Resources Canada, Québec City, QC, Canada, ³Forest Protection Limited, Lincoln, NB, Canada

10-min: SysEB, Diversity, Evolution, and Biology of Hemiptera

Meeting Room 304/305 (Convention Centre)

Moderators: Christiane Weirauch¹ and Joel Kits², ¹Univ. of California, Riverside, CA, ²Agriculture and Agri-Food Canada, Vineland, ON, Canada

9:30 **2282** Developing the bug-*Burkholderia* symbiosis as a model for studying environmental symbiont acquisition. **Alison Ravenscraft** (araven@email.arizona.edu) and Martha Hunter, Univ. of Arizona, Tucson, AZ

9:40 **2283** The assassin's tale: Towards resolving the evolutionary history of the Reduviidae. **Christiane Weirauch** (christiane.weirauch@ucr.edu), Univ. of California, Riverside, CA

9:50 **2284** Planthoppers of Pennsylvania (Hemiptera: Auchenorrhyncha: Fulgoroidea): Relative abundance and collection methods. Lawrence Barringer¹ and **Charles Bartlett** (bartlett@udel.edu)², ¹Pennsylvania Dept. of Agriculture, Harrisburg, PA, ²Univ. of Delaware, Newark, DE

10:00 **2285** Preliminary investigation of higher level Fulgoroidea (Hemiptera) phylogeny using mitochondrial genomes and data from additional gene regions. **Juniper Lake** (dnovick@udel.edu)¹, Julie Urban² and Charles Bartlett¹, ¹Univ. of Delaware, Newark, DE, ²Pennsylvania State Univ., University Park, PA

10:10 **2286** Characterizing the roles played by the three obligate bacterial endosymbionts of the spotted lanternfly, *Lycorma delicatula* (Hemiptera: Fulgoridae). **Julie Urban** (jmu2@psu.edu), Pennsylvania State Univ., University Park, PA

10:20 Break

10:30 **2287** Systematics of the leafhopper genus *Norvellina* (Hemiptera: Cicadellidae). **Joel Kits** (joel.kits@agr.gc.ca), Agriculture and Agri-Food Canada, Ottawa, ON, Canada

10:40 **2288** Spittlebugs produce foam as a thermoregulatory adaptation. **José Mauricio Bento** (jmsbento@usp.br)¹, Mateus Tonelli¹, Guilherme Gomes², Weliton Silva¹, Nathália Magri¹, Durval Vieira³ and Claudio Aguiar¹, ¹Univ. de São Paulo, Piracicaba, Brazil, ²Univ. de São Paulo, São Carlos, Brazil, ³Erythro Assessoria Química S/C Ltda, Campinas, Brazil

10:50 **2289** Morphometric and molecular delineation of *Melanaphis sacchari* and *Melanaphis sorghi*. **Samuel Nibouche** (samuel.nibouche@cirad.fr)¹, Raul F. Medina², Jocelyn R. Holt², Joëlle Sadeyen³, Anne-Sophie Zoogones³, Sandro Moretti¹ and Laurent Costet¹, ¹CIRAD - INRA, Saint-Pierre, France, ²Texas A&M Univ., College Station, TX, ³Univ. de La Réunion, Saint-Pierre, France

11:00 **2290** Environmental niche adaptation among the *Bemisia tabaci* cryptic species phylogeographical clades (Hemiptera: Aleyrodidae). **Jorge Paredes-Montero** (jparedes@email.arizona.edu) and Judith K. Brown, Univ. of Arizona, Tucson, AZ

11:10 **2291** Phylogeny, classification, and patterns of speciation for Aspidiotini armored scale insects (Hemiptera: Diaspididae). **Scott Schneider** (scott.schneider@ars.usda.gov)¹, Akiko Okusu² and Benjamin Normark², ¹USDA - ARS, Beltsville, MD, ²Univ. of Massachusetts, Amherst, MA

10-min: SysEB, Systematics, Evolution, and Diversity of Hymenoptera

Meeting Room 302/303 (Convention Centre)

Moderators: John M. Heraty¹ and Andrew M. R. Bennett², ¹Univ. of California, Riverside, CA, ²Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, ON, Canada

9:30 **2292** Systematics and biogeography of nearctic sawflies in the nematine genus *Pristiphora* (Hymenoptera: Tenthredinidae). **Spencer Monckton** (s.monckton@gmail.com), York Univ., Toronto, ON, Canada

9:40 **2293** Hidden jewels: Systematics of fossil Chalcidoidea (Hymenoptera). **Roger A. Burks** (burks.roger@gmail.com)¹, Lars Krogmann², Michael Haas² and John M. Heraty¹, ¹Univ. of California, Riverside, CA, ²State Museum of Natural History, Stuttgart, Germany

9:50 **2294** The search for a gondwanan relict taxon, Rotoitidae (Hymenoptera: Chalcidoidea), and its phylogenetic placement. **John M. Heraty** (john.heraty@ucr.edu)¹, James Woolley², Lars Krogmann³, Ralph Peters⁴, Austin Baker¹ and Krissy Dominguez¹, ¹Univ. of California, Riverside, CA, ²Texas A&M Univ., College Station, TX, ³State Museum of Natural History, Stuttgart, Germany, ⁴Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany

10:00 **2295** Importance of proof-checking in the era of genomics—lessons from phylogenomic analyses of Chalcidoidea wasps (Hymenoptera). **Junxia Zhang** (jxzhang1976@gmail.com), John M. Heraty and Roger Burk, Univ. of California, Riverside, CA

10:10 **2296** Ichneumonid phylogenomics, convergent evolution and predicting function from form: From evolutionary theory to real-world applications. **Bernardo Santos** (santosbe@si.edu), Smithsonian Institution, National Museum of Natural History, Washington, DC

10:20 Break

10:30 **2297** Presentation withdrawn

10:40 **2298** Diversity and taxonomy of *Binodoxys* Mackauer (Hymenoptera: Braconidae) in the United States. **Abigail Martens** (abigail.martens@sdstate.edu) and Paul Johnson, South Dakota State Univ., Brookings, SD

10:50 **2299** Examples of anomalous development in velvet-ant adults (Hymenoptera: Mutillidae). **Craig Brabant** (brabant@entomology.wisc.edu), Wisconsin Insect Research Collection, Madison, WI

11:00 **2300** Checklists of the Hymenoptera of Canada, Alaska, and Greenland: Comparisons in time, space and taxon. **Andrew M. R. Bennett** (andrew.bennett@agr.gc.ca), Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, ON, Canada

11:10 **2301** Modernisation of the Hymenoptera: Ants, bees, wasps, and sawflies of the early Eocene Okanagan Highlands of western North America. **S. Bruce Archibald** (sba48@sfu.ca)¹, Alexandr Rasnitsyn², Denis Brothers³ and Rolf Mathewes¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Russian Academy of Sciences, Moscow, Russian Federation, ³Univ. of KwaZulu-Natal, Scottsville, South Africa

Lunch and Learn: Getting an up Close Look at Concept Artist Ryan Church's Art and Inspiration

West Ballroom ABC (Convention Centre)

Moderator and Organizer: Ryan Church, Independent Graphic Artist, Los Angeles, CA

10:30 AM - 12:00 PM

WEDNESDAY, NOVEMBER 14 • AFTERNOON

Lunch and Learn: A Cross-Border Approach for Assessing the Risk of Pesticides to Bees in Canada and the U.S.

Meeting Room 306 (Convention Centre)

Moderators and Organizers: Connie Hart¹, Reed Johnson², Bridget O'Neill³ and Thomas Steeger⁴, ¹Health Canada, Pest Management Regulatory Agency, Ottawa, ON, Canada, ²The Ohio State Univ., Wooster, OH, ³DuPont Crop Protection, Wilmington, DE, ⁴US Environmental Protection Agency, Washington, DC

12:15 PM - 1:15 PM

Lunch and Learn: Breaking Down the Proverbial Wall: Using Effective Mentoring to Maximize Working Relationships

City Foyer (Level 2) (Convention Centre)

Moderators and Organizers: Katelyn Kesheimer¹, Scott O'Neal², William Kuhn³, Rob Morrison⁴, Lina Bernaola⁵, Monique Rivera⁶, Donna Dean⁷ and Cindy Simpson⁷, ¹Texas A&M Univ., Lubbock, TX, ²Univ. of Nebraska, Lincoln, NE, ³Univ. of Tennessee, Knoxville, TN, ⁴USDA - ARS, Manhattan, KS, ⁵Louisiana State Univ., Baton Rouge, LA, ⁶Univ. of Florida, Lake Alfred, FL, ⁷Association for Women in Science, Washington, DC

12:15 PM - 1:15 PM

Lunch and Learn: Certifications: What There Is and How It Helps

Meeting Room 221/222 (Convention Centre)

Moderators and Organizers: Michelle Hartzler¹, Angela M. Tucker², Shripat Kamble³, Jim Fredericks⁴ and Elizabeth Dykstra⁵, ¹Rollins, Atlanta, GA, ²Kansas State Univ., Manhattan, KS, ³Univ. of Nebraska, Lincoln, NE, ⁴National Pest Management Association, Fairfax, VA, ⁵Washington State Dept. of Health, Olympia, WA

12:45 PM - 1:45 PM

Program Symposium: Crossing Borders for a Healthier Tomorrow: The Role of Entomology in the One Health Initiative

Meeting Room 109 (Convention Centre)

Moderators and Organizers: Scott O'Neal¹, Joanna Konopka², Dan Peach³, Isobel Ronai⁴ and Nicholas Larson⁵, ¹Univ. of Nebraska, Lincoln, NE, ²Western Univ., London, ON, Canada, ³Simon Fraser Univ., Burnaby, BC, Canada, ⁴Univ. of Sydney, Sydney, Australia, ⁵USDA - ARS, Beltsville, MD

1:30 Welcoming remarks

1:35 **2302** Pests, pollinators, and pesticides: A One Health perspective on global health and food security. **Laura Kahn** (lkahn@princeton.edu), Princeton Univ., Princeton, NJ

2:05 **2303** The challenge of the sarcoptic mange epidemic in Pennsylvania black bears: The role of the One Health Initiative in veterinary entomology. **Erika Machtiger** (etm10@psu.edu)¹, Hannah Greenberg¹, Mark Tennent² and Justin Brown², ¹Pennsylvania State Univ., University Park, PA, ²Pennsylvania Game Commission, Harrisburg, PA

WEDNESDAY, NOVEMBER 14 /
MERCREDI 14 NOVEMBRE

2:20 **2304** Ticks: Unwittingly helping to unite efforts to protect human and animal health. **Kateryn Rochon** (kateryn.rochon@umanitoba.ca)¹, L. Robbin Lindsay² and Nicholas Ogden³, ¹Univ. of Manitoba, Winnipeg, MB, Canada, ²Public Health Agency of Canada, Winnipeg, MB, Canada, ³Public Health Agency of Canada, Saint-Hyacinthe, QC, Canada

2:35 **2305** Socioeconomic and gender-based differential immune response against mosquito salivary proteins in dengue endemic areas. **Berlin Londoño-Rentería** (blondono@ksu.edu)¹, Heman Shakeri¹, Paula Roza-Lopez¹, Michael Conway², Majid Jaber-Douraki¹ and Tonya Colpitts³, ¹Kansas State Univ., Manhattan, KS, ²Central Michigan Univ., Mount Pleasant, MI, ³Boston Univ. School of Medicine, Boston, MA

2:50 **2306** Epidemiological determinants of Zika virus transmission and spread in the Americas. **Benoit Talbot** (benoit.talbot@uottawa.ca)¹, Beate Sander² and Manisha Kulkarni¹, ¹Univ. of Ottawa, Ottawa, ON, Canada, ²Toronto General Hospital, Toronto, ON, Canada

3:05 **2307** Importance of the perimicrovillar membrane of triatomines in the interaction with *Trypanosoma cruzi*, causal agent of Chagas disease. **Ana Gutiérrez-Cabrera** (aegutierrezca@conacyt.mx), Instituto Nacional de Salud Pública, Cuernavaca, Mexico

3:20 Break

3:30 **2308** Funding opportunities for research targeting environmental health and food security issues: A perspective from USDA - NIFA. **Mary Purcell-Miramontes** (mpurcell@nifa.usda.gov), USDA - NIFA, Washington, DC

4:00 **2309** Developing diagnostic tools for ecological risk assessment. **Alexa Alexander Trusiak** (alexa.alexander-trusiak@canada.ca), Environment and Climate Change Canada, Fredericton, NB, Canada

4:15 **2310** Specialized herbivorous insects offer promise to restoring native biological communities displaced by an invasive weed. **Dale Halbritter** (dale.halbritter@ars.usda.gov) and Gregory Wheeler, USDA - ARS, Fort Lauderdale, FL

4:30 **2311** Harnessing sight communication pathways for fly management. **Bekka Brodie** (brodieb@ohio.edu)¹, Courtney Eichorn², Michael Hrabar², Emma Van Ryn², Adam Blake² and Gerhard Gries², ¹Ohio Univ., Athens, OH, ²Simon Fraser Univ., Burnaby, BC, Canada

4:45 **2312** Pollinator health: Integrating ecological, genetic and physiological factors. **Margarita López-Urbe** (mml64@psu.edu)¹ and Michael Simone-Finstrom², ¹Pennsylvania State Univ., University Park, PA, ²USDA - ARS, Baton Rouge, LA

5:00 **2313** Investigating interactions between environmental stressors and honey bee immunity. **Scott O'Neal** (soneal3@unl.edu) and Troy Anderson, Univ. of Nebraska, Lincoln, NE

SD2314 Air pollution impairs honey bee learning and memory of olfactory cues. **Ryan Leonard** (ryan.leonard@sydney.edu.au)¹, Thomas Pettit², Peter Irga², Clare McArthur¹ and Dieter Hochuli¹, ¹Univ. of Sydney, Sydney, Australia, ²Univ. of Technology, Ultimo, Australia

SD2315 Diamide modulation of the ryanodine receptor in a pest and beneficial species. **Jennifer Williams** (jwilliams90@huskers.unl.edu) and Troy Anderson, Univ. of Nebraska, Lincoln, NE

SD2316 Sublethal effects of insecticides on bed bug behavior. **Kacie Athey** (kacie.johansen@uky.edu), Kenneth Haynes and Michael Potter, Univ. of Kentucky, Lexington, KY

SD2317 Fumigation of the common bed bug (*Cimex lectularius* L.) with a floral volatile organic compound. **Nicholas Larson** (nicholas.larson@ars.usda.gov), Mark Feldlaufer and Aijun Zhang, USDA - ARS, Beltsville, MD

SD2318 Insight into genome wide methylation and epigenetic mechanisms in the black-legged tick, *Ixodes scapularis*. **Arvind Sharma** (arvinds@unr.edu), Lauren Mitchell and Monika Gulia-Nuss, Univ. of Nevada, Reno, NV

SD2319 Comparing the behavior, ecology, and host-associations of *Ixodes scapularis* between regions with low and high Lyme disease prevalence. **Mackenzie Tietjen** (kenzietietjen@tamu.edu)¹, Maria Esteve-Gassent¹, Ivan Castro Arellano², Andrew Li³ and Raul F. Medina¹, ¹Texas A&M Univ., College Station, TX, ²Texas State Univ., San Marcos, TX, ³USDA - ARS, Beltsville, MD

SD2320 The effects of virus infection on repellent response in *Aedes albopictus*. **Kevin Chan** (kchan90@vt.edu), Sally Paulson and Carlyle Brewster, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

SD2321 Genetic variation for dengue resistance in *Aedes aegypti* revealed by a genome-wide association study. **Heather Coatsworth** (hcoatswo@sfu.ca)¹, Clara Ocampo² and Carl Lowenberger¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Centro Internacional de Entrenamiento e Investigaciones Medicas, Cali, Colombia

SD2322 Big data in pathogen surveillance: From digital phenotypes to metagenomes. **Isaiah Hoyer** (v-ishoye@microsoft.com)¹, Andrzej Pastusiak¹, Jonathan Carlson¹, Maria Saenz Robles², James Pipas², Giovanna Carpi³, Douglas Norris³ and Ethan Jackson¹, ¹Microsoft Research, Redmond, WA, ²Univ. of Pittsburgh, Pittsburgh, PA, ³Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

SD2323 Transovarial delivery of Cas9 to diverse arthropod species for easy genetic manipulation. **Vanessa Macias** (vzm10@psu.edu)¹, Duverney Chaverra-Rodriguez¹, Grant Hughes², Rong Ma¹, Allyson Ray¹, Donghun Kim¹, Sujit Pujhari¹, Sage McKeand¹ and Jason Rasgon¹, ¹Pennsylvania State Univ., University Park, PA, ²Univ. of Texas, Galveston, TX

SD2324 Plant oils increase the toxicity of select insecticides: Additive toxicity and synergistic interactions. **Edmund Norris** (ejnorris@iastate.edu)¹, Aaron Gross², Lyric Bartholomay³ and Joel Coats¹, ¹Iowa State Univ., Ames, IA, ²Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ³Univ. of Wisconsin, Madison, WI

SD2325 The attraction of *Culex pipiens* to avian odours and associated visual cues. **Dan Peach** (dap3@sfu.ca), Elton Ko, Adam Blake, Regine Gries and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada

SD2326 Revealing the mechanisms of insecticide resistance in mosquitoes: A key challenge to protecting human health. **Leslie Rault** (lrault2@unl.edu), Scott O'Neal, Ellis Johnson and Troy Anderson, Univ. of Nebraska, Lincoln, NE

5:15 Poster session & mixer

Program Symposium: Insect Microbiomes: Traversing Disciplines to Understand and Manage Helpful and Harmful Hexapods

Meeting Room 211 (Convention Centre)

Moderators and Organizers: Jacob Russell¹ and Martha Hunter²,
¹Drexel Univ., Philadelphia, PA, ²Univ. of Arizona, Tucson, AZ

1:30 Introductory remarks

1:35 **2327** Genomic changes and evolutionary stability of antibiotic production in a 68 million-year-old defensive symbiosis.

Martin Kaltenpoth (mkaltenpoth@uni-mainz.de), Johannes Gutenberg Univ., Mainz, Germany

1:50 **2328** Genomic signatures of the transition to *Wolbachia*-mediated asexuality. **Amelia Lindsey** (alind005@ucr.edu)¹, Xin Wu², Paramita Chatterjee², John Werren³, Richard Stouthamer⁴ and Soojin Yi², ¹Indiana Univ., Bloomington, IN, ²Georgia Institute of Technology, Atlanta, GA, ³Univ. of Rochester, Rochester, NY, ⁴Univ. of California, Riverside, CA

2:05 **2329** Unraveling gut microbiota function in the social corbiculate bees. **Waldan Kwong** (waldankwong@gmail.com)¹ and Nancy Moran², ¹The Univ. of British Columbia, Vancouver, BC, Canada, ²Univ. of Texas, Austin, TX

2:20 **2330** Symbionts mediate host-parasitoid coevolution in insects. **Christoph Vorburger** (christoph.vorburger@eawag.ch), Eawag: Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland

2:35 Break

2:50 **2331** Evolution, ecology and specificity in a *Drosophila* defensive symbiosis. **Steve Perlman** (stevep@uvic.ca) and Matthew Ballinger, Univ. of Victoria, Victoria, BC, Canada

3:05 **2332** Untangling the regulatory role of symbiont small RNAs in response to host environmental changes. **Margaret Thairu** (mthai005@ucr.edu) and Allison Hansen, Univ. of California, Riverside, CA

3:20 **2333** Symbiosis as a source of pectinolysis in leaf beetles. **Hassan Salem** (hssalem@emory.edu), Emory Univ., Atlanta, GA

3:35 **2334** The role of gut bacteria in detoxifying plant defense compounds in a leaf mining fly. **Rebecca Duncan** (rpduncan@berkeley.edu) and Noah Whiteman, Univ. of California, Berkeley, CA

3:50 **2335** Mechanisms for the endosymbiont *Wolbachia* blocking Zika virus replication. **Horacio Frydman** (hfrydman@bu.edu), Boston Univ., Boston, MA

4:05 Break

4:20 **2336** Insect symbionts as biocontrol agents in plant pathosystems. **Einat Zchori-Fein** (einat@agri.gov.il)¹, Lilach lasur-Kruh², Ofir Bahar³ and Vered Naor⁴, ¹Agricultural Research Organization, The Volcani Center, Ramat Yishay, Israel, ²OORT Braude College, Karmiel, Israel, ³Agricultural Research Organization, The Volcani Center, Rishon LeZion, Israel, ⁴Shamir Research Institute, Rishon LeZion, Israel

4:35 **2337** How a selective symbiosis influences the ability of *Anasa tristis* to vector a plant pathogen. **Nicole Gerardo** (nicole.gerardo@emory.edu)¹, Tarik Acevedo² and Junyan Xia¹, ¹Emory Univ., Atlanta, GA, ²Pennsylvania State Univ., University Park, PA

4:50 **2338** The mosquito gut microbiome and its functions for development and immunity. **Kerri Coon** (kerri.coon@wisc.edu), Univ. of Wisconsin, Madison, WI

5:05 **2339** Molecular bases of the stinkbug-*Burkholderia* gut symbiosis. **Yoshitomo Kikuchi** (y-kikuchi@aist.go.jp), National Institute of Advanced Industrial Science and Technology, Sapporo, Japan

5:20 Concluding remarks

MUVE Section Symposium: Arthropod Genomics and Molecular Biology: What's New!

Meeting Room 301 (Convention Centre)

Moderators and Organizers: Monika Gulia-Nuss and Andrew Nuss, Univ. of Nevada, Reno, NV

1:30 Welcoming remarks

1:35 **2340** Epigenetic regulation of hormone action in *Aedes aegypti*. **Sharath Chandra Gaddelapati** (sharathgsc@uky.edu) and Subba Reddy Palli, Univ. of Kentucky, Lexington, KY

1:50 **2341** Use of gene editing tools to elucidate *Aedes* Cadherin protein function. **Sarjeet S. Gill** (sarjeet.gill@ucr.edu), Jianwu Chen and Karlygash G. Aimanova, Univ. of California, Riverside, CA

2:05 **2342** Tick genomics-challenges and opportunities. **Monika Gulia-Nuss** (mgulianuss@unr.edu)¹, Arvind Sharma¹ and Robert A. Harrell², ¹Univ. of Nevada, Reno, NV, ²Univ. of Maryland, Rockville, MD

2:20 **2343** Are redox signaling and innate immunity the keystone of vector competence in ticks? **Shahid Karim** (shahid.karim@usm.edu), Deepak Kumar, Faizan Tahir, Gary Crispell, Latoyia Downs and Surendra Sharma, The Univ. of Southern Mississippi, Hattiesburg, MS

2:35 **2344** Some like it hot: Thermal biology of disease vector insects. **Chloé Lahondère** (lahonder@uw.edu), Univ. of Washington, Seattle, WA

2:50 **2345** Breaking insecticide resistance: Peptide neurohormone targets and beyond. **Andrew Nuss** (nuss@cabnr.unr.edu), Zachary Speth, Rana Pooraiouby and Dennis Mathew, Univ. of Nevada, Reno, NV

3:05 Break

3:15 **2346** Chemoreception in Ixodes ticks: A simplified chemosensory network. **Almudena Ortiz-Urquiza** (a.ortiz-urquiza@swansea.ac.uk), Swansea Univ., Swansea, United Kingdom

3:30 **2347** GnRH-related neuropeptides in *Aedes aegypti*: Unravelling functional roles of an insect-specific family member. **Jean-Paul Paluzzi** (paluzzi@yorku.ca), York Univ., Toronto, ON, Canada

3:45 **2348** Prokaryote-targeted gut metatranscriptome sequencing in the termite *Reticulitermes flavipes*. **Michael Scharf** (mscharf@purdue.edu) and Brittany Peterson, Purdue Univ., West Lafayette, IN

4:00 **2349** Cross-talk between the mosquito and arboviruses. **Sujatha Sunil** (sujatha@icgeb.res.in), International Centre for Genetic Engineering and Biotechnology, New Delhi, India

4:15 **2350** Functional genomics in arthropod disease vectors. **Kevin Vogel** (kjavogel@uga.edu), Univ. of Georgia, Athens, GA

4:30 Concluding remarks

PBT Section Symposium: Social Insect Nutritional Ecology in a Changing World*Meeting Room 302/303 (Convention Centre)***Moderators and Organizers:** Pierre Lau, Pierre Lesne, Juliana Rangel and Spence Behmer, Texas A&M Univ., College Station, TX

1:30 Introductory remarks

1:35 **2351** The balancing of macronutrients by honey bees and the consequences of macronutrient deficiencies. **Sharoni Shafir** (shafir@agri.huji.ac.il), The Hebrew Univ., Rehovot, Israel2:05 **2352** Role of phytochemicals on honey bee longevity and pathogen tolerance. **Arathi Seshadri** (arathi@colostate.edu), Elisa Bernklau and Louis Bjostad, Colorado State Univ., Fort Collins, CO2:20 **2353** Nutritional interactions in insect societies: Insights from geometry. **Mathieu Lihoreau** (mathieu.lihoreau@univ-tlse3.fr)¹ and Jerome Buhé², ¹Univ. Paul Sabatier, Toulouse, France, ²The Univ. of Adelaide, Adelaide, Australia2:35 **2354** Are honey bees out for the gains? Honey bee preferences for nutritionally distinctive pollen types. **Pierre Lau** (plau0168@tamu.edu), Texas A&M Univ., College Station, TX2:50 **2355** Using honey bee foraging choice to understand colony-level dietary deficiencies. **Vanessa Corby-Harris** (vanessa.corby@ars.usda.gov), USDA - ARS, Tucson, AZ

3:05 Break

3:35 **2356** The elemental theatre and the ecological play: Linking an organism's recipe to its niche. **Michael Kaspari** (mkaspari@ou.edu), Univ. of Oklahoma, Norman, OK4:05 **2357** Nutrition and the rise of domesticated fungus cultivation by attine ants. **Jonathan Shik** (jonathan.shik@bio.ku.dk), Univ. of Copenhagen, Copenhagen, Denmark4:20 **2358** Fatty acids and sodium intake regulation as potential factors mediating competitive interactions in two invasive ant species. **Pierre Lesne** (pierre.lesne@tamu.edu), Richelle Marquess and Spence Behmer, Texas A&M Univ., College Station, TX4:35 **2359** The role of nutrition in a host-pathogen relationship: Ants versus fungus. **Enikő Csata** (csataeniko88@gmail.com)¹, Alfonso Pérez-Escudero¹ and Audrey Dussutour², ¹Centre de Recherches sur la Cognition Animale, Toulouse, France, ²Univ. Paul Sabatier, Toulouse, France4:50 **2360** Regulation of the intake of inorganic nutrients by the termite *Reticulitermes flavipes*. **Timothy M. Judd** (tjudd@semo.edu), Southeast Missouri State Univ., Cape Girardeau, MO

5:05 Concluding remarks

P-IE Section Symposium: Crossing New Frontiers in Conservation Biological Control*Meeting Room 122 (Convention Centre)***Moderators and Organizers:** Lessando Gontijo¹ and William Snyder², ¹Univ. Federal de Viçosa, Florestal, Brazil, ²Washington State Univ., Pullman, WA

1:30 Welcoming remarks

1:35 **2361** Enhancing food security and safety through habitat management and conservation biological control in Africa. **Charles Midega** (cmidega@mbita.icipe.org)¹, John Pickett², Toby Bruce² and Zeyaur Khan¹, ¹International Centre of Insect Physiology and Ecology (icipe), Nairobi, Kenya, ²Rothamsted Research, Harpenden, United Kingdom1:50 **2362** Harnessing multi-trophic interactions and chemical ecology for improved biological control. **Jared Ali** (jga8@psu.edu), Pennsylvania State Univ., University Park, PA2:05 **2363** Food webs and conservation biological control: Going deeper into the species richness. **Marcelo Haro** (marceloharo@epagri.sc.gov.br), Company of Agricultural Research and Rural Extension of Santa Catarina (EPAGRI), Itajaí, Brazil2:20 **2364** A global quantitative synthesis of landscape effects on conservation biological control. **Heather Grab** (hlc66@cornell.edu)¹, Rebecca Chaplin-Kramer², Emily Martin³, Megan E. O'Rourke⁴, Ricardo Perez-Alvarez¹, Mary Centrella¹, Tim Luttermoser¹ and Katja Poveda¹, ¹Cornell Univ., Ithaca, NY, ²Univ. of California, Berkeley, CA, ³Univ. of Würzburg, Würzburg, Germany, ⁴Virginia Polytechnic Institute and State Univ., Blacksburg, VA2:35 **2365** Conservation biological control (CBC) using selective insecticides as a valuable tool for IPM. **Adeney Bueno** (adeney.bueno@embrapa.br), Embrapa Pesquisa e Desenvolvimento, Londrina, Brazil

2:50 Break

3:05 **2366** For better or for worse: The many ways companion plants can affect conservation biological control. **Lessando Gontijo** (lessandomg@ufv.br), Univ. Federal de Viçosa, Florestal, Brazil3:20 **2367** Conservation biological control and the concept of evolutionary rescue. **J. P. Michaud** (jpmi@ksu.edu), Kansas State Univ., Hays, KS3:35 **2368** Conserving biological control and human health. **William Snyder** (wesnyder@wsu.edu), Washington State Univ., Pullman, WA3:50 **2369** Reverse engineering habitat management to enhance survival of the monarch butterfly (*Danaus plexippus*) at landscape scales. **Douglas A. Landis** (landisd@msu.edu)¹, Nathan Haan², Andrew Myers¹, Sara Hermann¹ and Carissa Blackledge¹, ¹Michigan State Univ., East Lansing, MI, ²Univ. of Washington, Seattle, WA**P-IE Section Symposium: Flight of Ideas: Various Methods for Monitoring Insect Movement across the Landscape***Meeting Room 114/115 (Convention Centre)***Moderators and Organizers:** Kevin Rice¹ and James Hagler², ¹Univ. of Missouri, Columbia, MO, ²USDA - ARS, Maricopa, AZ

1:30 Introductory remarks

1:35 **2370** Harmonic radar as a tool to monitor agricultural insect pests. **Charles Vincent** (charles.vincent@agr.gc.ca)¹, Tracy C. Leskey², Doo-Hyung Lee³ and Gilles Boiteau⁴, ¹Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada, ²USDA - ARS, Kearneysville, WV, ³Gachon Univ., Seongnam, South Korea, ⁴Agriculture and Agri-Food Canada, Fredericton, NB, Canada1:50 **2371** Using protein markers to identify within field dispersal of brown marmorated stink bug. **Anne Nielsen** (nielsen@aesop.rutgers.edu)¹ and Brett Blaauw², ¹Rutgers, The State Univ. of New Jersey, Bridgeton, NJ, ²Univ. of Georgia, Athens, GA

2:05 **2372** Trapping of small organisms moving randomly, principles and applications to pest monitoring and management, an overview. **Christopher Adams** (adamsch@msu.edu), Jim Miller and Larry Gut, Michigan State Univ., East Lansing, MI

2:20 **2373** Insect response and dispersal within a semi-natural natural gas field undergoing restoration activities. **Michael Curran** (mcurran2@uwyo.edu)¹, James Hagler², Douglas Smith¹, Scott Machtley², Richard Sprecher¹, Tim Robinson¹, Randa Jabbour¹ and Peter Stahl¹, ¹Univ. of Wyoming, Laramie, WY, ²USDA - ARS, Maricopa, AZ

2:35 **2374** Illustrating the effects of trap cropping on insect movement and behavior in organic strawberry. **Diego J. Nieto** (dnieto@ucsc.edu)¹, James Hagler², Scott Machtley², Charles H. Pickett³ and Sean L. Swezey⁴, ¹Driscoll's, Watsonville, CA, ²USDA - ARS, Maricopa, AZ, ³California Dept. of Food and Agriculture, Sacramento, CA, ⁴Univ. of California, Santa Cruz, CA

2:50 Break

3:10 **2375** Seasonal dispersal of spotted-wing drosophila from wild and cultivated host plants. **Heather Leach** (leachhea@msu.edu)¹, James Hagler², Scott Machtley² and Rufus Isaacs³, ¹Pennsylvania State Univ., University Park, PA, ²USDA - ARS, Maricopa, AZ, ³Michigan State Univ., East Lansing, MI

3:25 **2376** Lights, lasers, and drones: New techniques for tracking insects in the field. **Kevin Rice** (ricekevinb@gmail.com)¹, Miguel Hernandez², John Tooker³, Henry Medeiros², Amy Tabb⁴ and Tracy C. Leskey⁴, ¹Univ. of Missouri, Columbia, MO, ²Marquette Univ., Milwaukee, WI, ³Pennsylvania State Univ., University Park, PA, ⁴USDA - ARS, Kearneysville, WV

3:40 **2377** Nonlethal detection of protein-marked non-*Apis* bees. **Theresa Pitts-Singer** (theresa.pitts-singer@ars.usda.gov)¹, Natalie Boyle¹, Amber Tripodi¹, Scott Machtley², James Strange¹ and James Hagler², ¹USDA - ARS, Logan, UT, ²USDA - ARS, Maricopa, AZ

3:55 **2378** Tracking insect movement between a desert-adapted trap crop and cotton using a revised protein immunomarking technique. **James Hagler** (james.hagler@ars.usda.gov), Scott Machtley, Melissa Stefanek and Allison Machtley, USDA - ARS, Maricopa, AZ

P-IE Section Symposium: *Rhynchophorus* Weevil: A Global Threat Beyond Borders

Meeting Room 119/120 (Convention Centre)

Moderators and Organizers: Aziz Ajlan¹, Khalid Alhudaib², Abdulaziz Mohamed³, J. R. Faleiro⁴, Shoki Al-Dobai⁵, Muhammad Haseeb⁶ and Study Group "Integrated Protection of Date Palms" (SG IPDP)⁷, ¹King Faisal Univ., Jeddah, Saudi Arabia, ²King Faisal Univ., Hofuf, Saudi Arabia, ³Arabian Gulf Univ., Manama, Bahrain, ⁴Independent Red Palm Weevil Consultant, Goa, India, ⁵Food and Agriculture Organization, Rome, Italy, ⁶Florida A&M Univ., Tallahassee, FL, ⁷International Organization for Biological and Integrated Control, Manama, Bahrain

1:30 Introductory remarks

1:35 **2379** The South American palm weevil invasion in Southern California. **Christina D. Hoddle** (christina.hoddle@ucr.edu) and Mark Hoddle, Univ. of California, Riverside, CA

1:50 **2380** Red palm weevil (Coleoptera: Dryophthoridae) and sister species in the Caribbean pathways to Florida. **Muhammad Haseeb** (muhammad.haseeb@famu.edu)¹, Jing Zhang², Omotola Dosunmu³, Lambert Kanga¹, Richard Mankin⁴ and Jesusa C. Legaspi⁵, ¹Florida A&M Univ., Tallahassee, FL, ²Chinese Academy of Sciences, Beijing, China, ³Univ. of Florida, Gainesville, FL, ⁴USDA - ARS, Gainesville, FL, ⁵USDA - ARS, Tallahassee, FL

2:05 **2381** Red palm weevil (*Rhynchophorus ferrugineus*) invades Israel in 1999. **Shimon Bitton** (shibiton6@gmail.com), Ministry of Agriculture, Shaham, Israel

2:20 **2382** *Rhynchophorus palmarum* a serious pest of oil palm in Colombia. **Alex Bustillo-Pardey** (abustillo@cenipalma.org), Colombian Oil Palm Research Center, Bogotá, Colombia

2:35 **2383** Comparison between traps for mass trapping of palm weevils does not support the alleged mechanism of action of Electrap. **Francisco Gonzalez** (francisco_gonzalez@chemtica.com), Carlos Rodriguez, Carolina Calvo and Cam Oehlschlager, ChemTica Internacional, Heredia, Costa Rica

2:50 **2384** Area-wide suppression tactics of red palm weevil, *Rhynchophorus ferrugineus* Oliv., infesting coconut palms in India. **Chandrika Mohan** (cmcpcri@gmail.com), A. Josephraj Kumar, Vinayaka Hegde, V. Krishnakumar and P. Chowdappa, ICAR, Kerala, India

3:05 **2385** Microorganisms associated with the red palm weevil, a direction toward new research trends. **AbdulAziz Mohamed** (amamohamed@agu.edu.bh), Muhammad Farooq and Malabika Pathak, Arabian Gulf Univ., Manama, Bahrain

3:20 Break

3:30 **2386** Evaluation of some non-invasive approaches for the early detection of red palm weevil, *Rhynchophorus ferrugineus*, infestation. **Abdulrahman Aldawood** (aldawood@ksu.edu.sa), Khawaja Ghulam Rasool and Muhammad Tufail, King Saud Univ., Riyadh, Saudi Arabia

3:45 **2387** Isolation and characterization of indigenous *Beauveria bassiana* isolated from date palm infested with *Rhynchophorus ferrugineus* (Olivier) in Hail region, Saudi Arabia. **Khalid Asiry** (prof_1974@hotmail.com)¹, Abdel Moneim Sulieman², Naimah Al-Anazi², Vajid Veetil², Mohanad Abdelgadir² and Ibrahim Alkhregi², ¹King Abdulaziz Univ., Jeddah, Saudi Arabia, ²King Abdulaziz Univ., Hail, Saudi Arabia

4:00 **2388** Impact of periodic visual inspection of date palms in area-wide control of red palm weevil, *Rhynchophorus ferrugineus* Olivier. **Abdul Moneim Al-Shawaf** (yassir1418@yahoo.com), Yousef Al-Fuhaid, Ibrahim Abdullah, Bakheet Al-Awad, Abdel Moneim Al-Dandan, Zakaria Al-Asfour and Ali Al-Khalifa, Ministry of Environment, Water and Agriculture, Al-Ahsa, Saudi Arabia

4:15 **2389** Red palm weevil pest response through biologically-based technologies. **Divina Amalin** (divina.amalin@dlsu.edu.ph)¹, Jose Janairo¹, Mary Jane Flores¹ and Alberto Barrion^{1,2}, ¹De La Salle Univ., Manila, Philippines, ²Univ. of the Philippines, Laguna, Philippines

4:30 **2390** Cassava, *Manihotesculenta* Crantz, a befitting source for the isolation of insecticidal molecules against red palm weevil. **Cheruvandasseri Jayaprakas** (prakashcaj@gmail.com)¹ and S. Leena², ¹Indian Council of Agricultural Research, Thiruvananthapuram, India, ²ICAR, Kerala, India

4:45 **2391** Mass trapping of red palm weevil in coconut plantations of Goa using aggregation pheromone traps. **R. Maruthadurai** (maruthadurai.r@icar.gov.in) and R. Ramesh, ICAR, Goa, India

5:00 **2392** Current status of red palm weevil *Rhynchophorus ferrugineus* in Morocco. **Rachid Bouharroud** (bouharroud@yahoo.fr), INRA, Agadir, Morocco

5:15 **2393** Prevention of entry and spread of red palm weevil in KSA: Regulatory strategies and issues. **Sarath Balijepalli** (sarath60@yahoo.com)¹, Moises Fajardo², Polana S. P. V. Vidyasagar², J. R. Faleiro² and Abubakr Mohamed², ¹National Bureau of Plant Genetic Resources, Hyderabad, India, ²Food and Agriculture Organization, Riyadh, Saudi Arabia

5:30 Discussion

Member Symposium: Advances in Coccoidea Research: New Perspectives on Scale Insect and Mealybug Biology and Management

Meeting Room 210 (Convention Centre)

Moderators and Organizers: Juang-Horng Chong¹, William Klingeman², Shimat Joseph³ and Jessica Awad⁴, ¹Clemson Univ., Clemson, SC, ²Univ. of Tennessee, Knoxville, TN, ³Univ. of Georgia, Griffin, GA, ⁴Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

1:30 Introductory remarks

1:35 **2394** The evolution of the pupillarial habit in armored scale insects. **Benjamin Normark** (bnormark@ent.umass.edu) and Mayrolin García Morales, Univ. of Massachusetts, Amherst, MA

1:50 **2395** Asymmetrical host-use specialization in scale insects. **Nate Hardy** (n8@auburn.edu), Auburn Univ., Auburn, AL

2:05 **2396** Juvenile hormone regulation of *Planococcus* mealybug life history: Sexual dimorphism, metamorphosis, reproduction and aging. **Isabelle Vea** (isabelle.vea@ed.ac.uk)¹, Sayumi Tanaka², Sumika Yonei², David Wu¹, Tomohiro Tsuji², Takahiro Shiotsuki³, Akiya Jouraku³, Laura Ross¹ and Chieka Minakuchi², ¹Univ. of Edinburgh, Edinburgh, United Kingdom, ²Nagoya Univ., Nagoya, Japan, ³National Institute of Agrobiological Sciences, Tsukuba, Japan

2:20 **2397** The life history of *Allokermes galliformis* sheds light on its commensal relationship with the drippy blight pathogen. **Rachael Sitz** (rsitz@fs.fed.us)^{1,2} and Whitney Cranshaw², ¹USDA - Forest Service, Fort Collins, CO, ²Colorado State Univ., Fort Collins, CO

2:35 **2398** Prosperous livelihood on the Dead Sea shore: Two tamarisk mealybugs (*Trabutina* spp., Cocomorpha: Pseudococcidae) and their associates. Ben Levi¹, Alexie Protasov¹, **Malkie Spodek** (malkiespodek@gmail.com)^{2,3} and Zvi Mendel⁴, ¹Agricultural Research Organization, The Volcani Center, Rishon LeZion, Israel, ²The Steinhardt Museum of Natural History, Tel Aviv, Israel, ³Southern Arava R&D, D.N. Eilat, Israel, ⁴Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel

2:50 **2399** The fortuitous classical biological control of *Cryptocerya multicatrides*. **Takumasa Kondo** (takumasa.kondo@gmail.com), Corporación colombiana de investigación agropecuaria, Palmira, Colombia

3:05 **2400** Lepidopteran predators of scale insects: A review. **Jessica Awad** (jessica.awad@freshfromflorida.com) and James Hayden, Florida Dept. of Agriculture and Consumer Services, Gainesville, FL

3:20 **2401** The effects of warming on scale insects: From street trees to forests. **Steven D. Frank** (steven_frank@ncsu.edu)¹, Lawrence Long¹, Michael Just¹, Vincent D'Amico² and Adam Dale³, ¹North Carolina State Univ., Raleigh, NC, ²USDA - Forest Service, Newark, DE, ³Univ. of Florida, Gainesville, FL

3:35 Break

3:45 **2402** Species assemblage and diversity of scale insects in Florida. **Muhammad Ahmed** (muhammad.ahmed@freshfromflorida.com), Florida Dept. of Agriculture Division of Plant Industry, Gainesville, FL

4:00 **2403** What diagnostic service records reveal that is guiding training resource development for key scale insect pests. **William Klingeman** (wklingem@utk.edu)¹, Juang-Horng Chong², Carrie L. Harmon³, Lisa Ames⁴, Anthony LeBude⁵ and Predeesh Chandran⁶, ¹Univ. of Tennessee, Knoxville, TN, ²Clemson Univ., Clemson, SC, ³Univ. of Florida, Gainesville, FL, ⁴Univ. of Georgia, Griffin, GA, ⁵North Carolina State Univ., Mills River, NC, ⁶Clemson Univ., Pendleton, SC

4:15 **2404** Developing management plans for crapemyrtle bark scale (*Acanthococcus lagerstroemiae*). **Michael Merchant** (m-merchant@tamu.edu)¹ and Erfan Vafaie², ¹Texas A&M Univ., Dallas, TX, ²Texas A&M Univ., Overton, TX

4:30 **2405** Managing Japanese maple scale in nursery production. **Karla Adesso** (kaddesso@tinst.edu) and Paul O'Neal, Tennessee State Univ., McMinnville, TN

4:45 **2406** Japanese maple scale, *Lopholeucaspis japonica*, rages out of control: Knowing and controlling the enemy with an IPM approach. **Stanton Gill** (sgill@umd.edu)¹, Brian Kunkel², Paula M. Shrewsbury³, Nancy Harding⁴, Charles Schuster⁵, Tom Ilvento², Suzanne Klick⁶ and Virginia Rosenkranz⁷, ¹Univ. of Maryland, Ellicott City, MD, ²Univ. of Delaware, Newark, DE, ³Univ. of Maryland, College Park, MD, ⁴Univ. of Maryland Extension, College Park, MD, ⁵Univ. of Maryland, Derwood, MD, ⁶Central Maryland Research and Education Center, Ellicott City, MD, ⁷Univ. of Maryland, Salisbury, MD

5:00 **2407** Family and duration of crawler emergence periods influence efficacy of insecticides against scale insects. **Carlos Quesada** (cuq13@psu.edu)¹ and Clifford Sadof², ¹Pennsylvania State Univ., State College, PA, ²Purdue Univ., West Lafayette, IN

5:15 **2408** Efficacy of systemic insecticides depends on the feeding site of scale insects. **Juang-Horng Chong** (juanghc@clemson.edu), Clemson Univ., Clemson, SC

5:30 Concluding remarks

Member Symposium: Aquatic Entomology without Borders: A Field That Brings Together All Branches of ESA

Meeting Room 111/112 (Convention Centre)

Moderators and Organizers: Madeline Genco¹ and Andrea Kautz², ¹Clemson Univ., Clemson, SC, ²Carnegie Museum of Natural History, Rector, PA

1:30 Introductory remarks

1:35 **2409** Stream detritivore subsidy responses to rising common salts. **Sally Entekin** (sentekin@uca.edu)¹, Anastasia Mogilevski², Bethanie Howard-Parker³, Natalie Clay⁴ and Michelle Evans-White³, ¹Univ. of Central Arkansas, Conway, AR, ²Gettysburg College, Gettysburg, PA, ³Univ. of Arkansas, Fayetteville, AR, ⁴Louisiana Tech Univ., Ruston, LA

1:50 **2410** The gas exchange strategies of aeshnid and libellulid dragonflies during their developmental transition from water to air. **Philip Matthews** (pmatthews@zoology.ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

2:05 **2411** What controls aquatic invertebrate communities in depressional wetlands? **Darold Batzer** (dbatzer@uga.edu) and Nyree Riley, Univ. of Georgia, Athens, GA

2:20 **2412** Aquatic insects of the Ogeechee River: Changes over three decades. **Kelly Murray** (kmmurray14@gmail.com), Joseph McHugh and Darold Batzer, Univ. of Georgia, Athens, GA

2:35 **2413** Altitudinal distribution of aquatic beetles in Volcán Tacaná, Chiapas: Insight into faunal composition. **Magali Luna-Luna** (amagaliluna@gmail.com)¹ and Atilano Contreras-Ramos², ¹Univ. Autónoma Metropolitana-Iztapalapa, Ciudad de México, Mexico, ²Univ. Nacional Autónoma de México, Ciudad de México, Mexico

2:50 **2414** Aquatic Lepidoptera wellspring: Where do we go from here? **M. Alma Solis** (alma.solis@ars.usda.gov), USDA - ARS, Washington, DC

3:05 Break

3:20 **2415** Non-target effects of transgenic corn debris in streams: Invertebrate community structure and plant debris processing. **Bill Lamp** (lamp@umd.edu) and Rebecca Eckert, Univ. of Maryland, College Park, MD

3:35 **2416** The Megaloptera (Insecta: Neuropterida) of Colombia. Adrian Ardila-Camacho and **Atilano Contreras-Ramos** (acontreras@ib.unam.mx), Univ. Nacional Autónoma de México, Ciudad de México, Mexico

3:50 **2417** Effects of a hypolimnetic tailwater on macroinvertebrates: From diversity to voltinism. **Matthew W. Green** (mwwgreen@g.clemson.edu)¹, Kevin M. Burnette², Luke M. Jacobus³, Michael M. Gangloff², Jules Silverman⁴ and Shea R. Tuberty², ¹Clemson Univ., Clemson, SC, ²Appalachian State Univ., Boone, NC, ³Indiana Univ.-Purdue Univ., Columbus, IN, ⁴North Carolina State Univ., Raleigh, NC

4:05 **2418** Presentation withdrawn

4:20 **2419** A brief history of biological monitoring using aquatic insects. **Dave Penrose** (penrose.watershed.science@gmail.com), Penrose Environmental, Asheville, NC

SD2420 Macroinvertebrates.org: An open-access reference collection of aquatic macroinvertebrates of the Eastern U.S. **Andrea Kautz** (kautza@carnegiemnh.org)¹, John Wenzel¹, John C. Morse², Madeline Genco² and Marti Louw³, ¹Carnegie Museum of Natural History, Rector, PA, ²Clemson Univ., Clemson, SC, ³Carnegie Mellon Univ., Pittsburgh, PA

SD2421 Description and diagnosis of associated larvae and adults of two new Trichoptera species from Bqch Mã National Park, Vietnam. **Madeline Genco** (maddiegenco@gmail.com)¹, John C. Morse¹, Kelly Murray², Michael Caterino¹ and Thai Pham³, ¹Clemson Univ., Clemson, SC, ²Univ. of Georgia, Athens, GA, ³Vietnam National Museum of Nature, Hanoi, Vietnam

SD2422 Biogeography of *Pteronarcys biloba* Newman in the Upper-Susquehanna river basin. **Nicole Pedisich** (pedina99@oneonta.edu) and Jeffrey Heilveil, State Univ. of New York, Oneonta, NY

SD2423 Presentation withdrawn

SD2424 Revision of littoral *Cercyon* (Leach) species of Washington and British Columbia. **Alyssa Suzumura** (asuzu5@gmail.com) and Masahiro Ohara, Hokkaido Univ., Sapporo, Japan

SD2425 Male lures and other carriers affect sterility caused by lufenuron on fruit flies. **Chiou Ling Chang** (stella.chang@ars.usda.gov), USDA - ARS, Hilo, HI

SD2426 Comparison of wing morphology among behavioral morphotypes of the New Zealand riffle beetle *Hydora* (Coleoptera: Elmidae). **Kyle Whorral** (kyle.whorral225@topper.wku.edu)¹ and Crystal Maier², ¹Western Kentucky Univ., Bowling Green, KY, ²Field Museum of Natural History, Chicago, IL

4:50 Poster session

Member Symposium: Communicating Effectively in Extension: Addressing New Expectations in the Learning Experience

Meeting Room 204 (Convention Centre)

Moderators and Organizers: Matthew VanWeelden¹ and Terri Billeisen², ¹Univ. of Florida, Belle Glade, FL, ²North Carolina State Univ., Raleigh, NC

1:30 **2427** Science communication: Removing the "blindness" and closing the gap. **Kevin Folta** (kfolta@ufl.edu), Univ. of Florida, Gainesville, FL

2:00 **2428** Extension-ing in non-traditional ways: Barfblog and food safety talk podcast. **Benjamin Chapman** (bjchapma@ncsu.edu), North Carolina State Univ., Raleigh, NC

2:15 **2429** Beyond the fact sheet: Different strategies for communicating urban IPM. **Jody Gangloff-Kaufmann** (jlg23@cornell.edu), Cornell Univ., Farmingdale, NY

2:30 **2430** Science communication igniting public engagement of natural history collections. **Bryan Lessard** (bryan.lessard@csiro.au), CSIRO, Acton, Australia

2:45 **2431** Playing nice in the sandbox: Navigating the challenges of a regional, interagency extension program. **David Coyle** (dcoyle@sref.info), Clemson Univ., Clemson, SC

3:00 **2432** Using on-farm research and extension to promote IPM practices. **Nick Seiter** (nseiter@uaex.edu), Univ. of Illinois, Champaign, IL

3:15 **2433** Improving the online extension learning experience using overlay applications. **Terri Billeisen** (tlhctor@ncsu.edu), North Carolina State Univ., Raleigh, NC

3:30 Break

3:45 **2434** Communicating your story of science-based extension: Twitter, a powerful teaching tool to help you provide broader impacts. **Jennifer Gillett-Kaufman** (gillett@ufl.edu) and Eleanor Phillips, Univ. of Florida, Gainesville, FL

4:00 **2435** Harnessing social science to move the needle on non-Bt corn refuge compliance. **Dominic Reisig** (ddreisig@ncsu.edu), North Carolina State Univ., Plymouth, NC

4:15 **2436** See the nerd and then be the nerd with a Share Fair. Brian McCornack¹ and **Erin Hodgson** (ewh@iastate.edu)², ¹Kansas State Univ., Manhattan, KS, ²Iowa State Univ., Ames, IA

4:30 **SP2437** Extension tailored to fit your audience: Enhancing survey tools with Importance Performance Analysis. **Randall Cass** (randall@iastate.edu)¹, Erin Hodgson¹, Matthew O'Neal¹, Amy Toth¹ and Adam Dolezal², ¹Iowa State Univ., Ames, IA, ²Univ. of Illinois, Champaign, IL

4:40 **2438** Presentation withdrawn

4:55 **2439** Communicating best management practices in the Everglades Agricultural Area. **Matthew VanWeelden** (mvanweel1@ufl.edu), Univ. of Florida, Belle Glade, FL

5:10 **2440** How to optimize your extension website and publications for maximum sharing on social media. **Gwen Pearson** (gpearso@purdue.edu), Purdue Univ., West Lafayette, IN

Member Symposium: Crossing Borders of Understanding: Sharing Your Science with the Public

Meeting Room 118 (Convention Centre)

Moderators and Organizers: Tamra Reall¹ and Lauren Diepenbrock², ¹Univ. of Missouri, Columbia, MO, ²North Carolina State Univ., Raleigh, NC

1:30 **2441** Broadening our audience by diversifying the messenger. **Faith Oi** (foi@ufl.edu)¹, Janet Hurley² and L. C. Graham³, ¹Univ. of Florida, Gainesville, FL, ²Texas A&M Univ., Dallas, TX, ³Auburn Univ., Auburn, AL

1:45 **2442** Playing to win: How crop entomology is like table tennis. **Haley Catton** (haley.catton@canada.ca), Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

2:00 **2443** Extending knowledge, changing lives: Insecticide resistance to soybean aphid in North Dakota. **Travis Prochaska** (travis.prochaska@gmail.com)¹, Janet Knodel², Patrick Beauzay², Lesley Lubenow³, Anitha Chirumamilla³ and Samantha Lahman⁴, ¹North Dakota State Univ., Minot, ND, ²North Dakota State Univ., Fargo, ND, ³North Dakota State Univ., Langdon, ND, ⁴North Dakota State Univ., Cavalier, ND

2:15 **2444** Integrated management practices to improve pollinator health. **Jeremy Slone** (jds lone@ncsu.edu)¹, Hannah Burrack¹ and Margarita López-Urbe², ¹North Carolina State Univ., Raleigh, NC, ²Pennsylvania State Univ., University Park, PA

2:30 **2445** Using citizen science as a vehicle to engage and include the public in research programs: A case study using the Budworm Tracker program. **Emily Owens** (emily.owens@canada.ca), Natural Resources Canada, Fredericton, NB, Canada

SD2446 Zombies, mind-control, and Scooby-Doo: Using sci-fi and fantasy to explain your science. **Grant Bolton** (lgbcm4@mail.missouri.edu) and Jessica Kansman, Univ. of Missouri, Columbia, MO

SD2447 "What is IPM?"- sharing an ESA infographic. **Lauren Diepenbrock** (ldiepenbrock@ufl.edu), Univ. of Florida, Lake Alfred, FL

SD2448 Resistance management: Controlling insects that just won't die. **Kaitlin Chapman** (karmit.chapman@gmail.com), Jordan Reinders, Ana Vélez and Leslie Rault, Univ. of Nebraska, Lincoln, NE

SD2449 Parasitoid power: Putting pests in their place by invading their space. Kadie Britt¹, Katlyn Catron¹, Kirsten Brichler¹, **Jacqueline S. Brown** (jbrown06@vt.edu)¹, Pragya Chalise¹, Whitney Hadden², Derek Hennen¹, Nicole Quinn², Max Ragozzino¹ and Morgan Roth¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²Virginia Polytechnic Institute and State Univ., Winchester, VA

SD2450 Partnering with citizen scientists to tackle a megadiverse group of mites. **Ashley P. G. Dowling** (adowling@uark.edu) and Ray Fisher, Univ. of Arkansas, Fayetteville, AR

SD2451 Firefly watch: 10 years of crowdsourced lightning bug hunting. Avalon Owens¹, **Don Salvatore** (salvatore.dv@gmail.com)², Christopher Cratsley³ and Sara Lewis¹, ¹Tufts Univ., Medford, MA, ²Massachusetts Audubon Society, Lincoln, MA, ³Fitchburg State Univ., Fitchburg, MA

SD2452 Biodiversity data integration: A case study using economically-important fruit-piercing moths. **Crystal Klem** (cklem@purdue.edu), Purdue Univ., West Lafayette, IN

2:45 Poster session 1

3:00 **2453** What can farmers tell their customers about GMOs? **Peter Coffey** (petercoffey@gmail.com), Univ. of Maryland, College Park, MD

3:15 **2454** More fungus, less malaria. **Brian Lovett** (lovettbr@umd.edu)¹, Raymond J. St. Leger¹, Etienne Bilgo² and Abdoulaye Diabate², ¹Univ. of Maryland, College Park, MD, ²IRSS/Centre Muraz, Bobo-Dioulasso, Burkina Faso

3:30 **2455** How fit are female-lethal flies? Determining if genetically modified berry pests are ready for the field. **Laura Kraft** (ljkraft@ncsu.edu)¹, Max Scott² and Hannah Burrack², ¹Univ. of Georgia, Athens, GA, ²North Carolina State Univ., Raleigh, NC

3:45 **2456** Thirsty wasps kill more: Dehydration increases parasitism and host-feeding of *Pachycrepoides vindemiae* on spotted-wing drosophila (*Drosophila suzukii*). **Cherre Da Silva** (cherre.dasilva@oregonstate.edu) and Vaughn Walton, Oregon State Univ., Corvallis, OR

4:00 **2457** Bugs behaving badly: Using moth misbehaviors to illuminate origins of insect-host associations. **Jennifer M. Zaspel** (zasp0001@umn.edu), Univ. of Florida, Gainesville, FL

4:15 **2458** Biological control of an important forest defoliator in Canada: Brief history and recent essays with drones. **Véronique Martel** (veronique.martel@canada.ca)¹, Robert Johns², Guy Boivin³ and Sandy Smith⁴, ¹Univ. of New Brunswick, Fredericton, NB, Canada, ²Natural Resources Canada, Fredericton, NB, Canada, ³Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada, ⁴Univ. of Toronto, Toronto, ON, Canada

SD2459 Identification and testing of the trail pheromone of the western carpenter ant (WCA) *Camponotus modoc*: Implications for WCA management. **Asim Renyard** (asim_renyard@sfu.ca), Ashley Munoz, Regine Gries, Santosh Kumar and Gerhard Gries, Simon Fraser Univ., Burnaby, BC, Canada

SD2460 That's how you get (fire) ants. **Danielle Hoefele** (danielle_hoefele@sfu.ca), Simon Fraser Univ., Burnaby, BC, Canada

SD2461 Thinking like a bumble bee: Understanding bumble bee resource needs in agricultural landscapes. Jeremy Hemberger and **Claudio Gratton** (cgratton@wisc.edu), Univ. of Wisconsin, Madison, WI

SD2462 The Ant Picnic Project – K-12 classrooms collect data on ant food preference. Daniela Sorger and **Robert Dunn** (rrdunn@ncsu.edu), North Carolina State Univ., Raleigh, NC

SD2463 Utilizing citizen science for conservation: The success of Bumble Bee Watch. **Genevieve Rowe** (g.rove@wildlifepreservation.ca)¹, Sarah Johnson^{1,2}, Victoria MacPhail³ and Rich Hatfield⁴, ¹Wildlife Preservation Canada, Guelph, ON, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada, ³York Univ., Toronto, ON, Canada, ⁴The Xerces Society for Invertebrate Conservation, Portland, OR

SD2464 The green peach aphid uses flexible genomes to avoid attack by parasitoid wasps. **Yonathan Uriel** (yonathan_urriel@sfu.ca)¹, Paul Abram² and Gerhard Gries¹, ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Agriculture and Agri-Food Canada, Agassiz, BC, Canada

SD2465 Invasive mosquito project: Raising scientific and environmental awareness in the community through citizen science. **Julie Tsecouras** (jtsec001@ucr.edu)¹, William Walton¹ and Lee Cohnstaedt², ¹Univ. of California, Riverside, CA, ²USDA - ARS, Manhattan, KS

4:30 Poster session 2

Member Symposium: Crossing Borders through Education and Outreach

Meeting Room 116/117 (Convention Centre)

Moderators and Organizers: David Held¹, John Guyton², Douglas Golick³, Stephen P. Cook⁴ and Bernice DeMarco⁵, ¹Auburn Univ., Auburn, AL, ²Mississippi State Univ., Mississippi State, MS, ³Univ. of Nebraska, Lincoln, NE, ⁴Univ. of Idaho, Moscow, ID, ⁵Smithsonian Institution, Washington, DC

1:30 Introductory remarks

1:35 **2466** A day-long 4-H entomology field day. **Sophia Di Piazza** (ladybug.girl0202@gmail.com) and John Guyton, Mississippi State Univ., Mississippi State, MS

1:50 **2467** My experience with entomology outreach. **Stepp Goins** (steppgo@gmail.com) and John Guyton, Mississippi State Univ., Mississippi State, MS

2:05 **2468** A commitment to reinvigorate science education using arthropods. **John Guyton** (j.guyton@msstate.edu) and Breanna Lyle, Mississippi State Univ., Mississippi State, MS

2:20 **2469** Insects are cool: Murder and maggots. **Gail Anderson** (ganderso@sfu.ca), Simon Fraser Univ., Burnaby, BC, Canada

2:35 **2470** Using virtual reality to engage and instruct: A novel tool for outreach and extension. **Geoffrey Attardo** (gmattardo@ucdavis.edu), Yale Univ., New Haven, CT

SD2471 The Appalachian Beekeeping Collective: An apiculture nonprofit in southern West Virginia. **Parry Kietzman** (pkietzman@appheadwaters.org), Appalachian Beekeeping Collective, Lewisburg, WV

SD2472 Education and outreach in the Western Gulf Coast Center of Excellence in Vector Borne Diseases. **Craig J. Coates** (c-coates@tamu.edu)¹, Sonja Swiger², Saravanan Thangamani³, Adrienne Brundage¹, John Thomas⁴, Christopher Vitek⁴ and Pete Teel¹, ¹Texas A&M Univ., College Station, TX, ²Texas A&M Univ., Stephenville, TX, ³Univ. of Texas, Galveston, TX, ⁴Univ. of Texas, Edinburg, TX

SD2473 Biology comics: An open educational resource for general biology college courses. **Carly M. Tribull** (cmtribull@gmail.com), Farmingdale State College, Farmingdale, NY

3:05 Break & poster session

3:20 **2474** Is it possible to reach a broad audience with technical information? A case study using *The Book of Beetles*. **Pat Bouchard** (patrice.bouchard@acr.gc.ca), Agriculture and Agri-Food Canada, Ottawa, ON, Canada

3:35 **2475** *Terra Matter*: A multi-disciplinary endeavor of the Humanities and Sciences to raise awareness of specimen-based research and teaching at Oregon State University. Evan Baden¹, Peter Konstantinidis¹, Melanie Link-Perez¹, **Christopher Marshall** (marshach@science.oregonstate.edu)² and Ehren Pflugfelder¹, ¹Oregon State Univ., Corvallis, OR, ²Oregon State Arthropod Collection, Corvallis, OR

3:50 **2476** Inspiring STEM integration through entomology. **Jakob Goldner** (jgoldner@mix.wvu.edu), Jeffrey Holland and Todd Kelley, Purdue Univ., West Lafayette, IN

4:05 **2477** Using citizen science to build undergraduate students' entomological systems-thinking. **Douglas Golick** (dgolick2@unl.edu)¹, W. Wyatt Hoback² and Hartmut Doebel³, ¹Univ. of Nebraska, Lincoln, NE, ²Oklahoma State Univ., Stillwater, OK, ³George Washington Univ., Washington, DC

4:20 **2478** Entomological training for Native American students: First year successes and challenges. **Elizabeth Payne** (elizabeth.payne@okstate.edu), W. Wyatt Hoback, Bruce Noden, Astri Wayadande and Justin Talley, Oklahoma State Univ., Stillwater, OK

4:35 **2479** The North American Coalition for Insect Agriculture: A trade association for insects as food and feed. **Marianne Shockley** (entomolo@uga.edu), Univ. of Georgia, Athens, GA

4:50 **2480** Syngenta technical support: Programs with purpose. **Walt Osborne** (walt.osborne@syngenta.com)¹ and Caydee Savinelli², ¹Syngenta, Greensboro, NC, ²Syngenta Plant Protection, Greensboro, NC

5:05 **2481** Crossing borders between academia and industry in insect education. **James Kopco** (james.kopco@gmail.com), Guardian Pest Solutions, Superior, WI

5:20 Concluding remarks

Member Symposium: Crossing Taxonomic Borders: Challenging Arachnological Traditions in North America

Meeting Room 202 (Convention Centre)

Moderators and Organizers: Robert Bennett¹, Heather C. Proctor², Claudia Copley¹ and Catherine Scott³, ¹Royal British Columbia Museum, Victoria, BC, Canada, ²Univ. of Alberta, Edmonton, AB, Canada, ³Univ. of Toronto, Toronto, ON, Canada

1:30 **2482** Untangling the web of spider phylogeny. **Wayne Maddison** (wayne.maddison@ubc.ca), The Univ. of British Columbia, Vancouver, BC, Canada

2:00 **2483** Evolutionary impacts of introgressive hybridization in a group of *Habronattus* jumping spiders (Araneae: Salticidae). **Tierney Bougie** (tcbougie@gmail.com) and Marshal Hedin, San Diego State Univ., San Diego, CA

2:15 **2484** Widows as windows on evolutionary ecology: Developing *Latrodectus* spiders as models for integrative studies. **Maydianne Andrade** (mandrade@utsc.utoronto.ca), Univ. of Toronto, Toronto, ON, Canada

2:30 **2485** You take the high road and I'll take the silk road: Male widow spiders follow draglines of rivals to find females faster. **Catherine Scott** (catherine.scott@mail.utoronto.ca)¹, Sean McCann² and Maydianne Andrade¹, ¹Univ. of Toronto, Toronto, ON, Canada, ²Simon Fraser Univ., Burnaby, BC, Canada

2:45 **2486** Thermal acclimation and its effects on fitness in arctic and temperate spiders. **Susan Anthony** (santho2@uwo.ca)¹, Catherine Scott², Christopher Buddle³, Toke Høye⁴, Nils Hein⁵, Niklas Becker⁵ and Brent Sinclair¹, ¹Univ. of Western Ontario, London, ON, Canada, ²Univ. of Toronto, Toronto, ON, Canada, ³McGill Univ., Ste-Anne-de-Bellevue, QC, Canada, ⁴Aarhus Univ., Rønde, Denmark, ⁵Univ. of Bonn, Bonn, Germany

3:00 **2487** Evil candy strippers: Diverse predation tactics of the introduced theridiid spider *Enoplognatha ovata*. **Sean McCann** (smmccann@sfu.ca)¹, Catherine Scott² and Maydianne Andrade², ¹Simon Fraser Univ., Burnaby, BC, Canada, ²Univ. of Toronto, Toronto, ON, Canada

3:15 **2488** Omnidirectional strikes in flattie spiders (Selenopidae). **Sarah Crews** (screws@calacademy.org)¹ and Yu Zeng², ¹California Academy of Sciences, San Francisco, CA, ²Univ. of California, Merced, CA

3:30 **2489** Documenting diversity: Surveying British Columbia's spider fauna. **Robb Bennett** (robb.bennett@shaw.ca), Claudia Copley and Darren Copley, Royal British Columbia Museum, Victoria, BC, Canada

3:45 Break

4:00 **2490** The role of silk in prey capture by spiders. **Jason Bond** (jbond@ucdavis.edu)¹, J. Coddington², Chris Hamilton³, Ingi Agnarsson⁴ and Vera Opatova⁵, ¹Univ. of California, Davis, CA, ²Smithsonian Institution, National Museum of Natural History, Washington, DC, ³Florida Museum of Natural History, Gainesville, FL, ⁴Univ. of Vermont, Burlington, VT, ⁵Auburn Univ., Auburn, AL

4:15 **2491** The truth about camel spiders. **Paula Cushing** (paula.cushing@dmns.org)¹, Jack Brookhart¹ and Matthew Graham², ¹Denver Museum of Nature and Science, Denver, CO, ²Eastern Connecticut State Univ., Willimantic, CT

4:30 **2492** Utilizing ultraconserved elements in harvestmen (Opiliones) phylogenomics and species delimitation. **Shahan Derkarabetian** (sderkarabetian@gmail.com), Harvard Univ., Cambridge, MA

4:45 **2493** Feather mites play a role in cleaning host feathers: Insights from microscopy and DNA metabarcoding. **Heather C. Proctor** (hproctor@ualberta.ca)¹, Jorge Doña², David Serrano², Kevin Johnson³, Arnika Oddy-van Oploo¹, Jose Huguet-Tapia⁴, Marina Asuncion⁴ and Roger Jovani², ¹Univ. of Alberta, Edmonton, AB, Canada, ²Estación Biológica de Doñana (EBD-CSIC), Sevilla, Spain, ³Univ. of Illinois, Champaign, IL, ⁴Univ. of Florida, Gainesville, FL

5:00 **2494** Canadian tick population structure and bacterial communities. **Janet Sperling** (jhaley@ualberta.ca), Katherine Magor and Felix Sperling, Univ. of Alberta, Edmonton, AB, Canada

5:15 **2495** Biogeographic patterns in Caribbean arthropods. **Lauren Esposito** (lesposito@calacademy.org) and Sarah Crews, California Academy of Sciences, San Francisco, CA

Member Symposium: Crossing the Borders of Academia, Government, Industry, Extension, and Beyond: Careers in Entomology

Meeting Room 214 (Convention Centre)

Moderators and Organizers: Alix Whitener¹, Carey Minter², Jessica Hartshorn³ and Boyd Mori⁴, ¹Washington State Univ., Wenatchee, WA, ²Univ. of Florida, Fort Pierce, FL, ³Minnesota Dept. of Natural Resources, Grand Rapids, MN, ⁴Agriculture and Agri-Food Canada, Saskatoon, SK, Canada

1:30 Welcoming remarks

1:35 **2496** Forty years of entomology: Perspectives from across the spectrum of extension, academia, and industry (and some career insights that graduate students might find valuable). **Marlin Rice** (marlinrice@gmail.com), Corteva Agriscience, Agriculture Division of DowDuPont, Johnston, IA

1:50 **2497** Impacts through extension: Building a career around making a difference. **David R. Haviland** (dhaviland@ucdavis.edu), Univ. of California Cooperative Extension, Bakersfield, CA

2:05 **2498** Ideas from a border crosser: A necessity, and fun, within a career. **Howard Thistlewood** (howard.thistlewood@agr.gc.ca), Agriculture and Agri-Food Canada, Summerland, BC, Canada

2:20 **2499** Persistence, luck, networking and serendipity: Ingredients for a career in entomology. **Staffan Lindgren** (lindgren@unbc.ca), Univ. of Northern British Columbia, Prince George, BC, Canada

2:35 Break

2:50 **2500** There and back again: Crossing geographic, sub-discipline, and employer borders. **Sean Prager** (sean.prager@usask.ca), Univ. of Saskatchewan, Saskatoon, SK, Canada

3:05 **2501** Career or careening? Calm down, both work. Jessica Honaker and **Kristie Reddick** (contactus@thebugchicks.com), The Bug Chicks, Portland, OR

3:20 **2502** Connections: Your networks make you stronger. **Scott Meers** (scott.meers@gov.ab.ca), Alberta Agriculture and Rural Development, Brooks, AB, Canada

3:35 **2503** I quit my job, I'm free today. **Andony Melathopoulos** (andony.melathopoulos@oregonstate.edu), Oregon State Univ., Corvallis, OR

3:50 Panel discussion

4:20 Mixer

Member Symposium: Ecology and Management of Cereal Aphid Invasions, Crossing the Great Plains Borders from Mexico to Canada

Meeting Room 205 (Convention Centre)

Moderators and Organizers: Michael Brewer¹, Frank Peairs², Michael Brewer¹ and Frank Peairs², ¹Texas A&M AgriLife Research, Corpus Christi, TX, ²Colorado State Univ., Fort Collins, CO

1:30 Welcoming remarks: Cereal aphid country of the Great Plains from Mexico to Canada

1:30 **2504** Area-wide cereal aphid management: Appropriate and essential to large-scale cereal production systems. **Norman Elliott** (norman.elliott@ars.usda.gov)¹, Michael Brewer² and Kris Giles³, ¹USDA - ARS, Stillwater, OK, ²Texas A&M AgriLife Research, Corpus Christi, TX, ³Oklahoma State Univ., Stillwater, OK

2:00 **2505** Russian wheat aphid: From key pest to sporadic pest status, what have we learned. **Frank Peairs** (frank.peairs@colostate.edu), Colorado State Univ., Fort Collins, CO

2:15 **2506** Lessons from another Great Plains aphid: Role of generalist predators in the control of the invasive soybean aphid. **Jordan Bannerman** (jordan.bannerman@umanitoba.ca)¹, Alejandro Costamagna¹, Nicola Koper¹, Brian McCornack² and David Ragsdale³, ¹Univ. of Manitoba, Winnipeg, MB, Canada, ²Kansas State Univ., Manhattan, KS, ³Texas A&M Univ., College Station, TX

2:30 **2507** The latest cereal aphid invader of the Great Plains: Sugarcane aphid on sorghum. **Michael Brewer** (mjbrewer@ag.tamu.edu)¹, Tavvs M. Alves², John Gordy³, Ashleigh Faris⁴, Norman Elliott⁵ and G. David Buntin⁶, ¹Texas A&M AgriLife Research, Corpus Christi, TX, ²Center for Agroindustrial Innovation, Rio Verde, Brazil, ³Texas A&M Univ., Rosenberg, TX, ⁴Texas A&M Univ., Corpus Christi, TX, ⁵USDA - ARS, Stillwater, OK, ⁶Univ. of Georgia, Griffin, GA

2:45 **2508** The aphid: Genetic diversity and biotypes. **Karen Harris-Shultz** (karen.harris@ars.usda.gov)¹ and Alana Jacobson², ¹USDA - ARS, Tifton, GA, ²Auburn Univ., Auburn, AL

3:00 Break

3:15 **2509** Modeling regional migration and local colonization by airborne insects: Forecasting sugarcane aphid infestation of grain sorghum in the Great Plains. **Hsiao-Hsuan Wang** (hsuan006@tamu.edu), Texas A&M Univ., College Station, TX

3:45 **2510** Plant resistance as a cornerstone to management response. **Bonnie Pendleton** (bpendleton@wtamu.edu)¹ and Gary Peterson², ¹West Texas A&M Univ., Canyon, TX, ²Texas A&M AgriLife Research and Extension Center, Lubbock, TX

4:00 **2511** *Lysephlebus testaceipes*: A key parasitoid for aphid management in the southern plains. **Kris Giles** (kris.giles@okstate.edu) and Tom Royer, Oklahoma State Univ., Stillwater, OK

4:15 **2512** Information networks: Getting the word out using myfields.info. **Wendy Johnson** (wendyann@k-state.edu) and Brian McCornack, Kansas State Univ., Manhattan, KS

4:30 Concluding remarks: Components of an area-wide cereal aphid management system

Member Symposium: From Invertebrate Ecology to Evolutionary Biology: Celebrating the Achievements of Professor John R. Spence

Meeting Room 110 (Convention Centre)

Moderators and Organizers: Colin Bergeron¹, Jaime Pinzon², Tim Work³, Héctor Cárcamo⁴ and John Acorn¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²Natural Resources Canada, Edmonton, AB, Canada, ³Univ. du Québec, Montréal, QC, Canada, ⁴Agriculture and Agri-Food Canada, Lethbridge, AB, Canada

1:30 **2513** The depth and breadth of professor John Spence's contributions - truly "Juan" in a million! **Héctor Cárcamo** (hector.carcamo@agr.gc.ca)¹, Colin Bergeron², David Langor³ and John Acorn², ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²Univ. of Alberta, Edmonton, AB, Canada, ³Natural Resources Canada, Edmonton, AB, Canada

2:00 **2514** A 23-year record of colonization of north-American deciduous forest by the invasive carabid, *Pterostichus melanarius* (Illiger) and its adverse effect on native carabid assemblages. **Colin Bergeron** (cb1@ualberta.ca) and John Spence, Univ. of Alberta, Edmonton, AB, Canada

2:15 **2515** Can volume of deadwood estimate saproxylic beetle diversity in the boreal mixedwood forest? **Seung-Il Lee** (seungil1@ualberta.ca)¹, Jaime Pinzon¹, Colin Bergeron², Linhao Wu² and John Spence², ¹Natural Resources Canada, Edmonton, AB, Canada, ²Univ. of Alberta, Edmonton, AB, Canada

2:30 **2516** A year in the life of a forest ground spider community in Alberta. **Jaime Pinzon** (jaime.pinzon@canada.ca)¹ and John Spence², ¹Natural Resources Canada, Edmonton, AB, Canada, ²Univ. of Alberta, Edmonton, AB, Canada

2:45 **2517** A synthesis of carabid recovery in three Canadian partial harvesting experiments. **Tim Work** (work.timothy@uqam.ca)¹, Colin Bergeron² and Linhao Wu², ¹Univ. du Québec, Montréal, QC, Canada, ²Univ. of Alberta, Edmonton, AB, Canada

3:00 Break

SD2518 Effect of flight intercept trap design on the composition of the sampled community. **Chris MacQuarrie** (christian.macquarrie@canada.ca) and Jeremy D. Allison, Natural Resources Canada, Sault Ste. Marie, ON, Canada

SD2519 An elegy for Professor Spence. **Colin Bergeron** (cb1@ualberta.ca)¹ and W. Jan A. Volney², ¹Univ. of Alberta, Edmonton, AB, Canada, ²Natural Resources Canada, Edmonton, AB, Canada

SD2520 Aleocharine rove beetles in forest biodiversity research. **Greg Pohl** (greg.pohl@nrca-nrcan.gc.ca)¹, David Langor¹, James Hammond¹, Philip Hoffman¹ and Jan Klimaszewski², ¹Natural Resources Canada, Edmonton, AB, Canada, ²Natural Resources Canada, Québec City, QC, Canada

SD2521 Electrophysiological and behavioral response of black turpentine beetle and southern pine beetle to resin constituents in southern pine forests. **Holly L. Munro** (hmunro@uga.edu)¹, Brian T. Sullivan², Brittany F. Barnes¹, Cristian Montes¹, William P. Shepherd² and Caterina Villari¹, ¹Univ. of Georgia, Athens, GA, ²USDA - Forest Service, Pineville, LA

SD2522 A novel insect-pathogen complex and its association with eastern white pine dieback. **Thomas D. Whitney** (thomas.whitney@uga.edu)¹, Rima Lucardi² and Kamal J. K. Gandhi¹, ¹Univ. of Georgia, Athens, GA, ²USDA - Forest Service, Athens, GA

SD2523 Cumulative effects of wildfire and seismic lines on biodiversity in peatlands. **Jaime Pinzon** (jaime.pinzon@canada.ca)¹, Anna Dabros², Federico Riva² and Scott Nielsen², ¹Natural Resources Canada, Edmonton, AB, Canada, ²Univ. of Alberta, Edmonton, AB, Canada

3:15 Poster session

4:00 **2524** Creating a diverse and international forest entomology program. **Kamal Gandhi** (kjgandhi@warnell.uga.edu), Univ. of Georgia, Athens, GA

4:15 **2525** Evolution, not revolution: Dr. Spence's guide to navigating the taxonomic impediment, large-scale biomonitoring, and the role of natural history museums. **Tyler Cobb** (tyler.cobb@gov.ab.ca), Royal Alberta Museum, Edmonton, AB, Canada

4:30 **2526** Size and shape in insect ontogeny and evolution: Concepts of allometry in different morphometric frameworks. **Chris Klingenberg** (cpk@manchester.ac.uk), The Univ. of Manchester, Manchester, United Kingdom

4:45 **2527** Invasion by the little fire ant (*Wasmannia auropunctata*) changes biodiversity and ecosystem functioning in the rainforest of New Caledonia. **Carol Frost** (cmfrost@ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

5:00 **2528** Convergent evolution of complex structures for ant-bacterial defensive symbiosis in fungus-farming ants. **Cameron Currie** (currie@bact.wisc.edu)¹, Hongjie Li¹, Jeffrey Sosa-Calvo², Heidi Horn¹, Christian Rabeling², Mônica Pupo³, Jon Clardy⁴ and Ted Schultz⁵, ¹Univ. of Wisconsin, Madison, WI, ²Arizona State Univ., Tempe, AZ, ³Univ. de São Paulo, São Paulo, Brazil, ⁴Harvard Medical School, Cambridge, MA, ⁵Smithsonian Institution, Washington, DC

5:15 **2529** A retrospective from a career entomology student. **John Spence** (jspence@ualberta.ca), Univ. of Alberta, Edmonton, AB, Canada

Member Symposium: Global Resistance to Bt Crops: Resistance Has No Borders

Meeting Room 220 (Convention Centre)

Moderators and Organizers: Jeffrey Fabrick¹, Juan Luis Jurat-Fuentes² and Lolita G. Mathew¹, ¹USDA - ARS, Maricopa, AZ, ²Univ. of Tennessee, Knoxville, TN

1:30 **2530** Global surge in pest resistance to Bt crops and prospects for sustainability. **Bruce Tabashnik** (brucet@ag.arizona.edu) and Yves Carrière, Univ. of Arizona, Tucson, AZ

1:45 **2531** Resistance in corn earworm to Cry proteins expressed in *Bt* sweet corn as an in-field screen. **Galen Dively** (galen@umd.edu)¹, P. Dilip Venugopal² and Chad Finkenbinder³, ¹Univ. of Maryland, College Park, MD, ²US Food and Drug Administration, Silver Spring, MD, ³Benzon Research, Carlisle, PA

2:00 **2532** Field-evolved resistance in *Helicoverpa zea* to Cry1 and Cry2 *Bt* toxins in southern cropping systems. **David Kerns** (dlkerns@tamu.edu)¹, Fei Yang¹, José Santiago González¹, Dominic Reisig², Nathan Little³ and Gregory Payne⁴, ¹Texas A&M Univ., College Station, TX, ²North Carolina State Univ., Plymouth, NC, ³USDA - ARS, Stoneville, MS, ⁴Univ. of West Georgia, Carrollton, GA

2:15 **2533** *Bt* resistance in Australian *Helicoverpa* species. **Amanda Padovan** (amanda.padovan@csiro.au)¹, Tom Walsh¹, Wee Tek Tay¹, Sharon Downes² and David Heckel³, ¹CSIRO, Canberra, Australia, ²CSIRO, Narrabri, Australia, ³Max Planck Institute for Chemical Ecology, Jena, Germany

2:30 **2534** Evolution and mechanisms of dominant resistance to *Bt* toxin Cry1Ac of *Helicoverpa armigera* in China. **Yidong Wu** (wyd@njau.edu.cn), Lin Jin, Jing Wang, Fang Guan, Jianpeng Zhang and Yihua Yang, Nanjing Agricultural Univ., Nanjing, China

2:45 **2535** Pink bollworm resistance to *Bt*-II cotton: Why it struck India so hard. **Keshav Kranthi** (keshav@icac.org)¹, V. Chinnababu Naik² and Sandhya Kranthi², ¹International Cotton Advisory Committee, Washington, DC, ²ICAR, Nagpur, India

3:00 **2536** Molecular genetics of Cry2Ab resistance in laboratory- and field-selected pink bollworm from the U.S. and India. **Lolita Mathew** (lolita.mathew@ars.usda.gov) and Jeffrey Fabrick, USDA - ARS, Maricopa, AZ

3:15 **2537** Cabbage loopers as a biological system for studying resistance to *Bt* Cry toxins in Lepidoptera from biology to genomics. **Ping Wang** (pingwang@cornell.edu), Cornell Univ., Geneva, NY

3:30 Break

3:35 **2538** Perspectives from the midwestern United States on pest adaption to *Bt* crops. **Aaron Gassmann** (aaronjg@iastate.edu), Iowa State Univ., Ames, IA

3:50 **2539** *Striacosta albicosta* resistance to Cry1F in Ontario, Canada – no longer a secondary pest problem. **Jocelyn Smith** (jocelyn.smith@uoguelph.ca), Yasmine Farhan and Arthur Schaafsma, Univ. of Guelph, Ridgetown, ON, Canada

4:05 **2540** The status of resistance of *Busseola fusca*, *Chilo partellus* and *Spodoptera frugiperda* to *Bt* maize in South Africa. **Johnnie Van den Berg** (johnnie.vandenberg@nwu.ac.za)¹, A.S. Botha¹, Hannalene Du Plessis¹, Annemie Erasmus², Eline Strydom² and Janet Pretorius², ¹North-West Univ., Potchefstroom, South Africa, ²Agricultural Research Council, Potchefstroom, South Africa

4:20 **2541** Status of resistance to *Bt* crops in Brazil and the challenges and efforts to manage it. **Eliseu Pereira** (eliseu.pereira@ufv.br), Oscar Santos-Amaya, Clébson Tavares, Hugo Monteiro, Jaciara Gonçalves and Silvana Orozco-Restrepo, Univ. Federal de Viçosa, Viçosa, Brazil

4:35 **2542** Screening for resistance to *Bt* corn in fall armyworm in the Americas and beyond. **Caroline Placidi de Bortoli** (cplacidi@utk.edu), Rahul Banerjee and Juan Luis Jurat-Fuentes, Univ. of Tennessee, Knoxville, TN

4:50 **2543** Molecular characterization of a novel target-site mutation in ABCC2 transporters in Cry1F resistant fall armyworm from Brazil. **Debora Boaventura** (debora.boaventura.ext@bayer.com) and Ralf Nauen, Bayer CropScience AG, Monheim, Germany

5:05 **2544** Molecular characterization of resistance gene diversity in native New World and invasive east African *Spodoptera frugiperda*. **Wee Tek Tay** (weetek.tay@csiro.au)¹, Michael Otim², Karl Gordon¹, Cecilia Czapak³, Samia Elfékih¹, Sharon Downes⁴ and Tom Walsh¹, ¹CSIRO, Canberra, Australia, ²National Crops Resources Research Institute, Kampala, Uganda, ³Univ. Federal de Goiás, Goiânia, Brazil, ⁴CSIRO, Narrabri, Australia

5:20 **2545** Challenges, opportunities, and emerging strategies for managing resistance to *Bt* crops. **Nicholas Storer** (nstorer@dow.com)¹, Clint Pilcher², Analiza Alves² and Amit Sethi², ¹Dow AgroSciences, Kensington, MD, ²DuPont Pioneer, Johnston, IA

5:35 **2546** Resistance in lepidopteran pests to *Bacillus thuringiensis* (*Bt*) Plant Incorporated Protectants (PIPs) in the United States: EPA's Scientific Advisory Panel recommendations and potential options to enhance current Insect Resistance Management (IRM) program. **Kara Welch** (welch.kara@epa.gov), Jeannette Martinez and Alan Reynolds, US Environmental Protection Agency, Washington, DC

Member Symposium: Management of Bark and Ambrosia Beetles with Semiochemicals

Meeting Room 224 (Convention Centre)

Moderators and Organizers: Steven Seybold and Christopher J. Fettig, USDA - Forest Service, Davis, CA

1:30 Introductory remarks

1:40 **2547** Management of bark and ambrosia beetles with semiochemicals: Letter to a prospective graduate student. **John Borden** (jhbconsult@outlook.com), JHB Consulting, Burnaby, BC, Canada

2:10 **2548** Nonhost volatiles and bark beetle foraging: From concept to operational use. **Dezene P. W. Huber** (huber@unbc.ca)¹, Christopher J. Fettig², Kelsey Jones³, Maya Evenden³ and John Borden⁴, ¹Univ. of Northern British Columbia, Prince George, BC, Canada, ²USDA - Forest Service, Davis, CA, ³Univ. of Alberta, Edmonton, AB, Canada, ⁴JHB Consulting, Burnaby, BC, Canada

2:25 **2549** Managing the southern pine beetle with semiochemicals: Past and present. **Brian T. Sullivan** (briansullivan@fs.fed.us)¹, Holly L. Munro² and Kamal Gandhi², ¹USDA - Forest Service, Pineville, LA, ²Univ. of Georgia, Athens, GA

2:40 **2550** Using MCH to protect trees and stands from Douglas-fir beetle infestation. **Darrell W. Ross** (darrell.ross@oregonstate.edu), Oregon State Univ., Corvallis, OR

2:55 **2551** Conceptualization and preliminary results on a semiochemical based bark beetle management under climate stress, project EXTEMIT-K, for the Eurasian spruce beetle in Europe. **Rastislav Jakus** (rasti.jakus@gmail.com)^{1,2}, Marek Turcani², Roman Modlinger², Peter Surovy², Anna Jirosova², Ivana Tomaskova², Miroslav Blazenc¹, Alexander Gurtsev³, C. Rikard Unelius⁴ and Fredrik Schlyter², ¹Slovak Academy of Sciences, Zvolen, Slovakia, ²Czech Univ. of Life Sciences, Prague, Czech Republic, ³Russian Academy of Sciences, Moscow, Russian Federation, ⁴Linnaeus Univ., Kalmar, Sweden

3:10 Break

3:25 **2552** Applied chemical ecology for managing ambrosia beetles in ornamental nurseries and urban landscapes. **Christopher Ranger** (christopher.ranger@ars.usda.gov), USDA - ARS, Wooster, OH

3:40 **2553** Semiochemical-based IPM of ambrosia beetles in BC's forest industry: Implemented in 1982 and still running. **Eveline Stokkink** (islandbuglady@gmail.com)¹ and John Borden², ¹Woodstock Management Inc, Nanaimo, BC, Canada, ²Contech Enterprises Inc, Delta, BC, Canada

3:55 **2554** Host volatiles and other semiochemicals as potential repellents for redbay ambrosia beetle in mixed hardwood stands and avocado orchards. **Jason A. Smith** (jasons@ufl.edu), Univ. of Florida, Gainesville, FL

4:10 **2555** Semiochemical-based tools for management of bark and ambrosia beetles: Where do we go from here? **Nancy E. Gillette** (beetlegillette@yahoo.com)¹, Christopher J. Fettig² and Steven Seybold², ¹USDA - Forest Service, Berkeley, CA, ²USDA - Forest Service, Davis, CA

4:40 Discussion

5:00 Concluding remarks

Member Symposium: Sharing Ideas and Food: Stored Product Pest Control Across Interdisciplinary and Geographic Borders

Meeting Room 206 (Convention Centre)

Moderators and Organizers: Alison Gerken¹ and Sharon Dobesh², ¹USDA - ARS, Manhattan, KS, ²Kansas State Univ., Manhattan, KS

1:30 Welcoming remarks

1:35 **2556** Maize weevil: Genealogy, origin, and range expansion. **Raul Narciso Guedes** (guedes@ufv.br)¹, Gislaïne Carvalho¹, Lucas Braga¹ and Alberto Correa², ¹Univ. Federal de Viçosa, Viçosa, Brazil, ²Univ. de São Paulo, Piracicaba, Brazil

1:50 **2557** *Rhyzopertha dominica* (F.) (Coleoptera: Bostrichidae): Has its distribution in the Canadian prairies changed? **Brent Elliott** (brent.elliott@grainscanada.gc.ca)¹, Scott Meers², Blaine Timlick¹ and Thomas Phillips³, ¹Canadian Grain Commission, Winnipeg, MB, Canada, ²Alberta Agriculture and Rural Development, Brooks, AB, Canada, ³Kansas State Univ., Manhattan, KS

2:05 **2558** Low temperature to control stored-product insects in flour mill. **Paul Fields** (paul.fields@agr.gc.ca) and Ahmed Abdelghany, Agriculture and Agri-Food Canada, Winnipeg, MB, Canada

2:20 **2559** The empty grain bin as a micro-climate: Temperature and insecticidal efficacy. **Frank Arthur** (frank.arthur@ars.usda.gov), USDA - ARS, Manhattan, KS

2:35 **2560** Entomology and engineering: Working across borders to improve aerosol insecticide efficacy inside food facilities. **James Campbell** (james.campbell@ars.usda.gov)¹, Frank Arthur¹, Dan Brabec¹, Mark Casada¹, Fei Asuncion², Deanna Scheff¹, Srinivas Lanka², Ronaldo Maghirang² and Kun Yan Zhu², ¹USDA - ARS, Manhattan, KS, ²Kansas State Univ., Manhattan, KS

2:50 **2561** Current status of nitric oxide fumigation research for postharvest pest control. **Yong-Biao Liu** (yongbiao.liu@ars.usda.gov)¹ and Xiang-Bing Yang², ¹USDA - ARS, Salinas, CA, ²Univ. of California, Salinas, CA

3:05 **2562** Post-treatment effects of infrared radiation on lesser grain borer (*Rhyzopertha dominica*) development. **Tanja McKay** (tmckay@astate.edu)¹, Rachel Hampton¹, Griffiths Atungulu², Zephania Odek², Terry Siebenmorgen² and Shantae Wilson², ¹Arkansas State Univ., Jonesboro, AR, ²Univ. of Arkansas, Fayetteville, AR

3:20 Break

3:40 **2563** Effects of ozone on stored product insects on various commodities. **Barbara Amoah** (bamoah@scsu.edu) and Rizana M. Mahroof, South Carolina State Univ., Orangeburg, SC

3:55 **2564** Efficacy of methyl benzoate fumigation for controlling western flower thrips on apples. **Xiang-Bing Yang** (xbya@ucdavis.edu)¹, Yong-Biao Liu², Aijun Zhang³ and Yan Feng³, ¹Univ. of California, Salinas, CA, ²USDA - ARS, Salinas, CA, ³USDA - ARS, Beltsville, MD

4:10 **2565** The innovation lab for the reduction of post-harvest loss: Accomplishments from 5 years of maize post-harvest loss mitigation work in Ghana. **George Opit** (george.opit@okstate.edu)¹, Frank Arthur², James Campbell², Enoch A. Osekre³, Samuel McNeill⁴, George Mbata⁵ and Paul Armstrong², ¹Oklahoma State Univ., Stillwater, OK, ²USDA - ARS, Manhattan, KS, ³Kwame Nkrumah Univ. of Science and Technology, Kumasi, Ghana, ⁴Univ. of Kentucky, Princeton, KY, ⁵Fort Valley State Univ., Fort Valley, GA

4:25 **2566** Advances in insecticide treated packaging for post-harvest commodity storage. **Deanna Scheff** (deanna.scheff@ars.usda.gov), Frank Arthur and James Campbell, USDA - ARS, Manhattan, KS

4:40 **2567** New technologies for age old problems including how Bitcoin & Uber could change the face of African post-harvest commodity warehousing. **Georgina Bingham** (gvb@vestergaard.com)¹, George Opit², Leslie Rault³, Enoch A. Osekre⁴, Grace O. Otitodun⁵ and Allan Mortensen¹, ¹Vestergaard S. A., Lausanne, Switzerland, ²Oklahoma State Univ., Stillwater, OK, ³Univ. of Nebraska, Lincoln, NE, ⁴Kwame Nkrumah Univ. of Science and Technology, Kumasi, Ghana, ⁵Nigerian Stored Products Research Institute, Ilorin, Nigeria

4:55 **2568** *Trogoderma* species (Coleoptera: Dermestidae) associated with shipments of dried distiller's grains and solubles from the USA. **Thomas Phillips** (twp1@ksu.edu), Luke Pfannenstiel and David Hagstrum, Kansas State Univ., Manhattan, KS

5:10 **2569** Stored product insects intercepted at U.S. ports of entry from around the world. **Joel Perez-Mendoza** (joel.perez-mendoza@aphis.usda.gov), USDA - APHIS, Riverdale, MD

5:25 Concluding remarks

Member Symposium: The Crossroad Between Applied and Basic Research in the Study of Endemic and Invasive Insect Species: 6th Latin American/Hispanic Symposium

Meeting Room 213 (Convention Centre)

Moderators and Organizers: Ismael E. Badillo-Vargas¹, Ana Legrand², Jesus Lara³, Luis Canas⁴ and Silvia Rondon⁵, ¹Texas A&M AgriLife Research, Weslaco, TX, ²Univ. of Connecticut, Storrs, CT, ³Univ. of California, Riverside, CA, ⁴The Ohio State Univ., Wooster, OH, ⁵Oregon State Univ., Hermiston, OR

1:30 Welcoming remarks

1:35 **2570** The sugarcane aphid in the Americas: Not a host-switch but a truly invasive genotype. **Raul F. Medina** (rmedina@tamu.edu)¹, Jocelyn R. Holt¹, J. Scott Armstrong², Laurent Costet³ and Samuel Nibouche³, ¹Texas A&M Univ., College Station, TX, ²USDA - ARS, Stillwater, OK, ³CIRAD - INRA, Saint-Pierre, France

1:50 **2571** Invasion of a bird-parasitic fly in the Galápagos Islands: Enemy release and biological control. **George Heimpel** (heimp001@umn.edu), Univ. of Minnesota, St. Paul, MN

2:05 **2572** Comparison of the transcriptome of *Dectes texanus* larvae fed soybean, sunflower and ragweed. **Lina Aguirre-Rojas** (liaguero@ksu.edu), Kansas State Univ., Manhattan, KS

2:20 **2573** A Caribbean hub for entomological studies on invasive species. **Jose Carlos Rodrigues** (jose_carlos@mac.com), Univ. de Puerto Rico, San Juan, PR

2:35 Break

2:45 **2574** Forging new tools for the war against *Bactericera cockerelli* and “*Candidatus Liberibacter solanacearum*”. **Ismael E. Badillo-Vargas** (ismael.badillo@ag.tamu.edu), Texas A&M AgriLife Research, Weslaco, TX

3:00 **2575** Understanding the role of Roseau cane scale (Hemiptera: Acleridae) on the *Phragmites* die-offs in Louisiana. **Rodrigo Diaz** (rdiaz@agcenter.lsu.edu)¹, Leslie Aviles¹, Madeline Gill¹, Ian Knight¹, James T. Cronin¹, Scott Schneider² and Blake Wilson¹, ¹Louisiana State Univ., Baton Rouge, LA, ²USDA - ARS, Beltsville, MD

3:15 **2576** Sustainable management of the Asian citrus psyllid and the struggle of the citrus industry in Florida. **Alejandro Calixto** (aacalixto@dow.com), Dow AgroSciences, Wesley Chapel, FL

3:30 **2577** Optimal balance between fundamental and applied research to manage the rice water weevil in Louisiana. Lina Bernaola and **Mike Stout** (mstout@agcenter.lsu.edu), Louisiana State Univ., Baton Rouge, LA

3:45 Panel discussion

Member Symposium: The Legacy of James McMurtry: Current Research in Phytoseiid Ecology

Meeting Room 203 (Convention Centre)

Moderators and Organizers: Monica Farfan¹, Rebecca Schmidt-Jeffris¹ and Gilberto de Moraes², ¹Clemson Univ., Charleston, SC, ²Univ. de São Paulo, Piracicaba, Brazil

1:30 Welcoming remarks

1:35 **2578** Contribution of James A. McMurtry to acarology: From taxonomy to practical use of predatory mites. **Daniel Carrillo** (dancarr@ufl.edu), Univ. of Florida, Homestead, FL

1:50 **2579** Preserving the legacy: The workhorse phytoseiids in tree fruits. **Betsy Beers** (ebeers@wsu.edu)¹ and Rebecca Schmidt-Jeffris², ¹Washington State Univ., Wenatchee, WA, ²Clemson Univ., Charleston, SC

2:05 **2580** Gut-content analysis of *Phytoseiulus persimilis* in organic Florida strawberries using next-gen sequencing. **Karol Krey** (karol.krey@gmail.com) and Justin Renkema, Univ. of Florida, Wimauma, FL

2:20 **2581** The western orchard predatory mite: Biology, ecology, genetics and genomics. **Marjorie A. Hoy** (mahoy@ufl.edu), Univ. of Florida, Gainesville, FL

2:35 Break

2:50 **2582** Molecular phylogeny of the tribe Typhlodromini (Phytoseiidae) inciting a taxonomic reassessment. **Denise Navia Magalhaes Ferreira** (denise.navia@embrapa.br), Embrapa Recursos Genéticos e Biotecnologia, Asa Norte, Brazil

3:05 **2583** Genetic variation in dispersal strategies and natural populations of *Phytoseiulus persimilis* (Acari: Phytoseiidae). **Monica Farfan** (mfarfan@clemson.edu) and Rebecca Schmidt-Jeffris, Clemson Univ., Charleston, SC

3:20 **2584** The Milker-Killer dilemma: What is the role of dispersal in exploitation strategies of *Phytoseiulus persimilis* (Acari: Phytoseiidae)? **Alexandra Revynthi** (arevynthi@ufl.edu)¹, Dirk Verkleij², Arne Janssen² and Martijn Egas², ¹Univ. of Florida Tropical Research and Education Center, Homestead, FL, ²Univ. of Amsterdam, Amsterdam, Netherlands

3:35 **2585** Predation of two eriophyid species by phytoseiids and insects in Florida citrus. **Raul T. Villanueva** (raul.villanueva@uky.edu), Univ. of Kentucky, Princeton, KY

3:50 **2586** Do phytoseiids provide biological control of spider mites in California walnuts? **Nicholas J. Mills** (nmills@berkeley.edu), Univ. of California, Berkeley, CA

4:05 Concluding remarks

Member Symposium: Understanding and Mitigating the Risks of Pesticide Exposure for Pollinators and Other Beneficial Insects

Meeting Room 121 (Convention Centre)

Moderator and Organizer: Nigel Raine, Univ. of Guelph, Guelph, ON, Canada

1:30 Welcoming remarks

1:30 **2587** Pesticides and pollinators: Eight years and hundreds of manuscripts later, what have we learned? **Christian Krupke** (ckrupke@wsu.edu) and Sebastien Shepherd, Purdue Univ., West Lafayette, IN

2:00 **2588** Chronic exposure to neonicotinoids reduces honeybee health near corn crops. Nadejda Tsvetkov and **Amro Zayed** (zayed@yorku.ca), York Univ., Toronto, ON, Canada

2:15 **2589** Effect of pesticides and pesticide mixtures applied to almonds during bloom on honey bees. **Reed Johnson** (johnson.5005@osu.edu)¹, Andrea Wade² and Chia-Hua Lin¹, ¹The Ohio State Univ., Wooster, OH, ²College of Wooster, Wooster, OH

2:30 **2590** Assessing the comparative toxicity of systemic insecticides to bumblebees, and their exposure within field crops in southern Ontario. **Kayla Mundy** (kmundy03@uoguelph.ca), Ryan Prosser and Nigel Raine, Univ. of Guelph, Guelph, ON, Canada

2:45 **2591** Sensitivity of bumble bee queens to insecticides and other stressors. **S. Hollis Woodard** (hollis.woodard@ucr.edu)¹, Maria del Mar Leza Salord², Kristal Waltrous¹ and Michelle Duennes¹, ¹Univ. of California, Riverside, CA, ²Univ. of the Balearic Islands, Palma, Spain

3:00 **2592** Field study on native plants shows imidacloprid alters behavior and colony growth of *Bombus impatiens*. **Vera Krichik** (krisc001@umn.edu), Univ. of Minnesota, St. Paul, MN

3:15 **2593** Mitigating risks of insecticide exposure to bees in urban lawns and landscapes. **Daniel Potter** (dapotter@uky.edu)¹, Jonathan Larson² and Bernadette Mach¹, ¹Univ. of Kentucky, Lexington, KY, ²Univ. of Nebraska, Omaha, NE

3:30 **2594** Influence of flower resources and pesticide exposure on bumble bee colony development and reproduction. **Maj Rundlöf** (maj.rundlof@biol.lu.se)¹, Ola Lundin² and Neal M. Williams¹, ¹Univ. of California, Davis, CA, ²Swedish Univ. of Agricultural Sciences, Uppsala, Sweden

3:45 **2595** How does sulfoxaflor exposure affect bumblebee reproductive success? Harry Siviter, Mark Brown and **Elli Leadbeater** (elli.leadbeater@rhul.ac.uk), Royal Holloway Univ. of London, Egham, United Kingdom

SD2596 Is exposure to neonicotinoid residues in agricultural soil putting ground-nesting bees at risk during nest construction? **D. Susan Chan** (peponapis@yahoo.com)¹, Ryan Prosser¹, Jose Rodriguez Gil² and Nigel Raine¹, ¹Univ. of Guelph, Guelph, ON, Canada, ²Univ. of Ottawa, Ottawa, ON, Canada

SD2597 Tracking pesticide residues in pollen trapped from honey bees (*Apis mellifera* L.). **Kimberly Stoner** (kimberly.stoner@ct.gov)¹, Brian Eitzer¹ and Richard Cowles², ¹Connecticut Agricultural Experiment Station, New Haven, CT, ²Connecticut Agricultural Experiment Station, Windsor, CT

SD2598 In vitro larval rearing of *Osmia lignaria* (Hymenoptera: Megachilidae) for diet manipulation studies. **Natalie Boyle** (natalie.boyle@ars.usda.gov) and Theresa Pitts-Singer, USDA - ARS, Logan, UT

SD2599 Species-specific variation in a bee nicotinic acetylcholine receptor subunit affects actions of the neonicotinoid, clothianidin. **Joseph Hawkins** (josephedwardhawkins@gmail.com) and Andrew Jones, Oxford Brookes Univ., Oxford, United Kingdom

SD2600 Native bee nesting rates in relation to the presence of clothianidin in the soil of natural areas. **Jonathan Tetlie** (jonathan.tetlie@gmail.com), Univ. of Illinois, Champaign, IL

SD2601 Effects of pesticides in combination with honey phytochemicals on honey bee health and nursing behavior. **Ling-Hsiu Liao** (liao19@illinois.edu), Daniel Pearlstein and May Berenbaum, Univ. of Illinois, Champaign, IL

4:00 Break & poster session

4:15 **2602** Assessment of risk from systemic insecticides for the ground-nesting solitary bee *Peponapis pruinosa*, an important pollinator of North American cucurbit crops. D. Susan Chan, Beatrice Chan and **Nigel Raine** (nraine@uoguelph.ca), Univ. of Guelph, Guelph, ON, Canada

4:30 **2603** Minimizing pesticide impacts on wild pollinators in eastern apple orchards through integrated pest and pollinator management tactics. **David Biddinger** (djb134@psu.edu)¹, Edwin Rajotte² and Ngoc Phan², ¹Pennsylvania State Univ. Fruit Research and Extension Center, Biglerville, PA, ²Pennsylvania State Univ., University Park, PA

4:45 **2604** Roadside habitats for pollinators: Does heavy metal runoff and pesticide spillover result in an ecological trap? **Lauren Agnew** (agnew0050@umn.edu), Tim Mitchell, Kristin Sikkink, Elizabeth Borer and Emilie C. Snell-Rood, Univ. of Minnesota, St. Paul, MN

5:00 **2605** Understanding the risks of pesticide exposure for parasitoid wasps and butterflies. **Penelope Whitehorn** (p.whitehorn@kit.edu), Karlsruhe Institute of Technology, Garmisch-Partenkirchen, Germany

5:15 **2606** Pesticide impacts on hoverflies. **Jane Stout** (stoutj@tcd.ie)¹, Sarah Gabel¹ and Blanaid White², ¹Trinity College, Dublin, Ireland, ²Dublin City Univ., Dublin, Ireland

5:30 **2607** Response of non-target epigeal communities in field crops to neonicotinoid seed coatings. **Kirsten Pearsons** (kfp5094@psu.edu) and John Tooker, Pennsylvania State Univ., University Park, PA

5:45 **2608** Pollinator protection from pesticides in Canada: Regulatory perspective on pollinator risk assessment and risk mitigation. Connie Hart, Wayne Hou, **Nicole Lauro** (nicole.lauro@canada.ca), Barbara Martinovic Barrett and Nicole McKenzie, Health Canada, Pest Management Regulatory Agency, Ottawa, ON, Canada

6:00 **2609** Assessing and managing risk of pesticides to bees: A regulatory perspective. Thomas Steeger, **Deanna Colby** (colby.deanna@epa.gov) and Cameron Douglass, US Environmental Protection Agency, Washington, DC

Late-Breaking Symposium: Lincoln Brower, 1931 – 2018: Inspiring Scientist and Champion of Monarch Conservation

Meeting Room 306 (Convention Centre)

Moderators and Organizers: Cheryl Schultz¹, Myron Zalucki² and Karen Oberhauser³, ¹Washington State Univ., Vancouver, WA, ²Univ. of Queensland, Brisbane, Australia, ³Univ. of Wisconsin, Madison, WI

1:30 **2610** Lincoln Brower: Scientist, mentor and teacher. **Linda Fink** (lfink@sbc.edu)¹ and Andrew Brower², ¹Sweet Briar College, Sweet Briar, VA, ²Middle Tennessee State Univ., Murfreesboro, TN

1:45 **2611** Of milkweeds and monarchs: The origins of chemical ecology. **Stephen B. Malcolm** (steve.malcolm@wmich.edu), Western Michigan Univ., Kalamazoo, MI

2:00 **2612** Lincoln's legacy to conserving the oyamel fir forest where monarchs overwinter in Mexico. **Alfonso Alonso** (alonsoa@si.edu), Smithsonian Institution, National Museum of Natural History, Washington, DC

2:15 **2613** Spring migration: Citizen scientists track the journey north. **Elizabeth Howard** (ehoward@journeynorth.org), Journey North, Wayzata, MN

2:30 **2614** All hands on deck: Preserving monarch breeding habitat in a sea of corn and soybeans. **Karen Oberhauser** (koberhauser@wisc.edu), Univ. of Wisconsin, Madison, WI

2:45 **2615** The monarch decline: Habitat loss vs an increase in mortality during the migration. **Chip Taylor** (chip@ku.edu), Univ. of Kansas, Lawrence, KS

3:00 **2616** The diaspora: Monarchs outside North America. **Myron Zalucki** (m.zalucki@uq.edu.au), Univ. of Queensland, Brisbane, Australia

3:15 **2617** A long-term survey of spring monarchs in Florida: Lincoln Brower's final study. **Ernest Williams** (ewilliam@hamilton.edu), Hamilton College, Clinton, NY

Workshop: Exploiting the Dynamism of R Software to Help Entomologists Adapt to a Changing World: Crossing the Border from R Admirer to R User

Meeting Room 215/216 (Convention Centre)

Moderators and Organizers: Rob Morrison¹, Robert Zinna² and Jerome Wilson², ¹USDA - ARS, Manhattan, KS, ²Univ. of Arizona, Tucson, AZ

1:30 Introductory remarks

- 1:35 Skill level icebreaker
- 1:45 Getting started with computing
- 2:00 Introduction to R and R Studio
- 2:40 Break
- 2:55 Starting with data in R
- 3:45 Break
- 4:00 Introducing dplyr and tidy
- 4:45 Data visualization with ggplot2
- 5:15 Concluding remarks

10-min: PBT, Genes, Genomes, and Genetics

Meeting Room 208/209 (Convention Centre)

Moderators: Carrie Deans¹ and Sylvia Bonilla², ¹Texas A&M Univ., College Station, TX, ²Univ. of Florida Citrus Research and Education Center, Lake Alfred, FL

1:30 **2618** Rapid *cis*-regulatory evolution underlies differential expression of the pheromone synthesis gene, *bond*, in six *Drosophila* species. **Jian Pu** (pujian@msu.edu)¹, Zinan Wang¹, Mei Luo², Joanne Yew³ and Henry Chung¹, ¹Michigan State Univ., East Lansing, MI, ²Jiangxi Agricultural Univ., Nanchang, China, ³Univ. of Hawai'i, Honolulu, HI

1:40 **2619** Insect neuropeptide bursicon homodimers mediates the expression of *buttonless* (*Btn*) involved in cuticle melanization in *Drosophila*. **Qun Li** (liqu@missouri.edu), Yuping Huang, Shengzhang Dong, Hongwei Zhang and Qisheng Song, Univ. of Missouri, Columbia, MO

1:50 **2620** Salinity responsive aquaporin expression and localisation in osmoregulatory organs of mosquito larvae, *Aedes aegypti*. Lidiya Misyura and **Andrew Donini** (adonini@yorku.ca), York Univ., Toronto, ON, Canada

2:00 **2621** Sulfakinin signalling in the kissing bug, *Rhodnius prolixus*. **Ian Orchard** (ian.orchard@utoronto.ca), Hussain Al-Alkawi and Angela Lange, Univ. of Toronto, Mississauga, ON, Canada

2:10 **2622** Functional analysis of genes associated with melanin pigmentation in *Harmonia axyridis*. **Younghwan Kwak** (yhwak2030@gmail.com), Heon Yoon, Seo Yeong Bae, Hye-Ri Kwon, Young Nam Youn and Yong-Man Yu, Chungnam National Univ., Daejeon, South Korea

2:20 **2623** Experimental evolution followed by genome resequencing using a chromosome-level assembly reveals the complex genetic architecture of xenobiotic adaptation in *Tetranychus urticae*. **Thomas Van Leeuwen** (thomas.vanleeuwen@ugent.be)¹, Nicky Wybouw¹, Olivia Kosterlitz², Andre Kurlovs³, Sabina Bajda¹, Robert Greenhalgh³, Simon Snoeck¹, Huyen Bui³, Astrid Bryon¹, Ernesto Villacis-Pérez⁴, Wannes Dermauw¹ and Richard Clark³, ¹Ghent Univ., Ghent, Belgium, ²Univ. of Washington, Seattle, WA, ³Univ. of Utah, Salt Lake City, UT, ⁴Univ. van Amsterdam, Amsterdam, Netherlands

2:30 Break

2:40 **2624** Introduction of CRISPR/Cas gene edited insect cells into *Diaphorina citri*. **Sylvia Bonilla** (bonillas@ufl.edu)¹ and Kirsten Pelz-Stelinski², ¹Univ. of Florida Citrus Research and Education Center, Lake Alfred, FL, ²Univ. of Florida, Lake Alfred, FL

2:50 **2625** CRISPR/Cas9 gene editing to block malaria transmission. **Maria Luisa Simões** (mlsimoes@jhu.edu), Yuemei Dong and George Dimopoulos, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

3:00 **2626** The ABC transporter/white gene locus in the Indian meal moth, *Plodia interpunctella*, and mutagenesis with CRISPR/Cas9 gene editing. **Bryce Shirk** (bryce.shirk@ars.usda.gov)¹, Paul Shirk¹, Richard B. Furlong¹, Ke Wu², Erin Scully³ and Blair Siegfried², ¹USDA - ARS, Gainesville, FL, ²Univ. of Florida, Gainesville, FL, ³USDA - ARS, Manhattan, KS

3:10 **2627** Sensitivity analysis of RNA interference response in lepidopteran and dipteran cell lines. **Jisheng Liu** (jisheng.liu@gzhu.edu.cn)¹, Guy Smagghe² and Luc Swevers³, ¹Guangzhou Univ., Guangzhou, China, ²Ghent Univ., Ghent, Belgium, ³National Centre of Scientific Research Demokritos, Athens, Greece

3:20 **2628** Systemic RNAi in a *Diabrotica* cell line. **Kristopher Silver** (ksilver@ksu.edu), Yoonseong Park and Kun Yan Zhu, Kansas State Univ., Manhattan, KS

3:30 **2629** Cloning, expression, and functional analysis of two acetylcholinesterase genes in *Spodoptera litura* (Lepidoptera: Noctuidae). **Abdalla Salim** (morkaz2013abdalla@yahoo.com), Africa City of Technology, Khartoum North, Sudan

3:40 **2630** RNA-seq and metabolomics underlying survival of ticks (Ixodidae) during prolonged starvation. Andrew Rosendale¹, Megan Dunlevy¹, Marshall McCue² and **Joshua Benoit** (benoitja@ucmail.uc.edu)¹, ¹Univ. of Cincinnati, Cincinnati, OH, ²Saint Mary's Univ., San Antonio, TX

3:50 **2631** Comparative analysis of endogenous cellulases in lower and higher termites. **Naveeda Qureshi** (naveedaqresh@gmail.com), Quaid-I-Azam Univ., Islamabad, Pakistan

4:00 **2632** The transcriptional effects of dietary macronutrients on gene expression in the polyphagous agricultural pest *Helicoverpa zea* (Lepidoptera: Noctuidae). **Carrie Deans** (cadeans@tamu.edu)¹, Heiko Vogel², Gregory Sword¹ and Spence Behmer¹, ¹Texas A&M Univ., College Station, TX, ²Max Planck Institute for Chemical Ecology, Jena, Germany

10-min: PBT, Miscellaneous

Meeting Room 304/305 (Convention Centre)

Moderators: Jon Harrison¹ and Pablo Emiliano Canton², ¹Arizona State Univ., Tempe, AZ, ²Univ. Nacional Autónoma de México, Cuernavaca, Mexico

1:30 **2633** Comparison of developmental events in the embryos of two North American tick species. **Kevin Friesen** (friesenk8@macewan.ca)¹, Marlee Dixon¹, Jesse Webb¹ and Tim Lysyk², ¹MacEwan Univ., Edmonton, AB, Canada, ²Retired, Lethbridge, AB, Canada

1:40 **2634** Behavior and extra-oral digestion of wasp *Sclerodermus guani* (Hymenoptera: Bethyridae) to parasitize the borer *Monochamus alternatus* (Coleoptera: Cerambycidae) Part II: Wasp's egg-laying. **Yanxue Lai** (87169312@163.com), Ningbo Forest Pest Control and Quarantine Station, Ningbo, China

1:50 **2635** Compartmentalization of digestive enzymes across gut regions in adults and nymphs of *N. viridula*. **Pablo Emiliano Canton** (cantonjeda.p@ufl.edu) and Bryony Bonning, Univ. of Florida, Gainesville, FL

2:00 **2636** Quantifying the pH, bicarbonate, and TCO₂ changes that occur in the hemolymph of dragonflies during their water-to-air respiratory transition. **Daniel Lee** (danlee@zoology.ubc.ca) and Philip Matthews, The Univ. of British Columbia, Vancouver, BC, Canada

2:10 **2637** Development of a physiological age grading system for the southern green stink bug *Nezara viridula* (L.) (Hemiptera: Pentatomidae). **Michael Grodowitz** (michael.grodowitz@ars.usda.gov), Brad Elliott, M. Guadalupe Rojas and Juan Morales-Ramos, USDA - ARS, Stoneville, MS

2:20 **2638** Hypermetric scaling of the tracheal system in the leg but not within the head, thorax or abdomen suggests leg-specific constraints on oxygen supply and possibly body size in scarab beetles. **Jon Harrison** (j.harrison@asu.edu)¹, Meghan Duell¹, C. Jaco Klok¹, Julian Wagner¹, John VandenBrooks², Jillian Ciarlariello¹ and John Socha³, ¹Arizona State Univ., Tempe, AZ, ²Midwestern Univ., Glendale, AZ, ³Virginia Polytechnic Institute and State Univ., Blacksburg, VA

2:30 **2639** Research progress in *Bacillus thuringiensis* biofilm. **Tianpei Huang** (tianpeihuang@fafu.edu.cn) and Xiong Guan, Fujian Agriculture and Forestry Univ., Fuzhou, China

2:40 **2640** Water extract of *Phellinus igniarius* increased the lifespan of *Drosophila* adult. **Lijuan Hou** (hiul@missouri.edu) and Qisheng Song, Univ. of Missouri, Columbia, MO

2:50 Break

3:00 **2641** A role for paracellular barriers in setting the limits of insect cold tolerance. **Heath MacMillan** (heath.macmillan@carleton.ca) and Kaylen Brzezinski, Carleton Univ., Ottawa, ON, Canada

3:10 **2642** Different overwintering metabolic response in two populations of mountain pine beetle (Coleoptera: Curculionidae). **Philip Batista** (batista@unbc.ca)¹, Katherine Bleiker² and Dezene P. W. Huber¹, ¹Univ. of Northern British Columbia, Prince George, BC, Canada, ²Natural Resources Canada, Victoria, BC, Canada

3:20 **2643** Host-plant dependent variation in survival against a lepidopteran densovirus. **Angela Smilanich** (asmilanich@unr.edu)¹, Amy Wantanabe¹, Nadya Muchoney¹, Chelsea Chung¹, Adrian L. Carper² and M. Deane Bowers², ¹Univ. of Nevada, Reno, NV, ²Univ. of Colorado, Boulder, CO

3:30 **2644** Egg production and longevity responses to mating and social contact in adult females of the mirid *Lygus hesperus*. **Colin Brent** (colin.brent@ars.usda.gov), USDA - ARS, Maricopa, AZ

3:40 **2645** Characterizing the early stages of a novel host shift using host fitness and metabolomics. **Luis Matos** (lmatos@ewu.edu), Emily Hendrix and Joanna Joyner Matos, Eastern Washington Univ., Cheney, WA

3:50 **2646** Identification of fecundity-related gustatory receptor genes in the brown planthopper *Nilaparvata lugens*. **Kui Kang** (hzausgk@163.com), Sun Yat-Sen Univ., Guangzhou, China

4:00 **2647** Identification of a sugar gustatory receptor and its effect on fecundity of the brown planthopper *Nilaparvata lugens*. **Weiwen Chen** (chenweiwen1989@yeah.net), Sun Yat-Sen Univ., Guangzhou, China

4:10 **2648** High resolution QTL mapping reveals parallel and divergent selection responses to different METI-I acaricides in *Tetranychus urticae*. **Simon Snoeck** (simonp.snoeck@ugent.be)¹, Andre Kurlovs², Sabina Bajda¹, Robert Greenhalgh², Rene Feyereisen¹, Ernesto Villacis-Pérez³, Nicky Wybouw¹, Wannes Dermauw¹, Richard Clark² and Thomas Van Leeuwen¹, ¹Ghent Univ., Ghent, Belgium, ²Univ. of Utah, Salt Lake City, UT, ³Univ. van Amsterdam, Amsterdam, Netherlands

10-min: PBT, Pheromones, Immunity, and Microbes

Meeting Room 207 (Convention Centre)

Moderators: Gabriel Hughes¹ and Andres Sandoval-Mojica², ¹Univ. of California, Riverside, CA, ²Univ. of Florida, Lake Alfred, FL

1:30 **2649** Molecular basis of pyrethrum repellency. **Qiang Wang** (chinaqiangwang@live.cn)¹, Feng Liu¹, Peng Xu¹, Elizabeth Bandason¹, Mengli Chen², Yuzhe Du¹, Leticia Smith³, Jeff Scott³, Rufus Isaacs¹, Kazuhiko Matsuda⁴ and Ke Dong¹, ¹Michigan State Univ., East Lansing, MI, ²Zhejiang Univ., Hangzhou, China, ³Cornell Univ., Ithaca, NY, ⁴Kinki Univ., Nara, Japan

1:40 **2650** Repellency properties of pyrethroids to *Trichogramma pretiosum*. **Ana Clara Paiva** (anaclara-r@hotmail.com), Fernando Iost Filho, Diosef Ferrari and Pedro Yamamoto, Univ. de São Paulo, Piracicaba, Brazil

1:50 **2651** Developing a lure for *Helicoverpa armigera* that excludes *Helicoverpa zea*. **Gabriel Hughes** (gabriel.hughes@ucr.edu)¹, Jin Zhang² and Ring Cardé¹, ¹Univ. of California, Riverside, CA, ²Max Planck Institute for Chemical Ecology, Jena, Germany

2:00 **2652** Aggregation pheromone biosynthesis in the brown marmorated stink bug *Halyomorpha halys*: Genetic tools for alternative pest management? Jason Lancaster¹, Ashot Khirikian², Donald C. Weber², Michael E. Sparks², Dawn E. Gundersen-Rindal², Thomas P. Kuhar¹ and **Dorothea Tholl** (tholl@vt.edu)¹, ¹Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ²USDA - ARS, Beltsville, MD

2:10 **2653** After mating, *Solenopsis invicta* males prevent displacement of their sperm by another male. **Robert Vander Meer** (bob.vandermeer@ars.usda.gov)¹, Tappey H. Jones² and Satya Chintia³, ¹USDA - ARS, Gainesville, FL, ²Virginia Military Institute, Lexington, VA, ³Foresight Science and Technology, Gainesville, FL

2:20 **2654** Male annihilation technique using methyl eugenol for field suppression of *Bactrocera dorsalis* (Hendel) (Diptera: Tephritidae) on mango. **Elechi Asawalam** (elechiasw@yahoo.com), Michael Okpara Univ. of Agriculture, Umuahia, Nigeria

2:30 Break

2:40 **2655** Targeting the citrus greening disease pathogen in the Asian citrus psyllid, *Diaphorina citri* (Hemiptera: Liviidae) and citrus hosts using antisense oligonucleotides. **Andres Sandoval-Mojica** (smaf@ufl.edu)¹, Kirsten Pelz-Stelinski¹, Wayne Hunter² and Veenu Aishwarya³, ¹Univ. of Florida, Lake Alfred, FL, ²USDA - ARS, Fort Pierce, FL, ³AUM LifeTech, Inc., Philadelphia, PA

2:50 **2656** Secondary metabolites of *Xenorhabdus/Photorhabdus* inhibit eicosanoid biosynthesis. **Yonggyun Kim** (hosanna@anu.ac.kr), Andong National Univ., Andong, South Korea

3:00 **2657** The relationship between the thermal tolerance of cereal aphids and their bacterial symbionts. **Muhammad Majeed** (zeeshan.majeed@uos.edu.pk)^{1,2} and Chunsen Ma¹, ¹Chinese Academy of Agricultural Sciences, Beijing, China, ²Univ. of Sargodha, Sargodha, Pakistan

3:10 **2658** Effects of juvenile hormone mimic on growth, morphogenesis, and haemocytes of the black cutworm, *Agrotis ipsilon* larvae (Lepidoptera:Noctuidae). **Mona El Mandarawy** (melmandarawy@gmail.com)¹ and Elham Abdel-Hakim², ¹Plant Protection Research Institute, Giza, Egypt, ²National Research Institute, Cairo, Egypt

3:20 **2659** Immune response of the bed bug, *Cimex lectularius*, to simulated traumatic insemination and infection with entomopathogenic bacteria. **Jonas G. King** (jonas.king@msstate.edu)¹, Anagha Gopakumar², Carly Miranda³, Jose Pietri³ and Aline Badial¹, ¹Mississippi State Univ., Mississippi State, MS, ²Mississippi State Univ., MSU, MS, ³Apex Bait Technologies, Inc., Santa Clara, CA

3:30 **2660** The role of juvenile hormone binding protein in mosquito immunity. **Il-Hwan Kim** (il-hwan.kim@nih.gov)¹, Julio Castillo¹, Ines Martin-Martin¹, Eric Calvo¹, Azadeh A. Aryan², Zach Adelman³, Jose Ribeiro¹ and John Andersen¹, ¹National Institute of Allergy and Infectious Diseases, Rockville, MD, ²Virginia Polytechnic Institute and State Univ., Blacksburg, VA, ³Texas A&M Univ., College Station, TX

3:40 Break

3:50 **2661** Juvenile hormone mimics phenocopy parasitic wasp attacks in *Drosophila melanogaster*. **Rebecca Spokony** (rebecca.spokony@gmail.com)¹, Carolyn McGrail¹, Raquel Calero², Sarah Lee¹ and Marium Sarder¹, ¹Baruch College, City College of New York, New York, NY, ²Macaulay Honors College, City College of New York, New York, NY

4:00 **2662** Regulation of immune cell proliferation is conserved in mosquitoes. **Ellen Martinson** (e.martinson@uga.edu), Luca Valzania and Michael Strand, Univ. of Georgia, Athens, GA

4:10 **2663** Population-specific expression of antimicrobial peptides conferring pathogen resistance in the invasive ladybird *Harmonia axyridis*. **Heiko Vogel** (hvogel@ice.mpg.de)¹, Tobias Gegner², Henrike Schmidtberg² and Andreas Vilcinskas², ¹Max Planck Institute for Chemical Ecology, Jena, Germany, ²Justus Liebig Univ., Gießen, Germany

4:20 **2664** Bioactivity and molecular characterization of bombolins from *Bombus ardens*, *B. consobrinus*, *B. terrestris*, and *B. ussuriensis*. **Kyungjae Yoon** (kongbob89@snu.ac.kr), Seoul National Univ., Seoul, South Korea

4:30 **2665** Protease networks control and integrate mosquito immune reactions. Xin Zhang¹, Kathleen Sellens¹, Sifat Moon¹, Christopher Culbertson¹, Mike Osta², Caterina Scoglio¹ and **Kristin Michel** (kmichel@ksu.edu)¹, ¹Kansas State Univ., Manhattan, KS, ²American Univ. of Beirut, Beirut, Lebanon

10-min: P-IE, Ecology, General

Meeting Room 217/218/219 (Convention Centre)

Moderators: Temitope Kehinde¹ and EmmaLeigh Given², ¹Obafemi Awolowo Univ., Ile-Ife, Nigeria, ²Kent State Univ., North Canton, OH

1:30 **2666** Land use effects on native bee fitness in agricultural landscapes. **Sabine Nooten** (sabine.nooten@unh.edu) and Sandra Rehan, Univ. of New Hampshire, Durham, NH

1:40 **2667** Soil type and moisture effects on survival and emergence of western cherry fruit fly. **Wee Yee** (wee.yee@ars.usda.gov) and Peter Chapman, USDA - ARS, Wapato, WA

1:50 **2668** Effect of distance from tree row and inter-trap distance on capture of bees. **Wayne Ohnesorg** (wohnesorg2@unl.edu), Univ. of Nebraska, Norfolk, NE

2:00 **2669** Life and death in the phyllosphere: Interactions of plant-associated bacteria with insects. **Melanie Smees** (mrs353@cornell.edu) and Tory Hendry, Cornell Univ., Ithaca, NY

2:10 **2670** Manipulating plant cultivar diversity to promote biodiversity and reduce pests in urban landscapes. **Adam Dale** (agdale@ufl.edu), Ethan Doherty, Brianna Whitman, Basil Iannone and Jason Kruse, Univ. of Florida, Gainesville, FL

2:20 **2671** Spatial and temporal analysis of bark beetle and folivore disturbance in Pacific Northwestern forests, 1960-2017. **Alexander Pane** (apane@uw.edu)¹, Brian Harvey¹, Allan Carroll² and Patrick Tobin¹, ¹Univ. of Washington, Seattle, WA, ²The Univ. of British Columbia, Vancouver, BC, Canada

2:30 **2672** Early season resource pulses and carry-over effects impact bumble bee colony growth and reproduction. **Neal M. Williams** (nmwilliams@ucdavis.edu)¹, Rosemary Malfi¹, Elizabeth Crone² and Maj Rundlöf¹, ¹Univ. of California, Davis, CA, ²Tufts Univ., Medford, MA

2:40 **2673** Why are forests plant-rich and green with small biomass of herbivorous insects? Are insect food webs in forests pyramidal? Why can anti-nutritive plant defenses function to decrease the damage from insects: The realities that a novel parameterized food web model tells. **Kotaro Konno** (konno@affrc.go.jp), National Agriculture and Food Research Organization, Tsukuba, Japan

2:50 Break

3:00 **2674** Altering disturbance regimes for monarch butterfly conservation. **Nathan Haan** (haannath@msu.edu), Andrew Myers and Douglas A. Landis, Michigan State Univ., East Lansing, MI

3:10 **2675** Phenology and predatory behaviors of soldier beetles (*Chauliognathus* spp.) in agricultural systems. **Katlyn Catron** (kcatron@vt.edu) and Thomas P. Kuhar, Virginia Polytechnic Institute and State Univ., Blacksburg, VA

3:20 **2676** Modeling the abundance of two *Rhagoletis* fly (Diptera: Tephritidae) pests in Washington State, U.S.A. **Tewodros Wakie** (tewodros.wakie@ars.usda.gov), Wee Yee and Lisa Neven, USDA - ARS, Wapato, WA

3:30 **2677** Do ant nest patches improve grassland recovery following large-scale disturbances? **Nancy Nicolai** (nnicolai@unm.edu), Univ. of New Mexico, Albuquerque, NM

3:40 **2678** Assessing risk of peanut burrower bug, *Pangaeus bilineatus* (Hemiptera: Cydnidae), in southeast United States peanut systems. **Benjamin Aigner** (ben.aigner@uga.edu) and Mark R. Abney, Univ. of Georgia, Tifton, GA

3:50 **2679** Biological and ecological traits of strawberry blossom weevil *Anthonomus rubi* in relation to IPM and organic agriculture. **Sergei Popov** (sergei_ya_popov@mail.ru), Russian Timiryazev State Agrarian Univ., Moscow, Russia

4:00 **2680** Continent-wide patterns of migratory monarch protozoan infection informed by citizen science observations. **Leone Brown** (leone.brown@tufts.edu)¹, Paola Barriga², Elizabeth Crone¹ and Sonia Altizer², ¹Tufts Univ., Medford, MA, ²Univ. of Georgia, Athens, GA

4:10 Break

4:20 **2681** What's causing the monarch butterfly population to decline in the west? **Cheryl Schultz** (schultzc@wsu.edu)¹ and Elizabeth Crone², ¹Washington State Univ., Vancouver, WA, ²Tufts Univ., Medford, MA

4:30 **2682** Spatial and temporal patterns of colonization of *Arctostaphylos* host plants by *Tamalia* galling aphids. **Donald Miller** (dgmiller@csuchico.edu) and Colleen Hatfield, California State Univ., Chico, CA

4:40 **2683** Trade-offs for butterfly alpha and beta diversity in human-modified landscapes and tropical rainforests. Hemchandranauth Sambhu^{1,2}, Alliea Nankishore¹, Stephen Turton³ and **Tobin Northfield** (tnorthfield@wsu.edu)^{1,4}, ¹James Cook Univ., Cairns, Australia, ²Univ. of Guyana, Turkeyen, Guyana, ³Central Queensland Univ., Cairns, Australia, ⁴Washington State Univ., Wenatchee, WA

4:50 **2684** Butterfly gardens as a conservation cum ecotourism venture: A case study at Peechi (Kerala, India). **George Mathew** (gmathewkfri@gmail.com), Kerala Forest Research Institute, Mavelikara, India

5:00 **2685** Insect-flower interaction networks vary among endemic pollinator taxa over an elevation gradient. **Temitope Kehinde** (topekehinde@gmail.com), Obafemi Awolowo Univ., Ile-Ife, Nigeria

5:10 **2686** Testing cross-habitat impact of invasive plants: Do terrestrial invasive plants alter stream invertebrate communities? **Emma Leigh Given** (egiven1@kent.edu), Kent State Univ., North Canton, OH

5:20 **2687** Presentation withdrawn

10-min: P-IE, Host Plant Resistance

Meeting Room 212 (Convention Centre)

Moderators: Emily Kraus¹ and Tariq Mustafa², ¹Louisiana State Univ., Baton Rouge, LA, ²Univ. of Agriculture, Faisalabad, Pakistan

1:30 **2688** Interactions between nitrogen and silicon in rice and their effects on anti-herbivore resistance. **Rensen Zeng** (rszeng@fafu.edu.cn) and YuanYuan Song, Fujian Agriculture and Forestry Univ., Fuzhou, China

1:40 **2689** Up-regulating plant defenses to herbivores in rice, *Oryza sativa*, with methyl jasmonate seed treatments. **Emily Kraus** (ekraus@agcenter.lsu.edu) and Mike Stout, Louisiana State Univ., Baton Rouge, LA

1:50 **2690** Participatory evaluation of new sorghum varieties tolerant to insect pests for the sustainable growth of sorghum production in the central and western areas of Burkina Faso. **Ouattara Delphine** (deli1ouattara@yahoo.fr)¹ and Nacro Soulemene Nacro², ¹Institut de l'Environnement et de Recherches Agricoles, Bobo Dioulasso, Burkina Faso, ²INERA, Bobo Dioulasso, Burkina Faso

2:00 **2691** Combining electropenetrography (EPG) and life history traits in *Aphis glycines* (Hemiptera: Aphididae) to characterize the resistance of soybean lines. **Julien Saguez** (saguezj@yahoo.com)¹, Sébastien Boquel¹, Louise O'Donoughe¹, Charles Vincent², Annie-Ève Gagnon² and Philippe Giordanengo^{3,4}, ¹CÉROM, Saint-Mathieu-de-Beloeil, QC, Canada, ²Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, QC, Canada, ³Univ. de Picardie Jules Verne, Amiens, France, ⁴INRA, Sophia-Antipolis, France

2:10 **2692** Suppression of the oral secreted bacteria from the rice stem borer (*Chilo suppressalis* Walker) on rice defense responses. **Jie Wang** (jiewang0813@163.com) and Rensen Zeng, Fujian Agriculture and Forestry Univ., Fuzhou, China

2:20 **2693** Patterns of fumigant use in California grapes. **Doug Downie** (douglas.downie@cdpr.ca.gov), California Dept. of Pesticide Regulation, Sacramento, CA

2:30 **2694** Transcriptional responses of resistant and susceptible sorghum to sugarcane aphid herbivory. **Mahnaz Kiani** (mahnaz.kianifariz@ag.tamu.edu) and Ada Szczepaniec, Texas A&M Univ., Amarillo, TX

2:40 **2695** First combined resistance to hessian fly and sunn pest identified in synthetic hexaploid wheat. **Mustapha El Bouhssini** (m.bohssini@cgiar.org)¹, Abdelhadi Sabraoui², Tadesse Wuletaw², Livinus Emebiri³, Mui-Keng Tan⁴ and Francis Ogbonnaya⁵, ¹International Center for Agriculture Research in the Dry Areas, Aleppo, Syria, ²International Center for Agriculture Research in the Dry Areas, Rabat, Morocco, ³New South Wales Dept. of Primary Industries, Wagga Wagga, Australia, ⁴New South Wales Dept. of Primary Industries, Menangle, Australia, ⁵Grains Research and Development Corporation, Kingston, Australia

2:50 Break

3:00 **2696** Resistance to *Diatraea saccharalis* (Fabricius) (Lepidoptera: Crambidae) in different rice accessions. **José Alexandre Barrigossi** (jose.barrigossi@embrapa.br)¹, Ana Paula Pelosi², Flávio Jesus² and Anderson Silva², ¹Embrapa Arroz e Feijão, Santo Antônio de Goiás, Brazil, ²Instituto Federal Goiano, Urutaí, Brazil

3:10 **2697** Does growth-defense relationship explain tree resistance to pests in two common boreal tree species? **Jennifer Klutsch** (klutsch@ualberta.ca)¹, Chen Kee¹, Blaise Ratcliffe² and Nadir Erbilgin¹, ¹Univ. of Alberta, Edmonton, AB, Canada, ²Univ. of British Columbia, Vancouver, BC, Canada

3:20 **2698** Evaluation of soybeans for resistance to soybean thrips, *Neohyadatothrips variabilis* (Thysanoptera: Thripidae), infested with and without soybean vein necrosis virus. **Doris Lagos-Kutz** (doris.lagos-kutz@ars.usda.gov)^{1,2}, James Haudenshield³, Roger Bower^{1,2}, Leslie Domier^{1,2}, Michelle Pawlowski², Jaeyeong Han² and Glen L. Hartman^{1,2}, ¹USDA - ARS, Urbana, IL, ²Univ. of Illinois, Champaign, IL, ³Mérieux NutriSciences, Crete, IL

3:30 **2699** Plant priming by conspecific and leaf-eating herbivores do not influence larval densities of a galling pest of brassica crops. **Andrea Swan** (aeswan@uvm.edu) and Yolanda Chen, Univ. of Vermont, Burlington, VT

3:40 **2700** Effect of insecticide resistance on virulence to resistant rice cultivars in the brown planthopper. **Tomohisa Fujii** (tomofujii@affrc.go.jp)¹, Sachiyo Sanada-Morimura¹, Matsukura Keiichiro², Akiduki Gaku¹ and Masaya Matsumura¹, ¹National Agriculture and Food Research Organization, Kumamoto, Japan, ²National Agriculture and Food Research Organization, Ibaraki, Japan

3:50 Break

4:00 **2701** Expansion, diversity, and function of effector proteins in *Mayetiola* gall midges. **Ming-Shun Chen** (mchen@ksu.edu), USDA - ARS, Manhattan, KS; Kansas State Univ., Manhattan, KS

4:10 **2702** Sweetpotato variety confers resistance to sweet-potato weevils and influences the microbial community. **Milton Otema Anyanga** (moanyanga@yahoo.com)¹, Benard Yada¹, Charles Pepe-Ranne², Chad Keyser², James Trimble², Sinnikka Smith² and Brooke Bissinger², ¹National Crops Resources Research Institute, Kampala, Uganda, ²AgBiome, Inc., Research Triangle Park, NC

4:20 **2703** *Citrus ecirrhosus*: Source of whitefly resistance for watermelon. **Alvin Simmons** (alvin.simmons@ars.usda.gov)¹, Robert Jarret², Charles Cantrell³ and Amnon Levi¹, ¹USDA - ARS, Charleston, SC, ²USDA - ARS, Griffin, GA, ³USDA - ARS, Univ., MS



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4:30 **2704** Response of different composts and organic fertilizers on life cycle of hadda beetle (*Epilachna vigintioctopunctata* Fabricius) on brinjal. **Muhammad Aqueel** (anjum_ento@uos.edu.pk), Univ. of Sargodha, Sargodha, Pakistan

4:40 **2705** Comparative probing activities of potato and bindweed psyllids on their host and non-host plants. **Tariq Mustafa** (tariq.mustafa@uaf.edu.pk)¹, David R. Horton², Richard Zack³, William Rodney Cooper² and Joseph Munyaneza², ¹Univ. of Agriculture, Faisalabad, Pakistan, ²USDA - ARS, Wapato, WA, ³Washington State Univ., Pullman, WA

10-min: P-IE, Extension, Youth/Adult Education

Meeting Room 208/209 (Convention Centre)

Moderators: Frank Hale¹ and Suhas Vyavhare², ¹Univ. of Tennessee, Nashville, TN, ²Texas A&M Univ., Lubbock, TX

4:40 **2706** Using social media to increase ornamental entomology and plant pathology outreach. **Frank Hale** (fahale@utk.edu)¹, Alan Windham¹ and Darrell Hensley², ¹Univ. of Tennessee, Nashville, TN, ²Univ. of Tennessee, Knoxville, TN

4:50 **2707** Communicating insect conservation topics through formal education workshops. **Melissa Siska** (msiska@naturemuseum.org), Peggy Notebaert Nature Museum, Chicago, IL

5:00 **2708** Using distance education to address extension needs in Hawaii's island counties. **Christina Mogren** (cmogren@hawaii.edu), Univ. of Hawai'i, Honolulu, HI

5:10 **2709** Micro-CT generated 3D insect models to enhance student learning, and to answer research questions. Andrew Graf¹, Anika Sharma², Virginia Castillo¹ and **Craig J. Coates** (c-coates@tamu.edu)¹, ¹Texas A&M Univ., College Station, TX, ²Punjabi Univ., Patiala, India

5:20 **2710** Science communication in entomology: Knowing what's bugging them can help us connect with communities. **Joan King** (joanie_king@tamu.edu)¹, Joe Ballenger², Nancy Miorelli³ and Edward Vargo¹, ¹Texas A&M Univ., College Station, TX, ²Randstad, Florissant, MO, ³Univ. of Georgia, Athens, GA

5:30 **2711** Planning for success: Keys to an effective extension career. **Suhas Vyavhare** (suhas.vyavhare@ag.tamu.edu)¹ and Charles Allen², ¹Texas A&M Univ., Lubbock, TX, ²Texas A&M Univ., San Angelo, TX



Glossary of Terms and Abbreviations

10-min: Ten-minute (oral) papers

3-min: Three-minute presentations

APHIS: Animal Plant and Health Inspection Service

ARS: Agricultural Research Service

Bt: *Bacillus thuringiensis*

CABI: Centre for Agriculture and Bioscience International

CÉROM: Grain Research Center

CIRAD: Centre for International Cooperation in Agronomic Research for Development

CNRS: National Center for Scientific Research

CONICET: National Scientific and Technical Research Council

CSIRO: Commonwealth Scientific and Industrial Research Organization

ESA: Entomological Society of America

ESBC: Entomological Society of British Columbia

ESC: Entomological Society of Canada

ICAR: Indian Council of Agricultural Research

INDICASAT: Institute of Scientific Research and High Technology Services

INERA: Environmental Institute for Agricultural Research

INRA: National Institute of Agronomic Research

INTA: National Agricultural Technology Institute

IPM: Integrated Pest Management

Member Symposia: A wide range of topics and subject matter a covered by this category; some of which are very narrowly focused.

MUVE: Medical, Urban, and Veterinary Entomology. One of the Section topics.

NIFA: National Institute of Food and Agriculture

Organized Meeting: Specialty groups which hold their business meeting, student competitions, and other activities in conjunction with the ESA Annual Meeting are represented in this category.

PBT: Physiology, Biochemistry, and Toxicology. One of the Section topics.

P-IE: Plant-Insect Ecosystems. One of the Section topics.

Program Symposia: The meeting's top-tier symposia. These are broad in scope, reflect the theme of the meeting, "Crossing Borders: Entomology in a Changing World," and include international collaborations.

SENASA: National Service of Agricultural Health and Quality

Section Symposia: These symposia are overarching in theme and serve the interest of one or more Section topics: MUVE, PBT, P-IE, SysEB (see below for definitions).

USDA: United States Department of Agriculture

SysEB: Systematics, Evolution, and Biodiversity. One of the Section topics.

USD: United States Department of the Interior

VCC: Vancouver Convention Centre

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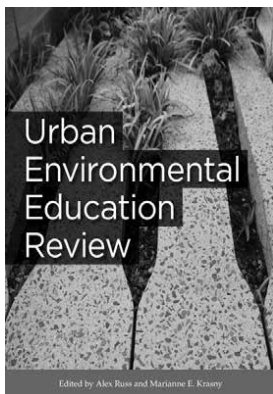
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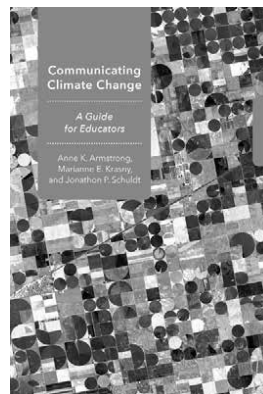
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Coleoptera Scarabaeidae <i>Aphodius pseudolividus</i>	1858	Diptera Anthomyiidae <i>Fucellia</i>	2137
Coleoptera Scarabaeidae <i>Cephalodesmus</i>	D3406	Diptera Asilidae <i>Asilus crabroniformis</i>	1231
Coleoptera Scarabaeidae <i>Cyclocephala paraguayensis</i>	0210	Diptera Asilidae <i>Lasiopogon</i>	2142
Coleoptera Scarabaeidae <i>Deltochilum loperae</i>	D3614	Diptera Calliphoridae.....	0283, D3218
Coleoptera Scarabaeidae <i>Dichotomius divergens</i>	D3614	Diptera Calliphoridae <i>Chrysomya megacephala</i>	1459, 1461, 1463
Coleoptera Scarabaeidae <i>Dicronorrhina derbyana</i>	2638	Diptera Calliphoridae <i>Chrysomya ruffiacis</i>	0273, 0317, 0762, 1460, D3217
Coleoptera Scarabaeidae <i>Dynastes granti</i>	0580	Diptera Calliphoridae <i>Cochliomyia hominivorax</i>	0805, 1463, D3447, D3449
Coleoptera Scarabaeidae <i>Dynastes hercules</i>	2638	Diptera Calliphoridae <i>Cochliomyia macellaria</i>	0273, 0317, 0762
Coleoptera Scarabaeidae <i>Goliathis goliathis</i>	2638	Diptera Calliphoridae <i>Lucilia sericata</i>	0273, 1455, 1456, 1460, 2311
Coleoptera Scarabaeidae <i>Leucothyreus</i>	0578	Diptera Calliphoridae <i>Phormia regina</i>	0792, 1321, 1456
Coleoptera Scarabaeidae <i>Liatongus rhadamistus</i>	1006	Diptera Calliphoridae <i>Protophormia terraenovae</i>	1453
Coleoptera Scarabaeidae <i>Maladera castanea</i>	0932, SD0853	Diptera Cecidomyiidae <i>Aphidoletes aphidimyza</i>	0496
Coleoptera Scarabaeidae <i>Ontherus diabolicus</i>	D3614	Diptera Cecidomyiidae <i>Contarinia nasturtii</i>	0126, 0384, 0394, 0396, 1283, 2241, 2273, 2699, D3338
Coleoptera Scarabaeidae <i>Onthophagus taurus</i>	0319, 1858	Diptera Cecidomyiidae <i>Contarinia sorghicola</i>	2690
Coleoptera Scarabaeidae <i>Oryctes rhinoceros</i>	1109, 1430	Diptera Cecidomyiidae <i>Dasineura lupini</i>	D3545
Coleoptera Scarabaeidae <i>Pachnoda interrupta</i>	D3262	Diptera Cecidomyiidae <i>Dasineura mali</i>	D3380
Coleoptera Scarabaeidae <i>Paulosawaya</i>	0579	Diptera Cecidomyiidae <i>Jaapiella ivannikovi</i>	0398
Coleoptera Scarabaeidae <i>Popillia japonica</i>	0387, 0513, 1853, 1872, 1883, D3049, D3384, D3426	Diptera Cecidomyiidae <i>Mayetiola destructor</i>	0127, 0429, 2695, 2701, D3334
Coleoptera Scarabaeidae <i>Rhizotrogus majalis</i>	1436	Diptera Cecidomyiidae <i>Sitodiplosis mosellana</i>	0055, 0378, 0380, 0857, 0861, 1283
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Coleoptera Scolytidae.....	1867, D3571	Diptera Ceratopogonidae <i>Culicoides</i>	0291, 1303, D3443
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Coleoptera Silphidae.....	SP1251	Diptera Ceratopogonidae <i>Culicoides insignis</i>	0890
Coleoptera Silphidae <i>Nicrophorus chryseus</i>	1707	Diptera Ceratopogonidae <i>Culicoides obsoletus</i>	SP2025
Coleoptera Silphidae <i>Nicrophorus vespilloides</i>	0754		
Coleoptera Silvanidae <i>Oryzaephilus mercator</i>	2563		
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Coleoptera Staphylinidae <i>Batrisodes</i>	1710		
Coleoptera Staphylinidae <i>Cafius</i>	SP2144		
Coleoptera Staphylinidae <i>Dalotia coriaria</i>	0499, 1114, SD0845		

Diptera Ceratopogonidae <i>Culicoides pulcaris</i>	SP2025	Diptera Culicidae <i>Culex perexiguus</i>	SP2026
Diptera Ceratopogonidae <i>Culicoides sonorensis</i>	0043, 0896, 2208, D3446	Diptera Culicidae <i>Culex pipiens</i>	0131, 0274, 0297, 0441, 0655, 0894, 1066, 1470, 1681, 1998, D3439, SD2325
Diptera Ceratopogonidae <i>Culicoides stellifer</i>	0890, 0891	Diptera Culicidae <i>Culex quinquefasciatus</i>	0264, 0265, 0304, 0305, 0440, 0593, 0600, 0629, 0636, 0893, 0899, 1311, 1466, D3239, D3445
Diptera Ceratopogonidae <i>Culicoides venustus</i>	0890, 0891	Diptera Culicidae <i>Culex restuans</i>	1066, 1068
Diptera Chaoboridae <i>Chaoborus</i>	D3274	Diptera Culicidae <i>Culex stigmatosoma</i>	1311
Diptera Chironomidae	0921, D3193	Diptera Culicidae <i>Culex tarsalis</i>	0625, 1311
Diptera Chironomidae <i>Belgica antarctica</i>	D3466	Diptera Culicidae <i>Toxorhynchites amboinensis</i>	2662
Diptera Chironomidae <i>Eretmoptera murphyi</i>	1198	Diptera Culicidae <i>Toxorhynchites rutilus</i>	0260, 0632
Diptera Chironomidae <i>Gliptotendipes barbipes</i>	D3411	Diptera Diopsidae <i>Diopsis longicornis</i>	D3108
Diptera Chironomidae <i>Paraclunio alaskensis</i>	D3198	Diptera Drosophilidae	2375
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Diptera Chironomidae <i>Stictochironomus marmoreus</i>	D3411	Diptera Drosophilidae <i>Drosophila hydei</i>	1195
Diptera Chloropidae <i>Liohippelates</i>	0975	Diptera Drosophilidae <i>Drosophila mauritiana</i>	2645
Diptera Chloropidae <i>Meromyza americana</i>	SD0842	Diptera Drosophilidae <i>Drosophila melanogaster</i>	0761, 0802, 1092, 1491, 1691, 1692, 1996, 2097, 2165, 2618, 2619, 2641, 2645, 2661, D3174, D3465, D3475, D3477, D3492, SP1703, SP2170
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Diptera Culicidae <i>Aedes</i>	0586, 0630, 0889	Diptera Drosophilidae <i>Drosophila sturtevantii</i>	SD1415
Diptera Culicidae <i>Aedes japonicus</i>	0299	Diptera Drosophilidae <i>Drosophila sukuzii</i>	0034, 0054, 0150, 0284, 0414, 0415, 0416, 0417, 0418, 0419, 0420, 0421, 0422, 0423, 0424, 0425, 0426, 0648, 0702, 0707, 0802, 0805, 0825, 1094, 1095, 1431, 1797, 1798, 1799, 1800, 1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1837, 1850, 1907, 1924, 1926, 2097, 2236, 2243, 2247, 2280, 2455, 2456, D3062, D3063, D3065, D3079, D3188, D3287, D3298, D3315, D3329, D3362, D3364, D3379, D3465, D3520, D3533, D3577, SP1703
Diptera Culicidae <i>Aedes aegypti</i>	0008, 0130, 0173, 0174, 0176, 0177, 0178, 0179, 0180, 0182, 0261, 0263, 0275, 0297, 0298, 0300, 0304, 0305, 0439, 0440, 0442, 0482, 0589, 0590, 0591, 0594, 0595, 0596, 0599, 0629, 0631, 0634, 0635, 0637, 0638, 0661, 0791, 0802, 0804, 0888, 0892, 0894, 0895, 0897, 1064, 1069, 1071, 1072, 1074, 1075, 1076, 1294, 1304, 1313, 1317, 1466, 1469, 1472, 1473, 1474, 1681, 1999, 2024, 2027, 2305, 2306, 2335, 2338, 2340, 2341, 2349, 2350, 2620, 2649, 2660, 2662, D3003, D3007, D3026, D3166, D3228, D3232, D3234, D3236, D3239, D3241, D3425, D3435, SD2321, SD2323, SD2324, SD2326, SP1315, SP1316, SP1706, VP02, VP03, VP46	Diptera Drosophilidae <i>Drosophila willistoni</i>	D3401
Diptera Culicidae <i>Aedes albopictus</i>	0129, 0130, 0261, 0262, 0264, 0298, 0299, 0301, 0302, 0303, 0304, 0482, 0589, 0595, 0633, 1066, 1068, 1071, 1074, 1313, 1320, 2306, D3005, D3027, D3166, D3228, D3234, D3236, D3237, D3239, D3240, D3241, D3413, D3425, SD2320, SP1316, VP38	Diptera Drosophilidae <i>Rhagoletis melanogaster</i>	2649
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Diptera Culicidae <i>Aedes japonicus</i>	0260, 0303	Diptera Dryomyzidae <i>Oedoparena</i>	2137
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Diptera Culicidae <i>Aedes triseriatus</i>	0260, 0299, 0303	Diptera Glossinidae <i>Glossina pallidipes</i>	D3010
Diptera Culicidae <i>Aedes vexans</i>	0392	Diptera Milichiidae <i>Paramyia</i>	2003
Diptera Culicidae <i>Anopheles</i>	0046, 0586	Diptera Muscidae <i>Atherigona soccata</i>	2690
Diptera Culicidae <i>Anopheles albimanus</i>	1065, SP1314, VP01	Diptera Muscidae <i>Atherigona reversura</i>	D3556
Diptera Culicidae <i>Anopheles arabiensis</i>	0628, SD2068	Diptera Muscidae <i>Haematobia irritans</i>	0266, 0267, 2214, 2218, 2220
Diptera Culicidae <i>Anopheles atroparvus</i>	VP01	Diptera Muscidae <i>Musca domestica</i>	0149, 0318, 1321, 1464, 2207, D3224, D3427
Diptera Culicidae <i>Anopheles barbirostris</i>	0443	Diptera Muscidae <i>Ophyra aenescens</i>	1457
Diptera Culicidae <i>Anopheles coluzzii</i>	0005, 0172, SP2026, VP09	Diptera Muscidae <i>Ophyra albuquerquei</i>	1457
Diptera Culicidae <i>Anopheles darlingi</i>	0132, 0588, D3008	Diptera Muscidae <i>Philornis downsi</i>	0135, 2571, D3152
Diptera Culicidae <i>Anopheles funestus</i>	0005, 0628	Diptera Muscidae <i>Stomoxys calcitrans</i>	1462, 2211, 2213, 2219, D3428
Diptera Culicidae <i>Anopheles gambiae</i>	0005, 0008, 0131, 0181, 0305, 0438, 0587, 0597, 0628, 0631, 0639, 0803, 0894, 1070, 1308, 1466, 2032, 2454, 2662, 2665, D3004, D3227, D3230, D3231, D3481, SD2324, VP09	Diptera Phoridae <i>Apocephalus borealis</i>	1590
Diptera Culicidae <i>Anopheles merus</i>	VP09	Diptera Psychodidae <i>Lutzomyia</i>	D3238
Diptera Culicidae <i>Anopheles quadrimaculatus</i>	0172	Diptera Psychodidae <i>Lutzomyia longipalpis</i>	1465
Diptera Culicidae <i>Anopheles quadrimaculatus</i>	0629, SD2068	Diptera Psychodidae <i>Phlebotomus papatasi</i>	0296, 0480, 1465
Diptera Culicidae <i>Anopheles stephensi</i>	0047, 0803, 0898, 1065, 1468, D3006, D3167, VP01	Diptera Psychodidae <i>Phlebotomus phlebotomus major</i>	0296
Diptera Culicidae <i>Culex</i>	0586, 0589, 0889, SP1316	Diptera Psychodidae <i>Phlebotomus sergenti</i>	0296
Diptera Culicidae <i>Culex panocossa</i>	D3430	Diptera Sarcophagidae <i>Blaesoxipha plinthopyga</i>	1460
		Diptera Sarcophagidae <i>Peckia intermutans</i>	1457
		Diptera Sarcophagidae <i>Sarcophaga bullata</i>	2097
		Diptera Sciaridae <i>Bradysia</i>	0500
		Diptera Sciaridae <i>Bradysia agrestis</i>	D3431

Diptera Sciaridae <i>Bradysia coprophila</i>	0499	Hemiptera Alydidae <i>Riptortus pedestris</i>	0218, 1991, 2339
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Diptera Syrphidae <i>Eristalis transversa</i>	0252	Hemiptera Aphididae <i>Acyrtosiphon kondoi</i>	1893
Diptera Syrphidae <i>Eupeodes americanus</i>	0252	Hemiptera Aphididae <i>Acyrtosiphon pisum</i>	0039, 0041, 0212, 0345, 0436, 0913, 1004, 1155, 1434, 1838, 1893, 1990, 2099, 2239, 2267, 2332, 2669, D3157, D3179, D3191, D3400, D3483, SP1260
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Diptera Tachinidae	2255	Hemiptera Aphididae <i>Aphis fabae</i>	2330
Diptera Tachinidae <i>Compsilura concinnata</i>	1344	Hemiptera Aphididae <i>Aphis glycines</i>	0862, 0955, 1135, 1290, 1899, 1904, 2443, 2506, 2691, D3066, D3190, D3314, D3346, SD0840, VP13
Diptera Tachinidae <i>Drino rhoeo</i>	0696	Hemiptera Aphididae <i>Aphis gossypii</i>	0194, 0711, 1437, D3573, VP15
Diptera Tachinidae <i>Trichopoda pennipes</i>	0677	Hemiptera Aphididae <i>Aphis helianthi</i>	0449
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Diptera Tephritidae <i>Bactrocera correcta</i>	2246	Hemiptera Aphididae <i>Cinara</i>	0432
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Diptera Tephritidae <i>Bactrocera dorsalis</i>	0785, 1846, 2246, 2654, D3485, D3486, D3487, D3489, D3490, SD2425	Hemiptera Aphididae <i>Dysaphis plantaginea</i>	0717, D3387
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Diptera Tephritidae <i>Ceratitis</i>	0864	Hemiptera Aphididae <i>Monelliopsis pecanis</i>	1917
Diptera Tephritidae <i>Ceratitis capitata</i>	1187, 2640, D3373, D3627, VP41	Hemiptera Aphididae <i>Myzus persicae</i>	0496, 0500, 0501, 0711, 0715, 0954, 1137, 1437, 1504, 1761, 1765, 1838, 2095, 2099, 2267, D3282, D3597, SD1775, SD2464
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Diptera Tephritidae <i>Rhagoletis cingulata</i>	0758, 1040, 1043	Hemiptera Aphididae <i>Rhopalosiphum padi</i>	0379, 1318, 1498, 1855, 2657, D3288
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Diptera Tephritidae <i>Rhagoletis mendax</i>	1040	Hemiptera Aphididae <i>Sipha flava</i>	D3335
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Hemiptera Berytidae <i>Jalysus wickhami</i>	2282	Hemiptera Calophyidae <i>Calophya terebinthifolii</i>	0189, 0435
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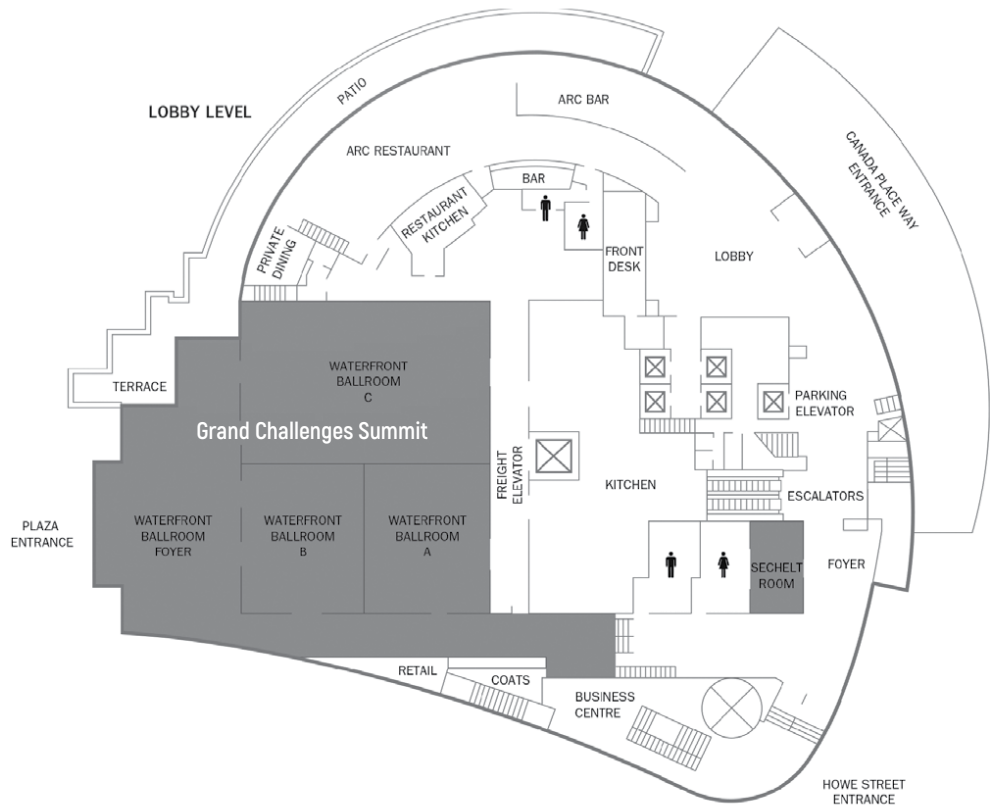
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Lepidoptera Tortricidae <i>Choristoneura occidentalis</i>	1045, 2134
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Neuroptera Chrysopidae <i>Chrysoperla comanche</i>	0782	<i>homalodemus homalodemus</i>	1544
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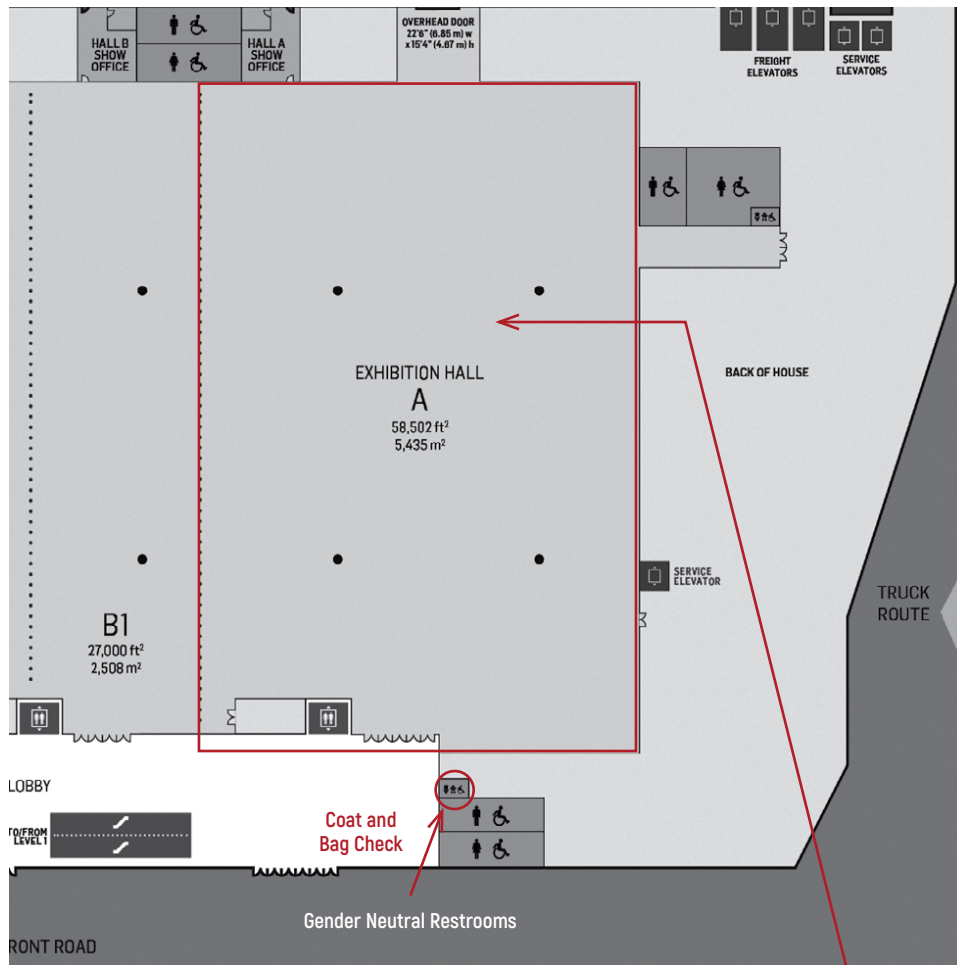


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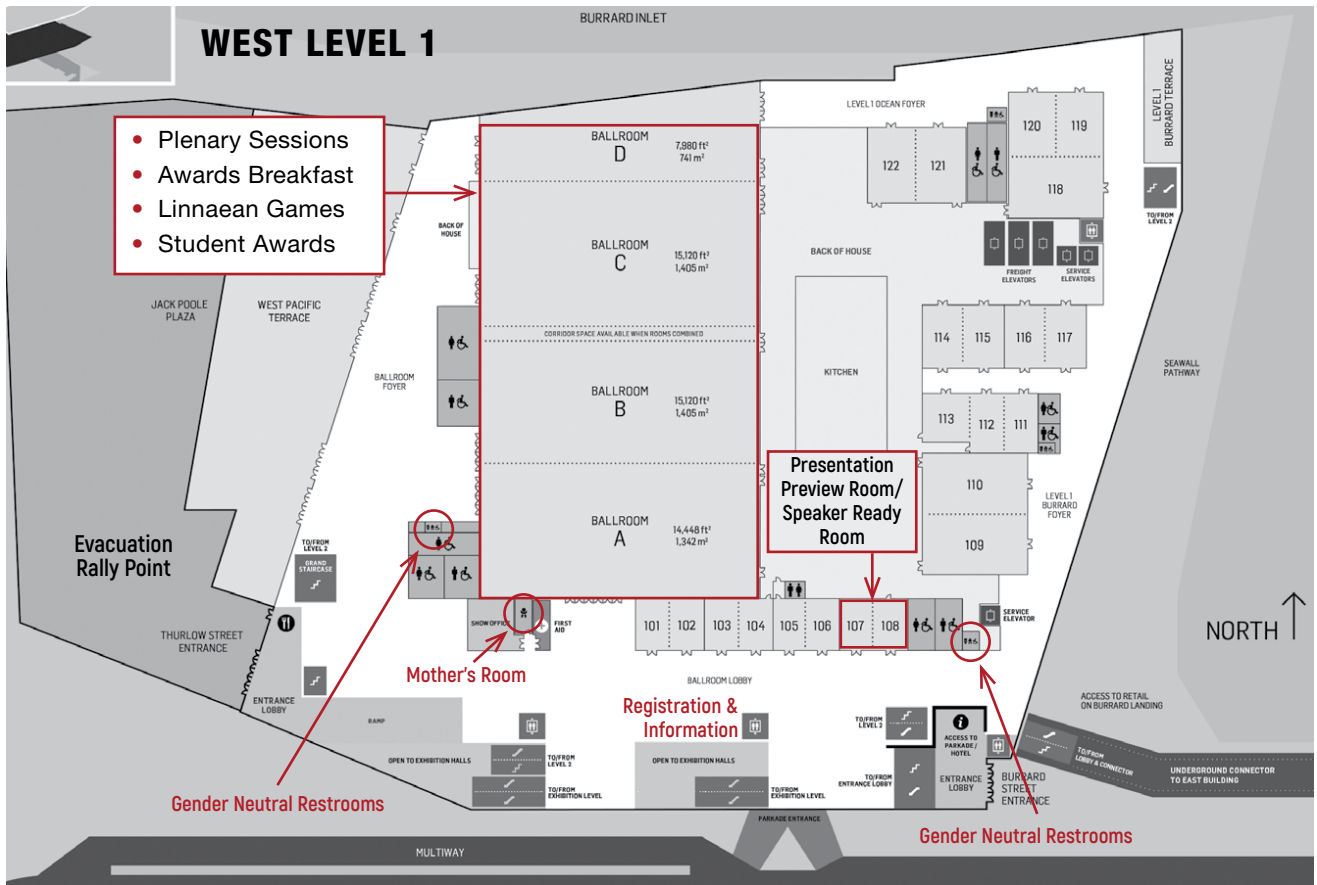
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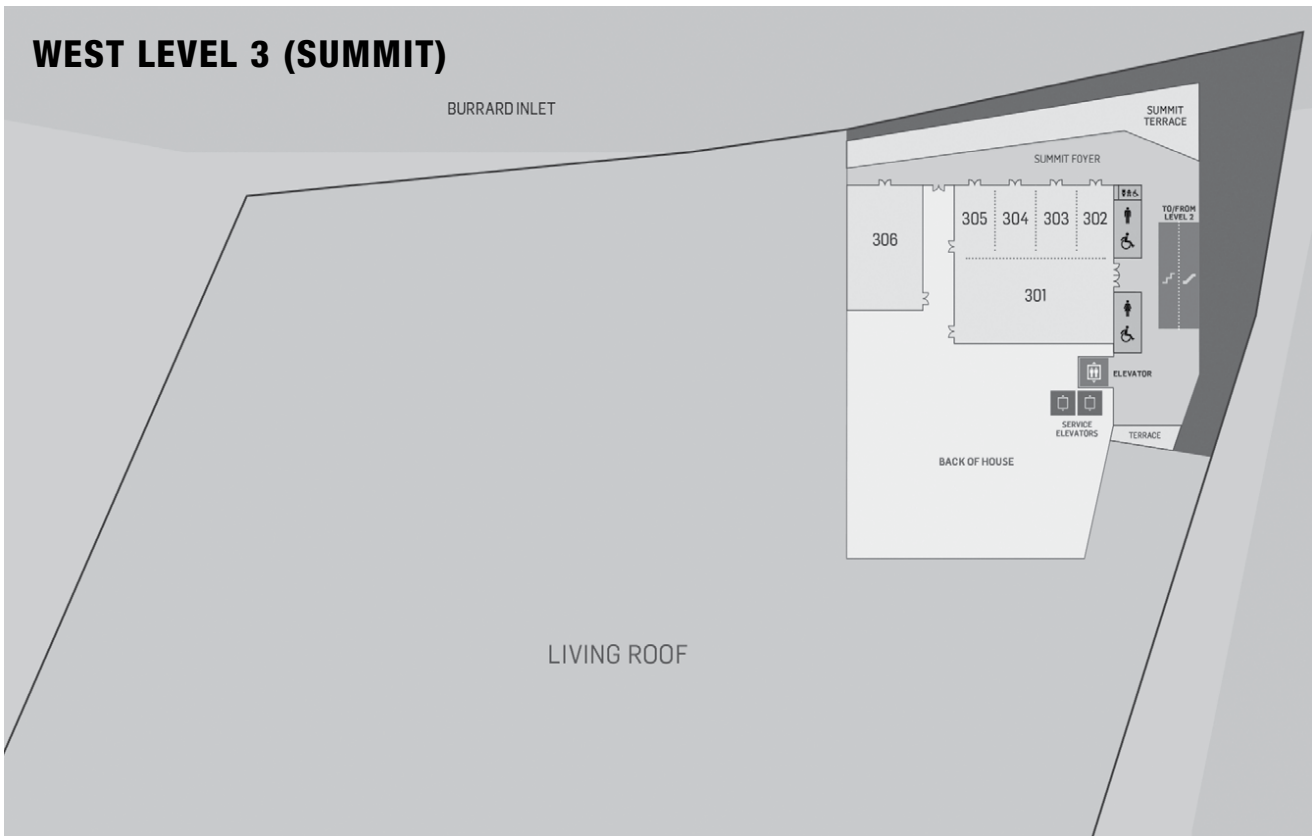
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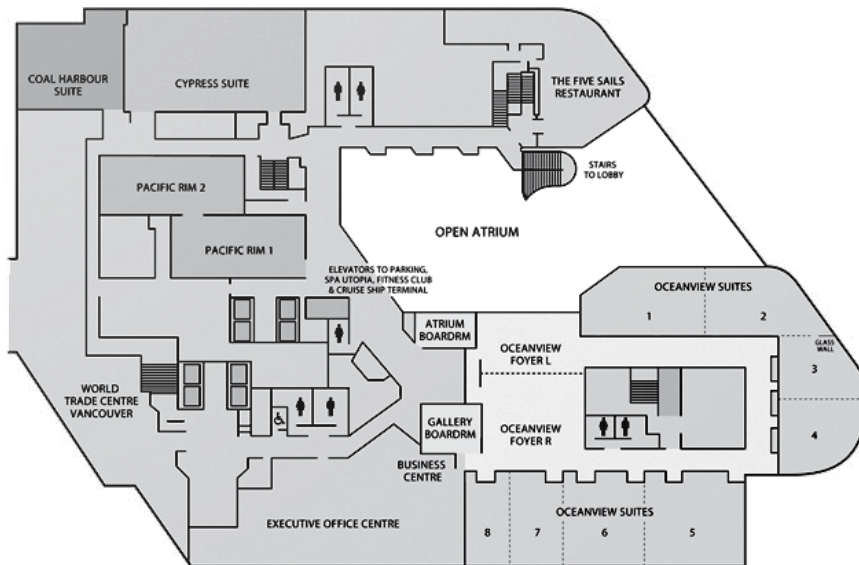


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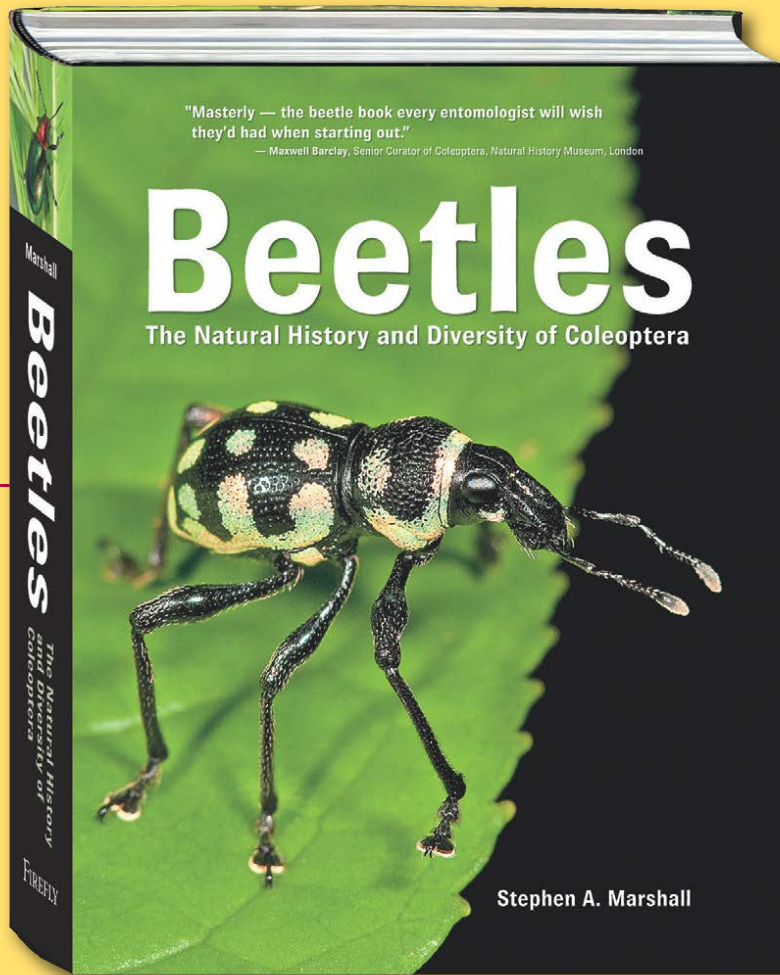


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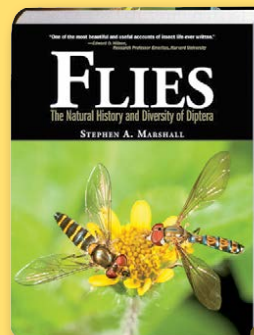
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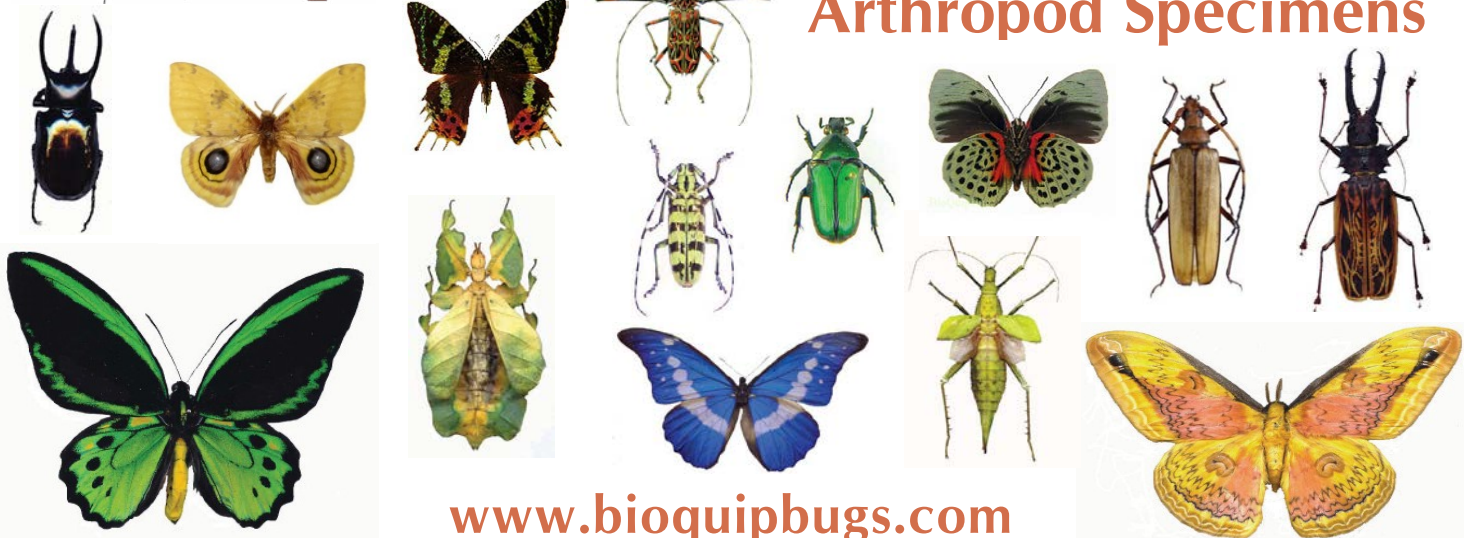


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