



IOWA STATE UNIVERSITY

Department of Entomology

January 2010 Newsletter
For Alumni and Friends

**50 Years
of IPM!**

New Extension Entomologist Hired



I'm so pleased to be on board as the newest faculty member in the Department of Entomology. I grew up in western North Dakota and completed my B.S. (Biology) and M.S. (Entomology) at North Dakota State University in Fargo. I earned my Ph.D. (Entomology) from the University of Minnesota in St. Paul in 2005 working on soybean aphid with Dr. David Ragsdale. My dissertation was focused on creating sampling plans and an economic threshold for soybean aphid, as well as describing the within-field distribution and landscape movement of this invasive insect. I created a sampling plan called *Speed Scouting for Soybean Aphid* that is widely adopted in the North Central Region.

In 2006, I became an extension entomologist at Utah State University. I was responsible for field and forage crops, turfgrass, ornamental

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Aphid Symposium at ISU

The second biennial ISU Aphid Research Symposium, organized by Matt O'Neal and Bryony Bonning was held at Iowa State University on January 16, 2009. Sponsorship was generously provided for the event by the 25th Anniversary of the Office of Biotechnology, the Department of Entomology, Center for Plant Responses to Environmental Stresses, and the Iowa Soybean Association. Ongoing research into aphid biology, aphid-plant interaction and management

will play a key role in sustainable crop production in Iowa, particularly as new aphid-related challenges arise, such as those associated with adoption of biorenewable crops. The purpose of the symposium was to enhance awareness of aphid-related research being conducted on campus, to share knowledge, exchange ideas, to establish new collaborations and identify areas of emphasis for future research. Outstanding

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Important note about delivery of future newsletters

To reduce financial and environmental costs associated with production of this newsletter, future newsletters will only be available online at www.ent.iastate.edu/alumni. If you received a hard copy this year and would like to receive e-mail notification, please update your information, including e-mail address at the ISU Foundation web site www.foundation.iastate.edu (Click on "Update Your Records" at the top of the screen). We expect that future newsletters will be posted online in February.

Soderlund Presents the 2009 Dahm Memorial Lecture

Dr. David Soderlund, currently chair of the Department of Entomology at Cornell University, Geneva, NY presented the 2009 Paul A. Dahm Memorial Lecture in Entomology on *Mechanisms of Insecticide Action and Resistance at the Voltage-Gated Sodium Channel*. Dr. Soderlund is a leading international authority on the toxicology and mode of action of insecticides affecting ion channels, especially the pyrethroids. He was among the first to incorporate the tools of molecular neurobiology in research on



David Soderlund

insecticide action and resistance and made significant contributions to identification of sodium channel polymorphisms associated with pyrethroid resistance. His research provides an experimental platform for the study of human sodium channels, an area of research with important regulatory implications. Dr. Soderlund received the International Award for Research in Agrochemicals, from the American Chemical Society, Agrochemical Division in 2008.

Photos from the 2009 ISU Mixer at Indianapolis



Tom Nowatzki, Jared Ostrem, Tom Baker.



Kris Giles, Clint Pilcher, Rayda Krell, Todd DeGooyer.



Patti Prasifka, Jeff Bradshaw, Rebekah Ritson, Rene Cooklin.



Clyde Ogg, Barbara Ogg, Gary Hein, Jon Tollefson.

Continued on back page



From the Chair's Perspective

The past year has flown by with many unexpected twists and challenges. As I write "From the Chair's Perspective" the University is continuing meetings, discussions and planning sessions to develop ways to meet the budget cuts imposed on the University by the Governor. As a Department we have been challenged by Dean Wintersteen to be part of the ongoing discussion to determine what the College of Agriculture and Life Sciences will look like in 5 to 10 years. We continue to meet the mission of the land grant system delivering real-time data to our stakeholders through extension, outreach, symposia and scientific panels. As we hold discussions on possible realignment/reorganization, we have the options of being an emphasis in a large department of Applied Biology, merging with another biological sciences department or remaining independent. The good part of this challenge is the opportunity for internal evaluation, assessment and to determine if there are ways to better carry out our teaching, extension and research as we meet the needs of the people of Iowa, the nation and the world.

During the past year Marlin Rice resigned from our Department to take a challenging position with Pioneer Hi-Bred. Marlin left a hole in our Extension staff; however, we were allowed to fill a position in Extension to cover soybean

insects. In May, Erin Hodgson joined our faculty just in time to work with growers solving problems with soybean aphid. Erin earned her Ph.D. from the University of Minnesota and came to us from Utah State University. Erin had a very busy and successful first growing season. Working as a team with Matt O'Neal, Jon Tollefson and Aaron Gassmann all bases were covered.



Les Lewis

Our Department is still strong, successful in extramural funding, excelling at teaching and delivering information to our clientele through all available outlets. After self-evaluation we will continue to be a productive Department and a key part of the University mission. If things go according to my original contract my tenure as Chair will end in September. It has been a challenge and a privilege to serve during this period of change. As always, stop by when you're in Ames.

Did you know?

Our faculty continue to make an impact through publishing in the highest ranked entomological journal, the *Annual Review of Entomology*. In volume 55 (2010), Bryony Bonning with collaborator W. Allen Miller review Dicistroviruses, a newly recognized virus group that includes Israeli acute paralysis virus of bees, which has been linked to colony collapse disorder, and Aphid lethal paralysis virus. Volume 54 (2009) includes reviews on *Fitness costs of insect resistance to Bacillus thuringiensis* by Aaron Gassmann and colleagues, and *Adaptation and invasiveness of western corn rootworm: Intensifying research on a worsening pest*, with USDA-ARS collaborators Tom Sappington and Nick Miller as co-authors.

IPM Symposium, continued from front page

oral presentations were given by the two invited speakers, Dr. Fiona Goggin, University of Arkansas, and Dr. Kelley Tilmon, South Dakota State University. With over 50 scientists, farmers and agribusiness professionals in attendance, the symposium was a great success. The conference fostered interactions amongst aphid researchers from different departments and also with members of the Iowa Soybean Association, the North Central Soybean Research Program, and Ag industry (Pioneer Hi-Bred International Inc. and Monsanto). The symposium highlighted both current and future potential aphid-related research needs.

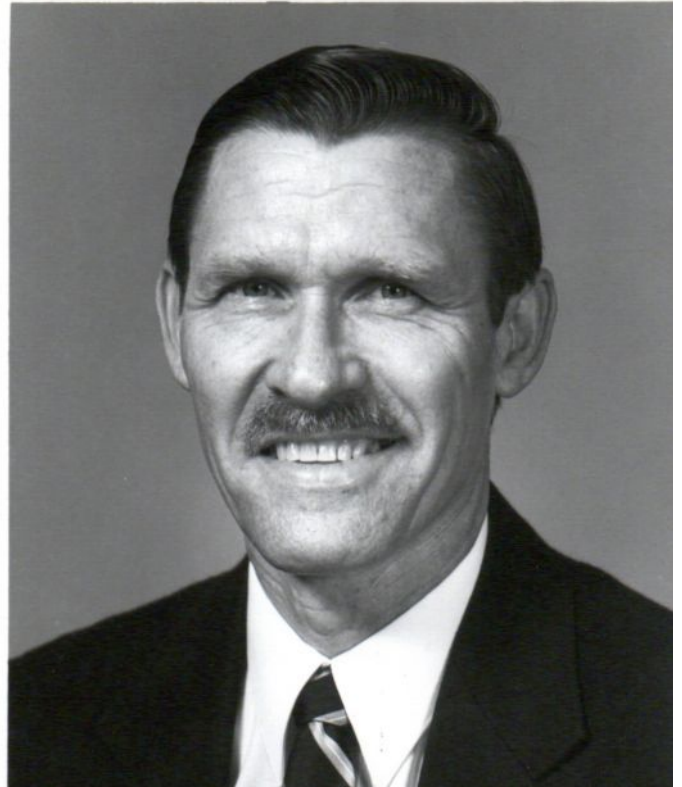


Alum Doug Dahlman Also Served as ESA President

We are humbled to report that not one, but two articles in the 2008 and 2009 Newsletters on ISU alumni who served as ESA President failed to include Doug Dahlman, who served as ESA President in 1997. Dahlman received his M.S. (1963) and Ph.D. (1965) at ISU. Hence, Iowa State has produced not eight, but nine ESA Presidents over the years. We apologize profusely for this error and encourage readers to correct any similar omissions noted in our newsletters.

Doug Dahlman writes: I compliment you on your oversight of another good Iowa State Department of Entomology Newsletter. I appreciate learning about current and past happenings at my alma mater. Since my retirement at the end of August 2001 from the University of Kentucky I really have not been involved to any degree with entomology other than the spring of 2002 when I went back to Kentucky to help with the Mare Reproductive Loss Syndrome (MRLS) project that Bruce Webb ran. That was very gratifying because it made a major contribution to identifying the cause of the problem. The essence of the MRLS is that there is a bacterium that resides in the grooves on the hairs on the eastern tent caterpillar. The horses ingest the cast skins of the caterpillars as they feed on the pasture grass. The hairs manage to penetrate the GI tract wall and carry the bacteria with them. The mares show a slight elevation in temperature following this but then return to normal body temperature. However, the bacteria, now in the blood of the mare, manage to cross the placental barrier and damage the fetus which either results in an abortion or if occurring late in the pregnancy, an unhealthy foal or a stillbirth. It will soon be time for the next peak of eastern tent caterpillars but with the current understanding of the problem, appropriate control measures can be taken.

I also was involved for several years as a science resource person with a project to improve the delivery of science education units to K-8 classes in North Carolina. Beyond that, the only entomological influence in my life is the incorporation of entomological themes in some of the woodworking projects that I design and build. I did teach a 3-credit Natural Science course at the Native American Bible College near Fayetteville,



Alum Doug Dahlman

NC in the fall 2007. That proved to be different and fairly enjoyable in that it drew substantially on my general science background that I had not used for a while.

I work locally with Habitat For Humanity several days a weeks (we hope to build 21 new houses this year) and Yvonne and I also have spent 20-60 work days a year on construction projects on college campus and church construction projects either staying in a dormitory or in our 19 foot Coach House.

Other Alum Updates

Brian Beidle (B.S. 2002) conducted an internship for biocontrol at Disney World (Epcot). He then joined The Steritech Group, a commercial structural pest company, as a technician and is now a technical project manager, with emphasis on troubleshooting pest situations, training new and current PCO's. He also identifies specimens for clients and coworkers, and tests new pesticides and delivery equipment. Brian is now a Board Certified Entomologist and got married in 1997.



Other Alum Updates

Craig Abel was appointed the new research leader of the USDA-ARS Corn Insects and Crop Genetics Unit in Ames, following Les Lewis' retirement. Abel received his B.S. degree in Animal Science at ISU in 1987 and his graduate degrees in entomology at ISU (M.S. 1993; Ph.D. 1998) under the direction of Richard "Dick" Wilson. He transferred from his position as research leader at USDA-ARS Southern Insect Management Research Unit, in Stoneville, MS where he worked as a research entomologist from 1998-2003 and research leader from 2003-2009. Now back in Ames, Craig Abel's research emphasis will be to expand genetic variation in maize for resistance to above-ground pests using new breeding methods, and to examine interactions between soybean and soybean aphid at the sub-cellular level to enhance plant resistance.

Eric Whitted (pictured below) graduated with an undergraduate major in entomology in 2008 and was featured as a College of Agriculture and Life Sciences "Young alum of the month." Eric, originally from New Hampshire, currently works for Mycogen Seeds as a trait introgression project manager in Hoolehua, Hawaii, working on introgression of insect resistance and herbicide resistance genes into elite corn inbred lines. His favorite ISU classes were Insect Biology with Russ Jurenka and Aquatic Insects with Greg Courtney, as he really enjoys collecting and identifying insects.



Eric Whitted

John Owens, Harlan vice chancellor of the Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln, will step down from that position on June 30, 2010. He will remain with UNL as an extension professor of entomology. Owens received his Ph.D. from ISU and was the Corn Insect Project Leader from 1971-75. Jon Tollefson was one of his graduate students. When Owens left he went to Texas Tech University, then moved back to Iowa for a position at Pioneer, followed by 23 years at New Mexico State University, and ultimately to the University of Nebraska-Lincoln. By the time he steps down from his current position, he will have been a dean, vice president or vice chancellor in the land-grant university system for a period of 25 years.

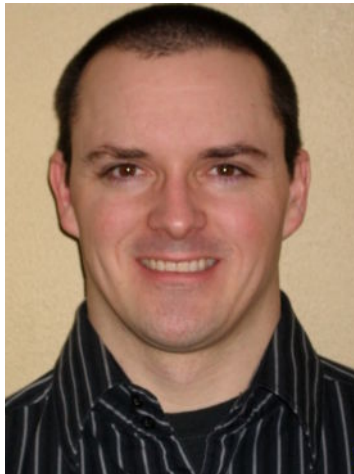
Jeff Bradshaw has taken a position as assistant professor of extension at the University of Nebraska. He was previously employed as a post-doctoral research associate by the University of Illinois at Urbana-Champaign. Jeff's Ph.D. adviser was Marlin Rice.

Hugh McCampbell writes: I earned a masters degree in entomology and biochemistry at ISU in 1969, under Dr. Edwin Hibbs. Y'all do a good job with the newsletter. When I graduated from ISU, I went to Auburn for a DVM degree. I have been a Veterinarian since 1972. I still search out insects, and of course have a lot of involvement with face flies and pinkeye in cattle, horn flies, bot flies in horses, horse flies, etc. Many of my cattle clients have joined the National Cattleman's Beef Association (NCBA) this year to the extent that I won the NCBA Top Hand Award. They give that award each year to the member who recruits the most new members.

I have a store room and a truck, and have a livestock Veterinary Practice in Sweetwater, Tennessee. I do about 50% horses, 30% beef, and 20% dairy. I carry rabies shots for farm dogs, and branch out to other species occasionally. I did a Caesarian Section on a nanny goat in a jacuzzi a few months ago. That was different. Life is interesting. All three children are married, and we have 13 grandchildren. I still play the piano and banjo when I have time. We enjoyed our time at ISU, and even lived in Pammel Court!

Coyle Wins ESA Comstock Award

In 2009, **David Coyle** received the John Henry Comstock graduate student award from the North Central Branch of the ESA. Coyle, who received his M.S. under the direction of Elwood "Woody" Hart in 2000 is majoring in entomology at the University of Wisconsin and is expecting to complete his Ph.D. by May 2010. He is advised by Dr. Kenneth Raffa. David's dissertation research involves the ecology and effects of root feeding by invasive weevils on the health and growth of trees in the northern hardwood ecosystem, invasive species management and pest management in production forestry.



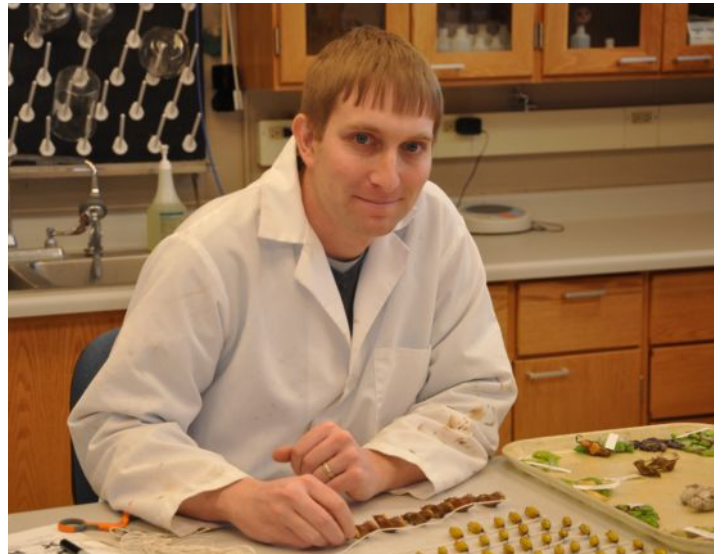
David Coyle

Johnson Ouma was honored with a Gold Medal Award by the African Union for distinguished research that would lead to effective tsetse fly and sleeping sickness control in Africa. Ouma received a medal and certificate. Ouma commented, "It was a deeply humbling experience and I feel highly honored." Ouma is a 2004 ISU graduate of entomology.



Elliot Krafur and Johnson Ouma

Nathan Brockman, the curator of the Christina Reiman Gardens Butterfly Wing, was awarded a scholarship to study imperiled butterfly conservation and management. The Florida Museum of Natural History/ McGuire Center for Lepidoptera and Biodiversity at the University of Florida and the Butterfly Conservation Initiative awarded Brockman the scholarship for professional training. Brockman earned a bachelors degree in entomology from ISU in 2000.



Nathan Brockman

The Entomological Foundation honored **Tom Turpin** for his accomplishments in and commitment to the field of entomology, and for his contributions to educating young people and adults about science through insects. Turpin taught one of the most popular courses at Purdue University for many years, drawing more than 450 students each semester. He also created the Purdue University Bug Bowl, a celebration of insect science that drew more than 30,000 visitors in 2009. Turpin was president of the Entomological Society of America in 1992. He earned a Ph.D. in entomology from ISU in 1971.



Tom Turpin



Three New ESA Fellows

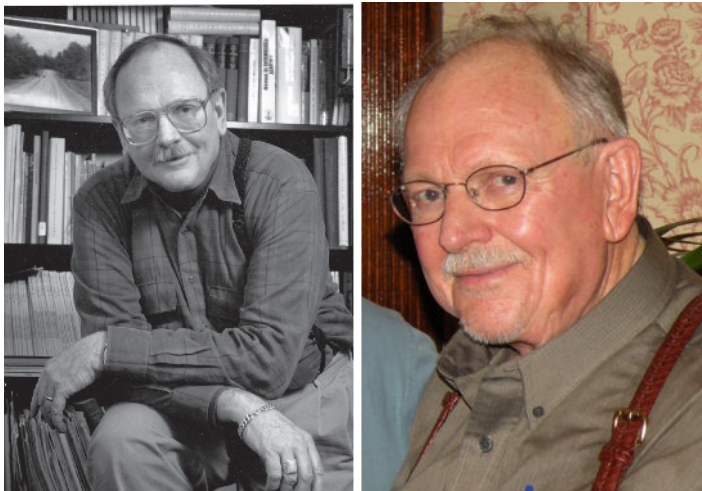
Former Iowa State entomology professors **Thomas Baker** and **William Showers**, and alumnus **Scott Hutchins** (Ph.D. 1987) were recently selected as fellows of the Entomological Society of America. The selection of fellow reflects outstanding contributions in one or more of the following: research, teaching, extension or administration. Showers is an emeritus professor and retired research entomologist for the USDA-ARS, and an alumnus who earned his doctorate in entomology in 1970. His research program was focused on corn pest ecology and management. Baker served as department chair from 1992 to 1999, and cur-



Scott Hutchins

rently holds a professorship at Pennsylvania State University. His research program addresses the neuroethology of olfaction and its applications for agents-of-harm detection and integrated pest management (IPM). Hutchins, currently senior director and global leader of crop protection research and development at Dow AgroSciences, influenced the science of entomology through his research on bioeconomics, IPM and host-plant response to insect injury, especially concepts related to the development of economic injury levels. All three fellows were recognized during the 2009 ESA annual meeting.

Featured Alumnus: Donald Roberts Honored by the Society for Invertebrate Pathology



Don Roberts at BTI (left) and recently.

Dr. Donald Roberts was the Honoree of the Society for Invertebrate Pathology's (SIP) Founders' Lecture this year, the most prestigious award given by the society. Roberts is one of the most productive contributors to insect pathology and a proponent of biocontrol in the developing world. He trained, inspired, and provided leadership for many insect pathologists, and was a pervasively influential founding member of SIP. To mark his scientific contribution to invertebrate pathology the newly recognized *Metarhizium robertsii* was named in his honor.

Don was born in Phoenix, Arizona, in 1933 and completed a B.S. degree at Brigham Young University, Utah (1957). He obtained a Master's degree from Iowa State University in 1959, studying the biology and chemical control of *Evora hemidesma*, a microlepidopteran leaf roller under the mentorship of Drs. Edwin Hibbs and Halbert Harris. Also in 1959, Don married Mae Strand; they have two children and three grandchildren.

Don continued his studies in insect pathology during his doctoral degree (1959-1964), working under the guidance of Drs. E.A. Steinhaus and M.E. Martignoni at the University of California in Berkeley. Don's dissertation concerned production of toxins and induction of mutations in a fungus, *Metarhizium anisopliae*. Don obtained a postdoctoral fellowship from NSF to work at the Swiss Federal Institute of Technology in Zurich with Dr. G. Benz, expanding his work on *M. anisopliae* toxins. From 1965 through 1996, Don was employed by the Boyce Thompson Institute for Plant Research (BTI) rising from Assistant to Full Rank Insect Pathologist by 1974. In 1996, BTI appointed Don the Roy A. Young Scientist (Chair Scientist). In 1979 Don proposed the for-

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Student Awards

The Entomology Alumni Scholarship for freshman undergraduates majoring in entomology was awarded to **Grace Sward**. This \$1,000 scholarship was awarded based on promise for a career in entomology.

The 2009 Wayne A. Rowley Scholarship in Entomology, which provides \$2,000 to students with preference given to applicants concentrating on medical entomology, was awarded to **Jon Oliver**. Jon is advised by Lyric Bartholomay.



Jessica Petersen

The Henry and Sylvia Richardson Research Incentive Grant was awarded to **Jessica Petersen** for her proposal, *Using coalescent based molecular phylogenetics to infer origins of crane fly biodiversity*. Jessica received \$1,000 toward research costs for this project. Jessica is advised by Greg Courtney.

The 2009 Entomology Student Scholarship for Student Excellence, which is funded by the Fred Clute Memorial Fund, was awarded to **Missy**



Missy Rynerson

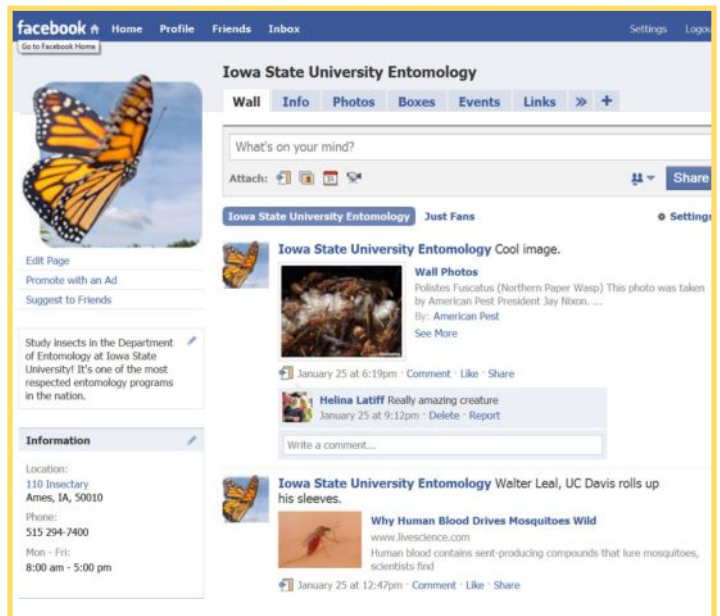
Rynerson. This \$500 award recognizes academic excellence at the undergraduate level, or excellence in research, teaching and/or extension at the graduate level. Missy is a graduate student supervised by Aaron Gassmann.

Several students received awards at the 2009 North Central Branch meeting of the Entomological Society of America for their presentations: **Missy Rynerson** took second place in the M.S. student poster competition; **Rachael Cox** took second place in the undergraduate oral presentation competition; **Mariana Chiozza** took third place in the M.S. student oral presentation competition; **Kevin Johnson** took second place in the Ph.D. oral presentation competition.

Yes, We're on Facebook!

In September, Iowa State University Entomology established a presence on the social networking site Facebook. The page contains upcoming events such as seminars and a steady stream of entomology-related news. Lyric Bartholomay, Bryony Bonning, Erin Hodgson, Matt O'Neal and John VanDyk contribute to the page. A steadily growing "Facebook fan" base views and occasionally comments on the posts (see screen shot to the right).

To view our Facebook page (and become a fan!) visit www.ent.iastate.edu and click on the Facebook icon.



2009 Graduations and Movin' on Up!

Undergraduates

Kelly Seman and **Greg VanNostrand** graduated with bachelors degrees in entomology in 2009. Kelly is now a masters student with Matt O'Neal, and Greg is a research associate with Erin Hodgson.



Greg VanNostrand playing softball.

Graduate students

Ian Murphy graduated in the fall with a masters degree in toxicology. Ian worked on the use of switchgrass- and microbe-mediated decontamination of atrazine in groundwater under the direction of Joel Coats. The title of his thesis was *Uptake and degradation of atrazine utilizing phytoremediation technology with switchgrass*.

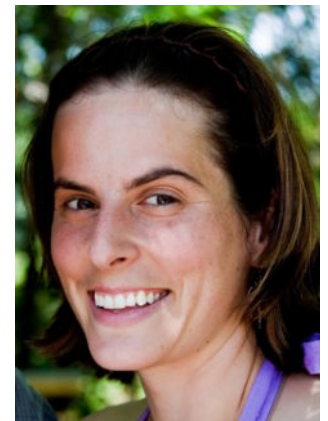
Matt Wihlm graduated with a masters degree in entomology. Matt worked on *The ecology, morphology, and phylogeography of the Nearctic species Axymyia furcata (Diptera: Axymidae)* under the direction of Greg Courtney. Following his graduation Matt spent four months in Asia (Burma, Thailand, Cambodia, Laos, and Viet Nam).

Gretchen Paluch graduated in May with a Ph.D., with majors in toxicology and entomology and a minor in statistics. The title of her dissertation conducted under the direction of Joel Coats and Lyric Bartholomay was *Characterization of botanical terpene activity in arthropods*. She is now Director of Basic Research for EcoSMART Technologies, Inc.

Marianna Chiozza graduated with a masters degree in genetics on *Exploring soybean aphid (Aphis glycines) resistance germplasm across the Midwest and its relationship with free amino acid accumulation in leaves*. Marianna was co-supervised by Matt O'Neal and Gustavo MacIntosh, Biochemistry, Biophysics and Molecular Biology, and is now a staff scientist at Insitute de Agrobiotecnologia Rosario (INDEAR) in Rosiaro Argentina. This institute combines federal and private researchers focused on crop production.

Susan DeBlieck graduated in May with a non-research masters degree in sustainable agriculture directed by Jerry DeWitt. Susan now works as a program coordinator in the Farm to School Program, Healthy Acadia, Bar Harbor, Maine.

Nina Richtman Schmidt graduated in May with a masters degree in microbiology under the direction of Bryony Bonning. Her thesis was entitled *Physiological impact of a Bacillus thuringiensis toxin on the black cutworm that enhances baculovirus pathogenicity*. Nina now works for Pioneer Hi-Bred in Johnston, Iowa, rearing and conducting bioassays with various lepidopteran pests.



Nina Schmidt

Eric Scolaro graduated in December with a masters degree in microbiology, under the direction of Jeff Beetham. He worked on *Analyzing the relationship of Leishmania chagasi and complement resistance through protein-protein interactions, genetic complementation, and innovative techniques*. Eric started employment at Pioneer Hi-Bred in Johnston, IA in August 2009.

Postdoctoral research associates

Jennifer Anderson, who worked as a postdoctoral research associate with Joel Coats, took a position of Environmental Safety Assessor at Pioneer Hi-Bred. She is based in Ankeny, Iowa.

Faculty and Staff Awards

Mark Shour was recognized by the National School IPM 2015 Steering Committee and the School IPM Regional Working Groups with a Child Care and School IPM Recognition Award. As the school IPM coordinator for Iowa State Extension and co-leader of the North Central School IPM Working Group, Shour has been instrumental in implementing and educating IPM in schools, child care and elderly care facilities. He leads school IPM projects in South Dakota, and speaks at training sessions for professionals in pest management and health care. Shour also participated in a collaborative project for the early detection of emerald ash borer using visual surveys, sentinel trees, traps, and nursery inspections. Fortunately, EAB was not discovered in Iowa during 2009.



Mark Shour

Matthew O’Neal and **Erin Hodgson** were recognized for their efforts to develop and implement management programs for soybean insect pests that are economically and ecologically sustainable. Matt and Erin, as part of a coalition of soybean researchers around the country, received two awards: The 2009 National Excellence in Multistate Research Award from the American Public Land-Grant Universities, and the 2009 Integrated Pest Management Team Award from the Entomological Foundation.

Marlin Rice and **Matt O’Neal** along with David Wright of the Iowa Soybean Association received best Extension Publication for *Soybean Aphid Management Field Guide 2008*.

At the 2009 North Central Branch ESA meeting, alumnus **Jeff Bradshaw**, **Marlin Rice**, **John VanDyk**, and **Derek Adams** received the 2009 Entomology Educational Project Award for Best Extension Website for the *Soybean Insects Guide* (available at www.ent.iastate.edu).

Jerry DeWitt was the 2009 recipient of the ISU College of Agriculture and Life Sciences George Washington Carver Distinguished Service Award. This annual award was established in 2005 to recognize alumni or friends who have demonstrated outstanding achievement in the agricultural, food, environmental, social and life sciences. The award emphasizes prestigious and influential contributions to society through writing, teaching, research or leadership. DeWitt is the director of the Leopold Center for Sustainable Agriculture.

He began his career at Iowa State as an extension entomologist in 1972. He has served the University in many capacities, including agriculture and natural resources extension program director; state liaison for Sustainable Agriculture, USDA-CSREES; extension IPM and pesticide applicator training program director; extension pest management and the environment program coordinator; and interim director/national program leader for Sustainable Agriculture, USDA-CSREES-SARE.



Erin Hodgson’s video Chloe’s Monarch Adventure won in its category in the new ESA YouTube Competition. Erin received an award at the opening ceremony of the ESA meeting in Indianapolis.



Rice to Pioneer Hi-Bred International

Marlin Rice, extension and research entomologist, resigned from Iowa State University on February 1 after 20 years of service to the agricultural community. Marlin began his career at ISU as an assistant professor on November 1, 1988. He quickly gained promotion and tenure to associate professor in 1992 and then professor in 1996.

Rice was a frequent and highly requested speaker in the area of insect pest management. He annually spoke at the Field Extension Education Laboratory, the Crop Advantage Series, and the Integrated Crop Management (ICM) Conference. He often gave two, and sometimes four, different presentations at the ICM Conference, presenting every year except one.

For 19 years, Rice was the executive editor of the *Crops, Soils and Pests Newsletter*, which later became *Integrated Crop Management*—the first full-color weekly crops newsletter published by a land-grant university. He was a consistent and prolific contributor to the newsletter, and he was widely recognized for his macrophotography skills with insects.

Iowa State University recognized Rice's work with the University Extension New Professional Award (1991), Excellence in Applied Research and Extension Award (1993), and Outstanding Achievement in Extension (2001). In 1998 he was awarded a Fulbright Scholarship to teach in the Crop Sciences Department at the University of Zimbabwe. Two of his students, Clint Pilcher and Jeff Bradshaw, won the John Henry Comstock Outstanding Graduate Student Award from the Entomological Society of America. His entomology peers elected him president of the Entomological Society of America and he served in that office during 2009.



Marlin Rice with Navice Kalunga near Kamena, Zambia.

Rice accepted a position as senior research scientist with Pioneer Hi-Bred International in Johnston, Iowa, working on corn trait characterization and development. In the last year-and-a-half, he has traveled to Zambia three times as the volunteer director of agricultural production for the Hope Children's Center in Serenje, which helps feed, clothe, and educate orphans.

Keep in touch!

Please let us know if you have information to share with friends and alumni of the ISU Department of Entomology. Items could include job changes, honors and awards, and personal notes. Please direct information to Dr. Bryony Bonning, Iowa State University, Department of Entomology, 418 Science II, Ames, IA 50011-3222; Fax: (515) 294-5957; E-mail: bbonning@iastate.edu.

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



AFRI Gives \$1 Million for Soybean Aphid Research

The Food, Conservation, and Energy Act of 2008 created the Agriculture and Food Research Initiative (AFRI) as a new competitive grant program for funding fundamental and applied research. In 2009, Matt O’Neal’s soybean aphid research was supported by two AFRI grants. The first of these was awarded through the Managed Ecosystem Program for a project titled “Biocomplexity of integrated perennial-annual agroecosystems.” This grant will support several scientists at Iowa State University, including two entomologists (O’Neal and Mary Harris), to address whether small amounts of native perennial habitat (reconstructed prairie) can improve ecosystem services to a corn-soybean rotation. Specifically, O’Neal is exploring if reconstructed prairie serves as a source of natural enemies that attack soybean aphids. The project is fully funded at \$500,000 for 3 years.

The second AFRI proposal to support soybean aphid research was funded through the Biology of Weedy and Invasive Species in Agroecosystems program. Working with colleagues at the Ohio State University and Michigan State University, O’Neal received support (\$500,000) for a proposal titled *Common buckthorn as a keystone invader in agricultural landscapes*. This project will examine the source-sink dynamics of the soybean aphid in relation to the abundance of buckthorn (the aphids’ overwintering host)

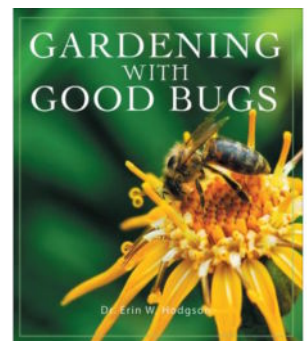
at the landscape level. One area to be explored is to what extent the abundance of buckthorn explains the risk of aphid outbreaks in soybean fields. Furthermore, this group will determine how the genetic variation of soybean aphid populations is influenced by the abundance of buckthorn. Questions about how the soybean aphid genetics vary at the landscape level will likely become more important as questions about resistance to insecticides and soybean-aphid resistant varieties of soybean are raised.

This new program expands the former National Research Initiative (NRI) to include integrated projects that combine research, education and extension awards. Entomology at ISU involves all three of these activities, which helped facilitate the creation of these proposals. Both proposals include a significant integrated component. The objectives of the first (“Biocomplexity of integrated perennial-annual agroecosystems”) include the creation of a service course to be taught to undergraduates at ISU. This course will be co-taught by O’Neal and colleagues in Natural Resource Ecology and Management and Agricultural and Biosystems Engineering. The second grant has a significant citizen scientist component that will aid in the location of and eventual removal of buckthorn across the Midwest.

Hodgson, continued from front page
and urban/structural issues. I also helped coordinate the USDA-APHIS-CAPS Program for invasive species detection in Utah. During that time, I published a book called *Gardening with Good Bugs* that is geared for homeowners. My research was applied and diverse, including aphids in alfalfa, billbugs in turfgrass, and alfalfa leafcutting bees in alfalfa seed.

My husband, Mike Erickson, and I moved to Ames this spring; he is working for 3M. We miss the mountains and parks in Utah, but we truly enjoy being back in the Midwest! My position at Iowa State University is an extension-research appointment that started in May 2009. Corn and soybean extension entomology is a daunting task in Iowa, and I have already had many chances to engage with growers and mem-

bers of industry about timely insect management issues. My research has always been IPM-based, and I strive to implement proactive tactics to make farming sustainable. Many of my research objectives are related to understanding insect biology and reducing insecticide usage. In January, I hired Greg VanNostrand as a research associate. He is a recent ISU graduate in entomology. I expect two graduate students to start this year as well. I feel so fortunate to be part of the Department of Entomology at ISU, where the faculty are very supportive and encouraging. —Erin Hodgson



Tollefson Takes Leave, but Have Pest Insect Problems in Iowa Corn Been Solved?

In 1975 I was hired to conduct corn insect pest management research and to teach applied ecology courses. At that time, the primary insect pests in corn were the corn rootworms. Research at Purdue University had demonstrated that insecticides were often applied against these insects prophylactically, which resulted in the unnecessary use of growers' resources and possible environmental harm. To offer a more informed rootworm management approach, I directed my research project through the development of sampling techniques for the adult and larval stages, the development of action thresholds to be used to determine when controls were needed, and finally the testing of the value of the action thresholds. We routinely evaluated chemical control products and tested corn rootworm plant-incorporated-protectants once they were available.

Some of the projects were small: a single evaluation of an experimental treatment in the greenhouse. Others were large, such as being part of a five-location, six-year pilot test of area-wide management of corn rootworms. Each site was over a 16 square-mile area. Some of the studies were successful, for example, calculating a simple threshold for deciding when to apply a larval-insecticide treatment based on adult numbers the previous summer, and others were not. Nematodes would attack corn rootworm larvae but their use in the field was not effective enough to result in grower acceptance.

In short, I must have been successful in combating corn rootworms during my 34 years on the faculty because I am now applying for leave from the University! Actually that is not quite true. During April 2007 I was diagnosed to have a glioma (brain tumor). The tumor was surgically removed during May, 2007 at the Mayo Clinic. Pathologists graded the tumor as a Grade 3 growth and recommended follow-up therapy. Because of the somewhat extensive treatments I would receive, I resigned from the Chair position after three years of my five-year term. I had six weeks of radiation therapy and six months of chemical treatments at Mayo Clinic. I then



Tolly in the office before taking leave.

had a nine-month "therapy holiday" until the fall of 2008 when the tumor was determined to be growing again. Since then I have been undergoing continual chemical treatment for the cancer. Being an academic instructor, I would grade the first chemical treatment a "D"; it didn't hold the growth in check. On December 23, 2008 we tried a different chemical, which has been stopping the growth. I have been giving the chemical a grade of "B," but the Medical Oncologist states it is better than that. The chemical is administered bi-weekly in Ames and I have an MRI and consultation at Mayo Clinic bi-monthly.

Because of the disease, and the treatment of the disease, I have elected to apply for long-term disability. I must be on sick leave until mid-February 2010 while my application is reviewed. At that time, if the insurance agency agrees, I will be moved to long-term disability.

Because I didn't solve all of Iowa's insect problems in corn, a new corn research entomologist was hired. Dr. Aaron Gassmann moved into our department in January 2008 and I have turned my equipment and building space over to him. I have an office and my contact information will remain the same, at least until it is decided if I may move to long-term disability.

Be well! —Jon Tollefson



Faculty of Distinction: Harold "Tiny" Gunderson



Tiny Gunderson

Harold Gunderson came to Iowa State College in 1935 to begin work on a Ph.D. in entomology. He served the state as an extension entomologist for the next 36 years until his untimely death in 1971 from a heart attack at the age of 58. Harold was born in Butte, Montana and attended Montana State College, receiving a bachelors and master degree in 1934 and 1935,

respectively. His masters thesis, *The relative toxicity of hydrogen cyanide, chlorpocrin and ethylene oxide to the eggs, nymphs and adults of the common bedbug (Cimex lectularius)*, is still useful today with the resurgence of the bedbug. After Montana State College, Harold spent one summer working for the USDA as an Emergency Agent conducting grasshopper surveys in 1934. This type of work led him to Iowa State College where he started on a Ph.D. which he finished in 1939. His thesis advisor was Charles Richardson. Carl Drake, the Department Head, and George Decker were acknowledged for advice. George Snedecor, the famous statistician, pro-

vided counseling on statistical problems. The major research for Harold's Ph.D. was *Effect of ether on the toxicity of certain fumigants to the confused flour beetle, Tribolium confusum*. He found that ether is synergistic in toxicity along with carbon disulfide, carbon tetrachloride, and ethyl acetate. Of course the use of these compounds today is not recommended for the control of stored product pests. Dr. Gunderson also advocated the use of DDT shortly after WWII. A popular program at the time was using DDT to fumigate whole towns to rid them of house flies. The entire town of Ames was sprayed in 1947, keeping stores and restaurants free from flies throughout the summer. Of course the dangerous effects of DDT were soon observed and this practice was stopped. As an extension entomologist, Dr. Gunderson helped thousands of people throughout the Midwest. He worked primarily in disseminating information on corn insect pests and through his efforts soil insecticides became widely accepted for controlling soil corn pests. He also provided information on how to control a variety of other pests including clothes moths, grasshoppers, and sap beetles. In addition, he had to provide expertise on how to deal with the rat population, which he estimated to exceed the human population in 1959.

Roberts, continued from page 7

mation of the Insect Pathology Resource Center at BTI that included scientists from Cornell University and the USDA. With Don's coordination, this organization made Ithaca an internationally acclaimed center for insect pathology.

Don retired from BTI in 1997, but continues as a research professor at the Department of Biology, Utah State University. Don's current research includes identification of possible biocontrol agents for the Mormon cricket (*Anabrus simplex*) and grasshoppers, molecular targets of abiotic factors that reduce biocontrol agents persistence under field conditions, and developing monoclonal antibodies to detect a parasite, *Myxobolus cerebralis*, of fish (trout) and aquatic worms (*Tubifex*). His current research laboratory has 8 staff and grant funding totaling more than \$200,000 a year.

Don has published over 250 papers and edited many books and monographs. Don has received numerous national and international awards including a Fulbright Senior Research Scholarship to Australia (1985); the L. O. Howard Distinguished Achievement Award (1989), the highest award of the ESA Eastern Branch; and the singular honor, awarded by the Entomological Society of Brazil in 1996, of Honorary Member (Membro Honorario).

This article was adapted from the Founders' Lecture presented by Raymond St. Leger, University of Maryland.



Faculty of Distinction: O. Wallace Park

Oscar Wallace Park began his apiculture career at the age of 14 as he wrote in his Ph.D. thesis: "The writer's interest in bees and the literature of apiculture dates from the summer of 1903 when he was given for his very own, the half dozen unproductive colonies of hybrids which had adorned the back yard of the farmstead even before his earliest recollections." The farmstead was located near Concordia, Kansas and after teaching (1908-1910) and serving as principal (1912-1914) in Kansas schools he enrolled at Kansas State College and graduated in Zoology in 1917. He conducted research on grasshopper genetics for about a year before coming to Iowa State College in 1918 as an assistant apiculturalist.



Wallace Park

His masters thesis was on *Studies of the carrying capacity of the honeybee* (awarded in 1920) and his Ph.D. thesis on *The acquisition of food by the honeybee*. His Ph.D. was the first conferred by the Department of Zoology and Entomology

in 1924. In 1923 he published two articles in the *American Bee Journal* describing the round and waggle dances by water collecting bees. Karl Von Frisch also published in 1923 but continued working on bee communication for which he won the Nobel Prize in 1973. Park turned his attention to studies on sugar concentrations in nectars, ripening of honey, rate of work by bees, and later breeding resistance to American foulbrood. His only Ph.D. student, Walter Rothenbuhler, started working with Park in 1946 and learned the technique of artificial insemination to help in selecting resistant colonies to various diseases. Rothenbuhler graduated the year Park died (1954). The apiculture legacy started by Park and others at Iowa State College continued until the last ISU bee-keeping course was taught in 1989.

O'Neal Experiments with Soybean Aphid Podcasts

Although Matt O'Neal has been using the web to provide information about soybean aphids since 2005, he recently stepped up his efforts by adopting a new media format: the podcast.

A podcast is a short audio segment that is produced periodically and distributed through an online syndication. Podcasts are downloaded to computers or mobile devices capable of playing digital media files, such as iPods, cell phones and MP3 players.

O'Neal produced 11 podcasts during the 2009 growing season, plus an extra podcast on implications of Iowa's recent change to the Bee Rule related to pesticide applications near bees.

O'Neal does some episodes solo, but often teams up with extension entomologist Erin Hodgson or a guest to talk about current issues. He also solicits questions from listeners through the website. "I wanted a more immediate release of our research findings," said O'Neal. "I think the ease and availability of podcasting is a way to get our information out. It's also fun -- I'm



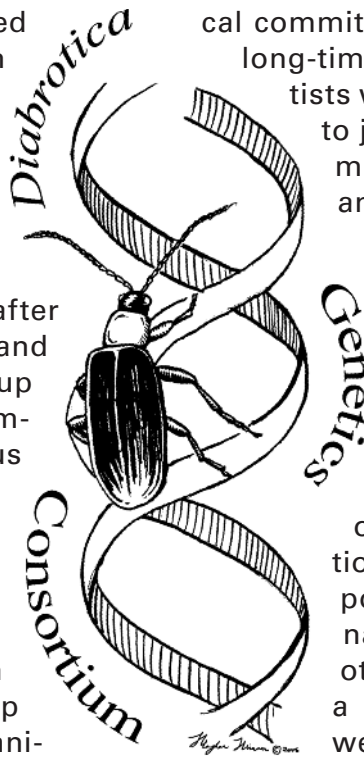
Matt O'Neal and Erin Hodgson creating a podcast.

addicted to my iPod and the dozen podcasts to which I am subscribed."

Since podcasting, visits to Dr. O'Neal's website (www.soybeanaphid.info) have doubled. The soybean aphid podcast is available directly from soybeanaphid.info or through iTunes U.

The *Diabrotica* Genetics Consortium

When Tom Sappington transferred from Texas to the USDA-ARS Corn Insects & Crop Genetics Unit in 2003, he asked his postdoc, Kyung Seok Kim, to develop microsatellite DNA markers for western corn rootworm (*Diabrotica virgifera virgifera*) for population genetics studies. Tom discovered shortly thereafter that labs in Ohio, Illinois, Colorado, and France had independently come up with the same idea. Rather than competing, Tom convinced the various groups that all could benefit from coordinating their efforts, offering to share the new markers Kyung Seok had just developed so that they could pursue research objectives in population studies. Jon Tollefson suggested bringing this new group to the attention of the NCR-46 techni-



cal committee on rootworms, of which Jon is a long-time active member. Tom invited scientists with an interest in rootworm genetics to join a consortium at the 2004 NCR-46 meeting. The response was surprising and overwhelming.

Today, the *Diabrotica* Genetics Consortium is made up of 36 research labs in 24 locations in 7 countries in North America, Europe, and Australia. The goal of the Consortium is to provide a platform for communication among its members, not only to avoid duplication of effort, but to facilitate collaborations and share resources. Tom and his postdoc Nick Miller currently coordinate a large collaborative effort with other Consortium members to obtain a genome sequencing project for the western corn rootworm.

Transgenic Aphid Resistance

Bryony Bonning and W. Allen Miller, professor of Plant Pathology and director of the Center for Plant Responses to Environmental Stresses, are developing a way to genetically modify soybeans to prevent damage from aphids. If the research is successful, soybeans will carry in-plant protection from aphids, similar to the way genetically modified corn now keeps the European Corn Borer from reducing corn yields. Bonning and Miller received a 2009 Grow Iowa Values Fund Grant. The goal of this grant is to support development of technologies with commercial potential and to support the growth of companies using those technologies. The researchers are working with Pioneer Hi-Bred, a DuPont business, as their corporate partner.

Previous research at Iowa State University indicated that if major soybean aphid outbreaks were left untreated, the loss in yield could exceed \$250 million in Iowa. The annual cost to prevent the yield loss with insecticides can reach \$64 million for Iowa soybean growers. Miller and Bonning determined that the coat protein of a plant virus can be used as a delivery vehicle to



move a toxin from the aphid gut into the hemocoel. Plants would be engineered to express the coat protein fused to a toxin. This novel technology provides a mechanism for use of toxins that act within the insect hemocoel rather than the gut, for transgenic insect resistance.



Entomological Entrepreneurship

Entrepreneurship has become a key emphasis at Iowa State University from promotion of entrepreneurial activities in the undergraduate classroom, to establishment of companies by faculty. The department of entomology has been doing its part along these lines, with ten patents awarded to Joel Coats, Tom Baker and Bryony Bonning since 1986 (see table), and the establishment of MSTRS™ Technologies, Inc.

(www.mstrs.com) by Tom Baker for marketing of pheromone-releasing dispensers for insect pest management. Three of these patents have been licensed: The California company Allylix recently licensed Joel Coats' technology for a West Indian sandalwood-derived mosquito repellent as a promising natural alternative to DEET.

Iowa State University Entomology Patents

<i>Patent Number</i>	<i>Patent Name</i>	<i>Inventor Name(s)</i>	<i>Date Issued</i>
4,594,360	<i>Chloronitoalkane Insecticides</i>	<i>Dr. Joel R. Coats</i>	<i>6/10/1986</i>
6,106,821	<i>Novel House Fly Attractant Compositions</i>	<i>Dr. Thomas C. Baker and Dr. Allard A. Cossé</i>	<i>8/22/2000</i>
6,207,705	<i>Biopesticides Related to Natural Sources</i>	<i>Dr. Joel R. Coats, Dr. Aimee L. Egger, Dr. Rong Tsao, and Dr. Gregory L. Tylka</i>	<i>3/27/2001</i>
6,524,605	<i>Biorational Repellants Obtained from Terpenoids for Use Against Arthropods</i>	<i>Dr. Joel R. Coats, Dr. Thomas C. Baker, Ms. Leah T. Nemetz, Dr. Christopher J. Peterson, and Dr. Junwei Zhu</i>	<i>2/25/2003</i>
6,543,181	<i>Fruit Fly Attractant Compositions</i>	<i>Dr. Thomas C. Baker, Dr. Kye-Chung Park, and Dr. Junwei Zhu</i>	<i>4/8/2003</i>
6,545,043	<i>Compounds Related to Natural Sources Their Use as Biopesticides</i>	<i>Dr. Joel R. Coats, Dr. Aimee L. Egger, Dr. Christopher J. Peterson, Dr. Rong Tsao, and Dr. Gregory L. Tylka</i>	<i>4/8/2003</i>
6,562,332	<i>Attractants of Beneficial Insects</i>	<i>Dr. Thomas C. Baker, Dr. Junwei Zhu, and Dr. John J. Obrycki</i>	<i>5/13/2003</i>
6,673,340	<i>Basement Membrane Degrading Proteases as Insect Toxins and Methods of Use for Same</i>	<i>Dr. Bryony C. Bonning and Dr. Robert L. Harrison</i>	<i>1/6/2004</i>
7,312,080	<i>Plant Resistance to Insect Pests Mediated by Viral Proteins</i>	<i>Dr. Wyatt A. Miller and Dr. Bryony C. Bonning</i>	<i>12/25/2007</i>
7,547,677	<i>Plant Virus Transmission Inhibitor and Methods</i>	<i>Dr. Bryony C. Bonning, Dr. Wyatt A. Miller, and Dr. Sijun Liu</i>	<i>6/16/09</i>



Soybean IPM- Then and Now

Editor's note: In 2009, entomologists celebrated the 50th anniversary of Stern et al. (1959) and the formalization of Integrated Pest Management. This year's Feature is a five-part article series highlighting this important concept. ISU faculty who work within corn and soybean production were asked to reflect on the past (Drs. Tollefson and Pedigo) and current (Drs. Gassmann and O'Neal) issues for IPM.

Integrated pest management (IPM; but then known only as pest management) took hold at Iowa State University about 1968. This was about nine years after the famous Stern et al. (1959)¹ publication on Integrated Control and only two years after the seminal review by P. W. Geier entitled *Pest Management* in the Annual Review of Entomology. In 1968, Iowa State originated a research project that embodied the pest management philosophy. Subsequently, in 1970, it offered the first course in the U.S. with management (as insect population management) in the title. The IPM research project emphasized soybean production systems and was only the second in the U.S. with this primary focus. In subsequent years, insect pests of alfalfa agroecosystems were added as part of the research objectives.

Over the following three decades research findings contributed to recommendations for IPM systems, particularly for the green cloverworm, bean leaf beetle, twospotted spider mite, seedcorn maggot, variegated cutworm, potato leafhopper, alfalfa weevil, and stalk borer. In many instances, an understanding of the population dynamics of these pests has led to predictive models, allowing a preventive stance in their management.

Major research efforts by the IPM project included leadership roles with multidisciplinary teams, which helped define the true

meaning of integration. This research involved projects attempting to understand physiological responses of crop plants to insect injury, interactions between insect pests and weeds, multi-level interactive responses of soybeans to insects, weeds, and nematodes and their management practices in a single agroecosystem.

Contributions to IPM theory were made as part of ongoing research in solving Iowa insect pest problems. The conceptualization and quantification of the Stern et al.'s economic injury level/economic threshold concept was seminal among these. Indeed, many publications and web sites continue to use the standard equation

$$EIL = C/VIDK$$

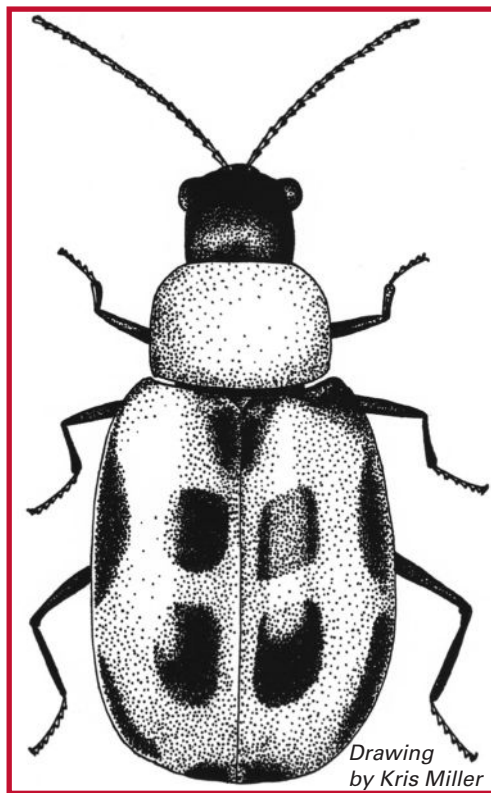
and propose this as the underpinning and general principle of IPM. A book based on these ideas, *Economic Thresholds for Integrated Pest Management*, highlighted the impact of this IPM research.

Other contributions to IPM were made in insect sampling and surveillance. In particular, several sequential sampling programs were developed for the green cloverworm in soybeans. Additionally, a unique statistical program using Wald's sequential probability ratio test to classify the outbreak/endemic status of pest populations was developed. Much of this and other work with sampling techniques and programs culminated in the publication of the book *Handbook of Sampling Methods for Arthropods in Agriculture*, still being used today.

Overall, the IPM research project, emphasizing soybeans and alfalfa, produced over 40

graduate degrees in Entomology, 160 refereed research publications, and six editions of the textbook *Entomology and Pest Management*, which has been adopted for classroom teaching worldwide. —Larry Pedigo

¹Stern, V. M., van den Bosch, R., and Hagen, K. S. 1959. The integrated control concept. *Hilgardia* 29:81-101.



Integrated Pest Management of Corn-Insect Pests

While the northern corn rootworm has been present in Iowa for many years, the western corn rootworm entered the state in the early 1960s and swept across it by 1970. At this time the idea of integrated pest management was being defined. While crop rotation disrupts the rootworm lifecycle, farmers growing corn continually to feed livestock require other management tools. Since rootworm injury does not occur until the larvae emerge in June, it is difficult to sample the damaging stage. The growing of corn continually in fields, the lack of sampling techniques, and the presence of "relatively" cheap chemicals resulted in farmers routinely applying insecticides to corn fields. Research revealed that economic damaging populations were reached in these fields, on the average, during one of five seasons; this seems a fertile scenario for the practice of "pest management."

To move away from "pest control" and toward "pest management," sampling techniques were developed for corn rootworm adults, eggs, and larvae during the 1970s and 1980s, and thresholds were calculated. Sampling techniques for the eggs were developed in Illinois, but the techniques for sampling adults and larvae were developed at ISU. The first action threshold was based on an agreement by corn research entomologists that "one adult corn rootworm per plant would produce sufficient eggs to produce an economically damaging population of larvae the following season." The number calculated through the field research of ISU Entomologists

was very close to this initial estimate (0.97 adults per plant), with an accuracy that lead growers to making the right decision 19 times out of 20. Further modification has resulted in thresholds of 0.5 to 0.75 adults per plant being used commercially.

A root injury scale was developed at ISU to classify root injury caused by rootworm larvae. The 1-6 scale was relative and difficult for growers to learn and apply without significant experience. A node-injury scale was developed in the ISU Department of Entomology and published by Oleson et al. in 2005. This scale is quantitative in nature, expressed as percentage of the roots injured, making it easy to learn and use. This scale allows farmers to more accurately determine the performance of their rootworm management tactics and better judge the value of the products that they purchased.

Are integrated pest management tactics needed in corn? Yes! For example, corn rootworms have developed resistance to insecticides and cultural controls. With the effectiveness of the new plant-incorporated-protectants and the failure of crop rotation, the new genetically modified varieties are likely to be used widely and intensively. Because of the insects' demonstrated resiliency, relying on single control tactics is likely to result in tolerance and failure of the technique(s). An integration of control tactics will have greater durability.

—Jon Tollefson

Harold Gunderson Memorial Lecture in Entomology

Dr. Peter Ellsworth is a professor with extension and research duties at the University of Arizona and Arizona Pest Management Center, Maricopa, Arizona. Ellsworth has broad interests in insect-crop interactions and applied insect ecology with particular emphasis on those aspects that may be exploited for sound ecological and economical pest management. His responsibilities are to develop research and extension IPM programs for cotton. In addition, he is interested in insect phenology, diapause, insect-water relations, predictive modeling, pest biology, sampling, thresholds, and damage dynamics. Ells-

worth has been instrumental in developing an IPM program for the management of whiteflies in cotton. This program employs multiple tactics at a landscape scale to reduce the pest status and use of insecticides for whitefly management. It was this work that he summarized in his presentation entitled *Fifty Years if the Integrated Control Concept: Moving the Model and Implementation Forward in Arizona*, in which he addressed the question "Is IPM dead?". Ellsworth noted that IPM, 50 years after the publication of its core concepts by Stern et al., is still

Continued on page 21

Current Status of IPM in Iowa's Corn and Soybeans

The IPM landscape for corn has changed drastically over the last decade with the introduction of transgenic corn that produces insecticidal toxins derived from the bacterium *Bacillus thuringiensis* (Bt). Bt corn for control of European corn borer was introduced in the mid 1990s. More recently, Bt corn for control of corn rootworm is available. Today, greater than half of the corn in the U.S. contains one or more Bt toxins. With Bt corn, the research focus has shifted to a greater emphasis on insect resistance management (IRM). Currently, IRM strategies for corn consist of planting a non-Bt refuge to delay pest resistance. Beginning in 2010, some companies will stack multiple Bt toxins, with the hope that multiple toxins will delay pest resistance and reduce the acreage of non-Bt refuge that must be planted.

A central tenet of IPM is using multiple methods to control a pest population including biological control, cultural control, host-plant resistance, and insecticides. The cultural control practice of crop rotation continues to be an effective management tool for corn rootworm in Iowa despite the increasing prevalence of rotation-resistant northern and western corn rootworm. The use of soil insecticides to control corn rootworm has diminished considerably and has been replaced by Bt corn. The widespread planting of Bt corn, despite the availability of other IPM strategies, signals a worrisome trend away from the ideas espoused by Stern et al. A review of the global data on pest response to Bt crops reveals a very good track record of success but also three cases of field-evolved resistance. Stern et al. recognized backlash exhibited by pest populations when repeatedly challenged with a single control tactic. One wonders whether extensive Bt corn planting fits within this paradigm, with Bt corn becoming a victim of its own success, or whether current IRM guidelines will lead to the sustainable control of the major corn pests.

Soybean was domesticated in China and many of the insects that co-evolved with the plant did not establish in regions that currently produce the majority of soybeans (e.g., U.S., Brazil, and Argentina). Therefore, the majority of soybean insects in Iowa do so through novel

associations. In an *Annual Review of Entomology* article entitled *Ecology and management of soybean arthropods*, Kogan and Turnipseed (1987) noted: "Entire guilds are missing from the Western Hemisphere: foremost among them are such soybean-colonizing aphids as the soybean specialist *Aphis glycines* (the soybean aphid), a common pest in East Asia."

Recently, that niche was filled in Iowa as the soybean aphid established and altered soybean management practices. Before the arrival of soybean aphid, soybean received very little, if any, insecticides. After the arrival of soybean aphid, growers dramatically increased their use

of insecticides, ranging from 1 to 4+ million acres per year in Iowa. Although soybean aphid was

noted as an important soybean pest in its native range by Kogan and Turnipseed, its impact in the U.S. has been markedly greater. It is not surprising for an invasive species, like soybean aphid, to escape mortality factors from their native range to have remarkably different carrying capacities within their exotic ranges. The soybean aphid is not the only invasive species to attack soybean. For example, the whitefly, *Bemisia tabaci*, is established in many soybean growing regions; however, IPM for this well-studied pest is particularly difficult as it has a quickly developed resistance to several insecticide classes, making true IPM (i.e., incorporation of multiple tactics) necessary for its successful management.

Research by Drs. O'Neal and Hodgson have built on the past successes of their predecessors. Scouting plans, economic thresholds and efforts to increase pest management tools available to growers (in the form of exotic biological control agents and aphid-resistant soybeans) are all outcomes of the research and extension programs at ISU. These efforts are ongoing, but have recently been recognized by the USDA and the ESA Foundation by national awards to faculty at ISU and at multiple Land Grant Universities for the impact it has had on soybean production in the U.S. (See related article in Faculty Awards.)—Aaron Gassmann and Matt O'Neal

The challenge for developing management plans for soybean aphid is to produce recommendations that do not result in backlash.

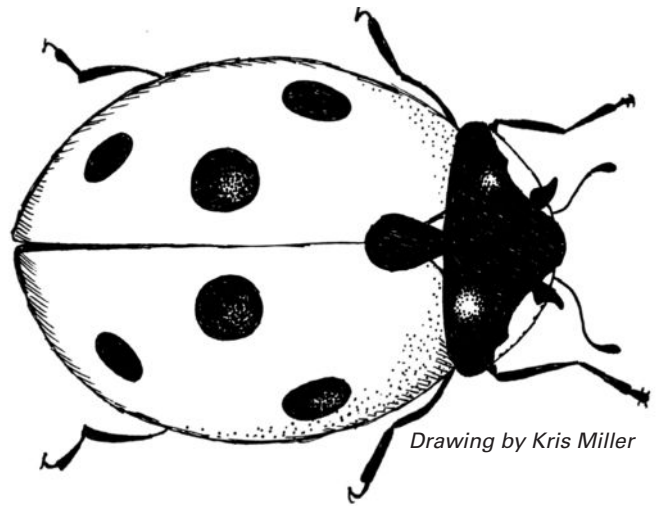
Ohmart: Impediments to IPM Adoption in California Specialty Crops

Cliff Ohmart of the Lodi Grape Commission in Lodi, California presented a seminar in the spring on "IPM in California Vineyards: The Good, the Bad and the Ugly", and in recognition of the 50th anniversary of IPM provided the following article.

Cliff Ohmart writes: The agricultural economy in California is very large and has an annual farmgate value of more than \$24 billion making it big business. It is also one of the birth places of Integrated Pest Management (IPM), with several University of California scientists helping define the concept and implementing some of the first programs. 2009 is the 50th anniversary of the publication of the Hilgardia paper by Stern¹, van den Bosch and Hagen that first laid out the IPM concepts.

In my opinion the level of IPM adoption in California and elsewhere is not as high as I would expect given we have been working at it for five decades. I have observed several potential impediments to grower adoption of IPM in California orchards and vineyards during my seven years experience as an IPM consultant working in orchard crops and 12 years experience working with 750 winegrape growers who manage about 100,000 acres of vineyards. Some impediments still exist and some are relevant to other parts of the U.S.: 1) Confusion over the definition of IPM; what might be considered IPM by one person may not be for another; 2) Many pest management programs are pesticide based, are efficacious and affordable; some growers may feel switching to an IPM based program is too risky; 3) Lack of guidance on how to implement IPM; we could have done a better job providing outreach to growers on how to implement IPM; 4) Lack of economic thresholds for many of our pests that are usable by growers; 5) Insufficient effort expended by growers and consultants on pest monitoring; 6) Lack of quantitative pest monitoring methods usable by growers and consultants in the field; 7) Lack of appreciation by growers and consultants of the value of quantitatively-based pest monitoring; 8) Pest management being a low priority in farm management-decision making; and finally 9) The

salaries of many pest management consultants are based on commissions from pesticide sales. There are valid reasons for these impediments and some will be very challenging to overcome. I will end with the observation that much of what compels a grower or consultant to make a particular pest management decision is based on the human psyche and perception of risk rather than on knowledge of the crop/pest dynamics. Focusing on this may help us increase the adoption of IPM on the farm.



Ellsworth, continued from page 19 a hotly debated paradigm for sustainable pest management. Although cotton is not a significant issue in Iowa, the management of hemipteran pests (i.e. the soybean aphid) within the context of IPM certainly is. Ellsworth described how his research with a team of USDA and land grant university entomologists has revealed how reduced-risk insecticides provide greater protection from whiteflies than conventional, broad-spectrum insecticides by conserving natural enemies. The phenomenon of a bioresidual may apply to soybean aphid management. Both pests are attacked by a variety of natural enemies which are negatively impacted by broad-spectrum insecticides. Such insecticides were replaced by more selective insecticides through Ellsworth's research and extension.

Opportunities to Give: Department of Entomology Donations

With the severe budget constraints at Iowa State University, the Department of Entomology is increasingly dependent upon the generosity of alumni and friends. To support the department, please fill out this section and return it with your check or money order (made out to The ISU Foundation) to Iowa State University, Department of Entomology, 110 Insectary, Ames, IA 50011. Alternatively, donations can be made online at <https://sws.foundation.iastate.edu/give/online/> (please specify Entomology and the name of the account in the "Other" category).

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- _____ **Fred Clute Memorial Entomology Fund** for general support for the Department of Entomology including The Entomology Student Scholarship for Student Excellence
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Mail this form and payment to:
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THANK YOU!!!



IOWA STATE UNIVERSITY
Department of Entomology

Entomo-silliness

The department's tradition of a holiday party at the end of the fall semester continues. The party now includes lots of good potluck food, games and door prizes, presentation of student awards, and an entomology-themed contest. Three years ago the contest was to design an insect image suitable for a signature block using characters on the computer keyboard. For example,

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Two years ago the contest challenge was to create a license plate (limited to only 7 characters or spaces and only the 26 letters and the 10 numerals) that conveyed an insect-related idea. (See associated article, page 26.) This year's contest was a bit more challenging. Faculty, students and staff were asked to create an entomology sniglet, a word that does not exist in the dictionary but should, or to redefine an existing word into a new, entomology-related meaning. The winners of the 2009 competition were:

Third place (tie): "between" - an 11 to 12 year old bee that has yet to reach puberty, from **Jonathan Childress**.

Third place (tie): "Innovasive" - Describing both the innovative and invasive, submitted by **Wendy Sparks**.

Second place: "Paramount" - displaying two insects at once on the same pin, by **Greg VanNostrand**.

First place: "Philarthropy" - exhibiting behaviors that benefit arthropods and the people who study them, sent in by **Lyric Bartholomay**.



Cockroach races at the 2009 Insect Film Festival.



Aphid bean-bag toss.



The Insect Zoo educates over 16,565 kids a year with hands-on programming!

The Insect Zoo Spreads Its Wings

The Insect Zoo continued to spread wisdom across the state of Iowa in 2009. In addition to the standard educational programming, the Insect Zoo display drew thousands of visitors during VEISHEA. Incredible insect crafts, hissing cockroach races, aphid-tossing (bean-bag style), and a hands-on critter exhibition combined to make it a memorable day for everyone involved. The Insect Zoo “wowed” Iowa State Fairgoers with a hands-on exhibition in the 4-H Exhibits building. Iowans had the opportunity to view, and interact with, remarkable creatures native to Iowa as well as from around the world while learning about their ecology.

The Insect Zoo is also excited to be collaborating with Greg Courtney and Kevin Molton (University of Tennes-

see) to provide the educational component of an NSF Partnerships for Enhancing Expertise in Taxonomy grant. The grant focuses on enhancing the taxonomic and phylogenetic knowledge base of net-winged midges (Diptera: Blephariceridae). The Insect Zoo will facilitate educational and outreach activities that will utilize aquatic insects as a foundation for the development of

programming on life cycles, water quality, biodiversity, and adaptation to aquatic environments. Program development will target the needs of Iowa and Tennessee middle school and high school students but could have applications both nationally and internationally.



Featured Postdoctoral Student: Susan Moser

As a new undergraduate at Iowa State University, my academic goals did not include Entomology. I was destined, or so I thought, towards veterinary school. My career goals soon changed after taking an elective insect biology course taught by Dr. Elwood Hart. Due to his excellent teaching and persuasive power, I soon found myself headed full steam ahead towards the Insectary. Although my bachelor's degree was in Animal Ecology, I had completed an independent study project with Dr. John Obrycki examining interactions amongst coccinellids as an undergraduate. This initial introduction to Entomology greatly influenced



my subsequent research, in which I have examined the ecology and behavior of predators and parasitoids during my M.S. (ISU, 2003) and Ph.D. (University of Kentucky, 2009) research, both under the direction of Dr. John Obrycki. As a postdoctoral researcher with Dr. Richard Hellmich, USDA-ARS, I am excited to be back in Ames and learning a new system and studying herbivore behavior in agroecosystems. I am also thrilled to be once again affiliated with the

Department of Entomology at Iowa State University. As a graduate student, I cheered for the local college teams (Go Illini and Wildcats!), but there is nothing as great as a Cyclone.



Insect Film Festival

The annual Insect Film Festival hosted by the Entomology Graduate Student Organization on October 20th was attended by about 70 people. In 2009 the Entomology Graduate Student Organization (EGSO) hosted the event at Reiman Gar-

dens. The event featured hands-on Insect Zoo displays, tours of the Christina Reiman Butterfly Wing, cockroach races, insect crafts, and the movie *A Bug's Life*.



Missy Rynerson, Laura Winkler, Kelly Seman, and Mike McCarville helped promote insects at the Film Festival.

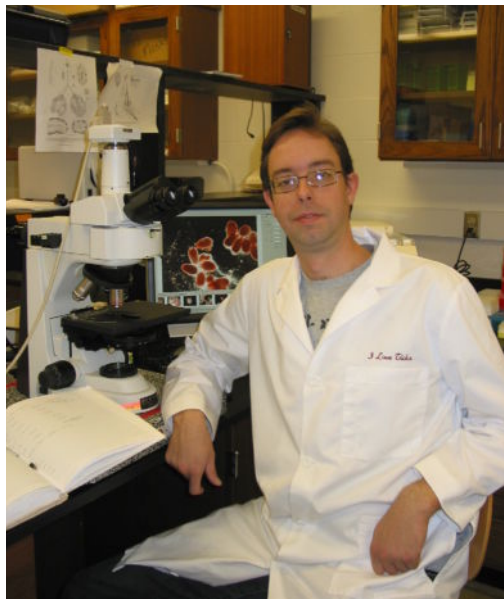


Mike Dunbar and Rene Cooklin show off the Insect Zoo.

Featured Graduate Student: Jon Oliver

Jon Oliver received his undergraduate degree in physical anthropology and Scandinavian languages from the University of Oregon. Prior to attending graduate school, he worked as a field archaeologist on numerous prehistoric excavations in the Midwest and as an ESL (English as a second language) instructor overseas.

He joined the Medical Entomology Lab to work with Lyric Bartholomay. Since 2006, he has been studying variations in immune responses between tick species to injected pathogens for his Ph.D. program in entomology. Recently, Jon has been developing techniques to quantify the phagocytosis of foreign bodies by hemocytes in a broad range



of arthropod taxa including insects, arachnids, and crustaceans. He also identifies ticks submitted to the Lyme Disease Surveillance Program, performs field surveillance for blacklegged ticks at lowa focal sites for this medically important species, and reports his surveillance findings on the medical entomology website and in extension publications.

Jon has been living in Ames since 2005 with his wife who is from South Korea. When he's not working, he enjoys hiking, cooking, reading, and spending time with his friends and family. He loves to travel and has lived in four foreign countries: Australia, France, South Korea, and Sweden.



Entomological Vanity Plate Competition

Thank you to all who submitted entries for the Vanity Plate Competition. Donald Lewis judged 59 entries. The finalists were: O2BABUG, O2CABUG, BUGNYO, PROBO6, BUGLUVR, PSTICYD, FLEZPLZ and the winner was IMN2NSX (I am into insects), submitted by Marlin Rice.

From Jim Mertins: Here is a photo (right) of my personal auto license plate for your contest, which I read about in the entomology departmental newsletter. I am a former faculty member of the department, but I now work at the USDA-APHIS National Veterinary Services Laboratories on the east side of Ames, where I identify animal parasites, especially ticks.



Entomologist and Actor



Brendan Dunphy

Entomology department research associate **Brendan Dunphy**, who earned bachelor's degrees in zoology, animal ecology and entomology in 2007, stars in the new feature film, *16 to Life*, which earned rave reviews

when it debuted at Iowa City's Landlocked Film Festival in August. Dunphy is part of ISU's mosquito surveillance program, working with Lyric Bartholomay. Since his first acting role as the lead in *James and the Giant Peach* in 2005, Dunphy has appeared in a number of commercials, corporate videos, films and theater productions, including an Iowa State *Choose Your Adventure* commercial. He has also acted in the films *The Offering* and *The Yin of Gary Fischer's Life*. Dunphy set up a Des Moines-based theater company, Mooncoin Entertainment, in 2009, where he produced a series of five plays on the works of Irish playwright Martin McDonagh.

Live Healthy Iowa

In the spring of 2009, ISU took the 100 day Live Healthy Iowa Challenge to heart, leading Iowa and UNI with the most participants (849). Three teams from the Department of Entomology signed up for the challenge (6LGSRUS, Diabrotica Heavyweights, and EntExt). The participants for team 6LGSRUS were faculty **Lyric Bartholomay, Greg Courtney, Matt O'Neal, and Bryony Bonning**. Diabrotica Heavyweights was comprised of Entomology graduate students **Fan Tong, Gretchen Paluch, Mike Dunbar, Jen Anderson, Ian Murphy, Ashley Jessick, Rebecca Sam, Nick Behrens, Aaron Gross, and Mike McCarville**. Of the 124 ISU teams, 6LGSRUS ranked 14th with a total of 362 hrs 30 min of exercise for the team, averaging 90 hr 37 min over 100 days. The Diabrotica Heavyweights came in 38th with an average time of 57 hrs 55 min and total team time of 579 hrs 15 min. Overheard from a member of the Diabrotica team "We are losing to the faculty. They are old and stuff. We can't lose to old people. First softball, now this, next life."



Team Members of 6LGSRUS: Greg Courtney, Bryony Bonning, and Lyric Bartholomay (Matt O'Neal not shown).



Faculty and Staff *Almost* Win Annual Softball Game

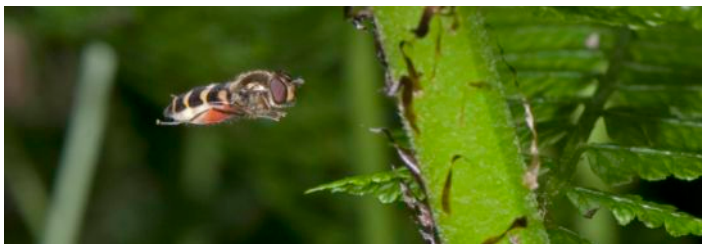
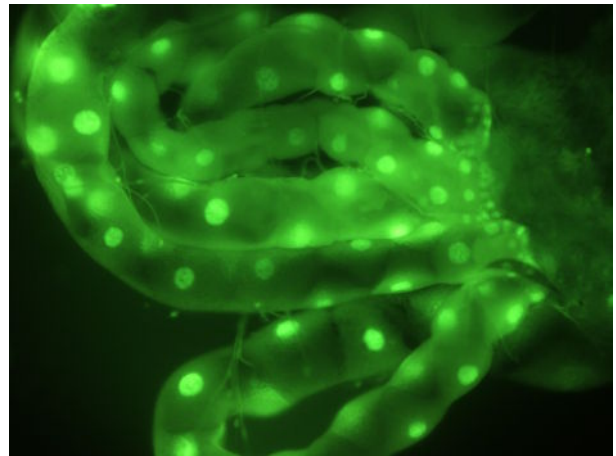
In the annual graduate students versus faculty/staff softball match, the graduate students were victorious. Graduate student Mike Dunbar gave a 'fair and balanced' summary: "It was a

hard(ly) fought contest, but in the end the grad students overcame the faculty 19-10." Dunbar suggested that the students 'kick-off' the spring with a kick-ball challenge against the faculty.



Front: Kelly Kyle, Aislinn Bartholomay, Jean Dyer, Joey Dyer, Matt O'Neal, Erin Hodgson, Donald Lewis, Mike Dunbar, Adam Varenhorst, Jon Childress; Back: Kenny Kyle, John Holscher, Pat Weber, Ada Bartholomay, Lyric Bartholomay, Christian Bartholomay, Beth Coates, Brad Coates, Aaron Gassmann, Jeremy Kroemer, Joel Coats, John VanDyk, Ken Holscher, Jon Tollefson, Missy Rynerson, Kevin Johnson, Ryan Keweshan, Grace Sward, Ian Murphy, Mike McCarville.

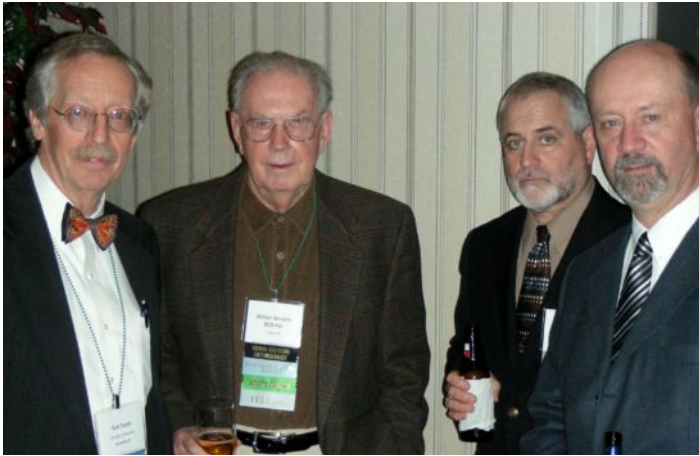
Insect Photo Competition Continues



First place (top left): "A hungry fly" by Greg Courtney; Second place (top right): "Aedes triseriatus malpighian tubules stained with acridine orange" by Paul Airs (Bartholomay Lab); Third place (bottom): "Safe landing" by Greg Courtney. Photos were once again judge by ISU photographer Bob Elbert.



Alumni Mixer



Tom Turpin, Bill Showers, Kevin Steffey, Mike Gray.



Karla Gomez, Patti Prasifka, Rick Hellmich, Nick Behrens, Luis Gomez, Jarrad Prasifka.



Henry Fadamiro, Russ Jurenka, Bryony Bonning, Bobby Boozer (guest), David Shapiro-Ilan.



Jessica Petersen, Matt Petersen, Nina Schmidt, Aaron Gassmann.

View more alumni mixer photos on the web at <http://www.ent.iastate.edu/alumni>

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