Department of Entomology Newsletter

Events from 2013

Coats Receives Alumni Award

Joel Coats, ISU Charles F. Curtiss Distinguished professor of entomology and toxicology, recently received the Alumni Achievement Award from the College of Liberal Arts and Sciences at the University of Illinois (UI). Joel combined his interests in entomology and chemistry by focusing his graduate education in insect toxicology. He got his Ph.D. (1974) from the UI at Urbana-Champaign with Robert L. Metcalf.

Joel has been on the faculty in the ISU entomology department since 1978. He was initially recognized for studying the environmental fate and effects of synthetic pyrethroids as replacements for older insecticides. His research program later developed novel techniques for detecting trace residues of pesticides and other agrochemicals (including veterinary antibiotics) in water, soil and sediment. The Coats Lab also focuses on botanicals, especially terpenes, which have activity as insecticides or insect repellents and pose less risk to humans and the environment.

Gary J. Greenspan (University of Illinois Alumni Association President), Joel Coats, and Brian Ross (UI College of Liberal Arts and Sciences Dean)

Bonning Named ESA Fellow

Bryony Bonning was elected an ESA Fellow in 2013 and presented a plaque at the National ESA meeting in Austin, TX. Only ten members are named each year for outstanding contributions to entomology in research, teaching, extension or administration. Bryony is a professor and has been a member of the ISU faculty since 1994. She has served as mentor for more than 30 graduate students and postdocs, authored or co-authored more than 110 scientific papers, reviews and book chapters, and holds five patents.

Bryony's research has been funded by diverse agencies including the National Science Foundation and USDA. She has served as associate editor for the Journal of Invertebrate Pathology, as

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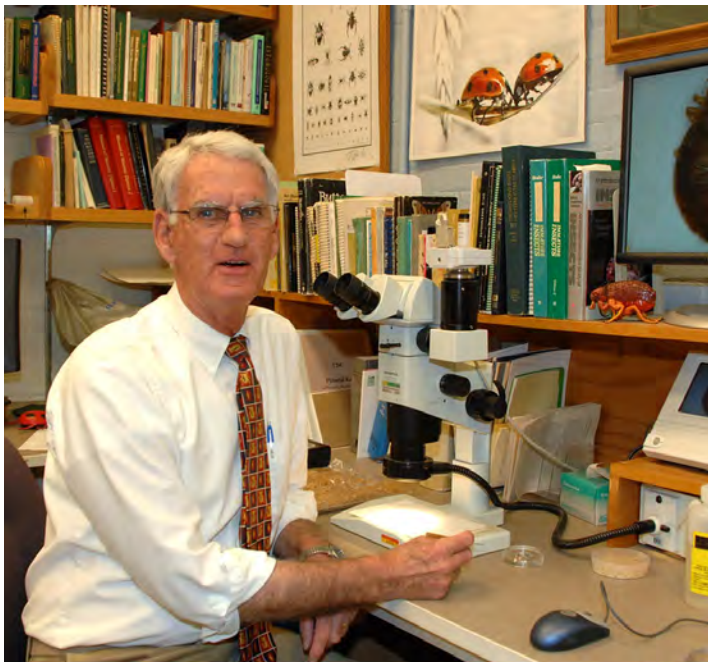
Lewis Wins Teaching Award



Donald Lewis was named the Ag Online Teacher of the Year by the ISU Brenton Center for Agricultural Instruction and Technology Transfer. This teaching award is based on student feedback. This is the second year the award has been presented as part of National Distance Learning Week.

Lewis, an ISU entomology professor, began teaching online classes in 2009. Four years ago he had 39 students in his classes. Student enrollment has steadily increased to 96 students during the fall 2013 semester.

Donald also became a 40-year member of ESA in 2013. Lewis is in charge of Iowa's extension urban entomology programs. He provides ISU's outreach insect pest management education for home and commercial vegetable and fruit production, landscape plants, turfgrass, greenhouses, and household pests.

Bartholomay Receives Bailey Award

Lyric Bartholomay, ISU associate professor and medical entomologist, was the 2013 recipient of the ISU Bailey Research and Career Development Award. This award was established with a generous estate gift from Carl A. and Grace A. Bailey. Mr. Bailey was an ISU alum of the electrical engineering program and a long-time employee of General Electric before retiring to Arizona. The overall goal of this award is to foster research that is innovative (outside of the established research program) and not only increases knowledge but also has practical applications. It is expected that the Bailey award will allow faculty to devote time toward high-risk, high-impact research addressing emerging scientific, technical and/or societal problems resulting in discoveries that not only increase knowledge but also have practical applications.

Her project, "Developing molecular genetics tools for the Pacific white shrimp, *Litopenaeus vannamei*," seeks to fight diseases, such as white spot syndrome virus, that cost the farmed shrimp industry more than $2 billion in losses each year. She will receive $50,000 each year for three years for support of a graduate research assistant, laboratory costs, and travel.

Lyric was also elected to two councils this year. She is on the Executive Council for the American Committee on Medical Entomology (2013-2016) and the ISU Graduate Council (2013-2016).

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council trustee, chair of the Virus Division and program chair for the Society for Invertebrate Pathology, and on the International Committee on Taxonomy of Viruses, Baculovirus Study Group, and Dicistrovirus and Iflavirus Study Group. She is a Fellow of the American Association for the Advancement of Science.

ISU Entomology Continues Excellence

Sue Blodgett writes: The Entomology Department is on the brink of several important events that may affect us for years to come. The first is the department institutional review scheduled for the fall of 2014. Our last review was in 2002 so we are quite overdue. Currently we are finalizing the external review panel, developing a schedule, and preparing a self-study document. The institutional review is different from previous departmental reviews that were under the aegis of USDA-CSREES. The institutional focus is on the department's plans for the future and a key document for the review will be the strategic plan. The faculty gathered for a departmental retreat to discuss our strategic plan and to identify contributors (no arm twisting here) to the self-study document.

Provost Wickert met with the department in the fall of 2013 and was anxious to visit the Insect Zoo he has heard so much about. Coordinator Ginny Morgal was described to him as a 'rock-star' when she brings the Insect Zoo to town; the 'Bug Lady' reminiscent of the Music Man. She has maintained a blistering pace, crisscrossing Iowa with her bugs in tow.

Sharron Quisenberry is now an emeritus professor in the department after a stellar career that spanned several major land grant institutions (see page 15). She and Larry have moved to warmer climates in Georgia and have a busy travel schedule. I'm not sure how many times they plan to circle the globe, but there will be few places that have not felt their tread. We had a highly entertaining going-away soiree in which stories were shared.

Stay connected!

We have more departmental news to share with our alumni and friends! Visit the ISU Entomology website, www.ent.iastate.edu/alumni/, to see our seminar schedule and social events. Also, find updates and hear about fun entomological news by "liking" us on our Facebook page, www.facebook.com/ISU.Entomology.

facebook

On March 9-12, 2014, the department will host the North Central Branch of the ESA in Des Moines. Erin Hodgson is the Local Arrangements Chair and Matt O'Neal is the Program Chair; both are doing a superb job in organizing the meeting along with Donald Lewis and John VanDyk. I hope you will consider coming to the meeting to see alumni and friends. We have updated and made some other improvements to the NCB website that you can access for more information *www.entsoc.org/northcentral*.

A newly designed entomology webpage is right around the corner. I invite you to visit us virtually to learn more about our current research, teaching and extension programs. There are some great 'historical' department pictures now available. I am sure the photos will bring back some memories! Visit *www.ent.iastate.edu/historical*, and click on the 'About Us' link in the left-hand tool bar to view the most recent departmental picture taken at Reiman Gardens this summer.

We welcome you to stay in touch!

Bonning Recipient of Nan-Yao Su Award

Bryony Bonning won the Nan-Yao Su Award for Innovation and Creativity in Entomology at the National ESA meeting in Austin, TX. Each year this award is given to an ESA member who is able to demonstrate through his/her projects or accomplishments an ability to identify problems and develop creative, alternative solutions that significantly impact entomology.

Bonning has published more than 110 scientific papers, reviews, and book chapters on diverse subjects including insecticidal toxins derived from *Bacillus thuringiensis*, insect small RNA, genetic optimization of insect viruses for pest management, insect virus discovery, and the development of insect resistant transgenic plants. Recent research has drawn on the disparate fields of plant virus-aphid molecular interactions and insect toxins to produce two innovative hemipteran management technologies: the modification of Bt toxins to target hemipteran pests which typically have low susceptibility to native Bt toxins, and the use of the coat protein of an aphid-vectored plant virus for delivery of insect specific neurotoxins to their target site within the aphid hemocoel.

ESA President Rob Wiedenmann and Bryony Bonning

CAMTech Launched

The National Science Foundation (NSF) Industry/University Cooperative Research Center, the Center for Arthropod Management Technologies (CAMTech) was funded by the NSF in August 2013, with formal approval from the Iowa Board of Regents for launch of the center given in December. The mission of the center is to streamline the efforts of industry, government and academia toward effective management of arthropod pests through precompetitive research, extending the utility of current technologies, and training of personnel for future employment within industry.

The inaugural Industry Advisory Board meeting was held October 7-9 at Reiman Gardens in Ames and the first round of projects selected for funding. The research conducted within the center is funded entirely by center memberships. The projects funded in this first round of CAMTech funding are:

1. Mechanisms of transcytosis across the insect gut (Bryony Bonning, ISU).
2. Characterization of digestive proteases in stink bugs (Nanasaheb Chougule, ISU).
3. Mechanisms of RNA interference (S. Reddy Palli, UK).
4. Toward increased efficacy of soybean cyst nematode management tools (Greg Tylka, ISU).

A second round of proposals will be considered for center funding in fall 2014. Janice Seibel was hired as Center Coordinator to assist director Bryony Bonning and co-director S. Reddy Palli with center activities. For more information see www.ent.iastate.edu/camtech

Hodgson Promoted to Associate Professor

Erin Hodgson writes: The last year was another busy one for me. I went through the final stages of tenure and promotion to associate professor at ISU. But so many positive things happened and helped me get to that point. I grew up in western North Dakota. I didn't grow up on a farm, but it was a small farming community. I decided to be adventurous and went all the way to Fargo for college (at the time, it did seem like a long way from home!). I got my B.S. in biology and botany from North Dakota State University and stayed there to complete my M.S. in entomology with Gary Brewer and Ian MacRae. I worked on a relatively obscure sunflower pest but enjoyed field research immensely. I thought I wanted to teach, so I continued on for my Ph.D. at the University of Minnesota in St. Paul. My research projects transitioned to a new pest in the U.S., soybean aphid, with Dave Ragsdale. I have an "inordinate fondness" for aphids that will never go away. During my time in MN, I discovered that I enjoyed extension, and working with farmers and people in agriculture more than teaching in the classroom.

I graduated in 2005 and got an extension/research entomology position at Utah State University. I really enjoyed my three years there, but I wanted more extension opportunities in agriculture. So in 2009, I started my current position at ISU and couldn't ask for a better job. I have many chances to communicate with farmers about field crop entomology. I write newsletters and field guides, blog, tweet, and podcast throughout the year. Over 3,000 people a year hear me speak about IPM in corn and soybean. I also am getting my tarsi wet with making Prezi's and short videos.

My research program compliments all that I do for extension. Most of my projects revolve around soybean aphid and aphids that feed on corn. I want to learn more about their biology, population dynamics and injury potential. I often collaborate within the department and university to develop IPM tactics with the hopes of reducing pesticides in the environment. I am a subject editor for the Journal of IPM and the editor of this annual newsletter; both are challenging and rewarding efforts.

When not at work, I enjoy hanging out with my husband and two dogs; we hike in the summer and watch football in the winter. Most of our family is located in MN and we visit often. I like to read, garden, crochet, and craft with paper and metal. I workout most mornings and even started running a few 5K races in the summer. As I reflect, I am so thankful for my career in entomology and look forward to more adventures.

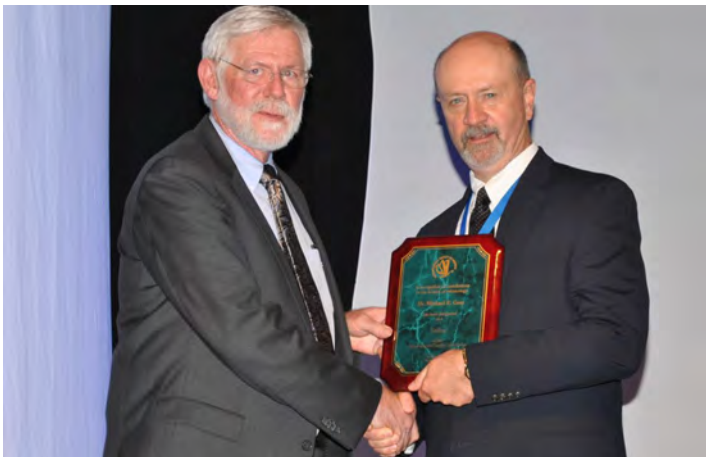
Kyle in Entomology for 20 Years

Kelly Kyle, secretary in entomology, celebrated 20 years in our department in 2013. In September 1993, after three years of service in the ISU Office of Admissions, Kelly transferred to entomology. Throughout the next 20 years, Kelly has changed offices (411 Science II to 10 Insectary to 110 Insectary), changed Chairs (Drs. Baker to Coats to Tollefson to Coats to Lewis to Jungst to Coats to Blodgett), and changed titles (Secretary I to II to III).

Kelly Kyle in Hawaii

Alumni Updates

Mike Gray became an ESA P-IE Fellow and received the NCB ESA C.V. Riley Achievement Award in 2013. Mike is a native of southwestern Iowa. He graduated from the University of Northern Iowa in 1977 with a B.A. in biology; he completed his M.S. and Ph.D. degrees in entomology from ISU in 1982 and 1986, respectively. In 2008, Mike served as ESA President. He is currently a professor in the Department of Crop Sciences and Assistant Dean for the Agriculture and Natural Resources Extension Program, College of ACES, University of Illinois.



ESA President Rob Wiedenmann and Mike Gray

Jim Blome received the ISU College of Agriculture and Life Sciences Henry A. Wallace Award at the Alumni Association Awards Ceremony. Jim is the president and CEO for Bayer CropScience.

Blome graduated with a B.S. in agronomy and pest management in 1985. He also worked in **Jon Tollefson**'s corn rootworm lab. Throughout his career, he served in executive positions in some of the nation's largest agricultural companies.

Active in several segments of the agricultural industry, Blome serves as a board member for the National Wild Turkey Federation, Directors of CropLife America, National FFA Organization Sponsors Board and most recently, the ISU Master of Business Administration Executive Advisory Council.

Ximena Cibils-Stewart (B.S. biology and entomology 2010) was recently honored with the 2013 P-IE Legends of Entomology Award for Master's Student Achievement at the National ESA meeting in Austin, TX. This award recognizes aspiring entomologists who exhibit exceptional potential during their M.S. degree. Students are selected based on their graduate research project, creative approaches to teaching, exemplary outreach and service to the discipline. Cibils-Stewart recently completed her M.S. degree at Kansas State University and is now working in Uruguay as a forest entomologist.

Brian McCornack (M.S. adviser) and Ximena Cibils-Stewart

Rick Foster (Ph.D. 1983) was recently recognized at the Millionarie's Club for his contributions to Afghanistan Agricultural Sanitary and Phytosanitary Project funded by USAID. The Millionaire's Club Recognition was created in 2005 to recognize faculty in the College of Agriculture at Purdue University who have received a one million dollar, or greater, grant for their project. Rick is professor of vegetable and fruit crops, IPM Coordinator and an extension entomologist.

Rick Foster promoting agriculture in Afghanistan.

Alumni Updates

Tom Turpin (Ph.D. 1971), a professor at Purdue University, was recently awarded the Special Boilermaker Award. The award was established by the Purdue Alumni Association in 1981 to recognize and honor special people who have contributed significantly to the improvement of the quality of life and the betterment of the educational experience for a substantial number of students. Tom was ESA President in 1992 and became an ESA Fellow in 2010.

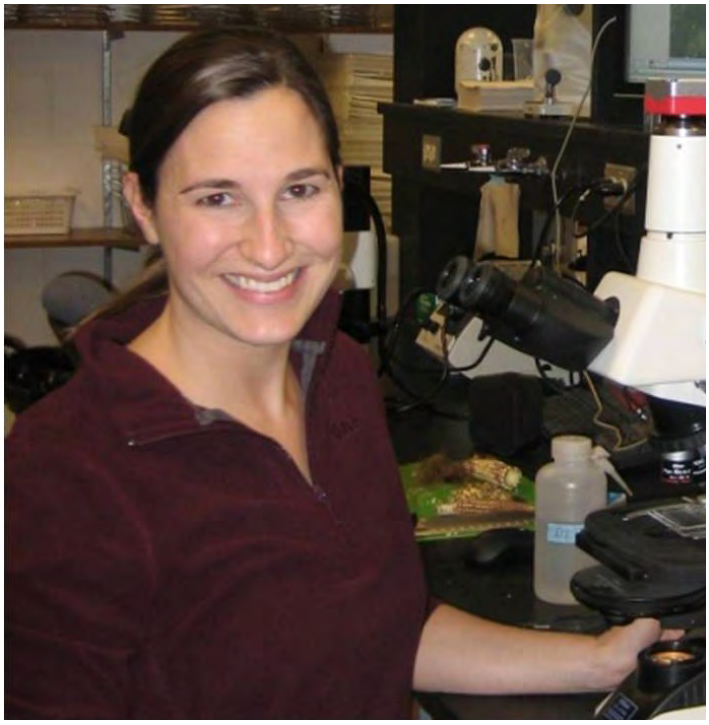
Tom Turpin

Laura Higgins (M.S. 1998) was elected to the ESA Certification Board of Directors. Laura works for DuPont Pioneer as the research director for the Input Trait Characterization group, leading multiple research teams in the characterization and development of insect control and herbicide-tolerance traits across multiple crops.

Paula Davis (M.S. 1986, Ph.D. 1990) is the NCB ESA President Elect, and also the Treasurer for the ESA P-IE Governing Council. Paula works for DuPont Pioneer as a senior manager for insect and disease traits.

Jennifer Petzold Maxwell always knew she wanted to study plants. Though she never intended to study insects, a few key mentors with whom she was lucky enough to interact during her graduate studies at North Carolina State University shaped her career path, and in 2009 she joined the Gassmann lab in ISU's department of entomology. She spent four years in Ames, where she was involved with projects that ranged from elucidating the effects of blended refuge on rootworm resistance to Bt corn, to studying tritrophic interactions among corn, the western corn rootworm, and entomopathogens.

Being a New Hampshire native and an east-coast transplant, Jen had never set foot in a cornfield until she arrived in Iowa for her post-doc. Jen left ISU in July 2013 after accepting an assistant professorship in the biology department at Wartburg College, a small liberal arts college in Waverly, Iowa. Here, Jen is enjoying teaching introductory biology, a senior seminar course, and a research course, and she is currently developing a new course called 'Plants and People.' She feels that her experience in the Gassmann lab helped her to develop into a better scientist, and her time at ISU was invaluable, stating "I will always be grateful for the relationships I developed, and for the memories that I made while at ISU."



Jennifer Petzold Maxwell

Tooker Presents 2013 Gunderson Lecture

The 2013 Harold Gunderson Memorial Lecture was given by John F. Tooker, assistant professor of entomology at Pennsylvania State University. John explores the trophic connections between natural enemies and host plant quality that regulate pest populations. His research team is trying to understand and harness the strength of these connections to improve pest control with a focus on annual crops.

He shared results from two projects; the first testing the influence of plant genotypes on pests. The second project involved the interruption of trophic connections due to insecticide use that is releasing a non-insect pest (slugs) from predation by ground beetles and the effect on no-till grain production in Mid-Atlantic states.

Tooker received a biology degree from Bates College (1992), and M.S. and Ph.D. degrees in entomology from the University of Illinois (1999 and 2003, respectively). Since 2008 he has been on the faculty at Penn State as an assistant professor and extension specialist, and affiliate faculty member to the Center of Chemical Ecology and The Intercollege Graduate Degree Program in Ecology.

He has published over 40 refereed articles, including 25 first authored publications, and several published with his current students. He has received funding from the Soybean Checkoff, USDA, and NSF to conduct extension and research that focuses on insect-plant interactions in agricultural systems, chemical ecology, induced host-plant defenses, natural-enemy ecology, tritrophic interactions, and gall-inducing insects. He has an active research program that involves five graduate students including two USDA-NIFA graduate fellows, an EPA STAR graduate fellow and an NSF graduate fellow.

EGSO Sponsors Kaplan Seminar

During the spring term of each academic year the Entomology Graduate Student Organization (EGSO) sponsors a guest lecturer. The guest lecturer is chosen based on the students' popular vote from a selection of nominated speakers. During the 2013 spring semester, EGSO sponsored Ian Kaplan's visit to ISU. The title of the lecture presented by Kaplan was "What happens when plants are always turned on? Constitutive herbivore-induced plant volatiles and the sustainable attraction of carnivores."

Ian is an assistant professor in the department of entomology at Purdue University. He obtained a Ph.D. in entomology (2007) from the University of Maryland and an M.S. in entomology (2003) from Auburn University. Kaplan was one of 96 U.S. researchers who received a Presidential Early Career Award for Scientists and Engineers (PECASE) in Washington, DC.

Pietrantonio Gives Dahm Lecture for 2013

The 22nd Paul A. Dahm Memorial Lecture was presented in April by Dr. Patricia Pietrantonio, who is Professor and Texas AgriLife Fellow in the Department of Entomology at Texas A&M University. She has an outstanding research program in insect toxicology, physiology and molecular biology. Dr. Pietrantonio has made major contributions to the field of molecular insect toxicology. Her ground-breaking research on the molecular and functional characterization of G-protein-coupled receptors, transporters and channels (aquaporins) in insect nervous, digestive and excretory systems has many potential applications in the field of insect toxicology.

Her project on neuropeptide receptors in ticks also has implications for novel tick-control agents and strategies. She also conducts research on mechanisms of insecticide resistance in insects and on *Bacillus thuringiensis* toxins in transgenic cotton. Her lecture was titled, "Towards target validation in pests: From candidate receptors to phenotypes."

Rubinoff Tracks Amphibious Caterpillars

Dan Rubinoff is an entomology professor and director of the Insect Museum at the University of Hawaii. He presented a seminar in September on the evolution of unprecedented ecological novelty and speciation in Hawaii's most diverse endemic radiation, the Hawaiian fancy case caterpillars (Hyposmocoma: Lepidoptera).

Several newly-discovered species of caterpillar in Hawaii function equally well in water or on land. The caterpillars can breathe and feed indefinitely both above and below the water's surface and can mature completely submerged or dry.

Did you know?

Some of our departmental seminars are video recorded and posted online. Anyone can watch the videos free of charge from a computer. To see topics and speakers, go to the ISU Entomology seminar archive website, www.ent.iastate.edu/seminararchive.

Student Awards

The Entomology Alumni Scholarship for undergraduates or graduates in entomology was presented to **Diveena Vijayendran**. This $1,500 scholarship was awarded based on promise for a career in entomology. Diveena is advised by Bryony Bonning.

Sue Blodgett and Diveena Vijayendran

The Larry Pedigo Graduate Scholarship in Entomology was awarded to **Mike McCarville**. This scholarship of $1,500, established to honor the many contributions of Larry Pedigo to the department and college, recognizes scholarly performance. Mike is mentored by Matt O'Neal.

The Entomology Student Scholarship for Student Excellence ($1,000), funded by the Fred Clute Memorial Fund, was awarded to **Aaron Gross**. This award recognizes undergraduate academic excellence, or excellence in research, teaching and/or extension at the graduate level. Aaron is mentored by Joel Coats.

Sue Blodgett and Aaron Gross

The Wayne A. Rowley Scholarship in Entomology, which provides $2,000 to students with preference given to applicants concentrating on medical entomology, was awarded to **Mike Dunbar**. Mike is supervised by Aaron Gassmann and Matt O'Neal.

The Jean L. Laffoon Memorial Scholarship for $1,500 was presented to **Diveena Vijayendran**. This scholarship was established in 2012 in memory of Dr. Laffoon, who was a systematist and faculty member in entomology from 1946-1973. Diveena is mentored by Bryony Bonning.

The Jim Oleson Scholarship in Entomology, which provides $1,000 to students who demonstrate academic promise and initiative, was awarded to **Adam Varenhorst**. Adam is advised by Matt O'Neal.

Sue Blodgett and Adam Varenhorst

The Henry and Sylvia Richardson Research Incentive Grant was award to **Eric Clifton**. This grant provides $2,000 towards a research experiences beyond those available in the student's degree program. Eric is supervised by Aaron Gassmann and Erin Hodgson.

Diveena Vijayendran received two awards at the 46th annual Society of Invertebrate Pathology meeting in Pittsburgh, PA. She ranked first place across all divisions for her oral presentation "A novel pea aphid antiviral defense strategy," and also received a student travel award from the virus division. Diveena is advised by Bryony Bonning.

At the 2013 ESA North Central Branch meeting (Rapid City, SD), ISU students were awarded the most student competition prizes of any institution. The following students received awards:

Kate Russell, third place for an undergraduate poster, "Evaluation of a natural product for protection of roses from Japanese beetle." Kate is supervised by Matt O'Neal and Russ Jurenka.

Cody Kuntz, first place for a master's paper, "The impact of surrounding landscape diversity on the seasonal abundance of Japanese beetle in soybean." Cody is supervised by Matt O'Neal.

Cody Kuntz and 2013 NCB ESA President Billy Fuller

Jing Sun, third place for a master's presentation, "European corn borer pheromone-race hybrids: Frequency, gene flow and host plant use in the Northeastern US." Jing is mentored by Brad Coates and Tom Sappington.

Joe Wheelock, third place for a master's presentation, "Insect pollinators in Iowa cornfields: Community identification and trapping methods analysis." Joe is advised by Matt O'Neal.

Adam Varenhorst, second place for a Ph.D. paper, "Induced susceptibility: A density dependent response that explains *Aphis glycines* populations on resistant soybean in field research plots." Adam is supervised by Matt O'Neal.

Mike McCarville, first place for a Ph.D. presentation, "Soybean aphid feeding affects soybean cyst nematode reproduction." Mike is advised by Matt O'Neal.

Mike McCarville and 2013 NCB ESA President Billy Fuller

Mike Dunbar, second place for a Ph.D. paper, "Impacts of rye cover crop on ground-dwelling beneficial arthropods." Mike is supervised by Aaron Gassmann and Matt O'Neal.

Mike Dunbar and 2013 NCB ESA President Billy Fuller

At the 2013 National ESA meeting (Austin, TX), ISU student **David Ingber** received a first place student competition prize for his paper, "Inheritance and fitness costs of Bt resistance for a field-derived strain of western corn rootworm, *Diabrotica virgifera virgifera* LeConte." David is mentored by Aaron Gassmann.

2013 Entomology Graduates

Kelly (Seman) Gill received her M.S. with Matt O'Neal in the spring of 2013. Her thesis was titled "Development of best-practices for conserving beneficial insects within Iowa's agricultural landscape." Kelly is now a Pollinator Conservation Specialist at the Xerces Society.

Eric Clifton got an M.S. degree with Aaron Gassmann and Erin Hodgson in the summer of 2013. His thesis was "Impacts of conventional and organic agriculture on soil-borne entomopathogenic fungi." Eric is now working on a Ph.D. with Aaron Gassmann and Erin Hodgson.

Rachel Binning received her Ph.D. in entomology in the summer of 2013. Her dissertation was "Fall armyworm and black cutworm susceptibility and avoidance to Bt maize, and implications for global insect resistance management." Rachel works at DuPont Pioneer as a Research Scientist for Insect Resistance Management.

Amanda (Hoffmann) Sorgatz got her M.S. degree under the supervision of Aaron Gassmann. Her thesis was "Fitness costs associated with resistance to Cry3Bb1 corn in western corn rootworm." Amanda now works as a research associate at DM Crops Research Group.

Lucas Linz graduated with a Ph.D. in microbiology in the spring of 2013. He worked in Bryony Bonning's lab and his dissertation was "Molecular interactions between *Pea enation mosaic virus* and its pea aphid vector." Lucas is working for Douglas Scientific in Alexandria, MN.

Lucas Linz

EGSO Update

The Entomology Graduate Student Organization (EGSO) established officers for the 2013-2014 academic year. The current officers are: President **Eric Clifton**, Vice President **Mike Dunbar**, Treasurer **Cody Kuntz**, and Secretary **David Ingber**.

EGSO activities in the spring semester included a faculty vs. students bowling tournament in February as well as training for Linnaean Games. EGSO members competed in the NCB ESA Linnaean Games in Rapid City, SD, in June. Team coach Mike Dunbar is taking questions from our alumni and friends to quiz EGSO members on their entomology facts in preparation for the 2014 Games in Des Moines, IA.

EGSO hosted the annual Insect Film Festival on October 23 at Reiman Gardens in Ames, IA. In addition to showcasing the movie "A Bug's Life," EGSO members presented live specimens from the Insect Zoo, taught kids how to make craft bugs and bee houses, and gave tours of the Christina Reiman Butterfly Wing. A good number of attendees were first-timers and the attendance for the film festival was a record high!

Live animal demonstrations and insect-themed crafts were a big hit at the annual Insect Film Festival.

Berens Receives NSF Grant

Ali Berens was recently awarded a National Science Foundation Doctoral Dissertation Improvement Grant for her work on visual communication in social wasps. Ali is a Ph.D. student in the Ecology, Evolution and Organismal Biology department and is mentored by **Amy Toth**.

Very few animals, mostly humans and other primates, are known to have an ability to recognize faces. How is this impressive feat of learning accomplished? Until now, ethical and technical limitations have made it difficult to study the ways in which animals' brains and genes permit them to recognize faces. Ali is studying a surprising new animal system to delve into how facial recognition works on the level of brains and genes. Remarkably, several species of social paper wasps possess this ability.

Like humans, certain wasp species are veritable geniuses in their ability to remember other wasps' faces. *Polistes fuscatus* wasps have striking variation in facial color patterns and they can learn faces much more readily than other visual patterns. *Polistes metricus* does not have facial variation and lacks the special ability to learn faces more readily than other patterns.

These two species with contrasting facial recognition abilities provide a unique opportunity to study the relationship between genes, brains and this ability. Wasps of each species can be trained to recognize faces or non-face patterns. Berens, along with Amy Toth and collaborator Elizabeth Tibbetts, University of Michigan, will use "next generation" sequencing to measure the activity of thousands of genes in these wasps' brains to determine whether there are particular genes associated with facial recognition. Berens can then manipulate gene activity in wasps' brains in order to determine whether such a change can improve or impair wasps' facial recognition abilities.

NSF-IOS, Behavioral Systems (Award # IOS-1311512), "Dissertation research: Uncovering molecular mechanisms of facial recognition using comparative transcriptomics" (Toth, PI, Ali Berens (Ph.D. student), co-PI), 2013-2015, $19,233.

Polistes fuscatus. *Photo by Santax, Flikr.*

Polistes metricus. *Photo by Patrick Coin, BugGuide.*

Opportunities to Contribute to Entomology

The Department of Entomology is increasingly dependent upon the generosity of alumni and friends. To support the department, particularly student awards, please fill out this section and return it with your check or money order (made out to The ISU Foundation) to the Department of Entomology, Iowa State University, 110 Insectary, Ames, IA 50011. Alternatively, donations can be made online at www.foundation.iastate.edu/entomology.

My support this year is in the amount of _____

Please designate my gift to the area(s) in the amount(s) shown below:

_____ Biosystematics Travel Fund for travel costs associated with biosystematics research

_____ Bug Guide: an online resource for insect identification

_____ Entomology Alumni Scholarship for undergraduate scholarships

_____ Entomology General Account

_____ Entomology Memorial Fund for various expenses, including graduate student travel and merit awards

_____ Iowa State University Insect Zoo

_____ Fred Clute Memorial Entomology Fund for general support for the Department of Entomology, including The Entomology Student Scholarship for Student Excellence

_____ Jean L. Laffoon Memorial Scholarship for graduate students in Entomology

_____ Jim Oleson Scholarship in Entomology for students who demonstrate academic promise

_____ Larry Pedigo Graduate Scholarship in Entomology for scholarly performance

_____ Henry and Sylvia Richardson Research Incentive Grant provides funding for graduate research experiences beyond their degree program

_____ Wayne A. Rowley Scholarship in Entomology for graduate and undergraduate scholarships, with preference given to those with an interest in medical entomology

For more information about these funds, please contact us at the departmental address above or call 515.294.7400. For more information about other gift designations, please contact Ray Klein via phone: 515.294.3303 or e-mail: rklein@iastate.edu.

Career Reflections from Sharron Quisenberry

When I was asked to reflect on my 38 years, including five years of graduate training, in the profession, I thought it was going to be an easy task. But it has become somewhat more difficult. Graduating in 1980 from the University of Missouri-Columbia, it was a high and a low. My experiences at Missouri were exciting and I felt that we received one of the best entomology educations in the country at the time because the faculty prepared us for change, flexibility, and the ability to think – to see the pieces as well as the whole. I became, over my tenure at MU, the "go-to" graduate student for my fellow graduate students. However, in graduating my advisor, Thomas Yonke, quickly reminded me that the Ph.D. I had just received and the respect from my peers allowed me to start over at the "bottom of the totem pole," and he was correct.

I begin my career here at ISU as an Assistant Professor – Extension Specialist with specialties in forage crops and livestock entomology. The 2 years I spent at ISU were rewarding because of the breadth of subjects in entomology that I was exposed to in extension. Dave Foster, Harry Stockdale, and Donald Lewis were great mentors and colleagues. Also, the students at that time were outstanding and I served on several of their committees. However, I wanted to do more research and graduate teaching. I left ISU and spent 9.5 years at Louisiana State University going from Assistant to full Professor while building robust research, teaching, and graduate student training programs. Being a faculty member was by far one of the most rewarding and fulfilling experiences, particularly, in a well-regarded department with over 20 faculty. My move into administration began at the University of Idaho as an entomology division chair and researcher in a combined department of over 65 faculty.

I started to move into other administrative positions beginning with head of entomology and researcher at the University of Nebraska-Lincoln, Dean of the College of Agriculture at Montana State University, Dean of the College of Agriculture and Life Sciences at Virginia Tech, and, finally, Vice President for Research and Economic Development back at ISU. The administrative positions have been challenging because of budget constraints and the ability to make the changes necessary to move programs forward.

As an administrator, I never forgot where I came from, or the fact faculties are the "foundation" of the university. My one regret is that some universities do not realize and embrace rapid change and the repurposing of funds needed to build new initiatives. Institutions must be flexible, able to think through and provide solutions to problems, network across the disciplines to initiate and hasten change, and leverage resources to ensure change occurs. It is not easy but I have a firm belief that land grant universities can make the correct decisions to ensure there are educational opportunities for future generations and to continue to build the knowledge base and creative capabilities that will stimulate discovery for next generation technologies and economic development.

It has been a great career with unbelievable national (ESA President, Fellow, and Honorary Member) and global experiences. These experiences have provided opportunities to positively touch many and it is anticipated that through others will continue to touch many more. But, by far, the most gratifying of all, I have had the pleasure of being an entomologist – the greatest of all professions – with fantastic colleagues. At the end of the day, it is not the number of books, book chapters, publications, presentations, and grants that are important. It is the number of people and programs that have been positively impacted and the ability to sustain and build networks that will continue to build and to enhance our educational framework. My wish is for the sustainability of the land grant university and entomology programs, it is a challenge.

Update from the Entomology Postdoc World

Postdoctoral researchers are an ephemeral but essential part of the academic world. Currently we have eight postdocs in the ISU entomology department busy working on a wide variety of projects and research topics. In addition to work, each of them is married with children (or children on the way). While some of them moved to Ames just recently, others have been at ISU for years. They hail from India, Nepal, Mexico, Nebraska, and Wisconsin. Here is a quick look at our current postdocs:

(L-R) Divya Sinha, Siva Jakka, Teresa Fernandez-Luna, Jennifer Deitloff, Thelma Heidel-Baker, Ram Shrestha, and Yashdeep Phanse.

Jennifer Deitloff is a member of the Gassmann Lab researching the impacts of mating behavior on the evolution of corn rootworm Bt resistance. She is a herpetologist who received her Ph.D. from ISU in Ecology and Evolutionary Biology.

Teresa Fernandez received her Ph.D. in Mexico in biochemistry. Here at ISU, she is in the Bonning Lab working on increasing the toxicity of Bt toxins against different agricultural insect pests. She has only been at ISU a few months and will be welcoming a new baby to her family in 2014.

Thelma Heidel-Baker is an extension coordinator for soybean pests in the Hodgson Lab while also conducting research on pollinator conservation in agricultural crops in the O'Neal Lab. She and her family moved to Ames a year ago from Minnesota where she completed her Ph.D. at the University of Minnesota in entomology.

Siva Jakka completed his Ph.D. in entomology at the University of Tennessee, Knoxville. As a member of the Gassmann Lab, he is currently characterizing resistance to Bt corn in the corn rootworm. Shortly after he and his wife moved to Ames this past summer, their family grew with the birth of their son Ishaan.

Yashdeep Phanse is working on dual projects, one developing RNAi-based vaccines against shrimp viruses and the other designing "molecular mosquitocides" using nanoparticles in the Bartholomay Lab. A native of India, he completed his Ph.D. in immunobiology from ISU.

Supraja Puttamreddy completed her Ph.D. in genetics from ISU. Originally from India, she is working in the Bartholomay Lab both identifying strategies for developing molecular-based viral vaccines, as well as developing transgenic shrimp that can resist common shrimp viruses.

Ram Shrestha, originally from Nepal, is currently conducting research on Bt resistance in western corn rootworm in the Gassmann Lab. Ram and his family moved to Ames in June 2013 from Lubbock, Texas where he received his Ph.D. at Texas Tech University.

Divya Sinha received her Ph.D. from ISU in Molecular, Cellular, and Developmental Biology. She is currently studying molecular interactions between plant viruses and aphid vectors in the Bonning Lab. She credits comic books and strong family support for her career in life science research.

Featured Grad Student: Diveena Vijayendran

Diveena Vijayendran writes: My name is Diveena Vijayendran. A small girl with big dreams, I travelled from Malaysia to the U.S. to pursue scientific research. I completed a B.S. degree in Biotechnology (Honors in Research) at the University of Northern Iowa. After a brief time in industry, I decided to pursue a Ph.D. degree to start my path towards a career in academia. I joined the laboratory of Dr. Bryony Bonning to study small RNAs in aphids.

The goals of my current research are to identify and characterize novel aphid viruses and also to characterize microRNAs, a non-coding RNA in multiple aphid species. In addition to research, I have developed an interest in teaching. My effort in research and teaching was recognized by the Department in 2012 through the Student Excellence in Research and Teaching Award. I was also recently awarded ISU's Excellence in Teaching Award. I have been a participant in the Preparing Future Faculty Program (PFF) at ISU to better prepare myself for a career in academia.

I hope to be a successful researcher and educator in the future. As an International student in the U.S., I have had the opportunity to be part of a host family program. My host parents, Jon and Carol Reese in Cedar Falls, IA, their families and the other international students they host have been a big part of my life here. We spend time together doing fun activities like a recent road trip to Yellowstone National Park. While I do miss my family and friends back home, Iowa has been a welcoming place for me to explore and learn.

Diveena with her Iowa host family, Carol and Jon Reese.

(L-R) Sijun Liu, Nanasaheb Chougule, Diveena Vijayendran, and Bryony Bonning at the 2013 Society of Invertebrate Pathology meeting in Pittsburgh, PA.

Keep in touch!

Please let us know if you have information to share with Department of Entomology friends and alumni. Items could include job changes, honors and awards, and personal notes. Kindly direct information to Erin Hodgson, Iowa State University, Department of Entomology, 103 Insectary, Ames, IA 50011-3140 or via e-mail: ewh@iastate.edu.

The ISU Department of Entomology Newsletter is for Alumni and Friends, and is produced by ISU entomology faculty and staff. This newsletter and previous issues are available online at www.ent.iastate.edu/alumni.

Emerald Ash Borer Update in Iowa

The emerald ash borer (EAB) is one of the most destructive forest insects of all time. This exotic, Asian buprestid has shown up in 22 states in the U.S. Although adults disperse short distances from host trees (with estimates of up to 6 miles), EAB is primarily spread by moving infested firewood. Published damage estimates state 'untold millions' of trees killed by this insect since it was first identified in Detroit, MI, in 2002.

Four Iowa counties (Allamakee, Cedar, Des Moines, and Jefferson) have been declared infested by the USDA-APHIS-PPQ. **Robin Pruisner** (B.S. 1994), Iowa Department of Agriculture and Land Stewardship State Entomologist, in collaboration with the USDA, established a quarantine (November 1, 2013) for 25 counties in eastern Iowa, based on proximity to known infestations in Iowa and Illinois, movement of wood products, and wood product industry locations.

Emerald ash borer

Emerald ash borer larva

Emerald ash borer feeds exclusively on *Fraxinus* species. Black, green, and white ashes are markedly susceptible to larval feeding in the cambial zone beneath the bark, with mortality occurring in 2 to 5 years. Blue ash appears to be the most resistant of North American species: one area in southeast Michigan had more than 60% of blue ash still growing where nearby white ash had been killed. Manchurian ash has shown promising resistance to EAB in field trials.

Native natural enemies (woodpeckers and a solitary endoparasitoid [*Atanycolus cappaerti*]) have provided minimal control of EAB. Classic biological control efforts have involved mass-reared parasitoids from China (*Oobius agrili*, *Tetrastichus planipennisi*, and *Spathius agrili*), multiple release sites, and are showing successful establishment by some of these parasitoids. Research with systemic chemical treatments (active ingredients azadirachtin, dinotefuran, emamectin benzoate, and imidacloprid) have demonstrated varying successes for protecting uninfested ash trees. Emamectin benzoate protection persists at least 2 years, with 100% control of EAB.

ISU Extension and Outreach recently updated their EAB treatment options. Find out more here: *www.extension.iastate.edu/pme.*

Emerald ash borer-infested tree in Burlington, IA

Greetings From the Insect Zoo

Dan Wardell, Iowa public television KIDS club host, and Ginny Morgal

The Insect Zoo had another a busy year. We had a huge display in the 4-H building for the Iowa State Fair. Thousands of people ooed and ahhed at all of the arthropods! We also participated in the STEM event at the Iowa State Fair, delivering two show-stopping presentations for about 100 people.

The star arthropods of the Insect Zoo flew with Wendy Wintersteen to participate in the Borlaug Inspire Days. Students from the surrounding area of Cresco, IA. visited to learn about the Borlaug Boyhood Farm and the impact he had on feeding the world. The Insect Zoo was honored to be a part of this event.

Insect Zoo at the State Fair

In case you missed the news, the Insect Zoo was featured on the kids segment of Iowa Outdoors. You can find the episode on their website. Dan Wardell of IPTV Kids Club was there and we all had a great time. (Rosie the tarantula was very upset about the 10 lbs. the TV added).

As usual, the Insect Zoo has visited lots of schools around Iowa. In fact, this past year has been so busy with so many new schools requesting visits that the arthropods are looking forward to the holiday break! But this break won't last long. The Insect Zoo will be spending three days in Keokuk for the Keokuk Eagle Days!

We are gearing up for VEISHEA 2014! We will be unveiling our honey bee observation hive that will be installed on the fourth floor. Be sure to stop by and check it out. We will also have a webcam on the colony for viewing. It will be a great learning tool for teachers.

Insect Zoo at the State Fair

The Insect Zoo could not make it without its trusty student workers. I would like to thank Grace Sward, Drake Falcon, Jaclyn Sanchez and our newest student, Joshua Byrne. Thank you for being such hard workers.

The Insect Zoo would also like to thank all of the donors who have contributed to the prosperity of the Insect Zoo over the past year. I cannot thank you enough for your generous donations.

ISU Wins Another Stinger Award

Thelma Heidel-Baker and **Erin Hodgson** won the YouTube Your Entomology video contest at the ESA annual meeting in Austin. The winning extension video was titled, "Join the resistance against soybean aphid!" Thelma and Erin worked with Cable Hardin, visual arts associate professor at South Dakota State University to create three short videos on host plant resistance for soybean aphid. Watch the award-winning video here: http://bit.ly/1d0WJmX.

Endangered Tasmanian Torrent Midge

Greg Courtney writes: Torrent midges, as their name suggests, make their homes in the fastest-flowing parts of rivers and streams. Their larvae have evolved remarkable and unique adaptations, including suckers on their underside. Their pupae attach to rocks until the adult flies emerge. The adults are slender with long legs, superficially resembling crane flies.

Although often considered rare, torrent midges can be locally abundant and of considerable trophic value, including an important food for trout. Because torrent midges generally require clean, cool, well-oxygenated streams, they are potentially useful bioindicators of water quality.

The Tasmanian torrent midge, *Edwardsina tasmaniensis*, known only from Cataract Gorge of the South Esk River (Launceston, Tasmania), is an endemic species that is most likely extinct. All records of this fly are from 1923 to 1933, prior to the 1955 construction of Trevallyn Dam.

It seems unlikely that more Tasmanian torrent midges will be discovered. Habitats comparable to those historically in Cataract Gorge (a large, rocky, pristine, "torrential" river near sea level) probably do not exist elsewhere in northern Tasmania. The likely extinction is probably related to the construction of Trevallyn Dam and resulting changes to water flow, temperature, and turbidity in Cataract Gorge.

Deforestation poses another threat to torrent midges because loss of riverside vegetation may accelerate rising temperatures and sedimentation in the river. Failure to protect riparian corridors and significant portions of watersheds can ultimately result in other impacts, such as catastrophic debris torrents.

There currently is no plan for the management of Tasmanian torrent midges. For most species,

Adult Tasmanian torrent midge

details on their distribution and ecology are limited to two surveys during the past half century. Although both suggest the demise of this midge, there are six other Tasmanian species, including four that are widespread and locally abundant.

The continued survival of these and other torrent midges will depend on protection of mountain stream ecosystems, including river corridors. Streams lower down, which historically have been most accessible and heavily impacted by human activity, should be a high priority.

Lack of knowledge about the distribution and ecology of torrent midges may slow efforts to provide a specific management plan. However, these flies are among many species restricted to cool, clean streams. They are sensitive to rising temperatures, diminishing flow, increasing sedimentation, and other impacts. It follows that conservation efforts should strive to protect river corridors and watersheds, which will then protect torrent midges and other members of this unique community.

2014 North Central Branch Meeting in Iowa

The North Central Branch of the ESA will meet in Des Moines in 2014. The ISU department is hosting the meeting and **Sue Blodgett** is the NCB ESA President. In addition to eleven symposia, Program Chair **Matt O'Neal** is organizing a full program of papers and posters for the meeting. **Larry Pedigo** and his dixie jazz band will play at the Welcome Reception on Sunday evening! **John VanDyk** is providing the technical support to keep the meeting running smoothly. **Erin Hodgson** is the Chair for Local Arrangements and is coordinating meeting logistics. Other meeting features include a DuPont Pioneer facility tour, 6K Hexapod Scurry fun run, student competition for papers and posters, and Linnaean Games student competition.

We hope to see you at the 2014 NCB ESA meeting! Look for more meeting details on our departmental website, or the North Central Branch website: http://entsoc.org/northcentral.

Arrivals and Departures

Sean Bradley (B.S. Animal Ecology, ISU 2012) became a research associate in the Gassmann Lab in 2013. He worked as an undergraduate employee in the same lab for several years.

Sean Bradley

Sharron Quisenberry, ISU Vice President for Research and Economic Development, retired in 2013. Read more about her career on page 15.

Edmund Norris, research associate in the Coats Lab, started as a Ph.D. student in toxicology at ISU.

Michael Hofmockel is a systems analyst in the IT support group with John VanDyk.


Edmund Norris

Several postdocs started appointments in the entomology department in 2013 (see page 16). At the same time, a few postdocs left the entomology department, including:

Jennifer Deitloff was a postdoc in the Gassmann Lab and is now a lecturer for the ISU department of ecology, evolution and organismal biology.

Jennifer Petzold Maxwell was also a postdoc with Aaron Gassmann. See page 7 for more information about her new position at Wartburg College.

Jeremy Kroemer worked in the Bonning Lab as a postdoc and now is employed by Monsanto Company in St. Louis, MO.

Tyasning Kroemer was first a member of the Jurenka Lab and then the Bartholomay Lab until she left ISU in 2013. She recently had a baby and lives in St. Louis with her husband.

Selected Publications

Albright, VC, IJ Murphy, JA Anderson, and JR Coats. 2013. Fate of atrazine in a switchgrass-soil column system, Chemosphere 90:1847-1853.

Bonning, BC, N Pal, S Liu, Z Wang, S Sivakumar, GF King, and WA Miller. 2013. Toxin delivery by the coat protein of an aphid-vectored plant virus provides plant resistance to aphids. Nature Biotech DOI: 10.1038/nbt.2753.

Bowers, E, RL Hellmich, GP Munkvold. 2013. Vip3Aa and Cry1Ab proteins in maize reduce Fusarium ear rot and fumonisins by deterring kernel injury from multiple Lepidopteran pests. World Mycotoxin Journal. 6:127-135.

Bruner, RF, EW Hodgson, and AJ Gassmann. 2013. Preference and performance of soybean defoliators on *Rag1* soybean. Journal of Economic Entomology 106: 2577-2584.

Chougule, NP, H Li, S Liu, KE Narva, T Meade, and BC Bonning. 2013. Retargeting of Bt toxins against hemipteran insect pests. PNAS 110: 8465-70.

Coates, BS, H Johnson, KS Kim, RL Hellmich, CA Abel, C Mason, and TW Sappington. 2013. Frequency of hybridization between *Ostrinia nubilalis* E-and Z-pheromone races in regions of sympatry within the United States. Ecology and Evolution 3: 2459-2470.

Coates, BS, DV Sumerford, RL Hellmich, and CA Abel. 2013. Unlinked genetic loci control the reduced transcription of aminopeptidase N 1 and 3 in the European corn borer and determine tolerance to *Bt* Cry1Ab toxin. Insect Biochemistry and Molecular Biology 43: 1152-1160.

Farnsworth, EJ, M Chu, WJ Kress, AK Neill, JH Best, J Pickering, RD Stevenson, GW Courtney, JK VanDyk, and AM Ellison. 2013. Next-generation field guides. Bioscience 63: 891-899.

Gross, AD, MJ Kimber, TA Day, P Ribeiro, and JR Coats. 2013. Quantitative structure-activity relationships (QSARs) of monoterpenoids at an expressed American cockroach octopamine receptor, pp. 97-110. *In* Beck, Coats, Duke and Koivunen (eds.), Pest Management with Natural Products, American Chemical Society, Washington, DC. DOI: 10.1021/bk-2013-1141.

Hesler, LS, MV Chiozza, ME O'Neal, et al. 2013. Performance and prospects of *Rag* genes for management of soybean aphid. Entomologia Experimentalis et Applicata. 147: 201-216.

Lambkin, CL, BJ Sinclair, T Pape, GW Courtney, JH Skevington, R Meier, DK Yeates, V Blagoderov, and BM Wiegmann. 2013. The phylogenetic relationships among infraorders and superfamilies of Diptera based on morphological evidence. Systematic Entomology 38: 164-179.

Nusawardani, T, JA Kroemer, M-Y Choi, and RA Jurenka. 2013. Identification and characterization of the pyrokinin/ pheromone biosynthesis activating neuropeptide family of G protein-coupled receptors from *Ostrinia nubilalis*. Insect Molecular Biology 22: 331-340.

McCarville, MT, and ME O'Neal. 2013. Soybean aphid population growth as affected by host plant resistance and insecticidal seed treatments. Journal of Economic Entomology 106: 1302-1309.

Petzold-Maxwell, JL, LJ Meinke, ME Gray, RE Estes, and AJ Gassmann. 2013. Effect of Bt maize and soil insecticides on yield, injury, and rootworm survival: implications for resistance management. Journal of Economic Entomology 106: 1941-1951.

Rudeen, ML, ST Jaronski, JL Petzold-Maxwell, and AJ Gassmann. 2013. Entomopathogenic fungi in cornfields and their potential to manage larval western corn rootworm *Diabrotica virgifera virgifera*. Journal of Invertebrate Pathology 114: 329-332.

Weiner, SA, DA Galbraith, DC Adams, N Valenzuela, FB Noll, CM Grozinger, and AL Toth. 2013. A survey of DNA methylation across social insect species, life stages, and castes reveals abundant and caste-associated methylation in a primitively social wasp. Naturwissenschaften 100: 795-799.

Fourth ISU Hemipteran Research Symposium

The Fourth Biennial ISU Hemipteran Research Symposium (formally the Aphid Symposium) was held at ISU on March 26, 2013. Sponsorship was generously provided by the Office of Biotechnology, and the ISU Plant Sciences Institute Virus-Insect Interactions Network.

Hemipteran pests are increasing in abundance and importance as plant pests in Iowa. On-going research into hemipteran biology, insect-plant interaction and management will play a key role in sustainable crop production in Iowa, particularly as new challenges arise. The brown marmorated stink bug (BMSB) and the kudzu bug now present serious threats to U.S. agriculture, with BMSB now established in Iowa.

The keynote address was given by Dr. Galen Dively, University of Maryland, on "Biology, economic impact, and management of the brown marmorated stink bug." With 40 registered participants, 9 oral presentations and 10 poster presentations, the symposium was a great success. The conference fostered interactions amongst researchers from the departments of entomology, plant pathology and microbiology, and biochemistry, biophysics and molecular biology, and also with members of the North Central Soybean Research Program, Iowa Soybean Association, and Agriculture industry (DuPont Pioneer).

Stink bug nymphs on soybean

The purpose of the symposium was to enhance awareness of hemiptera-related research being conducted on campus, exchange ideas, establish new collaborations and identify areas of emphasis for future research. The symposium highlighted research needs and included presentation of results from collaborations that were a direct result of interactions at previous ISU symposia.

Insects Respond to Drought

Diane Debinski, ISU professor in the department of ecology, evolution and organismal biology, recently published a paper in *Ecology* that examined the effects of drought on insects. The paper, "Gradient-based habitat affinities predict species vulnerability to drought" examined changes in abundance of butterfly species along a hydrological gradient of six montane (mountainous) meadow habitats. Data were collected in the Greater Yellowstone Ecosystem of the Rocky Mountains. Diane tracked changes from 1997 to 2007, of which eight years were considered in mild to extreme drought.

Diane and colleagues were able to measure the changes in the insect community. Abundances of species with affinity for xeric (dry) habitats increased in virtually all meadow types. Conversely, abundances of species with affinity for hydric (wet) habitats decreased, particularly in mesic and xeric meadows.

Most striking, increasing abundances of species with xeric habitat affinity were offset by decreasing or stable abundances of species with hydric habitat affinity. In some hydric meadows, species with affinity for hydric habitats increased. In these cases, decreasing moisture conditions in hydric meadows actually increased habitat suitability because sites near the limit of moisture extremes for some species became more acceptable.

Species responses were relatively predictable based upon habitat affinity and habitat location along the hydrological gradient, and mesic meadows showed the highest potential for changes in community composition. The implications of these results are that longer-term changes due to drought could simplify community composition, resulting in prevalence of species tolerant to drying conditions and a loss of species associated with wetter conditions.

Photos from the 2013 ESA Meeting in Austin

Bryony Bonning, Agenor Mafra-Neto, Paula Davis, and Sue Blodgett

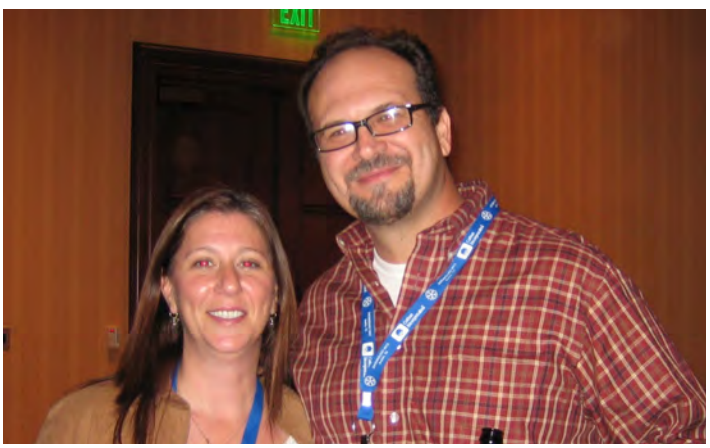
Ron Hammond and Scott Hutchins

Mike Gray, Jeff Bradshaw, Matt O'Neal, Gary Hein, and Von Kaster

Matt Petersen and Kevin Johnson

Rick Hellmich and Jörg Romeis

Tom Turpin, Rayda Krell, Clint Pilcher, and Karla Gomez



Robyn Rose and Carlos Bogran

Marlin Rice and Michael Smith