NORTH CENTRAL BRANCH

ENTOMOLOGICAL SOCIETY OF AMERICA

69th Annual Meeting

President: Sue Blodgett

Des Moines Marriott Downtown
700 Grand Avenue
Des Moines, Iowa 50309

2014 NCB-ESA Corporate Sponsors

BASF
The Chemical Company

Bayer CropScience

Dow AgroSciences

MONSANTO

DUPONT

PIONEER

syngenta

VALENT

WINFIELD

WEST CENTRAL, Inc.
World Class Solutions™

CONTENTS

Meeting Logistics.....1

2014 NCB-ESA Officers and Committees 5

2014 Award Recipients 7

Sunday, 9 March 2014
- At-a-Glance 18
- Afternoon.....19

Monday, 10 March 2014
- At-a-Glance 23
- Posters 25
- Morning 30
- Afternoon.....35

Tuesday, 11 March 2014
- At-a-Glance 45
- Posters 47
- Morning 51
- Afternoon.....55

Wednesday, 12 March 2014
- At-a-Glance 60
- Morning 61

Author Index 67

Scientific Name Index 77

Keyword Index.....82

Common Name Index 83

Map of Meeting Facilities .....inside back cover

MEETING LOGISTICS

Registration

All participants must register for the 2014 NCB-ESA meeting. Name tags are required for all conference functions. Meeting registration is located in the *Exhibit Hall* on the third floor of the Des Moines Marriott Downtown. Registration, meeting packets, and membership renewal will be available for pre-registered and on-site registration attendees at the following times:

Sunday	Noon – 7:00pm
Monday	7:30am – 5:00pm
Tuesday	7:30am – 5:00pm
Wednesday	9:00am – 10:00am

Guidelines for Speakers and Moderators

The 2014 NCB-ESA meeting will follow standard practices. Moderators are responsible for 1) maintaining the program schedule by not starting presentations prior to its time, and 2) not allowing a speaker to exceed the allotted time. If a presentation is cancelled, the moderator must wait to begin the next talk until the scheduled time. If there are problems with the computer or projector, please ask IT Support for assistance in the *Sioux City Room*.

Student Competition Judge and Moderator Training

A meeting for moderators and student competition judges is scheduled on Sunday at 4:30pm – 5:00pm in the *Cedar Rapids Room*. Judging packets will be distributed at that time.

Employment Opportunity Center

Employers and job seekers are invited to post announcements on a table located in the *Exhibit Hall*. Please bring copies of your documents for distribution.

Program Updates, Messages, Lost and Found

Please notify Program Chair, Matt O'Neal (oneal@iastate.edu), about any program changes. All meeting announcements will be posted on a message board in the *Exhibit Hall*. Lost and found items may be turned in and retrieved at the registration table.

IT Support

The IT Support area is located in the *Sioux City Room* on the third floor of the Des Moines Marriott Downtown. Extra supplies will be located there if necessary (e.g., timers, laser pointers, batteries, etc.). There will also be a charging station with a limited number of outlets for your electronic devices (bring your own charger). The room is available during the following times:

Sunday	Noon – 7:00pm
Monday	7:30am – 5:00pm
Tuesday	7:30am – 5:00pm
Wednesday	9:00am – 11:30am

Creating Presentations: PowerPoint presentations should be created in a format compatible with Microsoft Office 2010 (.pptx). We cannot accept presentation files created using Office 2013. Presenters should name their file using the following format: PaperNumber_PresenterLastName.pptx (e.g., 12_Smith.pptx). Presenters are encouraged to avoid using embedded audio and video files in their presentations.

Uploading and Previewing Presentations: Bring a copy of the presentation file on a USB memory stick to the *Sioux City Room* for uploading and previewing. Files should be uploaded the day before they are to be presented. Presenters are encouraged to bring a copy of the file to their session in case there are problems.

Uploading Symposium Presentations: Symposium organizers should coordinate with speakers for uploading presentation files before the session starts. Organizers can use a meeting laptop or provide their own if desired.

Audio/Visual Equipment: All meeting rooms will be equipped with an LCD projector, projection screen, Windows laptop, and laser pointer/slide advancer. All computers used at the 2014 meeting will run Windows 7, so presenters who create their presentation on a Mac computer should ensure that the presentation is compatible with PowerPoint 2010 on Windows. You may preview the file in the *Sioux City Room*.

Please, No Photographs

We request that attendees not take photographs or video during sessions because they are disruptive to the presenters. Please request permission before taking photographs of posters.

Poster Presentations

Posters will be displayed in the *Exhibit Hall* on the third floor of the Des Moines Marriott Downtown. Velcro will be provided for all the posters. Posters should not exceed 45 inches wide x 45 inches long to ensure they fit on the poster stands.

Student competition posters should be set up on Sunday between 6:00pm – 8:00pm and removed on Monday between 5:00pm – 6:00pm. Authors of ALL posters are encouraged to stand by their posters from 3:00pm – 4:00pm to network and answer questions.

Regular submitted posters should be set up on Monday between 6:00pm – 8:00pm and removed on Tuesday between 5:00pm – 6:00pm. Authors of ALL posters are encouraged to stand by their posters from 3:00pm – 4:00pm.

Hotel Amenities

Food and beverage. The Marriott Downtown has a few dining options. The Rock River Grill and Tavern is located on the second floor and is open for breakfast and lunch. The City Center Lounge is located in the main lobby and has a full bar and dinner menu. A convenience store is also located near the main lobby and offers premium coffee and snacks.

Internet. There is free wifi internet to all registered NCB-ESA meeting participants. To access the internet on the second and third floors, use the "Marriott_Conference" network and "ESA" for the passcode. Please be courteous when using the internet during your stay. Refrain from streaming large files, such as video, so that everyone will have access to the internet. People staying at the Marriott will have a separate passcode for their sleeping rooms (provided at check-in).

Hotel shuttle/Skywalk. The Marriott provides a complimentary shuttle for the downtown area. There is also a network of skywalks in downtown Des Moines (accessed on second floor). Learn how to navigate by 1) picking up a map at the registration desk in the *Exhibit Hall*, 2) visiting this helpful website, *www.catchdesmoines.com*, or 3) scanning this QR code on your smart device to access the mobile site. →

Special Events

DuPont Pioneer Tour. On Tuesday (11 March), there will be a complimentary tour of the DuPont Pioneer facility in Johnston, IA. You must be pre-registered for this event to attend the tour. Closed toe/heel shoes are required and transportation will be provided. Please meet in the main lobby area at 1:30pm to check in with the tour director, Paula Davis. You should expect to be back at the hotel by 5:30pm.

6K Hexapod Scurry. On Wednesday (12 March), we are hosting a 6K fun run in downtown Des Moines. If you would like to participate, registration and race packets are at the registration desk in the *Exhibit Hall*. Please meet in the main lobby at 9:45am to check in with the race organizer, Thelma Heidel-Baker. All 6K race proceeds will benefit the Entomological Foundation.

Special Acknowledgements

Kelly Kyle: program editing, registration, and wine tasting contest.

John VanDyk and his crew: IT support.

Paula Davis and **DuPont Pioneer**: facility tour.

Thelma Heidel-Baker and **Ricky Baker**: 6K Hexapod Scurry.

Erin Hodgson: 2014 NCB-ESA meeting logo.

Rosina Romano, Cindy Myers, ESA Central staff, and **Tori Daigle** (Confex): website, online registration, and support.

Larry Pedigo and the Dixie Slicks Jazz Band (Bobby Boydson, Jon Jero, Dick Fawcett, Kathy Cline, John Basart, Bud Sternquist, and Jean Olson): live music at the Welcome Reception.

Robert Elbert: awards photography.

Jill Hemphill and staff at the Des Moines Marriott Downtown: meeting logistics; **Cindy Accola** (Sigler) for printing; **Becky Gomez** (Freeman Co.) for poster stand and easel rentals; **Glenda Stormes-Bice** for microfiber cloths, bags, and tumblers; and **Paulette Lester** (Greater Des Moines Convention and Visitors Bureau) for local information, maps, signs, and bags.

www.esancb.org

#NCBESA

2013-2014 NCB-ESA Officers and Committees

President
Sue Blodgett

President-Elect
Paula Davis

Past President
Billy Fuller

Secretary-Treasurer
Mark Boetel

Governing Board Representative
John Obrycki

Executive Committee Members-at-Large
Linda Mason, Erin Hodgson, Robert Wright,
and Kacie Athey (student representative)

Program Planning Committee
Matt O'Neal (Chair), Kelley Tilmon,
and Mitch Stamm (student representative)

Local Arrangements Committee
Erin Hodgson (Chair), Thelma Heidel-Baker,
John VanDyk, Donald Lewis, Kelly Kyle,
and Adam Varenhorst (student representative)

Nominating Committee
Ian MacRae, Susan Moser, and Grayson Brown

Audit Committee
Von Kaster, Jonathan Lundgren, and Matt Carroll

Photo Salon Committee
Tom Myers (Chair), Ric Bessin, Gary Hein,
and David Voegtlin

NCB-ESA Student Awards Committee
Deborah Finke (Chair), Jason Harmon, Robert Koch,
Thelma-Heidel Baker, Bradley McManus, Patti Prasifka,
and Joliene Lindholm (student representative)

NCB-ESA Honorary Awards Committee
Kelly Tindall (Chair), Brian McCornack,
Buyung Hadi, Bradley McManus, and
Amy Morey (student representative)

NCB-ESA Professional Awards Committee
Kelley Tilmon (Chair), Mary Gardiner,
Deane Zahn, Anitha Chirumamilla, and
Rob Morrison (student representative)

NCB-ESA Education Project Awards Committee
Phil Sloderbeck (Chair), Chelle Hartzer,
Jeffery Preece, and Casey Burks

Student Affairs Committee
Kacie Athey (Chair), Alice Harris, Rachel Sitz,
Kayla Perry, Rob Morrison, Adam Varenhorst,
Aston Walter, Rita Velez, Joliene Lindholm, Mitch Stamm,
Amy Morey, Alice Leroux, and Brittani Alexander

Linnaean Games Committee
Dan Young (Chair), Wyatt Hoback (Gamesmaster),
Eileen Cullen, Dan Herms, Marianne Alleyne,
and Alice Harris (student representative)

2014 North Central Branch ESA
C.V. Riley Achievement Award

Dr. Frederick Baxendale
University of Nebraska-Lincoln

Dr. Frederick Baxendale is Professor of Entomology and Director of the Forensic Science program at the University of Nebraska-Lincoln (UNL). He joined the entomology faculty at UNL in 1984 as an Assistant Professor. He received his B.S. in Entomology from Cornell University, and his M.S. and Ph.D. in Entomology from Texas A&M University. Fred's research and extension programs have promoted effective and environmentally-responsible IPM strategies for insect and mite pests affecting turfgrasses, landscapes, and other horticultural plantings. His current emphasis is on identifying the insects and mites associated with buffalograss and zoysiagrass, investigating their biology, ecology, distribution and injury potential, and developing management alternatives for potential pests. He has published over 56 refereed journal articles, and over 200 extension publications and trade journal articles, and is frequently an invited speaker at programs throughout the region and nation. One of the great strengths he brings to his extension programs is the enthusiasm for the subject that he is able to convey to his audience. He has mentored numerous undergraduate and graduate students who have received competitive scholarships and fellowships, and ESA awards, and have gone on to successful careers in the public and private sectors. He has contributed to entomology through many administrative roles at UNL, including Extension Entomology Coordinator, Interim Department Head and currently, Director of the Forensic Science program. In all these roles he has brought a high level of dedication, enthusiasm, and effort to contribute to the success of the unit.

Fred has frequently provided service and leadership to ESA including; NCB-ESA President-Elect, President, Past President (2010-2013); Annual Meeting Program, Co-Chair (2001-2002); Executive Committee, Member-at Large (2001-2003); Local Arrangements Committee, Co-Chair (1995-1996); Membership Committee (1988-1993) including Chair (1990-1993); Nominating Committee, Chair (1999); ESA Distinguished Achievement Award in Extension Committee (1990-1992) including Chair (1991-1992); Entomology Foundation Counselor (2000-2009); Insect Pest Handbook Editorial Board (1996-2000) including Chair (2000); Professional Maintenance and Certification Committee (1993-1994); Program Evaluation Committee (1989-1991); Section Fa Nominating Committee (2001); and Stanley Beck Fellowship Selection Committee (1994-1997, 2003). His accomplishments have been recognized by a variety of professional groups, including: ESA Distinguished Achievement Award in Extension; NCB Distinguished Achievement Award in Extension, Excellence in Extension Award - North Central Region, National Association of State Universities and Land-Grant Colleges (NASULGC); ESA Recognition Award in Urban Entomology; Extension Award of Merit; Nebraska Chapter of Gamma Sigma Delta, Distinguished Service Award; and Nebraska Cooperative Extension Association.

2014 North Central Branch ESA
Recognition Award in Entomology

Dr. James F. Campbell
USDA-ARS, Manhattan, Kansas

Dr. James Campbell is a Research Entomologist with the USDA-ARS Center for Grain and Animal Health Research in Manhattan, Kansas. Dr. Campbell received a B.S. degree and an M.S. degree in Entomology from Rutgers University, and a Ph.D. degree in Entomology from the University of California-Davis. He joined USDA-ARS in 1999 and has since then conducted research focused on investigating the spatial distribution and movement patterns of stored-product insects in food facility landscapes, improving the implementation and interpretation of insect monitoring programs, and determining the impact of different management tactics on pest populations within commercial food facilities. Dr. Campbell has been an author on 110 peer-reviewed journal articles, has given more than 150 invited presentations, and has been involved in research teams obtaining more than $12 million in extramural funding. Dr. Campbell is an Adjunct Professor in the Department of Entomology at Kansas State University, where he has co-supervised eight graduate students and served on many other graduate student committees. Dr. Campbell serves as the Secretary/Treasurer for the Permanent Committee of the International Working Conference on Stored Product Protection and is on the Editorial Board of the Journal of Stored Products Research. He has served as ESA Section Cd Secretary, Vice-Chair, and Chair. Dr. Campbell has received the USDA-ARS Northern Plains Area Early Career Research Scientist of the Year Award and NCB-ESA Award for Excellence in Integrated Pest Management.

2014 North Central Branch ESA
Award of Excellence in Integrated Pest Management

Dr. John C. Wise
Michigan State University

Dr. John C. Wise is a Professor in the Michigan State University (MSU) Department of Entomology, and Research and Extension Coordinator of the MSU Trevor Nichols Research Center in Fennville, MI. Dr. Wise received a B.S. in Natural Resources in 1984 from the University of Michigan, M.S. in Entomology in 1990, and a Ph.D. in Resource Development in 1999 from MSU. His primary research interest is studying the performance characteristics of new insecticide chemistries for control of fruit insect pests. He also investigates alternative delivery systems for crop protection materials in fruit agroecosystems. Wise runs the Applied Insecticide Toxicology Lab on the MSU campus, conducting research on the performance mechanisms and plant penetration attributes of pesticides, pesticide environmental fate and arthropod resistance. Wise has developed a wide range of Integrated Pest Management and Good Agriculture Practices training programs, targeting large commercial farms as well as small underserved grower communities. These training programs have led to opportunities to offer training venues in other US states, like Wisconsin, Ohio, Indiana and New Jersey, as well as international train-the-trainer events in Chile, Mexico, Rwanda and India. Dr. Wise is a member of ESA, and serves as Section Editor for ESA's Arthropod Management Tests. Wise has been a Field Research Director for the IR-4 GLP field residue program in the north-central region for more than fifteen years, and will become Director of the IR-4 north-central region in July 2014.

2014 North Central Branch ESA
Distinguished Achievement Award in Extension

Dr. Deborah G. McCullough
Michigan State University

Dr. Deborah G. McCullough holds a B.S. in Biology, an M.S. in Forestry from Northern Arizona University and a Ph.D. in Entomology from the University of Minnesota. She is a Professor with a joint appointment in Entomology and Forestry at Michigan State University (MSU), where her responsibilities include research, extension and teaching. Dr. McCullough's research focuses on forest insect ecology, impacts and management, with the goal of developing long-term, sustainable strategies to protect forest health. Much of Dr. McCullough's recent activities, and those of her graduate students and colleagues, address invasive forest pests, particularly emerald ash borer (EAB). Results are transferred to a wide range of users including foresters, arborists, regulatory officials, and property owners, as well as members of Native American tribes and conservation groups. McCullough has given over 650 presentations since 1992. She regularly provides information to a variety of media, directs the national EAB website, has published more than 60 manuals and extension bulletins, and has written at least 50 articles for trade publications. McCullough has also published more than 95 papers about forest insect ecology and management in scientific journals. McCullough teaches Insects and Diseases of Forest and Shade Trees annually to Forestry and Horticulture students. She received the Distinguished Alumnus Award from the School of Forestry at Northern Arizona University (2006), was recognized by the MI Department of Agriculture for Outstanding Contributions to Michigan Natural Resources (2005), and received MSU awards for the Outstanding Extension Specialist (2002, 2000).

2014 North Central Branch ESA
Distinguished Achievement Award in Horticultural Entomology

Dr. Daniel Herms
The Ohio State University

Dan Herms is a Professor and State Extension Specialist in the Department of Entomology at The Ohio State University (OSU), and also serves as Chair of the department. He received his B.S. in Landscape Horticulture from OSU, his M.S. in both Horticulture and Entomology, also from Ohio State University, and a Ph.D. from Michigan State University in Entomology with a specialization in Ecology and Evolutionary Biology. His research and extension programs focus on the ecology and management of insect pests in forests, urban forests, ornamental landscapes, nurseries and Christmas tree plantations, with foci on the chemical ecology of plant-insect interactions, phenological modeling, ecological impacts of invasive insects, and biologically-based pest management. He has published more than 200 research and extension papers, been invited to present more than 450 research and extension presentations, and received more than $9 million dollars in external funding. He teaches or co-teaches Forest Entomology and Pathology, Insect Ecology, and the Nature and Practice of Science. He has served on the USDA Emerald Ash Borer Science Advisory Panel and Asian Longhorned Beetle Technical Working Group, chairs the International Union of Forest Research Organizations Working Group on Tree Resistance to Insects, and is a subject editor for Environmental Entomology. He received his start in horticulture in a family greenhouse and floral business in southern Ohio. Prior to joining OSU in 1997, he directed the pest management program for 13 years at the Dow Gardens, a botanic garden in Midland, Michigan.

2014 North Central Branch ESA
Educational Project Awards

Presented by BCEs and ACEs of Mid-America

<u>Extension Bulletin</u>
"Ohio Bee Identification Guide"

Scott Projzner and Mary Gardiner
The Ohio State University

Prior to the development of this identification guide, Ohio did not have any native bee Extension materials. This guide includes photos and key identification characters for 10 common types of native bees found in Ohio. It also indicates size, nesting locations, identifying behaviors and additional identification features that can be seen with a hand lens. This guide has been used extensively by our laboratory as well as other extension specialists. To date, they have distributed over 1,000 copies and another co-worker has distributed 750 copies, and it has been accessed by 600 users on eXtension. In addition it has served as a model for guides developed for Arizona and Montana. The guide can be found at: *http://pollinator.org/PDFs/OhioBeeGuideFINAL.pdf*.

Educational Outreach Program
"The Bug House"

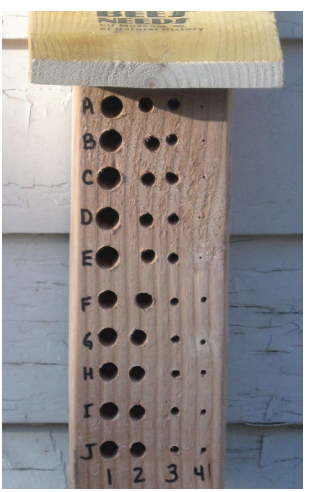
Doug Landis, Gary Parsons and Jennifer Verba
Michigan State University

The Bug House is located in the Natural Science Building at MSU. It is a place where visitors can interact with insects and view various displays. Undergraduate and graduate students host tours for thousands of visitors each year. For more information, visit their website at: *www.ent.msu.edu/bughouse*.

Citizen Science Initiative
"The Bees' Needs"

Virginia Scott and Alex Rose
Univ. of Colorado Museum of Natural History

This interactive project has brought entomology research to citizens' backyards by distributing 250 bee nesting blocks to citizens in the area around Boulder, Colorado. The research has identified previously unknown relationships between landscape attributes and management practices that affect bee nesting behavior and raised citizen awareness of cavity-nesting bees in Colorado's Front Range. To learn how to participate in this project, visit their website at: *http://beesneeds.colorado.edu/*.



2014 North Central Branch ESA
J.H. Comstock Graduate Student Award

Michael T. McCarville
Iowa State University

Michael will complete his Ph.D. in Entomology with a Plant Pathology minor this spring at Iowa State University (ISU). He completed his B.S. at Briar Cliff University in 2008 and M.S. in 2011 at ISU. He is advised by Dr. Matthew O'Neal. Michael's research focuses on integrating soybean aphid and soybean cyst nematode management through host-plant resistance. Michael has always been intrigued by how insects, nematodes, and pathogens manipulate host-plant defenses and primary metabolism. He realizes that multiple herbivores and stressors attack plants simultaneously and this can lead to plant-mediated interactions between herbivores and pathogens. Integrated pest management, therefore, should not be limited to using multiple tactics to manage a single pest, but should include combining tactics to efficiently manage multiple pests at once. Michael's dissertation is divided into two parts. First, evaluating the compatibility of a resistance pyramid with other tactics for managing both soybean aphid population densities and virulence allele frequencies. Second, Michael has explored the ability of host-plant resistance to manipulate pest population densities and subsequently alter soybean aphid-soybean cyst nematode interactions. Michael has authored six peer-review journal articles, nine extension publications and co-authored a grant to fund his entire Ph.D. research. He has given 16 scientific presentations, five extension talks and eight posters. Michael has taught courses at ISU in insect biology and pest management, serving as a lab instructor for six semesters. He has been active in the NCB-ESA, serving on the Student Affairs Committee for two years.

2014 North Central Branch ESA
Graduate Student Scholarship Award

Lauren M. Diepenbrock
University of Missouri

Lauren is currently a Ph.D. candidate at the University of Missouri, working with Dr. Deborah Finke studying factors influencing the native coccinellid community in Missouri. She completed an M.S. in Science Education from Syracuse University and then taught high school science for a few years before deciding to further her own scientific training. In August of 2009, she completed an M.S. in Ecology and Evolutionary Biology at Florida State University where she documented the natural history of trap-jaw ants, *Odontomachus brunneus*, under the guidance of Dr. Walter Tschinkel. After graduating, she came home to Missouri to work towards a doctoral degree in the Division of Plant Sciences at MU. In addition, she has been active in outreach programs including the Science and Technology Entry Program (STEP) at Syracuse University, Saturday at the Sea at Florida State University, and Science Safari, Adventures in Education, and South Farm Showcase at the University of Missouri. While at MU, she has been an active participant and leader in the Conservation Biology Graduate Certificate Program, P.R. officer and President of the C.V. Riley Entomological Society, helped to establish a division-level graduate student association, and served for two academic years as the seminar co-coordinator for the Conservation Biology Seminar Series. Throughout her doctoral program, she has presented her research at the NCB-ESA, ESA, Ecological Society of America, and Natural Areas Association meetings; and internationally at the Ecology of Aphidophaga International Symposium in Serbia. She has won multiple awards for the presentation of her research and has published her work in the journals *Insectes Sociaux* and *Insect Conservation and Diversity*.

2014 North Central Branch ESA
Student Travel Scholarships

Tavvs Micael Alves, University of Minnesota

Barbara Amoah, Kansas State University

Gladys Andino, Purdue University

Austin Bauer, Luther College

Mariom Carvajal, North Dakota State University

Theresa Cira, University of Minnesota

Camila Farias de Oliveira,
University of Nebraska-Lincoln

Kyndall Dye, University of Kentucky

Eduardo Faundez, North Dakota State University

Kathryn Ingerslew, University of Missouri

David Johnston, University of Minnesota-Duluth

Katelyn Kowles, University of Kentucky

Kendra Larson, University of Minnesota-Duluth

David Lowenstein, University of Illinois at Chicago

Emmanuel Santa-Martinez,
University of Wisconsin-Madison

William Morrison III, Michigan State University

Erin O'Brien, The Ohio State University

Devon Rogers, The Ohio State University

Abiya Saeed, University of Kentucky

Marissa Schuh, Luther College

David Wangila, University of Nebraska-Lincoln

MEETING-AT-A-GLANCE
SUNDAY
9 March 2014

Services	
Noon-7:00pm	Meeting Registration *Exhibit Hall*
Noon-7:00pm	IT Support *Sioux City Room*
4:30pm-5:00pm	Moderator and Competition Judges Training *Dubuque Room*
6:00pm-8:00pm	Poster setup for Monday *Exhibit Hall*
Functions	
5:00pm-8:00pm	Linnaean Games - preliminary rounds *Salon A-D*
8:00pm-10:30pm	Welcome Reception (live jazz and wine tasting contest) *Salon E-H*
Business	
3:00pm-5:00pm	Executive Committee Meeting *Cedar Rapids Room*
Scientific Program	
1:30pm-5:00pm	Symposium: Transformative Concepts for Pest Management *Davenport Room*
2:00pm-4:50pm	Symposium: BugGuide: Citizen Science at a Crossroads *Council Bluffs Room*

SCIENTIFIC PROGRAM
SUNDAY AFTERNOON

Symposium: Transformative Concepts for Pest Management

1:30pm – 5:00pm
Davenport Room

Organizer: Bryony Bonning, Iowa State Univ.

Moderators: Bryony Bonning, Iowa State Univ.; and **Stephen Dobson**, Univ. of Kentucky

1:30	1	The NSF Center for Arthropod Management Technologies. **Bryony Bonning**, bbonning@iastate.edu, Iowa State Univ., Ames, IA
2:00	2	Using RNAi as a novel technology to control western corn rootworm. **Renata Bolognesi**, renata.bolognesi@monsanto.com, Monsanto Company, Chesterfield, MO
2:30	3	Coat proteins of insect vectored plant viruses as toxin delivery agents. **W. Allen Miller**, wamiller@iastate.edu, Iowa State Univ., Ames, IA
3:00		Break
3:20	4	Transformative concepts based on Bt toxins. **Tom Meade**, meade@dow.com, Dow AgroSciences, Indianapolis, IN
3:50	5	Male mosquitoes as vehicles for pesticide-delivery: Autocidal approaches using Wolbachia and chemical pesticides. **Stephen Dobson**, sdobson@uky.edu, Univ. of Kentucky, Lexington, KY

4:20 6 Enhancing and capitalizing on the genetic toolkit of entomopathogenic fungi. **Brian Lovett**, lovettbr@umd.edu, Univ. of Maryland, College Park, MD

4:50 Concluding remarks. **Bryony Bonning**, Iowa State Univ.

Symposium: BugGuide: Citizen Science at a Crossroads

2:00pm – 4:50pm
Council Bluffs Room

Organizer: John VanDyk, Iowa State Univ.

Moderators: John VanDyk and **Laura Jesse**, Iowa State Univ.

2:00		Introductory remarks. **John VanDyk**, Iowa State Univ.
2:05	7	The state of BugGuide: Past, present and future. **John VanDyk**, jvandyk@iastate.edu, Iowa State Univ., Ames, IA
2:30	8	BugGuide: Part of nature education in the Chicago region. **John Balaban** and **Jane Balaban**, balx2@comcast.net, Skokie, IL
2:55	9	A botanist on BugGuide: Assisting IDs of phytospecific insects. **John Pearson**, John.Pearson@dnr.iowa.gov, Iowa Dept. of Natural Resources, Des Moines, IA
3:20		Break
3:30	10	BugGuide: Making science fun again. **MJ Hatfield**, mjhatfield@oneota.org, Oneota Biological Field Station, Plymouth Rock, IA
4:00	11	BugGuide as a model for crowdsourcing extension diagnostics. **Laura Jesse**, ljesse@iastate.edu, Erika Saalau, John VanDyk, Daren Mueller, and Jay Staker, Iowa State Univ., Ames, IA
4:25	12	Not just for images anymore: BugGuide as a tool in research and teaching. **Gregory Courtney**, gwcourt@iastate.edu, Iowa State Univ., Ames, IA

MEETING-AT-A-GLANCE
MONDAY
10 March 2014

Services	
7:30am-5:00pm	Meeting Registration *Exhibit Hall*
7:30am-5:00pm	IT Support *Sioux City Room*
6:00pm-8:00pm	Poster setup for Tuesday *Exhibit Hall*
Functions	
7:30am-10:00am	Continental Breakfast *Exhibit Hall*
11:30am-1:00pm	Student Lunch *Salon E*
3:00pm-4:00pm	Refreshment Break *Exhibit Hall*
5:30pm-8:00pm	Linnaean Games - final rounds *Salon A-D*
8:30pm-11:30pm	Student Mixer *Raccoon River Brewing Company* *200 10th St., Des Moines*
Business	
8:00am-9:15am	Opening Business Meeting *Cedar Rapids Room*

MEETING-AT-A-GLANCE
MONDAY
10 March 2014

Scientific Program - Morning	
7:30am-5:00pm	Student Competition Poster Display *Exhibit Hall* *[Authors Present 3:00-4:00]*
9:30am-11:06am	B.S. Student Ten-Minute Paper Competition *Council Bluffs Room*
9:30am-10:54am	M.S. Student Ten-Minute Paper Competition (SysEB, MUVE, PBT Session) *Davenport Room*
9:30am-11:42am	M.S. Student Ten-Minute Paper Competition (P-IE Session) *Dubuque Room*
Scientific Program - Afternoon	
1:00pm-2:36pm	Ph.D. Student Ten-Minute Paper Competition (PBT Session) *Council Bluffs Room*
1:00pm-3:00pm	Ph.D. Student Ten-Minute Paper Competition (P-IE Session I) *Davenport Room*
1:00pm-4:45pm	Symposium: Forest Entomology *Dubuque Room*
3:30pm-5:42pm	Ph.D. Student Ten-Minute Paper Competition (P-IE Session II) *Council Bluffs Room*
3:30pm-4:54pm	Ph.D. Student Ten-Minute Paper Competition (SysEB, MUVE Session) *Davenport Room*
3:30pm-5:30pm	Symposium: Stink Bugs: Emerging Threats in the East and Midwest *Cedar Rapids Room*

SCIENTIFIC PROGRAM
MONDAY MORNING

B.S. Student Poster Competition

Exhibit Hall

[Authors Present from 3:00-4:00]

D1 Burying the flies: Fly control by carrion feeding beetles. **Scout Wilson**, wilsonsm2@lopers.unk.edu, Univ. of Nebraska-Kearney, Kearney, NE; Carlos Giorgenon, UNESP, Jaboticabal, Brazil; and W. Wyatt Hoback, Univ. of Nebraska-Kearney, Kearney, NE

D2 Localization of octopamine and tyramine receptor transcripts in the American cockroach, *Periplaneta americana*. **Samuel Howard**, sjhoward@iastate.edu, Aaron Gross, Lyric Bartholomay, Michael J. Kimber, and Joel Coats, Iowa State Univ., Ames, IA

D3 Calculating the impact of plant diversity on ground-dwelling invertebrates in restored prairie of central Nebraska. **Grace Williams**, grace.williams@my.simpson.edu, Michael Frank, Hannah Longstreet, Luis Saucedo, Courtney Sherwood, Lauren Tirado, Demetre Van Arsdale, Clinton Meyer, and Heidi Berger, Simpson College, Indianola, IA

D4 Two-spotted spider mites (*Tetranychus urticae*) perform better on soybean plants grown in saline conditions. **Jaclyn Eichele**, Jaclyn.Eichele@my.ndsu.edu, Jason P. Harmon, Deirdre Prischmann-Voldseth, Chandra Heglund, Abbey Wick, and Jamin Dreyer, North Dakota State Univ., Fargo, ND

D5 Survival of dermestids in low oxygen environments. **Suzzan Trambly**, tramblysm@lopers.unk.edu, and W. Wyatt Hoback, Univ. of Nebraska-Kearney, Kearney, NE

D6 A survey that established a baseline set of population data for Odonata species of Jay Cooke State Park, Carlton County, Minnesota. **Kendra Larson**, lars4094@d.umn.edu, Univ. of Minnesota-Duluth, Duluth, MN

D7 Transmission of *Polistes* vibrational signals across the nest. **Megan Harrison**, meh@iastate.edu, Iowa State Univ., Ames, IA

D8 Notes on *Blaudus* Stål, 1872 (Hemiptera: Heteroptera: Acanthosomatidae). **Mariom Carvajal**, mariom.carvajal@gmail.com, David A. Rider, and Eduardo Faundez, North Dakota State Univ., Fargo, ND

M.S. Student Poster Competition

Exhibit Hall

[Authors Present from 3:00-4:00]

D9 Not all hypoxia is the same: Survival of immersion differs from survival of an anoxic atmosphere in soldier fly larvae. **Leticia Serpa**, leserpa15@hotmail.com, and W. Wyatt Hoback, Univ. of Nebraska-Kearney, Kearney, NE

D10 Toxin engineering for enhanced toxicity against the soybean aphid, *Aphis glycines* Matsumura. **Benjamin Deist**, bdeist@iastate.edu, Nanasaheb Chougule, Teresa Fernandez-Luna, and Bryony Bonning, Iowa State Univ., Ames, IA

D11 Recognition of parasitized pea aphids, *Acyrthosiphon pisum*, by other pea aphids. **Audra Stonefish**, stonefisha@gmail.com, and Jason P. Harmon, North Dakota State Univ., Fargo, ND

D12 Review of wheat stem sawfly (*Cephus cinctus*). **Christopher McCullough**, ctmccull@cord.edu, Univ. of Nebraska-Lincoln, Lincoln, NE

D13 Survey of soybean aphid populations in the Red River Valley and potential influencing factors. **Erin McLean**, erin.mclean@ndsu.edu, Deirdre Prischmann-Voldseth, and Jason P. Harmon, North Dakota State Univ., Fargo, ND

D14 Foliar Milstop application negatively affects soybean aphid (*Aphis glycines*) populations on soybean (*Glycine max*). **Philip Rozeboom**, parozeboom@jacks.sdstate.edu, South Dakota State Univ., Brookings, SD; Kelley Tilmon, South Dakota State Univ., Brookings, SD; Louis S. Hesler, USDA-ARS, Brookings, SD; and Shannon Osborne, USDA-ARS, Brookings, SD

D15 Measuring fitness costs and inheritance for resistance to Bt corn by western corn rootworm. **Aubrey Paolino**, apaolino@iastate.edu, and Aaron Gassmann, Iowa State Univ., Ames, IA

D16 Monitoring the effectiveness of three Bt corn hybrids against corn rootworm in South Dakota. **David Ordosch**, david.ordosch@sdstate.edu, South Dakota State Univ., Brookings, SD

D17 Effects of neonicotinoid insecticides on spider mites. **Karly Henry**, karly.henry@sdstate.edu, and Adrianna Szczepaniec, South Dakota State Univ., Brookings, SD

D18 Ash mortality caused by emerald ash borer impacts forest floor invertebrate communities. **Kayla I. Perry**, perry.1864@osu.edu, The Ohio State Univ., OARDC, Wooster, OH; Rosemary Walker, SAIC, Sandusky, OH; and Daniel A. Herms, The Ohio State Univ., OARDC, Wooster, OH

D19 Road crossings and upstream and downstream aquatic macroinvertebrate communities. **Erik Prenosil**, prenosilej@lopers.unk.edu, Jeremy Grauf, and W. Wyatt Hoback, Univ. of Nebraska-Kearney, Kearney, NE

Ph.D. Student Poster Competition

Exhibit Hall

[Authors Present from 3:00-4:00]

D20 Diversity and significance of the microbial community in the larval development and vector competence of *Culicoides sonorensis* for EHDV. **Dinesh Erram**, derram@ksu.edu, Kansas State Univ., Manhattan, KS; Robert Pfannenstiel, USDA-ARS, Manhattan, KS; Mark Ruder, USDA-ARS, Manhattan, KS; Dana Nayduch, USDA-ARS, Manhattan, KS; and Ludek Zurek, Kansas State Univ., Manhattan, KS

D21 Bifenthrin susceptibility among western corn rootworm (*Diabrotica virgifera virgifera* LeConte) field populations. **Adriano Pereira**, aelias374@yahoo.com.br, Univ. of Nebraska, Lincoln, NE; John Wang, Univ. of Nebraska-Lincoln, Lincoln, NE; Lance Meinke, Univ. of Nebraska, Lincoln, NE; Wade French, USDA-ARS, Brookings, SD; and Blair Siegfried, Univ. of Nebraska, Lincoln, NE

D22 Parasitoids emerging from trees colonized by native *Agrilus* in Wisconsin. **Todd Johnson**, sttdj01@gmail.com, Univ. of Wisconsin, Madison, WI; Steven Krauth, Univ. of Wisconsin, Madison, WI; Michael Gates, USDA-ARS, Washington, DC; John Huber, Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, ON, Canada; Norman Johnson, The Ohio State Univ., Columbus, OH; István Mikó, Pennsylvania State Univ., Univ. Park, PA; John Strazanac, West Virginia Univ., Morgantown, WV; James Woolley, Texas A&M Univ., College Station, TX; Robert Zuparko, Univ. of California Berkley, Berkley, CA; and Kenneth Raffa, Univ. of Wisconsin, Madison, WI

D23 Forecasting the distribution of an invasive, polyphagous moth, *Epiphyas postvittana* (Lepidoptera: Tortricidae), in a changing climate. **Amy C. Morey**, morey041@umn.edu, Univ. of Minnesota, St. Paul, MN; Robert Venette, U.S. Forest Service, St. Paul, MN; and William D. Hutchison, Univ. of Minnesota, St. Paul, MN

D24 Comparison of multiple sticky traps for the monitoring of Bt-susceptible and Bt resistant corn rootworm (*Diabrotica* spp.) populations. **Trisha Leaf**, trisha.franz@gmail.com, and Kenneth Ostlie, Univ. of Minnesota, St. Paul, MN

D25 Tolerance of MIR604 in reciprocal cross offspring of MIR604-selected and control western corn rootworm colonies. **Ryan Winslow Geisert**, rwg5h8@mail.missouri.edu, Univ. of Missouri, Columbia, MO; Daniel L. Frank, West Virginia Univ., Morgantown, WV; Lisa Meihls, USDA-ARS, Columbia, MO; and Bruce Hibbard, USDA-ARS, Univ. of Missouri, Columbia, MO

D26 See D53

D27 Influences of an herbicide and an adjuvant on the behavior and colony growth of the common eastern bumble bee (*Bombus impatiens*). **Scott Prajzner**, prajzner.1@osu.edu, The Ohio State Univ., Wooster, OH; Michael Gallagher, The Ohio State Univ., Columbus, OH ; and Mary M. Gardiner, The Ohio State Univ., Wooster, OH

D28 Investigating prostaglandin E2 synthase in the black-legged tick, *Ixodes scapularis*. **Joshua R. Urban**, josurb@ksu.edu, and Yoonseong Park, Kansas State Univ., Manhattan, KS

B.S. Student Ten-Minute Paper Competition

9:30am – 11:06am
Council Bluffs Room

Moderators:
John Ruberson, Kansas State Univ.;
and **Marco Toapanta**, DuPont Pioneer

9:30 13 The bigger they are, the harder gravity is on them: An examination of g-force and insect survival. **Adrianne Pursley**, pursleyac2@lopers.unk.edu, Univ. of Nebraska, Kearney, NE; Leon G. Higley, Univ. of Nebraska, Lincoln, NE; and W. Wyatt Hoback, Univ. of Nebraska-Kearney, Kearney, NE

9:42 14 Impact of prescribed fire on plant and insect communities in a roadside prairie planting. **Austin Bauer**, baueau01@luther.edu, and Kirk Larsen, Luther College, Decorah, IA

9:54 15 The effect of European buckthorn (*Rhamnus cathartica*) on ground-dwelling insects, including ants (Hymenoptera: Formicidae) and ground beetles (Coleoptera: Carabidae) in northeast Iowa forests. **Marissa Schuh**, schuma08@luther.edu, and Kirk Larsen, Luther College, Decorah, IA

10:06 16 Virulent aphid population dynamics in Kentucky winter wheat: A land use analysis. **Anna Muncy**, anna.muncy@uky.edu, Katelyn A. Kowles, and James D. Harwood, Univ. of Kentucky, Lexington, KY

10:18 17 Varying the timing of insecticide application limits non-target impacts in soybean. **Patrick Wagner**, pmwagner@iastate.edu, Matthew E. O'Neal, and Adam J. Varenhorst, Iowa State Univ., Ames, IA

10:30 18 Evaluation of a natural product for protection of roses from Japanese beetles (*Popillia japonica* Newman). **Kate Russell**, krussell@iastate.edu, Matthew E. O'Neal, and Russell Jurenka, Iowa State Univ., Ames, IA

10:42 19 Survey of insects in Iowa vineyards. **Tyler Stallman**, stallman@iastate.edu, and Erin W. Hodgson, Iowa State Univ., Ames, IA

10:54 20 Revision of *Acrophyma* Bergroth, 1917 (Hemiptera: Heteroptera: Acanthosomatidae). **Mariom Carvajal**, mariom.carvajal@gmail.com, Eduardo Faundez, and David A. Rider, North Dakota State Univ., Fargo, ND

M.S. Student Ten-Minute Paper Competition: SysEB, MUVE, PBT Session

9:30am – 10:54am
Davenport Room

Moderators:
Kevin Steffey, Dow AgroSciences;
and **Joliene Lindholm**, Univ. of Wisconsin

9:30 21 Efficacy of three pyrethroid insecticides in suburban mosquito suppression. **Kyndall Dye**, kyndall.dye@uky.edu, and Grayson C. Brown, Univ. of Kentucky, Lexington, KY

9:42 22 Effects of gap junction inhibitors on the survival and diuretic capacity of adult female mosquitoes, *Aedes aegypti*. **Travis Calkins**, calkins.21@osu.edu, and Peter Piermarini, The Ohio State Univ., Wooster, OH

9:54 23 Bt toxin engineering to promote protoxin activation in the aphid gut. **Michael Allen Rausch**, mrausch@iastate.edu, Nanasaheb Chougule, and Bryony Bonning, Iowa State Univ., Ames, IA,

10:06 24 Characterization of the peptidase and the non-peptidase homologs from the transcriptome of *Callosobruchus maculatus*. **Alice M. Vossbrinck**, vossbri2@illinois.edu, Weilin Sun, Maria Carmen Valero Quiros, Susan Balfe, and Barry R. Pittendrigh, Univ. of Illinois, Urbana, IL

10:18 25 Development of navel orangeworm (*Amyelois transitella*) resistance to pyrethroid insecticides: Comparisons between a resistant and a susceptible strain. **Mark Demkovich**, mdemkov3@illinois.edu, Univ. of Illinois, Urbana, IL; Bradley S. Higbee, Paramount Farming Co, Bakersfield, CA; Joel Siegel, USDA-ARS, Parlier, CA; and May R. Berenbaum, Univ. of Illinois, Urbana, IL

10:30 26 Effects of soil compaction and leaf litter on burial preferences in *Nicrophorus orbicollis*. **Kelly Willemssens**, willemssenka@lopers.unk.edu, and W. Wyatt Hoback, Univ. of Nebraska-Kearney, Kearney, NE

10:42 27 Genetic characterization of turf infesting sod webworms and their host associations. **Devon Rogers**, rogers.781@osu.edu, The Ohio State Univ., Columbus, OH; David Shetlar, The Ohio State Univ., Columbus, OH; and Steven Passoa, USDA-APHIS, Columbus, OH

M.S. Student Ten-Minute Paper Competition: P-IE Session

9:30am – 11:42am
Dubuque Room

Moderators:
Michael Culy, Dow AgroSciences;
and **Louis Hesler**, USDA-ARS

9:30 28 Are long-legged fly (Diptera: Dolichopodidae) assemblages altered by agroecosystem management or surrounding landscape composition?. **Andrea Kautz**, kautz.14@osu.edu, and Mary M. Gardiner, The Ohio State Univ., Wooster, OH

9:42 29 Investigating effects of surrounding landscape diversity on populations of Japanese beetles in Iowa soybean. **Cody D. Kuntz**, cdkuntz@iastate.edu, and Matthew E. O'Neal, Iowa State Univ., Ames, IA

9:54 30 Exploring effects of weed management in agroecosystems: Subterranean arthropods, soil properties and soybean production. **Ashton Hansen**, ashton.walter@ndsu.edu, Deirdre Prischmann-Voldseth, Amitava Chatterjee, and Jason P. Harmon, North Dakota State Univ., Fargo, ND

10:06 31 Mechanical exclusion and biological control of the brown marmorated stink bug (*Halyomorpha halys*) in organic agriculture. **Rachelyn Dobson**, legolover6@gmail.com, Univ. of Kentucky, Lexington, KY

10:18 32 Cold hardiness of the emerald ash borer (*Agrilus planipennis* Fairmaire) in green and black ash. **Lindsey Christianso**n, chri1203@umn.edu, Univ. of Minnesota, St. Paul, MN; and Robert Venette, U.S. Forest Service, St. Paul, MN

10:30 33 Dectes stem borer, *Dectes texanus* Leconte, (Coleoptera: Cerambycidae) in Nebraska soybeans. **Zach Rystrom**, zrystro@hotmail.com, and Robert Wright, Univ. of Nebraska, Lincoln, NE

10:42 34 Prevalence and patterns of bacterial endosymbionts in solitary bees. **Abiya Saeed**, abiyasaeed@gmail.com, and Jennifer A. White, Univ. of Kentucky, Lexington, KY

10:54 35 Comparing the pollinator communities found in corn and soybean fields in Iowa. **M. Joseph Wheelock**, wheelock@iastate.edu, and Matthew E. O'Neal, Iowa State Univ., Ames, IA

11:06 36 Comparative beetle emergence and root injury for rootworm-Bt traits in Cry3Bb1 problem fields in Illinois. **Preston Schrader**, schrade1@illinois.edu, Nicholas Tinsley, Ronald Estes, and Michael E. Gray, Univ. of Illinois, Urbana, IL

11:18 37 Inheritance and fitness costs of Bt resistance in field-derived strains of western corn rootworm (*Diabrotica virgifera virgifera* LeConte). **David A. Ingber**, davidngbr@gmail.com, Iowa State Univ., Ames, IA; Graham Head, Monsanto, St. Louis, MO; and Aaron Gassmann, Iowa State Univ., Ames, IA

11:30 38 Impact of co-infection of *Wheat streak mosaic virus* and *Triticum mosaic virus* on virus transmission rates and wheat curl mite reproduction in the field. **Camila F. de Oliveira**, oliveira-camila@live.com, Gary L. Hein, and Stephen Wegulo, Univ. of Nebraska, Lincoln, NE

SCIENTIFIC PROGRAM
MONDAY AFTERNOON

Ph.D. Student Ten-Minute Paper Competition: PBT Session

1:00pm – 2:36pm
Council Bluffs Room

Moderators:
Dan Moellenbeck, DM Crop Research Group;
and **Jennifer Frederick**, Kansas State Univ.

1:00 39 *Varroa jacobsoni* haplotypes that differ in their reproductive success on the European honey bee (*Apis mellifera*) display differential gene expression. **Gladys Andino**, gandino@purdue.edu, Purdue Univ., West Lafayette, IN; Michael Gribskov, Purdue Univ., West Lafayette, IN; Denis Anderson, CSIRO Ecosystem Sciences, Canberra ACT, Australia; and Greg J. Hunt, Purdue Univ., West Lafayette, IN

1:12 40 Biological validation of enzyme-linked immunosorbent assays for detection of Cry proteins in the environment. **Vurtice Albright**, valbrigh@iastate.edu; Iowa State Univ., Ames, IA; Richard L. Hellmich, USDA-ARS, Ames, IA; and Joel Coats, Iowa State Univ., Ames, IA

1:24 41 The southern cattle tick (*Rhipicephalus microplus*) tyramine receptor: A potential target of biopesticides. **Aaron Gross**, adgross@iastate.edu, Iowa State Univ., Ames, IA; Michael J. Kimber, Iowa State Univ., Ames, IA; Kevin B. Temeyer, USDA-ARS, Kerrville, TX; Robert J. Miller, USDA-ARS, Edinburg, TX; Adalberto Perez de Leon, USDA-ARS, Kerrville, TX; and Joel Coats, Iowa State Univ., Ames, IA

1:36 42 Characterization of larval specific proteins from *Manduca sexta* Verson's glands. **Joliene Lindholm**, jlindholm@entomology.wisc.edu, Univ. of Wisconsin, Madison, WI

1:48 43 Seasonal benefits of propolis for honey bee health and immunity. **Renata Borba**, rsborba@umn.edu, and Marla Spivak, Univ. of Minnesota, St. Paul, MN

2:00 44 Use of the honey bee (*Apis mellifera*) cell line, E-711, as a model for *Nosema* sp. infection. **Michael Goblirsch**, goblirmj@umn.edu, Marla Spivak, and Tim Kurtti, Univ. of Minnesota, St. Paul, MN

2:12 45 Baseline susceptibility of the soybean aphid to the neonicotinoid insecticide thiamethoxam in the north central region of the United States. **Matheus Ribeiro**, matheusgpmr@gmail.com, Univ. of Nebraska, Lincoln, NE; Blair Siegfried, Univ. of Nebraska, Lincoln, NE; and Thomas E. Hunt, Univ. of Nebraska, Concord, NE

2:24 46 Toxicity of thiamethoxam seed treatments on key natural enemies of soybean aphid. **Carolina Camargo**, caro.camargo@yahoo.es, Univ. of Nebraska, Lincoln, NE; Blair Siegfried, Univ. of Nebraska, Lincoln, NE; and Thomas Hunt, Univ. of Nebraska, Concord, NE

Ph.D. Student Ten-Minute Paper Competition: P-IE Session I

1:00pm – 3:00pm
Davenport Room

Moderators:
Rufus Isaacs, Michigan State Univ.;
and **Meghan O'Neal**, DuPont Pioneer

1:00 47 Is pyramiding resistance the answer for soybean aphid management? **Michael T. McCarville**, mikemcc@iastate.edu, Iowa State Univ., Ames, IA; Matthew E. O'Neal, Iowa State Univ., Ames, IA; Bruce D. Potter, Univ. of Minnesota, Lamberton, MN; Kelley Tilmon, South Dakota State Univ., Brookings, SD; Eileen M. Cullen, Univ. of Wisconsin, Madison, WI; Brian McCornack, Kansas State Univ., Manhattan, KS; John Tooker, Pennsylvania State Univ., Univ. Park, PA; and Deirdre Prischmann-Voldseth, North Dakota State Univ., Fargo, ND

1:12 48 A comparative study on the distribution of adult *Dectes texanus* in continuously planted soybean fields. **Alice Harris**, alice3@k-state.edu, and Brian McCornack, Kansas State Univ., Manhattan, KS

1:24 49 Determining pest and pesticide interactions as a means to optimize soybean yield. **Eric H. Clifton**, eclifton@iastate.edu, Erin W. Hodgson, Gregory Tylka, and Aaron Gassmann, Iowa State Univ., Ames, IA

1:36 50 Land use and field edges drive movements of spiders in soybean agroecosystems. **Hannah J. Penn**, hannahjpenn@gmail.com, and James D. Harwood, Univ. of Kentucky, Lexington, KY

1:48 51 Biological control and degree-day modeling yield promising results for managing the asparagus miner (Diptera: Agromyzidae) in commercial asparagus fields. **William R. Morrison**, morri362@msu.edu, Jeffrey Andresen, and Zsofia Szendrei, Michigan State Univ., East Lansing, MI

2:00 52 The effects of tillage on pollinator activity in cucurbit growing systems. **Amanda Skidmore**, amanda.skidmore@gmail.com, and Ric Bessin, Univ. of Kentucky, Lexington, KY

2:12 53 Field-evolved resistance to Bt toxin Cry3Bb1 and mCry3A in Nebraska western corn rootworm, *Diabrotica virgifera virgifera* (LeConte) (Coleoptera: Chrysomelidae) populations. **David Wangila**, dwangila2@huskers.unl.edu, and Lance Meinke, Univ. of Nebraska, Lincoln, NE

2:24 54 Effect of crop management on root injury, adult abundance, and susceptibility to Bt toxins on western corn rootworm. **Mike W. Dunbar**, dunbar@iastate.edu, Matthew E. O'Neal, and Aaron Gassmann, Iowa State Univ., Ames, IA

2:36 55 Spectral response of soybean plants to infestation of soybean aphids (Hemiptera: Aphididae). **Tavvs Alves**, alves011@umn.edu, CNPq/Brazil, Robert Koch, and Ian MacRae, Univ. of Minnesota, St. Paul, MN

2:48 56 Lethal and sublethal effects of insecticides on *Halyomorpha halys* (Hemiptera: Pentatomidae) eggs, nymphs, and adults. **Theresa M. Cira**, cirax002@umn.edu, Eric C. Burkness, Robert Koch, and William D. Hutchison, Univ. of Minnesota, St. Paul, MN

Symposium: Forest Entomology

1:00pm – 4:45pm
Dubuque Room

Organizers and Moderators:
Todd Johnson, **Joseph Wong**, and **Linnea Meier**,
Univ. of Illinois at Urbana-Champaign

1:00		Introductory remarks. **Todd Johnson**, Univ. of Illinois at Urbana-Champaign
1:05	57	Mitigating the impacts of a mountain pine beetle outbreak at Mount Rushmore National Memorial, South Dakota. **Cody Wienk**, cody_wienk@nps.gov, Fire Ecologist, Omaha, NE
1:35	58	USDA-APHIS-PPQ and forest entomology: Collaboration, coordination, and communication. **Christopher Pierce**, Christopher.Pierce@aphis.usda.gov, USDA-APHIS-PPQ, Jefferson City, MO
2:05	59	Cold tolerance of emerald ash borer and its parasitoids: Tales from the north. **Robert Venette**, rvenette@fs.fed.us, U.S. Forest Service, St. Paul, MN; Lindsey DE Christianson, Univ. of Minnesota, St. Paul, MN; and Anthony A. Hanson, Univ. of Minnesota, St. Paul, MN
2:35	60	Tackling TCD in Illinois: Survey and monitoring for thousand cankers disease. **Kelly Estes**, kcook8@illinois.edu, Univ. of Illinois, Champaign, IL
3:05		Break
3:30	61	Pathogen studies in pest and beneficial forest insects. **Leellen Solter**, lsolter@illinois.edu, lllinois Natural History Survey/Univ. of Illinois, Champaign, IL
4:00	62	Persistence of American chestnut in the wake of successive invasions. **Lynne K. Rieske-Kinney**, lrieske@uky.edu, Univ. of Kentucky, Lexington, KY

4:30 Concluding remarks. **Todd Johnson**, Univ. of Illinois at Urbana-Champaign

Ph.D. Student Ten-Minute Paper Competition: P-IE Session II

3:30pm – 5:42pm
Council Bluffs Room

Moderators:
John Obrycki, Univ. of Kentucky;
and **Stephen Novak**, Dow AgroSciences

3:30 63 Host defensive behaviors and indirect competition between two parasitoids of the soybean aphid. **James Kopco,** jk729@cornell.edu, and Jason P. Harmon, North Dakota State Univ., Fargo, ND

3:42 64 The influence of tillage in sugar beets on beneficial, edaphic arthropod communities, and the arthropod-mediated ecosystem services they provide. **R. J. Pretorius**, rjpretor@cut.ac.za, Univ. of Nebraska-Lincoln, Lincoln, NE; Gary L. Hein, Univ. of Nebraska, Lincoln, NE; and Jeffrey Bradshaw, Univ. of Nebraska-Lincoln, Scottsbluff, NE

3:54 65 Suppression of pea aphids by the biological control agent *Aphidius ervi* declines in the presence of the non-enemy *Aphidius colemani*. **Kathryn Ingerslew**, ksiggc@mail.missouri.edu, and Deborah L. Finke, Univ. of Missouri, Columbia, MO

4:06 66 Quantifying the prevalance of intraguild predation in winter wheat: Impact on biological control. **Katelyn A. Kowles**, katelyn.kowles@uky.edu, Univ. of Kentucky, Lexington, KY; Douglas W. Johnson, Univ. of Kentucky, Princeton, KY; and James D. Harwood, Univ. of Kentucky, Lexington, KY

4:18 67 The influence of aphid abundance on coccinellid egg predation in tallgrass habitats in Missouri. **Lauren M. Diepenbrock**, Lmhd74@mizzou.edu, and Deborah L. Finke, Univ. of Missouri, Columbia, MO

4:30 68 Comparing abundance and biomass in describing arthropod communities in citrus canopies. **Aleix Valls**, danteal@gmail.com, North Dakota State Univ., Fargo, ND; and Josep Piñol, UAB, Bellaterra, Spain

4:42 69 A potential push strategy involving native prairie. **Wayne J. Ohnesorg**, wohnesorg2@unl.edu, Univ. of Nebraska-Lincoln, Norfolk, NE; Robert Wright, Univ. of Nebraska, Lincoln, NE; Marion Ellis, Univ. of Nebraska-Lincoln, Lincoln, NE; and Thomas E. Hunt, Univ. of Nebraska, Concord, NE

4:54 70 Do biotype-1 soybean aphids benefit from the presence of biotype-2 on resistant soybean? **Adam J. Varenhorst**, ajv@iastate.edu, Michael T. McCarville, and Matthew E. O'Neal, Iowa State Univ., Ames, IA

5:06 71 Combined effects of host-plant resistance and foliar insecticides for soybean aphid management. **Anthony A. Hanson**, hans4022@umn.edu, and Robert Koch, Univ. of Minnesota, St. Paul, MN

5:18 72 Conservation of ash diversity: Strategies for preserving diversity and population structures of ash invaded by emerald ash borer. **Erin O'Brien**, obrien.501@osu.edu, The Ohio State Univ., OARDC, Wooster, OH

5:30 73 Establishing risk for alternative over-summering hosts for wheat curl mites and associated viruses. **Anthony J. McMechan**, justin.mcmechan@gmail.com, and Gary L. Hein, Univ. of Nebraska, Lincoln, NE

Ph.D. Student Ten-Minute Paper Competition: SysEB, MUVE Session

3:30pm – 4:54pm
Davenport Room

Moderators:
Wendy Johnson and **Deanna Scheff**, Kansas State Univ.

3:30 74 Phylogeny of North American *Aphaenogaster* Species (Hymenoptera: Formicidae) reconstructed with morphological and DNA data. **Bernice B. DeMarco**, demarc10@msu.edu, and Anthony I. Cognato, Michigan State Univ., East Lansing, MI

3:42 75 Revision of *Acledra (Neoacledra)* (Heteroptera: Pentatomidae: Pentatominae: Carpocorini). **Eduardo Faundez**, ed.faundez@gmail.com, and David A. Rider, North Dakota State Univ., Fargo, ND

3:54 76 Postmortem changes in chemical profile and undertaking response in termites. **Qian Sun**, qian.sun@uky.edu, Kenneth Haynes, and Xuguo Zhou, Univ. of Kentucky, Lexington, KY

4:06 77 Trapping mold mites, *Tyrophagus putrescentiae* (Acari: Acaridae), for IPM decisions: effect of trap placement and trap design. **Barbara Amoah**, bamoah@ksu.edu, and Thomas Phillips, Kansas State Univ., Manhattan, KS

4:18 78 Using natural compounds to control mosquito populations: Efficacy of plant essential oils against the African malarial and the yellow fever mosquito. **Edmund Norris**, ejnorris@iastate.edu, Aaron Gross, Lyric Bartholomay, and Joel Coats, Iowa State Univ., Ames, IA

4:30 79 An *in vivo* RNAi approach to disrupt development in the filarial worm, *Brugia malayi*. **Lisa Fraser**, lmfraser@iastate.edu, Michael J. Kimber, and Lyric Bartholomay, Iowa State Univ., Ames, IA

4:42 80 Infestation of *Rhyzopertha dominica* (F) first instars on sound and artificially-damaged hard red winter wheat kernels. **Mario Andrada**, mandrada@ksu.edu, Kansas State Univ., Manhattan, KS

Symposium: Stink Bugs: Emerging Threats in the East and Midwest

3:25pm – 5:30pm
Cedar Rapids Room

Organizers and Moderators:
Kelley Tilmon, South Dakota State Univ.;
and **Robert Koch**, Univ. of Minnesota

3:25 Introductory remarks. **Kelley Tilmon**, kelley.tilmon@sdstate.edu, South Dakota State Univ., Brookings, SD; and **Robert Koch**, Univ. of Minnesota, St. Paul, MN

3:30 81 Biology and management of brown marmorated stink bug on field crops in the Mid-Atlantic region. **Galen Dively**, galen@umd.edu, Univ. of Maryland, College Park Maryland, MD; Ames Herbert, Virginia Tech, Suffolk, VA; and Joanne Whalen, Univ. of Delaware, Newark, DE

3:50 82 Impact and management of brown marmorated stink bug on vegetable crops. **Thomas P. Kuhar**, tkuhar@vt.edu, Virginia Tech, Blacksburg, VA

4:10 83 Impact of a possible Midwest IPM enemy, *Megacopta cribraria* (kudzu bug), on soybeans. **Dominic Reisig**, dominic_reisig@ncsu.edu, North Carolina State Univ., Plymouth, NC

4:30 84 THE Ohio StinkBugeyes: Status of native and invasive stink bugs in Ohio's crops. **Andrew P. Michel**, michel.70@osu.edu, The Ohio State Univ., Wooster, OH; Celeste Welty, Ohio State Univ., Columbus, OH; James Jasinski, Ohio State Univ., Urbana, OH; and Raman Bansal, Ohio State Univ., OARDC, Wooster, OH

4:50 85 Identifying the initial potential for biological control of brown marmorated stink bug (*Halyomorpha halys*) in central Michigan. **Matthew Grieshop**, grieshop@msu.edu, and Kristin Deroshia, Michigan State Univ., East Lansing, MI

5:10 86 Proactive response to the arrival of the brown marmorated stink bug in Minnesota. **Robert Koch**, koch0125@umn.edu, Univ. of Minnesota, St. Paul, MN

MEETING-AT-A-GLANCE
TUESDAY
11 March 2014

Services	
7:30am-5:00pm	Meeting Registration *Exhibit Hall*
7:30am-5:00pm	IT Support *Sioux City Room*
Functions	
7:30am-10:00am	Continental Breakfast *Exhibit Hall*
10:00am-11:00am	Photo Salon *Cedar Rapids Room*
Noon-1:30pm	Awards Luncheon *Salon A-H*
1:30pm-5:00pm	DuPont Pioneer Tour *Meet in the lobby at 1:30* *[must be pre-registered]*
3:00pm-4:00pm	Refreshment Break *Exhibit Hall*
3:30pm-5:30pm	NCERA 220 Working Group Meeting *Cedar Rapids Room*

MEETING-AT-A-GLANCE
TUESDAY
11 March 2014

Scientific Program - Morning	
7:30am-5:00pm	Poster Display *Exhibit Hall* *[Authors Present 3:00-4:00]*
7:55am-11:35am	Symposium: Protecting Our Pollinators: Current Pollinator Health and Conservation Efforts in the Midwest *Council Bluffs Room*
8:40am-11:10am	Symposium: The Buzz About Entomology: Engaging the Public in Science *Dubuque Room*
9:50am-11:30am	Symposium: Peeling Back the Mylar: Challenges Around Insect Sourcing and Rearing *Davenport Room*
Scientific Program - Afternoon	
2:00pm-4:30pm	Symposium: The “Ecology” in Agroecology: Asking Basic Questions in Applied Systems *Council Bluffs Room*
2:00pm-5:30pm	Symposium: The Phenomenon of Resistance in the North Central Branch *Davenport Room*
2:00pm-4:08pm	Submitted Ten-Minute Papers *Dubuque Room*

SCIENTIFIC PROGRAM
TUESDAY MORNING

Regular Submitted Posters

Exhibit Hall

[Authors Present from 3:00-4:00]

D29 Efficacy of a novel marigold plant extract for darkling beetle (*Alphitobius diaperinus*) control. **Brett Kreifels**, brettkreifels@hotmail.com, Sheila Purdum, Roberto Cortinas, Susan Cuppett, and Kathy Hanford, Univ. of Nebraska-Lincoln, Lincoln, NE

D30 Observing color-change in goldenrod crab spiders (*Misumena vatia*). **David Johnston**, joh07919@d.umn.edu, Univ. of Minnesota-Duluth, Duluth, MN

D31 miRNAs in resistant and susceptible strains in bed bug (*Cimex lectularius*). **Miguel Alvarez**, alvarez.165@osu.edu, The Ohio State Univ., Wooster, OH

D32 Monitoring non-target arthropods in hybrids with the Herculex® I insect protection trait and Optimum® Intrasect® maize products: Overview of global field trials. **Andrew Wingen**, andrew.wingen@pioneer.com, Rachel Woods, and Nicholas Schmidt, DuPont Pioneer, Johnston, IA

D33 Baseline susceptibility of soybean aphid (*Aphis glycines*) to lambda-cyhalothrin in Minnesota. **Celia Silverstein**, clsilver@umn.edu, Univ. of Minnesota, Minneapolis, MN; and Robert Koch, Univ. of Minnesota, St. Paul, MN

D34 Evaluation of in-furrow application of a liquid-fertilizer-ready insecticide for protection of soybean and enhancement of plant vigor and yield. **Walter Rich**, richx082@umn.edu, Univ. of Minnesota, St. Paul, MN

D35 Observations of overwintering sites and movements of *Coleomegilla maculata* (Coleoptera: Coccinellidae). **Jessica Cole**, Jess.cole@uky.edu, and John Obrycki, Univ. of Kentucky, Lexington, KY

D36 Immature stages of development in the parasitic wasp, *Trissolcus japonicus* (Hymenoptera: Scelionidae), on its host, *Halyomorpha halys* (Hemiptera: Pentatomidae). **Heather Leach**, heatherleach.tc@gmail.com, and Ernest Delfosse, Michigan State Univ., East Lansing, MI

D37 Molecular detection of hitch-hiking parasitoids in migratory aphids from the Midwest suction trap network. **Anh K. Tran**, aktran@umn.edu, Univ. of Minnesota, St. Paul, MN; Amanda R. Stephens, Univ. of Minnesota, St. Paul, MN; Doris M. Lagos, Univ. of Illinois, Urbana, IL; Julie A. Peterson, Univ. of Nebraska-Lincoln, North Platte, NE; Joe M. Kaser, Univ. of Minnesota, St. Paul, MN; and George E. Heimpel, Univ. of Minnesota, St. Paul, MN

D38 Soybean aphid management in Iowa. **Erin W. Hodgson**, ewh@iastate.edu, and Greg VanNostrand, Iowa State Univ., Ames, IA

D39 Aphid Alert II - Monitoring flights of vectors of Potato Virus Y. **Ian V. MacRae**, imacrae@umn.edu, Univ. of Minnesota, St. Paul, MN; and Nathan Russart, Univ. of Minnesota, Crookston, MN

D40 Temperature conditioning of soybean seedlings influences expression of resistance to soybean aphid (*Aphis glycines*) Biotype 1. **Ashley Hough**, ahough31@ksu.edu, and James R. Nechols, Kansas State Univ., Manhattan, KS

D41 Switchgrass photosynthetic response to simulated insect defoliation differs during drought. **Fatima Mustafa,** Univ. of Nebraska-Lincoln, Lincoln, NE; Muhammad Irfan Ullah, Univ. of Nebraska-Lincoln, Lincoln, NE; W. Wyatt Hoback, hobackww@unk.edu, Univ. of Nebraska-Kearney, Kearney, NE; Kerri M. Farnsworth-Hoback, Univ. of Nebraska-Kearney, Kearney, NE; John

E. Foster, Univ. of Nebraska-Lincoln, Lincoln, NE; and Shripat Kamble, Univ. of Nebraska-Lincoln, Lincoln, NE

D42 Participatory detection and early mapping of spotted wing drosophila distribution in South Dakota. **Buyung Hadi**, buyung.hadi@sdstate.edu, South Dakota State Univ., Brookings, SD

D43 Evaluation of foliar-applied insecticides and insecticide/fungicide combinations to control insect pests in soybean. **Ronald Estes**, restes@illinois.edu, Nicholas Tinsley, Preston Schrader, and Michael E. Gray, Univ. of Illinois, Urbana, IL

D44 Flight phenology and summiting behavior of sugarbeet root aphids (*Pemphigus betae* Doane). **Nathan Russart**, Univ. of Minnesota, Crookston, MN; Ian V. MacRae, imacrae@umn.edu, Univ. of Minnesota, St. Paul, MN; Mark A. Boetel, North Dakota State Univ., Fargo, ND; and Robert Foottit, Agriculture and Agri-Food Canada, Ottawa, ON, Canada

D45 Evaluating multiple approaches for managing corn rootworm larvae with seed blends. **Nicholas Tinsley**, tinsley@illinois.edu, Ronald Estes, Preston Schrader, and Michael Gray, Univ. of Illinois, Urbana, IL

D46 Soybean aphid management in South Dakota. **Bradley McManus**, Bradley.McManus@sdstate.edu, Billy Fuller, and Kelley Tilmon, South Dakota State Univ., Brookings, SD

D47 Fall insecticide treatments to manage spring infestations of alfalfa weevil (*Hypera postica*). **Alysha M. Soper**, alyshaso@ksu.edu, R. Jeff Whitworth, and Holly Davis, Kansas State Univ., Manhattan, KS

D48 Reduction of inputs to the sub-lethal seedling assay used for measuring Bt susceptibility in western corn rootworm. **Dianna Gillespi**e, dianna.gillespie@pioneer.com, and Matt Wihlm, DuPont Pioneer, Johnston, IA

D49 Multi-year efficacy and grain yield performance of stacked insect control traits deployed in a blended refuge against lepidoptera pests of maize. **Roxanne Fegley**, roxanne.fegley@pioneer.com, Pioneer Hi-Bred International, Windfall, IN; Murdick J. McLeod, Pioneer Hi-Bred International, Inc, Windfall, IN; and Steven R. Paszkiewicz, Pioneer Hi-Bred International, Inc., Johnston, IA

D50 Corn rootworm control and yield performance of maize expressing Cry34Ab1/35Ab1 and mCry3a with and without soil insecticide. **Susan E. Moser**, susan.moser@pioneer.com, DuPont Pioneer, Johnston, IA

D51 Multi-year efficacy and grain yield performance of single and stacked insect control traits deployed in a blended refuge against western corn rootworm, (*Diabrotica virgifera virgifera*). **Murdick J. McLeod**, murdick.mcleod@pioneer.com, Pioneer Hi-Bred International, Inc, Windfall, IN; Roxanne Fegley, Pioneer Hi-Bred International, Windfall, IN; and Steven R. Paszkiewicz, Pioneer Hi-Bred International, Inc., Johnston, IA

D52 Preliminary assessment of the impacts of forest management on carrion beetle (Coleoptera: Silphidae) activity in the Land Between the Lakes National Recreation area of western Kentucky. **Carmen Greenwood**, cgreenwood1@murraystate.edu, and Paul Gagnon, Murray State Univ., Murray, KY

D53 Notes on *Menestheus* (Heteroptera: Pentatomidae: Aeptini). **Eduardo Faundez**, ed.faundez@gmail.com, and David A. Rider, North Dakota State Univ., Fargo, ND

D54 A survey and historical comparison of the Megachilidae (Insecta: Hymenoptera) of Itasca State Park, Minnesota. **Joel Gardner**, gard0228@umn.edu, Univ. of Minnesota, Brooklyn Park, MN

Symposium: Protecting Our Pollinators: Current Pollinator Health and Conservation Efforts in the Midwest

7:55am – 11:35am
Council Bluffs Room

Organizers and Moderators:
Thelma Heidel-Baker and **Adam Dolezal**, Iowa State Univ.

7:55		Introductory remarks. **Thelma Heidel-Baker**, Iowa State Univ.
8:00	87	Linking pollinator health to soil health and watershed management. **Marty Adkins**, martin.adkins@ia.usda.gov, USDA - Natural Resources Conservation Service, Des Moines, IA
8:20	88	Effect of landscape resources and grassland management practices on bee abundance and nutrition in a Midwestern agricultural landscape. **Amy L. Toth**, amytoth@iastate.edu, Iowa State Univ., Ames, IA
8:40	89	Influence of land use on wild bee diversity in the Prairie Potholes Region of North Dakota. **Elaine Evans**, fuzzybumblebee@gmail.com, Univ. of Minnesota, St. Paul, MN
9:00	90	Bees and flowers in the city: Pollination of vegetables and wildflowers in residential yards. **David Lowenstein**, dlowen2@uic.edu and Emily Minor, Univ. of Illinois, Chicago, IL
9:20	91	Bumble Boosters 2.0: Pollinator conservation through education research and outreach. **Louise Lynch**, lilynch777@yahoo.com, and Douglas Golick, Univ. of Nebraska-Lincoln, Lincoln, NE
9:40		Break

9:50 92 Teaching pollination literacy through the pollination to plate mobile application. **Douglas Golick**, dgolick2@unl.edu, Marion Ellis, and Tiffany Heng-Moss, Univ. of Nebraska-Lincoln, Lincoln, NE

10:10 93 Interaction between landscape use, pollen diet, and virus dynamics in honey bees. **Adam Dolezal**, adolezal@iastate.edu, Iowa State Univ., Ames, IA

10:30 94 Sustaining specialty crop pollination through conservation. **Rufus Isaacs**, isaacsr@msu.edu, Michigan State Univ., East Lansing, MI; Jason Gibbs, Michigan State Univ., East Lansing, MI; Ashley Bennett, Michigan State Univ., East Lansing, MI; Brett R. Blaauw, Rutgers, The State Univ. of New Jersey, Bridgeton, NJ; and Emily May, Michigan State Univ., East Lansing, MI

10:50 95 Perennial grasslands increase multiple ecosystem services in agricultural landscapes. **Douglas A. Landis**, landisd@msu.edu, Michigan State Univ., East Lansing, MI

11:10 96 Impacts of agricultural land use on the health and survival of commercial honey bees. **Matthew Smart**, smart053@umn.edu, Univ. of Minnesota, St. Paul, MN

11:30 97 Concluding remarks. **Thelma Heidel-Baker**, Iowa State Univ.

Symposium: The Buzz About Entomology: Engaging the Public in Science

8:35am – 11:10am
Dubuque Room

Organizer: Kacie Athey, Univ. of Kentucky

Moderators: Alice Harris, Kansas State Univ.; and **Rob Morrison**, Michigan State Univ.

8:35		Introductory remarks. **Alice Harris**, Kansas State Univ.
8:40	98	Engaging the public in entomology research and learning through modern technologies. **Douglas Golick**, dgolick2@unl.edu, Univ. of Nebraska-Lincoln, Lincoln, NE
9:00	99	Online versus workshop: Does your training method affect the accuracy of citizen-science collected arthropod data? **Mary M. Gardiner**, gardiner.29@osu.edu, The Ohio State Univ., Wooster, OH; Mary Griffith, Dept. of Entomology, Columbus, OH; and Chelsea A. Smith, The Ohio State Univ., Wooster, OH
9:20	100	The monarch larva monitoring project: Citizens and scientists unraveling an ecological mystery. **Carl Stenoien**, sten0364@umn.edu, and Karen Oberhauser, Univ. of Minnesota, St. Paul, MN
9:40		Break
9:50	101	Scientific outreach: Creating meaningful educational content to reach diverse audiences. **Corrie Moreau**, cmoreau@fieldmuseum.org, Field Museum of Natural History, Chicago, IL
10:10	102	MSU BugHouse: Ages 3 to 93, entomology for a diverse audience. **Bernice B. DeMarco**, demarc10@msu.edu, Michigan State Univ., East Lansing, MI

10:30 103 Engaging stakeholders as if your app depends on it. **Wendy A. Johnson**, wendyann@ksu.edu, Kansas State Univ., Manhattan, KS

10:50 104 There is an app for that: Development and implementation of the Unified Butterfly Recorder app. **Nathan Brockman**, mantisnb@iastate.edu, Iowa State Univ., Ames, IA

Symposium: Peeling Back the Mylar: Challenges Around Insect Sourcing and Rearing

9:50am – 11:30am
Dubuque Room

Organizer and Moderator: Jared Ostrem, DuPont Pioneer

9:50 105 Challenges in the collection and rearing of European corn borer (*Ostrinia nubilalis*). **Terence Spencer**, tspencer1@unl.edu, Univ. of Nebraska-Lincoln, Lincoln, NE

10:10 106 Challenges to supplying the research machine. **Jared Ostrem**, jared.ostrem@pioneer.com, DuPont Pioneer, Johnston, IA

10:30 107 Current challenges rearing wood-boring beetles. **Jason Hansen**, jason.a.hansen@aphis.usda.gov, USDA-APHIS-PPQ-CPHST Otis Laboratory, Buzzards Bay, MA

10:50 108 Field testing agronomic crops: Adapting to the challenges around insect sourcing and rearing. **Dan Moellenbeck**, dan@dmcropresearch.com, DM Crop Research Group, Inc, Polk City, IA

11:10 109 Sources of variability in the design and conduct of bioassays. **Chad Boeckman**, chad.boeckman@pioneer.com, DuPont Pioneer, Ankeny, IA

SCIENTIFIC PROGRAM
TUESDAY AFTERNOON

Symposium: The "Ecology" in Agroecology: Asking Basic Questions in Applied Systems

2:00pm – 4:30pm
Council Bluffs Room

Organizers: Brandon Barton, Univ. of Wisconsin; **Jamin Dreyer**, North Dakota State Univ.; and **Jason Harmon**, North Dakota State Univ.

Moderators: Jamin Dreyer, North Dakota State Univ.; and **Jason Harmon**, North Dakota State Univ.

2:00 110 Down in the underground: Bottom-up effects of organic fertilization practices on corn pests and predatory insects. **Ebony G. Murrell**, egmurre@ilstu.edu, Univ. of Wisconsin-Madison, Madison, WI

2:20 111 Insights from modern plant-insect ecology to enhance biocontrol in agricultural landscape. **Ian Kaplan**, ikaplan@purdue.edu, Purdue Univ., West Lafayette, IN

2:40 112 Species interactions transmit indirect effects of precipitation in an agroecosystem. **Brandon Barton**, btbarton@wisc.edu, Univ. of Wisconsin, Madison, WI

3:00 113 Are urban vacant lots valuable for arthropod conservation? **Mary M. Gardiner**, gardiner.29@osu.edu, The Ohio State Univ., Wooster, OH

3:20 114 Livin' on the Edge: The importance of locomotion across habitat boundaries. **Jamin Dreyer**, jamin.dreyer@ndsu.edu, North Dakota State Univ., Fargo, ND

3:40 Break

3:50 115 Understanding the trophic ecology of natural enemies to enhance biological control in field crops. **Julie A. Peterson**, petersja@umn.edu, Univ. of Minnesota, St. Paul, MN

4:10 116 Observations of a sit-and-wait scientist: Examples of how individual behaviors can influence the population dynamics and species interactions of insects in agroecosystems. **Jason Harmon**, Jason.Harmon.ndsu@gmail.com, North Dakota State Univ., Fargo, ND

Symposium: The Phenomenon of Resistance in the North Central Branch

2:00pm – 5:30pm
Davenport Room

Organizers and Moderators:
Mike Dunbar, Iowa State Univ; and
Nicholas Tinsley, Univ. of Illinois-Urbana-Champaign

2:00 117 Molecular interactions between soybean aphid biotypes and resistant soybean. **Andrew P. Michel**, michel.70@osu.edu, The Ohio State Univ., Wooster, OH; Raman Bansal, The Ohio State Univ., Wooster, OH; Jacob Wenger, The Ohio State Univ., OARDC, Wooster, OH; and MA. Rouf Mian, USDA-ARS, Wooster, OH

2:20 118 Just deal with it: Biotypic diversity of soybean aphid. **Louis S. Hesler**, Louis.Hesler@ars.usda.gov, USDA-ARS, Brookings, SD

2:40 119 Resistance in non-target organisms - Aphids and mites, a relationship made somewhere other than heaven. **Ian V. MacRae**, imacrae@umn.edu, Univ. of Minnesota, St Paul, MN; Bruce D. Potter, Univ. of Minnesota, Lamberton, MN; and Robert Koch, Univ. of Minnesota, St. Paul, MN

3:00 120 Lep resistance to Bt: Multiple phenomena in maize. **Richard L. Hellmich**, Richard.Hellmich@ARS.USDA.GOV, USDA-ARS, Ames, IA

3:20 121 Do growers practice IPM? The case of herbicide-resistant weeds. **Micheal D. Owen**, mdowen@iastate.edu, Iowa State Univ., Ames, IA

3:40 Break

3:50 122 Grower perception of western corn rootworm management in Iowa. **Mike W. Dunbar**, dunbar@iastate.edu, J. Arbuckle, Matthew E. O'Neal, and Aaron Gassmann, Iowa State Univ., Ames, IA

4:10 123 SmartStax performance against western corn rootworm. **Dwain M. Rule**, ddrule@dow.com, Dow AgroSciences, Indianapolis, IN; Kevin Johnson, Dow AgroSciences, Danville, IL; Nicholas Storer, Dow AgroSciences, Midland, MI; and Miles Lepping, Univ. of Maryland, College Park, MD

4:30 124 Best CRW management practices: Short and long term implications. **Tony Burd**, tony.burd@syngenta.com, Syngenta, Greensboro, NC; and Miloud Araba, Syngenta Lawn & Garden, Greensboro, NC

4:50 125 Up, up and away: Charateristics of western corn rootworm aerial dispersal from Bt-transgenic cornfields. **Joseph Spencer**, spencer1@illinois.edu, and Sarah A. Hughson, Univ. of Illinois, Urbana, IL

5:10 126 Bt resistance in western corn rootworm: A model for understanding pest management with Bt crops that are not high dose. **Aaron Gassmann**, aaronjg@iastate.edu, Eric H. Clifton, Mike W. Dunbar, Amanda M. Hoffmann, David A. Ingber, Siva Jakka, Jennifer Petzold Maxwell, Melissa Rudeen, and Ram Shrestha, Iowa State Univ., Ames, IA

Submitted Ten-Minute Papers: Session I

2:00pm – 4:08pm
Dubuque Room

Moderator: David Margolies, Kansas State Univ.

2:00 127 Colonization of green infrastructure by cavity nesting bees and wasps. **Brittany Buckles**, bbuckls2@illinois.edu, Univ. of Illinois at Urbana-Champaign, Urbana, IL

2:12 128 Linking pollinator behavior to selfing rate and pollen discounting for three distinct pollinators of alfalfa. **Emmanuel Santa-Martinez**, santamartnez@wisc.edu, Univ. of Wisconsin-Madison, Madison, WI; and Johanne Brunet, USDA-ARS, Madison, WI

2:24 129 The effects of lab vs. field rearing environment on physiological development of *Polistes* wasps. **Jennifer M. Jandt**, jjandt2@gmail.com, Iowa State Univ., Ames, IA

2:36 130 Effects of temperature and habitat on *Beauveria* and *Metarhizium* (Ascomycota: Hypocreales) isolation in *Galleria mellonella* (Lepidoptera: Pyralidae) in Missouri. **Tamra Reall**, TRFY9F@mail.mizzou.edu and Richard Houseman, Univ. of Missouri, Columbia, MO

2:48 131 As different as night and day: How different warming times affect aphid population growth. **Joseph V. Alfonso**, jv1089@gmail.com, and Jason P. Harmon, North Dakota State Univ., Fargo, ND

3:00 Break

3:20 132 Three years of corn rootworm best management practices in Bt corn. **Matthew W. Carroll**, matthew.carroll@monsanto.com, Graham Head and Luke Samuel, Monsanto, St. Louis, MO

3:32 133 Modeling western corn rootworm resistance to Bt proteins. **Alan Willse**, Alan.ray.willse@monsanto.com, Monsanto, St. Louis, MO

3:44 134 Field trial performance of SmartStax® Technology for control of western corn rootworm. **Kevin Johnson**, kdjohnson@dow.com, Dow AgroSciences, Danville, IL; Patricia Prasifka, Dow AgroSciences, West Fargo, ND; Dwain M. Rule, Dow AgroSciences, Indianapolis, IN; Amanda Jacobson, Dow AgroSciences, West Lafayette, IN; and Nicholas Storer, Dow AgroSciences, Midland, MI

3:56 135 Introducing Seeker, a new insecticide from Dow AgroSciences for managing row crop insect pests. **Fikru Haile**, fhaile@dow.com, Dow AgroSciences, Carmel, IN; Scott Ditmarsen, Dow AgroSciences, Madison, WI; Dave Ruen, Dow AgroSciences, Lanesboro, MN; Patricia Prasifka, Dow AgroSciences, West Fargo, ND; Kevin Johnson, Dow AgroSciences, Danville, IL ; Michael Moechnig, Dow AgroSciences, Tornonto, SD; Eric Scherder, Dow AgroSciences, LLC, Huxley, IA; Jamey Thomas, Dow AgroSciences, Indianapolis, IN; and Neil Spomer, Dow AgroSciences, LLC, Brookings, SD

MEETING-AT-A-GLANCE
WEDNESDAY
12 March 2014

Services	
9:00am-10:00am	Meeting Registration *Exhibit Hall*
9:00am-11:30am	IT Support *Sioux City Room*
Functions	
10:00am-11:00am	6K Hexapod Scurry *Meet in lobby at 9:45* *[must be pre-registered]*
Business	
8:00am-9:15am	Final Business Meeting *Dubuque Room*
12:30pm-2:00pm	Executive Committee Meeting *Cedar Rapids Room*
Scientific Program	
9:30am-1:00pm	Symposium: Advances and Challenges in Western Corn Rootworm Management *Council Bluffs Room*
9:30am-12:35pm	Symposium: A Focus on Arthropods and Global Change: Studying Drivers of Community Structure and Function *Davenport Room*
9:30am-11:30am	Submitted Ten-Minute Papers *Dubuque Room*

SCIENTIFIC PROGRAM
WEDNESDAY MORNING

Symposium: Advances and Challenges in Western Corn Rootworm Management

9:30am – 1:00pm
Council Bluffs Room

Organizers:
Siva Rama Krishna Jakka, Ram Shrestha,
and **Aaron Gassmann**, Iowa State Univ.

Moderator:
Aaron Gassmann, Iowa State Univ.

9:30 Introductory remarks. **Aaron Gassmann**, Iowa State Univ., Ames, IA

9:35 136 Recollections, frustrations, and predictions of north central branch rootworm entomologists. **Michael Gray**, megray@illinois.edu, Univ. of Illinois, Urbana, IL

9:55 137 Rotation resistance in the western corn rootworm: It takes a lot of guts to be resistant. **Joseph Spencer**, spencer1@illinois.edu, Univ. of Illinois, Urbana, IL

10:15 138 Rootworm Bt trait/insecticide combinations: Potential impact on western corn rootworm biology and management. **Lance Meinke**, LMEINKE1@unl.edu, Univ. of Nebraska, Lincoln, NE

10:35 139 Monitoring and characterization of Bt resistance in *Diabrotica virgifera virgifera*. **Ram Shrestha**, Siva Jakka, sjakka@mail.iastate.edu, and Aaron Gassmann, Iowa State Univ., Ames, IA

10:55 Break

11:15 140 Laboratory selection of resistance to Cry3Bb1, mCry3a, eCry3.1Ab, and Cry34/35Ab1 transgenic corn and an experimental evaluation of refuge techniques. **Bruce Hibbard**, Bruce.Hibbard@ars.usda.gov, USDA-ARS, Univ. of Missouri, Columbia, MO; Jennifer Deitloff, Iowa State Univ., Ames, IA; Lisa Meihls, USDA ARS, Columbia, MO; and Aaron Gassmann, Iowa State Univ., Ames, IA

11:35 141 Evaluating potential Cry3Bb1 resistance mechanisms in western corn rootworm. **Jeff Haas**, jeff.a.haas@monsanto.com, Monsanto, St. Louis, MO

11:55 142 Sifting for secrets and looking for leverage: Advances in genetics/genomics research on western corn rootworm. **Thomas Sappington**, Tom.Sappington@ars.usda.gov, USDA-ARS, Ames, IA

12:15 143 Combining RNAi with Bt to control western corn rootworm. **William Moar**, william.moar@monsanto.com, Monsanto, St. Louis, MO

12:35 144 Developing RNA interference as a pest management tool for western corn rootworms: Identifying opportunities and potential risks. **Blair Siegfried**, bsiegfried1@unl.edu, Univ. of Nebraska, Lincoln, NE; Kenneth Narva, Dow AgroSciences Indianapolis, IN; Xuguo Zhou, Univ. of Kentucky, Lexington, KY; Ana Maria Velez, Univ. of Nebraska, Lincoln, NE; and Adriano Pereira, Univ. of Nebraska, Lincoln, NE

12:55 Concluding remarks. **Aaron Gassmann**, Iowa State Univ., Ames, IA

Symposium: A Focus on Arthropods and Global Change: Studying Drivers of Community Structure and Function

9:30am – 12:35pm
Davenport Room

Organizer and Moderator:
Scott Prajzner, The Ohio State Univ.

9:30 Introductory remarks. **Scott Prajzner**, The Ohio State Univ.

9:35 145 Changing agriculture in Brazil: How on-farm practices deliver biological control services. **James D. Harwood**, james.harwood@uky.edu, Univ. of Kentucky, Lexington, KY; Dany Silvio S. L. Amaral, Federal Univ. of Viçosa, Viçosa, Brazil; Madelaine Venzon, Marcus Vinicius Alfenas Duarte, Agriculture and Livestock Research Enterprise of Minas Gerais (EPAMIG), Viçosa, Brazil; Fernanda Freitas Sousa, EPAMIG, Viçosa, Brazil; and Angelo Pallini, Federal Univ. of Viçosa, Viçosa, Brazil

9:55 146 Conversion of urban vacant land into gardens influences bee community structure without altering pollination services. **Scott Prajzner**, prajzner.1@osu.edu, and Mary M. Gardiner, The Ohio State Univ., Wooster, OH

10:15 147 Can studies of individuals and populations help inform how climate change may affect aphid-natural enemy communities? **Jason P. Harmon**, jason.harmon@ndsu.edu, North Dakota State Univ., Fargo, ND

10:35 148 Reduced wind strengthens top-down control of soybean aphids. **Brandon Barton**, btbarton@wisc.edu, Univ. of Wisconsin, Madison, WI

10:55 Break

11:15 149 Plant foliar quality, stoichiometric constraints, digestive compensation, and food web interactions in generalist feeding insect herbivores. **Anthony Joern**, ajoern@ksu.edu, Kansas State Univ., Manhattan, KS; Sheena Parsons, The Univ. of Kansas, Lawrence, KS; and Angela N. Laws, Univ. of Notre Dame, Notre Dame, IN

11:35 150 Non-target effects of neonicotinoid insecticides: Implications for arthropod communities in urban and agricultural systems. **Adrianna Szczepaniec**, adrianna.szczepaniec@sdstate.edu, South Dakota State Univ., Brookings, SD

11:55 151 Cascading ecological impacts of emerald ash borer: Effects of ash mortality on litter arthropod communities. **Kayla I. Perr**y, perry.1864@osu.edu, The Ohio State Univ., OARDC, Wooster, OH; Rosemary Walker, SAIC, Sandusky, OH; and Daniel A. Herms, The Ohio State Univ., OARDC, Wooster, OH

12:15 152 Differential effects of an invasive plant on pollinator services. **Jeffrey Masters**, jeffery.masters@louisville.edu, and Sarah Emery, Univ. of Louisville, Louisville, KY

Submitted Ten-Minute Papers: Session II

9:30am – 11:30am
Dubuque Room

Moderators:
Deane Jorgenson, Syngenta; and
Michael McCarville, Iowa State Univ.

9:30 153 Evolution of pharmacophagy in tiger moths (Lepidoptera: Erebidae: Arctiinae). **Susan J. Weller**, welle008@umn.edu, Univ. of Minnesota, Minneapolis, MN; Jennifer Zaspel, Purdue Univ., West Lafayette, IN; Reza Zahiri, Univ. of Turku, Turku, Finland; Niklas Wahlberg, Univ. of Turku, Turku, Finland; and C. Taylor Wardell, Univ. of Minnesota, St. Paul, MN

9:42 154 The evolution and loss of complex behaviors in social insects: Silk weaving and arboreal nesting in *Polyrhachis* spiny ants. **Corrie Moreau**, cmoreau@fieldmuseum.org, Field Museum of Natural History, Chicago, IL

9:54 155 The evaluation of relocation as a conservation strategy for the American burying beetle (*Nicrophorus americanus*) using a surrogate species (*Nicrophorus marginatus*). **Adrienne L. Conley**, conleya2@lopers.unk.edu, and W. Wyatt Hoback, Univ. of Nebraska-Kearney, Kearney, NE

10:06 156 Effects of parasitisim on primitively eusocial host genome: *Xenos vesparum* hijacks genomic machinery to cause asocial behavior in *Polistes dominula*? **Amy Geffre**, Iowa State Univ., Ames, IA; Laura Beani, laura.beani@unifi.it, Università di Firenze, Florence, Italy; Jeyaraney Kathirithamby, Univ. of Oxford, Oxford, United Kingdom; Ruolin Liu, Iowa State Univ., Ames, IA; Fabio Manfredini, Pennsylvania State Univ., Univ. Park, PA; and Amy L. Toth, Iowa State Univ., Ames, IA

10:18 157 Evaluation of a new deltamethrin formulation on concrete surfaces and wheat against field strains of three stored-grain insect species. **Blossom Sehgal**, blossom@ksu.edu, and Bhadriraju Subramanyam, Kansas State Univ., Manhattan, KS

10:30 158 The effect of the glyphosate-based herbicide on the activity of *Sinella curviseta* (Collembola: Entomobryidae) in the laboratory. **Muhammad Khalid Mukhtar**, mkmukhtar@gmail.com, Michael Sitvarin, and Ann L. Rypstra, Miami Univ., Oxford, OH

10:42 159 Efficacy of Phantom EC versus Phantom PI (chlorphenapyr) formulations on two warehouse beetle field strains (*Trogoderma variabile*). **Sharon Dobesh**, sdobesh@ksu.edu, Kansas State Univ., Manhattan, KS; Frank Arthur, USDA-ARS, Manhattan, KS; and R. Jeff Whitworth, Kansas State Univ., Manhattan, KS

10:54 160 dsRNA biodistribution and RNAi in three mosquito disease vectors. **Paul Airs**, pairs@iastate.edu, Brendan Dunphy, Yashdeep Phanse, and Lyric Bartholomay, Iowa State Univ., Ames, IA

11:06 161 Baseline susceptibility of *Spodoptera frugiperd*a (Lepidoptera: Noctuidae) to Cry1F *Bacillus thuringiensis* toxin. **Karen F. da Silva**, kfdsilva@gmail.com, Univ. of Nebraska, Lincoln, NE; Andre Crespo, DuPont Pioneer, Johnston, IA ; Terrence A. Spencer, Univ. of Nebraska, Lincoln, NE; and Blair Siegfried, Univ. of Nebraska, Lincoln, NE

11:18 162 Horizontal gene transfer and gene duplication of hemicellulose degrading genes in an invasive insect pest. **Chaoyang Zhao**, zhao.1369@osu.edu, and Omprakash Mittapalli, The Ohio State Univ., Wooster, OH

AUTHOR INDEX
by presentation number

Adkins, Marty. **87**
Airs, Paul..... ..... **160**
Albright, Vurtice **40**
Alfonso, Joseph V. **131**
Alvarez, Miguel **D31**
Alves, Tavvs.... ..... **55**
Amaral, Dany Silvio S. L. 145
Amoah, Barbara **77**
Anderson, Denis 39
Andino, Gladys **39**
Andrada, Mario **80**
Andresen, Jeffrey 51
Araba, Miloud 124
Arbuckle, J..... 122
Arthur, Frank.. 159
Balaban, John and Jane **8**
Balfe, Susan... 24
Bansal, Raman 84, 117
Bartholomay, Lyric 78, 79, 160, D2
Barton, Brandon **112**, **148**
Bauer, Austin.. ..... **14**
Beani, Laura.. ..... **156**
Bennett, Ashley 94
Berenbaum, May R. 25
Berger, Heidi. D3
Bessin, Ric. 52
Blaauw, Brett R. 94
Boeckman, Chad **109**
Boetel, Mark A. D44
Bolognesi, Renata 2
Bonning, Bryony **1**, 23, D10
Borba, Renata **43**
Boyd, Crystal L **D53**
Bradshaw, Jeffrey 64
Brockman, Nathan **104**
Brown, Grayson C. 21

Brunet, Johanne 128
Buckles, Brittany..... **127**
Burd, Tony..... ..... **124**
Burkness, Eric C. 56
Calkins, Travis. **22**
Camargo, Carolina **46**
Carroll, Matthew W..... **132**
Carvajal, Mariom **20**, **D8**
Chatterjee, Amitava 30
Chougule, Nanasaheb 23, D10
Christianson, Lindsey **32**, 59
Cira, Theresa M. **56**
Clifton, Eric H. **49**, 126
Coats, Joel.....40, 41, 78, D2
Cognato, Anthony, I. 74
Cole, Jessica... .....**D35**
Conley, Adrienne L..... **155**
Cortinas, Roberto D29
Courtney, Gregory **12**
Crespo, Andre..... 161
Cullen, Eileen M. 47
Cuppett, Susan D29
da Silva, Karen F..... **161**
Davis, Holly.....D47
de Oliveira, Camila F. **38**
Deist, Benjamin **D10**
Deitloff, Jennifer 140
Delfosse, Ernest.....D36
DeMarco, Bernice B. **74**, **102**
Demkovich, Mark..... **25**
Deroshia, Kristin 85
Diepenbrock, Lauren M. **67**
Ditmarsen, Scott 135
Dively, Galen..... **81**
Dobesh, Sharon **159**
Dobson, Rachelyn **31**
Dobson, Stephen **5**
Dolezal, Adam **93**
Dreyer, Jamin..... **114**, D4

Duarte, Marcus Vinicius Alfenas..... 145
Dunbar, Mike W. **54**, **122**, 126
Dunphy, Brendan 160
Dye, Kyndall.. ..... **21**
Eichele, Jaclyn **D4**
Ellis, Marion... ..... 69, 91
Emery, Sarah.. 152
Erram, Dinesh **D20**
Estes, Kelly..... **60**
Estes, Ronald.. ..... 36, **D43**, D45
Evans, Elaine..... **89**
Farnsworth-Hoback, Kerri M. D41
Faundez, Eduardo 20, **75**, D8, **D26**
Fegley, Roxanne **D49**, D51
Fernandez-Luna, Teresa D10
Finke, Deborah L..... 65, 67
Foottit, Robert.....D44
Foster, John E. D41
Frank, Daniel L.....D25
Frank, Michael.....D3
Fraser, Lisa.... .....**79**
French, Wade. D21
Fuller, Billy.....D46
Gagnon, Paul.. .....D52
Gallagher, Michael.....D27
Gardiner, Mary M. 28, **99**, **113**, 146, D27
Gardner, Joel.. .....**D54**
Gassmann, Aaron 37, 49, 54, 122, **126**, 139, 140, D15
Gates, Michael.....D22
Geffre, Amy.... 156
Geisert, Ryan Winslow **D25**
Gibbs, Jason... 94
Gillespie, Dianna.....**D48**
Giorgenon, Carlos D1
Goblirsch, Michael **44**
Golick, Douglas **92**, **98**
Grauf, Jeremy.....D19
Gray, Michael. 36, **136**, D43, D45
Gribskov, Michael 39

Greenwood, Carmen **D52**
Grieshop, Matthew **85**
Griffith, Mary. 104
Gross, Aaron. **41**, 78, D2
Haas, Jeff. **141**
Hadi, Buyung. **D42**
Haile, Fikru **135**
Hanford, Kathy D29
Hansen, Ashton **30**
Hansen, Jason **107**
Hanson, Anthony A. 59, **71**
Harmon, Jason 30, 63, 116, 131, **147**, D4, D11, D13
Harris, Alice **48**
Harrison, Megan **D7**
Harwood, James D. 16, 50, 66, **145**
Hatfield, MJ **10**
Haynes, Kenneth 76
Head, Graham 37, 132
Heglund, Chandra D4
Heimpel, George E. D37
Hein, Gary L. 38, 64, 73
Hellmich, Richard L. 40, **120**
Heng-Moss, Tiffany 91
Henry, Karly **D17**
Herbert, Ames 81
Herms, Daniel A. 151, D18
Hesler, Louis S. **118**, D14
Hibbard, Bruce **140**, D25
Higbee, Bradley S. 25
Higley, Leon G. 13
Hoback, W. Wyatt 13, 26, 155, D1, D5, D9, D19, **D41**
Hodgson, Erin W. 19, 49, **D38**
Hoffmann, Amanda M. 126
Hough, Ashley **D40**
Houseman, Richard 130
Howard, Samuel **D2**
Huber, John. D22
Hughson, Sarah A. 125
Hunt, Greg J. 39

Hunt, Thomas E. 45, 46, 69
Hutchison, William D. 56, D23
Ingber, David A. **37**, 126
Ingerslew, Kathryn **65**
Isaacs, Rufus..... **94**
Jacobson, Amanda 134
Jakka, Siva..... ..... 126, **139**
Jandt, Jennifer M. **129**
Jasinski, James..... 84
Jesse, Laura... ..... **11**
Joern, Anthony **149**
Johnson, Douglas W. 66
Johnson, Kevin..... 123, **134**, 135
Johnson, Norman D22
Johnson, Todd **D22**
Johnson, Wendy A. **103**
Johnston, David **D30**
Jurenka, Russell 18
Kamble, Shripat D41
Kaplan, Ian..... ..... **111**
Kaser, Joe M... ..... D37
Kathirithamby, Jeyaraney..... 156
Kautz, Andrea. **28**
Kimber, Michael J. 41, 79, D2
Koch, Robert..... 55, 56, 71, **86**, 119, D33
Kopco, James. **63**
Kowles, Katelyn A. 16, **66**
Krauth, Steven D22
Kreifels, Brett. **D29**
Kuhar, Thomas P. **82**
Kuntz, Cody D. **29**
Kurtti, Tim..... 44
Lagos, Doris M. D37
Landis, Douglas A. **95**
Larsen, Kirk..... 14, 15
Larson, Kendra..... **D6**
Laws, Angela N. 149
Leach, Heather **D36**
Leaf, Trisha..... ..... **D24**

Lepping, Miles 123
Lindholm, Joliene **42**
Liu, Ruolin..... 156
Longstreet, Hannah D3
Lovett, Brian.. ..... **6**
Lowenstein, David **90**
Lynch, Louise.. ..... **91**
MacRae, Ian V. 55, **119**, **D39**, **D44**
Manfredini, Fabio 156
Masters, Jeffrey **152**
Maxwell, Jennifer Petzold 126
May, Emily..... 94
McCarville, Michael T. **47**, 70
McCornack, Brian 47, 48
McCullough, Christopher **D12**
McLean, Erin.. .....**D13**
McLeod, Murdick J. D49, **D51**
McManus, Bradley **D46**
McMechan, Anthony J. **73**
Meade, Tom.. ..... **4**
Meihls, Lisa.... ..... 140, D25
Meinke, Lance 53, **138**, D21
Meyer, Clinton D3
Mian, MA. Rouf 117
Michel, Andrew P. **84**, **117**
Mikó, István... .....D22
Miller, Robert J. 41
Miller, W. Allen **3**
Minor, Emily... 90
Mittapalli, Omprakash 162
Moar, William **143**
Moechnig, Michael 135
Moellenbeck, Dan..... **108**
Moreau, Corrie **101**, **154**
Morey, Amy C. **D23**
Morrison, William R. **51**
Moser, Susan E. **D50**
Mueller, Daren..... 2
Mukhtar, Muhammad Khalid..... **158**

Muncy, Anna.. ..... **16**
Murrell, Ebony G. **110**
Mustafa, Fatima..... D41
Narva, Kenneth..... 144
Nayduch, Dana D20
Nechols, James R. D40
Norris, Edmund **78**
O'Brien, Erin.. ..... **72**
O'Neal, Matthew E. 17, 18, 29, 35, 47, 54, 70, 122
Oberhauser, Karen 105
Obrycki, John..... D35
Ohnesorg, Wayne J. **69**
Ordosch, David **D16**
Osborne, Shannon D14
Ostlie, Kenneth..... D24
Ostrem, Jared. **106**
Owen, Micheal D. **121**
Pallini, Angelo..... 145
Paolino, Aubrey **D15**
Park, Yoonseong D28
Parsons, Sheena 149
Passoa, Steven..... 27
Paszkiewicz, Steven R. D49, D51
Pearson, John. **9**
Penn, Hannah J. **50**
Pereira, Adriano 44, **D21**
Perez de Leon, Adalberto..... 41
Perry, Kayla I..... **151**, **D18**
Peterson, Julie A. **115**, D37
Pfannenstiel, Robert D20
Phanse, Yashdeep 160
Phillips, Thomas 77
Pierce, Christopher **58**
Piermarini, Peter 22
Piñol, Josep.... 68
Pittendrigh, Barry R. 24
Potter, Bruce D. 47, 119
Prajzner, Scott **146**, **D27**
Prasifka, Patricia 134, 135

Prenosil, Erik.. ..... **D19**
Pretorius, R. J. **64**
Prischmann-Voldseth, Deirdre 30, 47, D4, D13
Purdum, Sheila D29
Pursley, Adrianne..... **13**
Raffa, Kenneth..... D22
Rausch, Michael Allen..... **23**
Reall, Tamra.. ..... **130**
Reisig, Dominic..... **83**
Ribeiro, Matheus **45**
Rich, Walter **D34**
Rider, David A. 20, 75, D8, D26
Rieske-Kinney, Lynne K..... **62**
Rogers, Devon **27**
Rozeboom, Philip..... **D14**
Rudeen, Melissa 126
Ruder, Mark..... D20
Ruen, Dave..... 135
Rule, Dwain M. **123**, 134
Russart, Nathan..... D39, D44
Russell, Kate... ..... **18**
Rypstra, Ann L. 158
Rystrom, Zach..... **33**
Saalau, Erika... 11
Saeed, Abiya..... **34**
Samuel, Luke.. 132
Santa-Martinez, Emmanuel..... **128**
Sappington, Thomas **142**
Saucedo, Luis..... D3
Scherder, Eric.. 135
Schmidt, Nicholas..... D32
Schrader, Preston **36**, D43, D45
Schuh, Marissa **15**
Sehgal, Blossom..... **157**
Serpa, Leticia..... **D9**
Sherwood, Courtney..... D3
Shetlar, David. 27
Shrestha, Ram 126, 139
Siegel, Joel..... 25

Siegfried, Blair 45, 46, **144**, 161, D21
Silverstein, Celia **D33**
Sitvarin, Michael 158
Skidmore, Amanda **52**
Smart, Matthew **96**
Smith, Chelsea A. 104
Solter, Leellen **61**
Soper, Alysha M. **D47**
Sousa, Fernanda Freitas 145
Spencer, Joseph **125**, **137**
Spencer, Terence **105**, 161
Spivak, Marla 43, 44
Spomer, Neil 135
Staker, Jay 2
Stallman, Tyler **19**
Stenoien, Carl **100**
Stephens, Amanda R. D37
Stonefish, Audra **D11**
Storer, Nicholas 123, 134
Strazanac, John D22
Subramanyam, Bhadriraju 157
Sun, Qian **76**
Sun, Weilin 24
Szczepaniec, Adrianna **150**, D17
Szendrei, Zsofia 51
Temeyer, Kevin B. 41
Thomas, Jamey 135
Tilmon, Kelley ..... 47, N/A, D14, D46
Tinsley, Nicholas 36, D43, **D45**
Tirado, Lauren D3
Tooker, John 47
Toth, Amy L. **88**, 156
Trambly, Suzzan **D5**
Tran, Anh K. **D37**
Tylka, Gregory 49
Ullah, Muhammad Irfan D41
Urban, Joshua R. **D28**
Valero Quiros, Maria Carmen 24
Valls, Aleix **68**

Van Arsdale, Demetre D3
VanDyk, John.. 7
VanNostrand, Greg D38
Varenhorst, Adam J. 17, **70**
Velez, Ana Maria 144
Venette, Robert 32, **59**, D23
Venzon, Madelaine 145
Vossbrinck, Alice M. **24**
Wagner, Patrick **17**
Wahlberg, Niklas 153
Walker, Rosemary 151, D18
Wang, John D21
Wangila, David **53**
Wardell, C. Taylor 153
Wegulo, Stephen 38
Weller, Susan J. **153**
Welty, Celeste 84
Wenger, Jacob 117
Whalen, Joanne 81
Wheelock, M. Joseph **35**
White, Jennifer A. 34
Whitworth, R. Jeff 159, D47
Wick, Abbey D4
Wienk, Cody **57**
Wihlm, Matt... ..... D48
Willemssens, Kelly **26**
Williams, Grace **D3**
Willse, Alan **133**
Wilson, Scout. **D1**
Wingen, Andrew **D32**
Woods, Rachel D32
Woolley, James D22
Wright, Robert 33, 69
Zahiri, Reza 153
Zaspel, Jennifer 153
Zhao, Chaoyang **162**
Zhou, Xuguo... ..... 76, 144
Zuparko, Robert D22
Zurek, Ludek.. ..... D20

SCIENTIFIC NAME INDEX
by presentation number

Acari Tetranychidae *Tetranychus urticae* 119, D4, D17

Acari Acaridae *Tyrophagus putrescentiae* 77

Acari Eriophyidae *Aceria tosichella* 73

Aeromonadales Aeromonadaceae *Aeromonas veronii* D20

Araneae Thomisidae *Misumena vatia* D30

Blattodea Blattidae *Periplaneta americana* D2

Coleoptera Bostrichidae *Rhyzopertha dominica*..... 157

Coleoptera Silvanidae *Oryzaephilus surinamensis*..... 157

Coleoptera Bostrichidae *Rhyzopertha dominica*..... 80

Coleoptera Buprestidae *Agrilus anxius*.....D22

Coleoptera Buprestidae *Agrilus bilineatus* D22

Coleoptera Buprestidae *Agrilus liragus* D22

Coleoptera Buprestidae *Agrilus planipennis* 32, 59, 72, 151, 162, D18

Coleoptera Carabidae *Bembidion quadrimaculatum oppositum* 14

Coleoptera Carabidae *Cyclotrachelus sodalis* 15

Coleoptera Carabidae *Pterostichus stygicus* 15

Coleoptera Cerambycidae *Dectes texanus* 33, 48

Coleoptera Chrysomelidae *Callosobruchus maculatus*.....24

Coleoptera Chrysomelidae *Diabrotica barberi*.....54, D16, D24, D45

Coleoptera Chrysomelidae *Diabrotica v. virgifera* 2, 36, 37, 53, 54, 122, 123, 124, 125, 126, 132, 133, 134, 136, 137, 138, 139, 140, 141, 142, 143, 144, D15, D16, D21, D24, D25, D43, D45, D48, D50, D51

Coleoptera Coccinellidae 17

Coleoptera Coccinellidae *Coccinella septempunctata* 66, 67

Coleoptera Coccinellidae *Coleomegilla maculata* D35

Coleoptera Coccinellidae *Harmonia axyridis*..... 145

Coleoptera Coccinellidae *Hippodamia convergens* 67

Coleoptera Curculionidae *Dendroctonus ponderosae* 57

Coleoptera Curculionidae *Hypera postica* D47

Coleoptera Curculionidae *Pityophthorous juglandis* 60

Coleoptera Dermestidae *Dermestus maculatus* D5

Coleoptera Dermestidae *Trogoderma variabile* 159

Coleoptera Scarabaeidae *Popillia japonica* 18, 19, 29

Coleoptera Silphidae *Nicrophorus orbicollis* 26, D1, D52

Coleoptera Silphidae *Nicrophorus nicrophorus americanus* 155

Coleoptera Silphidae *Nicrophorus nicrophorus marginatus* 155

Coleoptera Silphidae *Nicrophorus pustulatus* D52

Coleoptera Silphidae *Nicrophorus tomentosus* D52

Coleoptera Tenebrionidae *Alphitobius diaperinus* D29

Coleoptera Tenebrionidae *Tribolium castaneum* 157

Coleoptera Tenebrioniidae *Tenebrio molitor* 13

Collembola 30

Collembola Entomobryidae *Sinella curviseta* 158

Diptera Anthomyiidae *Delia platura* D34

Diptera Agromyzidae *Ophiomyia simplex* 51

Diptera Caliphoridae D1

Diptera Ceratopogonidae *Culicoides sonorensis* D20

Diptera Culicidae *Aedes aegypti* 5, 22, 78, 79, 160

Diptera Culicidae *Aedes albopictus* 5, 21

Diptera Culicidae *Anopheles gambiae* 5, 78, 160

Diptera Culicidae *Anopheles quadrimaculatus* 21

Diptera Culicidae *Culex pipiens* 21, 160

Diptera Drosophilidae 13

Diptera Drosophilidae *Drosophila suzukii* 19, D42

Diptera Stratiomyidae *Hermetia illucens* D9

Hemiptera Acanthosomatidae *Acrophyma bicallosa* 20

Hemiptera Acanthosomatidae *Blaudus ruficornis* D8

Hemiptera Acanthosomatidae *Acrophyma cumingii* 20

Hemiptera Acanthosomatidae *Tunaria andicola* D8

Hemiptera Anthocoridae *Orius insidiosus* 17

Hemiptera Aphdidae *Acyrthosiphon pisum*..... 9, 23, 65, 131, D11

Hemiptera Aphididae *Aphis glycines*.....17, 45, 46, 47, 49, 55, 63, 70, 71, 117, 118, 119, 135, 147, 148, D10, D13, D14, D33, D37, D38, D39, D40, D43, D46

Hemiptera Aphididae *Myzus persicae* D39

Hemiptera Aphididae *Pemphigus betae* D44

Hemiptera Aphididae *Rhopalosiphum padi*..... 16, 66, D37

Hemiptera Aphididae *Sitobion avenae* 16

Hemiptera Cimicidae *Cimex lectularius* D31

Hemiptera Pentatomidae 84

Hemiptera Pentatomidae *Acledra haematopus* 75

Hemiptera Pentatomidae *Halyomorpha halys*..31, 56, 81, 82, 85, 86, D36

Hemiptera Pentatomidae *Menestheus menestheus cuneatus*.....D26

Hemiptera Pentatomidae *Neoacledra* 75

Hemiptera Phylloxeridae *Daktulosphaira vitifoliae* 19

Hemiptera Plataspidae *Megacopta cribraria* 83

Hymenoptera Cephidae *Cephus cinctus* D12

Hymenoptera Vespidae *Euodynerus foraminatus* 127

Hymenoptera Aphelinidae *Aphelinus certus* D37

Hymenoptera Apidae *Bombus impatiens* 128, 146

Hymenoptera Apidae *Apis mellifera* 39, 43, 44, 93, 128

Hymenoptera Apidae *Apis cerana*..... 39

Hymenoptera Apidae *Melissodes bimaculata* 146

Hymenoptera Braconidae *Aphidius ervi* 65

Hymenoptera Braconidae *Aphidius colemani*..... 65

Hymenoptera Braconidae *Binodoxys communis* 63

Hymenoptera Braconidae *Chorebus rondanii*..... 51

Hymenoptera Braconidae *Lysiphlebus testaceipes* 63

Hymenoptera Cynipidae *Dryocosmus kuriphilus* 62

Hymenoptera Formicidae *Aphaenogaster rudis* 74

Hymenoptera Formicidae *Polyrhachis* spp. 154

Hymenoptera Halictidae *Lasioglossum pilosum* 34

Hymenoptera Megachilidae *Megachile rotundata* 27, 128

Hymenoptera Megachilidae *Osmia aglaia* 34

Hymenoptera Megachilidae *Osmia caerulescens* 127

Hymenoptera Pteromalidae *Thinodytes cephalon* 51

Hymenoptera Scelionidae *Trissolcus japonicus* D36

Hymenoptera Torymidae *Torymus sinensis* 62

Hymenoptera Vespidae *Polistes dominula* 156

Hymenoptera Vespidae *Polistes fuscatus* 129, D7

Hypocreales Clavicipitaceae *Metarhizium* 130

Hypocreales Cordycipitaceae *Beauveria* 130

Isoptera Rhinotermitidae *Reticulitermes flavipes* 76

Ixodida Ixodidae *Rhipicephalus microplus* 41

Lepidoptera 120

Lepidoptera Crambidae *Ostrinia nubilalis* 40, 103, D49

Lepidoptera Crambidae *Parapediasia teterrella* 27

Lepidoptera Erebidae *Spilosoma virginica* 153

Lepidoptera Hesperiidae *Ancyloxypha numitor* 14

Lepidoptera Lycaenidae *Everes comyntas* 14

Lepidoptera Noctudidae *Spodoptera frugiperda* 161, D49

Lepidoptera Nymphalidae *Danaus plexippus* 100

Lepidoptera Pyralidae *Amyelois transitella* 25

Lepidoptera Pyralidae *Galleria mellonella* 130

Lepidoptera Sphingidae *Manduca sexta* 42

Lepidoptera Tortricidae *Epiphyas postvittana* D23

Mesostigmata Varroidae *Varroa jacobsoni* 39

Neuroptera Chrysopidae *Chrysoperla carnea* 66

Odonata Calopterygidae *Calopteryx maculata* D6

Odonata Libellulidae *Celithemis eponina* D6

Odonata Macromiidae *Didymops transversa* D6

Orthoptera Acrididae *Melanoplus femurrrubrum* 149, D41

Orthoptera Gryllidae *Acheta domesticus* 13

Plecoptera aquatic macroinvertebrates D19

Poales Poaceae *Triticum aestivum* 73

Prostigmata Eriophyidae *Aceria tosichella* 38

Ranunculales Ranunculacae *Ficaria verna* 152

Spirurida Onchocercidae *Brugia malayi* 79

Strepsiptera Stylopidae *Xenos vesparum* 156

Trombidiformes Tetranychidae *Tetranychus schoenei* 150

Tylenchida Heteroderidae *Heterodera glycines* 49

Unassigned Potyviridae Tritimovirus wheat streak mosaic virus 73

KEYWORD INDEX
by presentation number

behavior.....63, D11, D35

biocontrol - general.....28, 64, 65, 66, D22, D36, D37

climate change.....131

ecology - general.....14, 29, 30, 67, 68, 69, D3, D4, D12, D13

extension..... ..... D38, D39

host-plant resistance..... 70, 71, D40, D41

invasive species.....15, 31, 32, 56, 72, D23, D42

IPM.....18, 47, 51, D5

IPM - field crops.....16, 17, 33, 48, 49, 50, 135, D14, D43, D44, D45, D46, D47

MUVE (medical, urban, and veterinary entomology).....21, 77, 78, 79, 80, 130, 157, 159, D1, D20, D29

PBT (physiology, biochemistry, and toxicology) 13, 22, 23, 24, 25, 39, 40, 41, 42, 43, 44, 45, 46, 158, 160, 161, 162, D2, D9, D10, D21, D27, D28, D30, D31

P-IE (plant-insect ecosystems)....14, 15, 16, 17, 18, 19, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 109, 127, 128, 131, 132, 133, 134, 35, D3, D4, D5, D11, D12, D13, D14, D15, D16, D17, D22, D23, D24, D25, D32, D33, D34, D35, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51

pollination..... 34, 35, 52, 127, 128

resistance management.....36, 37, 53, 54, 132, 133, D15, D16, D48

sampling..... ..... 19, 55, D24

seed treatments..... D17

SEB (systematics, evolution, and biodiversity).....20, 26, 27, 74, 75, 76, 129, 153, 154, 155, 156, D6, D7, D8, D18, D19, D26, D52, D53, D54

transgenic crops.....134, D25, D49, D50, D51

vectors of plant disease 38, 73

COMMON NAME INDEX
by presentation number

African malaria mosquito 160

alfalfa leafcutter bee 127

alfalfa leafcutting bee 128

alfalfa weevil D47

American burying beetle 155

American cockroach D2

Asian tiger mosquito 21

Asian varroa mites 39

asparagus miner 51

bed bug D31

bird cherry-oat aphid 16, 66, D37

biting midge D20

black soldier fly D9

bluegrass webworm 27

bronze birch borer D22

bronze poplar borer D22

brown marmorated stink bug 31, 56, 81, 82, 85, 86, D36

burying beetle 26, D1

cattle tick 41

common eastern bumble bee 128

common malaria mosquito 21

convergent lady beetle 67

cowpea weevil 24

darkling beetle D29

Dectes stem borer 33, 48

eastern subterranean termite 76

emerald ash borer 32, 59, 72, 162, D18

English grain aphid 16

European corn borer 40, 103, D49

European honey bees 39

fall armyworm 161

goldenrod crab spider D30

grape phylloxera 19

greater wax moth 130

Green Muscardine Disease 130

green peach aphid D39

Ground Beetle 14, 15

Halloween Pennant D6

ham mite 77

honey bee 39, 43, 44, 93, 128

honey bee mite 39

Japanese beetle 18, 19, 29

kudzu bug 83

least skipper 14

lesser grain borer 80, 157

lesser mealworm D29

light brown apple moth D23

mason bee 127

minute pirate bug 17

mold mite 77

mountain pine beetle 57

navel orangeworm 25

northern corn rootworm 54, D16, D24, D45

northern house mosquito 21, 160

paper wasp 129, D7

pea aphid 3, 23, 65, 131, D11

pink spotted lady beetle D35

red flour beetle 157

sawtoothed grain beetle 157

seedcorn maggot D34

sevenspotted lady beetle 66, 67

soybean aphid.....17, 45, 46, 47, 49, 55, 63, 70, 71, 118, 119, 135, D10, D13, D14, D33, D37, D38, D39, D40, D43, D46

soybean cyst nematode 49

soybean stem borer beetle 48

spotted wing drosophila D42

springtail.....158

Stream Cruiser D6

sugarbeet root aphid D44

tiger mosquito 5

tobacco hornworm 42

twolined chestnut borer D22

twospotted spider mite..... 119, D4, D17

walnut twig beetle 60

warehouse beetle 159

western corn rootworm 2, 36, 37, 53, 54, 122, 125, 126, 132,133, 134, 136, 137, 138, 139, 140, 141, 142, 143, 144, D15, D16, D21, D24, D25, D43, D45, D48, D50, D51

wheat curl mite.....38, 73

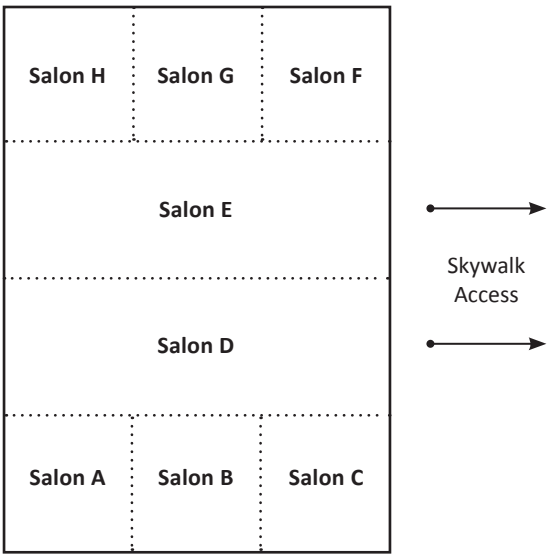
wheat stem sawfly D12

White Muscardine Disease 130

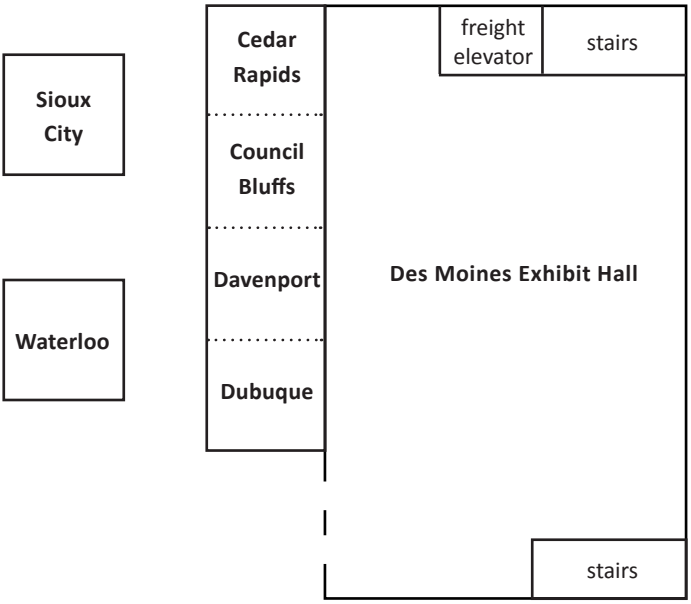
yellow fever mosquito 5, 78, 79, 160

yellow woollybear.....153

Des Moines Marriott Downtown Meeting Facilities Map



SECOND FLOOR – BALLROOM



THIRD FLOOR

Mark Your Calendars!

Plan to attend the 62nd Annual ESA Meeting
November 16-19, 2014 in Portland, OR

@EntsocAmerica

ENTOMOLOGY **2014**

Grand Challenges Beyond Our Horizons

Plan to attend the 70th Annual
NCB-ESA Meeting

Manhattan, Kansas