



IOWA STATE UNIVERSITY Department of Entomology

January 2008 Newsletter
For Alumni and Friends



IOWA STATE UNIVERSITY

Pedigo Honored with Entomological Foundation Medal

Larry P. Pedigo was awarded the first Entomological Foundation Medal “in recognition of outstanding service and dedication in the field of entomology.”

The medal was presented by Foundation President George Kennedy and Entomological Society of America President Scott Hutchins during a \$100 per person dinner and dance that was attended by more than 170 friends, colleagues, and former students.

Before the medal presentation, Hutchins delivered an insightful and humorous reflection on Pedigo’s life and how events and people had influenced his career in entomology.

Earlier in the day, a symposium, “A Career of Innovation, Initiative, and Influence: Honoring Larry P. Pedigo,” was presented by former students and colleagues. —Marlin E. Rice



Former students of Larry Pedigo were on hand to honor him at the Entomological Foundation dinner in San Diego. Left to right: Joe Funderburk, Paula Davis, Steve Lefko, Tom Myers, Leon Higley, W. K. Frankie Lam, Mike Zeiss, Wilmar Morjan, Larry Pedigo, David Buntin, Lamar Buckelew, Rayda Krell, Carol Pilcher, Ron Hammond, and Scott Hutchins.

Coats Elected Fellow of ESA



ESA President Scott Hutchins presents the Fellow’s award to Joel Coats.

Joel R. Coats, a faculty member in the Department of Entomology for 29 years, was recently elected as a Fellow of the Entomological Society of America.

Fellows are elected by the Governing Board of the Society based upon their outstanding contributions in research, teaching, extension, or administration. The October *ESA Newsletter* summarized his career as follows:

“He served a five-year term as Department Chair and is currently Interim Chair of that department. Continued on page 2

Rat Population In Story County Is Under Survey

Story county is one of two counties in the state in which a county-wide farm rat population survey will be made during January, it was announced today.

The survey is to be made by Iowa State college extension entomologists, vocational agriculture teachers and the county extension service in cooperation with farm-

Rat control was a part of ISU Extension Entomology’s rich history. Details on page 10.

Sesquicentennial Seminar Speaker: Dr. Glenn King

The 2007 Entomology sesquicentennial seminar speaker and the 16th Paul A. Dahm Memorial Lecturer in Entomology was Dr. Glenn King, Professorial Research Fellow, Institute for Molecular Bioscience, University of Queensland, Australia.

Dr. King's seminar was titled, "Itsy Bitsy Spider Toxins and Their Potential for Insect Control." For the past 10 years, his research has focused on the structure, function, and potential insecticidal applications of peptide toxins expressed in spider venoms.

His work has been instrumental in unraveling the extraordinary complexity of spider venoms, the roles played by different classes of peptide toxins in immobilization of arthropod prey, and the mechanism by which spiders evolved complex repertoires of peptide toxins.

Current work in his lab is challenging the long-standing paradigm that peptide toxins from venomous animals are unlikely to be useful insecticides



Bryony Bonning, Lyric Bartholomay, Glenn King, Joel Coats and Russ Jurenka after King's sesquicentennial seminar.

because they are incapable of penetrating the insect digestive system. However, Dr. King has shown that peptidic spider toxins are orally active in insects and that they can breach the insect blood-brain barrier. —*Bryony Bonning*

Coats, continued from front page

Joel's areas of research and teaching specialization are insect toxicology and the environmental toxicology and chemistry of pesticides. A native of Ohio, Dr. Coats received his B.S. degree in zoology (chemistry minor) from Arizona State University, and he received his graduate degrees in entomology (chemistry minor) from the University of Illinois, specializing in insecticide toxicology, as a student of Robert L. Metcalf. He was a visiting professor in the Department of Environmental Biology at the University of Guelph, Ontario, Canada, for two years.

"He has served as major professor for 36 graduate students who are currently employed in the fields of entomology or toxicology. His scientific

publication record includes seven books, 31 book chapters, six review articles, and 117 articles in peer-reviewed journals. Dr. Coats teaches all or portions of five graduate-level courses in the area of insect toxicology or environmental toxicology and chemistry. He is also a Fellow of the American Association for the Advancement of Science. In 2006, he received the International Award for Research in Agrochemicals from the American Chemical Society's Agrochemicals Division."

Congratulations to Joel on attaining this distinction of honor and representing our department well. —*Marlin E. Rice*



From the Chair's Perspective

In 2008, Iowa State University is celebrating the 150th anniversary of its founding, which will be marked by many special events on campus. In the Department of Entomology, we are celebrating the 127th year of entomology being taught as a course, and we will have sesquicentennial seminar speakers during the year. Iowa State has announced a major fundraising campaign in conjunction with the 150th anniversary, called Campaign Iowa State: With Pride and Purpose.

I want to express our department's heartfelt thanks to Jon Tollefson for his service to us as chair for the past 3 years. His dedication, diplomacy, and good judgment have served us very well as our department continues to evolve and thrive. This year, we are searching for a new department chair, while I serve as interim chair. Jon will continue to teach and participate in research and extension activities as well.

We are all excited about the new assistant professor arriving in January to take over primary responsibility for research and teaching in the area of corn insect pest management. Our newest faculty member is Aaron Gassmann from the University of Arizona in the Department of Entomology, where he has been a postdoctoral research associate studying resistance management in transgenic crops, primarily cotton. He previously served in a postdoctoral capacity in the Department of Entomology at the University of California, Riverside. He received his Ph.D. at the State University of New York-Stony Brook. Aaron is a native of Dubuque, IA, and

We are celebrating the 127th year of entomology courses at Iowa State.

received his undergraduate degree at the University of Saint Thomas in St. Paul, MN. He plans to establish a vigorous nationally and internationally recognized research program focused on integrated pest management and integrated resistance management of soil-borne pests of corn.



Joel Coats

Corn and soybean are both high profile as the state and the country focus on biofuels as renewable energy resources. The bioeconomy as a whole, and biofuels for example, are receiving considerable attention and new funding for ISU, from the state legislature and energy companies. The new emphasis on biofuels production, processing, use, and environmental impacts is driving several new programs on campus and heightens the importance of our crop protection objectives.

Our students continue to be hired into excellent jobs in the workforce, and they continue to make important contributions to the profession and our society after they have completed their degrees. We are extremely proud of our alumni as they reflect so positively on our department. Please keep in touch with us, and stop in to see us if you are in the neighborhood. Best wishes for 2008. —Joel Coats, Interim Chair

Bartholomay Publishes in Science

Lyric Bartholomay is part of the international team that identified 350 genes in the immune system of a tropical disease-transmitting mosquito and looked at their evolution compared with two other species. Their paper was published in the June 21 edition of *Science*.

Bartholomay was invited to the team of 35 scientists because of her expertise in a component of the immune response in certain disease-transmitting mosquitoes. For several years, she has researched

antimicrobial peptides, small proteins that are activated when an adult mosquito is infected with bacteria and other pathogens.

"Understanding how the mosquito responds when it is infected with a particular pathogen will help us understand how a human responds to infection," Bartholomay said. "And it can potentially help us come up with some new ways to control infection and the transmission of disease agents from the perspective of the mosquito."

Plant Sciences Institute Takes on the Soybean Aphid

Iowa suffered extensive outbreaks of soybean aphids this past year. Millions of acres of farmland were sprayed to control the pest, because if

left untreated, aphids can reduce soybean yields by up to 40%. To develop new tools for managing soybean aphids, the ISU Plant Sciences Institute has launched a new project in the Crop Protection Research Initiative.

Funding from the institute and the Iowa Soybean Association supports Allen Miller (Plant Pathology) and Bryony Bonning (Entomology). Nina Richtman Schmidt in the Bonning lab, in conjunction with the O'Neal lab (Entomology), coordinated the collection of thousands of soybean aphids during the summer to screen for aphid viruses that may have potential for use in soybean aphid management.

In addition, Bonning and Miller will develop a virus-based tool called virus-induced gene silencing (VIGS) to characterize aphid gene expression. Using a virus to introduce an aphid gene of interest, the host will see it as an "alien gene" and destroy that gene and its own in the process.



Allen Miller and Bryony Bonning examine a soybean aphid colony. Photo: Bob Ebert.

Iowa Insect Survey Project Starts Adopt-a-Trap Program

The Adopt-a-Trap: Iowa Insect Survey Project was born from a paucity of knowledge about the distribution and identity of insects in Iowa. A survey such as this has not been conducted in Iowa since the 1940s, and at that time, it was preliminary at best.

To effectively monitor the impact of environmental change on insect diversity, baseline data on the resident fauna are critical. In 2007, we initiated the Adopt-a-Trap project by sampling insects using Malaise traps at locations across Iowa.



Malaise trap and catch from the Iowa Insect Survey.

whereby students, educators, and the public will have access to information on the insects of Iowa, including a checklist of insect families.

We are currently in the process of sorting, identifying, and sending specimens to amateurs and specialists. Individuals interested in collecting, sorting, and identifying specimens should contact Jessica Davis at jdd@iastate.edu or (515) 294-1815 for more information. —Jessica Davis



Jessica Davis



News from Alumni

Celso E. Mendoza, Ph.D., who arrived at ISU in 1959 and obtained his M.S. and Ph.D. under the direction of the late Dr. Don Peters, writes: After ISU, I went to Cornell University to join Dr. Bernard V. Travis as a research associate in medical and veterinary entomology. The late Dr. Travis was an ISU Entomology graduate. Then, I went to Ottawa with a postdoctoral grant from the Canada National Research Council. I now live in Victoria, British Columbia, Canada, after my retirement. I am still active in environmental toxicology, volunteering my expertise in the phasing out the use of synthetic pesticides in foods and the environment.

Luis Gomez (ISU student 1995-1998) and **Karla (Walker) Gomez** (ISU student 1996-1998) moved to Guatemala where Luis worked for Dow AgroSciences in several roles in the Research and Development area. In 2007, they moved to Indianapolis, IN, where Luis has taken a position in the Global Headquarters as Technical Expert for Insecticides in the North America Region. Karla and Luis now have two girls, Nicole (3 years) and Samantha (2 years) and are living in Carmel north of Indianapolis.

Dan A. Wolfenbarger, Brownsville, TX, writes: You wanted to know about my learning experiences at ISU. They were all good. I received my M.S. from ISU in December 1957 and was there from January 1956. Tom Hibbs was my advisor. I came to ISU from the University of Florida (UF). I left ISU and transferred to Ohio State University where I was granted a Ph.D. in 1961. I have been retired from the USDA-ARS since 1995. I thoroughly enjoyed my ISU experience because it was a super school. I took statistics and plant science courses because I was an entomology major at UF where I took most all the entomology courses that were offered to undergraduates from 1952 to 1956. My statistics kept me in good stead for my years of employment. I took enough entomology at ISU to graduate. I enjoyed them all. The history of entomology by H. H. Knight was the most enjoyable. Immature insects was also interesting but I forget the instructor.

[The instructor was either Slater or Laffoon. -Ed.]

Hutchins is ESA President

During 2007, Scott H. Hutchins (Ph.D. 1987) served as president of the Entomological Society of America (ESA). Hutchins was instrumental in providing leadership to the governing board and membership during the past several years in directing the society toward a historic restructuring and renewal. Hutchins capped off the year with an incredible annual meeting in San Diego under the theme, "Making Connections: Innovation, Initiative, and Influence." During this meeting, annual membership exceeded 6,000 members with 2,825 registered attendees—both of which are modern records for the society. It is an incredible honor for our department to have a former student elected to a position of leadership within the largest entomological society in the world.



Scott Hutchins

In addition to Hutchins, several other Iowa Staters have served as ESA president over the years: Harry Knight (1948), George Decker (1955, Ph.D. 1944), Frank "Tom" Turpin (1992, Ph.D. 1971), and Kevin Steffey (2004, Ph.D. 1979). —*Marlin E. Rice*

Keep in Touch!

Please let us know whether 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, Department of Entomology, Iowa State University, 418 Science II, Ames, IA 50011-3222; Fax: (515) 294-5957; e-mail: bbonning@iastate.edu.

ISU Entomology Newsletter for Alumni and Friends is produced by the entomology faculty and staff at ISU. This newsletter, previous issues, and additional photographs are online at

<http://www.ent.iastate.edu/alumni>

Visit our departmental web site at

<http://www.ent.iastate.edu>



Student Awards

The 2007 Harold Stockdale Memorial Scholarships to undergraduates majoring in entomology were awarded to **Brendan Dunphy** and **Kelly Seman**. These scholarships for \$500 each were awarded based on promise for a career in entomology.

The 2007 Department of Entomology Herbert Osborn Award for Professional Performance was awarded to **Keri Henderson** (Ph.D. category). She conducts research with Joel Coats. In addition, Keri won first place in the Ph.D. Student Platform Competition at the Ozark-Prairie Regional Meeting of the Society of Environmental Toxicology and Chemistry. Keri also received second place in the Student Poster Competition of the Agrochemicals Division of the American Chemical Society National Meeting in Boston, MA, in August.

The 2007 recipient of the Wayne A. Rowley scholarship was **Jon Oliver**. This scholarship provides \$1,500 to students with preference given to applicants concentrating on medical entomology. Jon is a graduate student working with Lyric Bartholomay.

Nina Richtman Schmidt was awarded the 2007 Richardson Research Incentive grant for her proposal "Investigation of the physiological impact of a *Bacillus thuringiensis* toxin on the black cut-



Nina Richtman Schmidt received the 2007 Richardson Research Incentive grant.

worm that enhances baculovirus pathogenicity." Nina received \$2,500 toward research costs. Nina also received a Graduate Research Award in

Continued next page

Faculty and Staff Awards

The 2007 Entomology Graduate Student Organization (EGSO) Recognition Award was presented to **Bryony Bonning** in recognition of her commitment and dedication to the department and its members.

Junwei Zhu, Adjunct Assistant Professor and MSTRS Technologies, Inc., received an award in June from the Iowa Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) program for Most Innovative SBIR Award.



EGSO's Gretchen Paluch (president) and Wayne Ohnesorg (treasurer) present Bryony Bonning with the EGSO Recognition Award.



Student awards, continued

Microbiology for the same proposal. This award will pay for part of her 2008 stipend. Nina is a graduate student in the laboratory of Bryony Bonning. Nina also received an Iowa State University Teaching Excellence Award. This award recognizes the accomplishments of the top 10% of teaching assistants.

Nick Schmidt won a President's Prize for best poster at the 2008 annual meeting of the Entomological Society of America in San Diego. The poster reported the first year of a project to estimate the contribution of tallgrass prairie to the beneficial insect community in soybean fields. Nick works in the laboratory of Matt O'Neal.

Nisus Corporation, in conjunction with the Professional Women in Pest Management (PWIPM), awarded their Annual \$2,500 Scholarship for a female graduate student interested in a career in the urban pest control industry to **Gretchen Paluch**, (pictured on opposite page), a graduate research assistant in the ISU Department of Entomology. Gretchen is a Ph.D. student; she also received her B.S. and M.S. degrees from ISU. She is studying natural insecticides and repellents for mosquito control.



Bryony Bonning, chair of the Student Awards and Scholarships Committee, presents Jon Oliver with the 2007 Wayne A. Rowley Scholarship.

Gretchen may use the scholarship to defer a portion of the costs of graduate school. The award also included \$500 toward travel expenses to attend the National Pest Management Association's 2007 PestWorld in Orlando, FL.



Keri Henderson received the Herbert Osborn Award for Professional Performance.

ICM Newsletter Authors Receive Award

The publication *Integrated Crop Management: Special Issue Corn Following Corn*, published February 12 by Iowa State University, was selected for recognition in the 2007 American Society of Agronomy (ASA) Educational Materials Awards Program. The authors of this publication included Dean **Wendy Wintersteen**, **Jon Tollefson**, **Rich Pope**, **Benjamin Kaeb**, **Patricia Prasifka** and **Marlin E. Rice**. The award was presented at the ASA meetings in New Orleans.



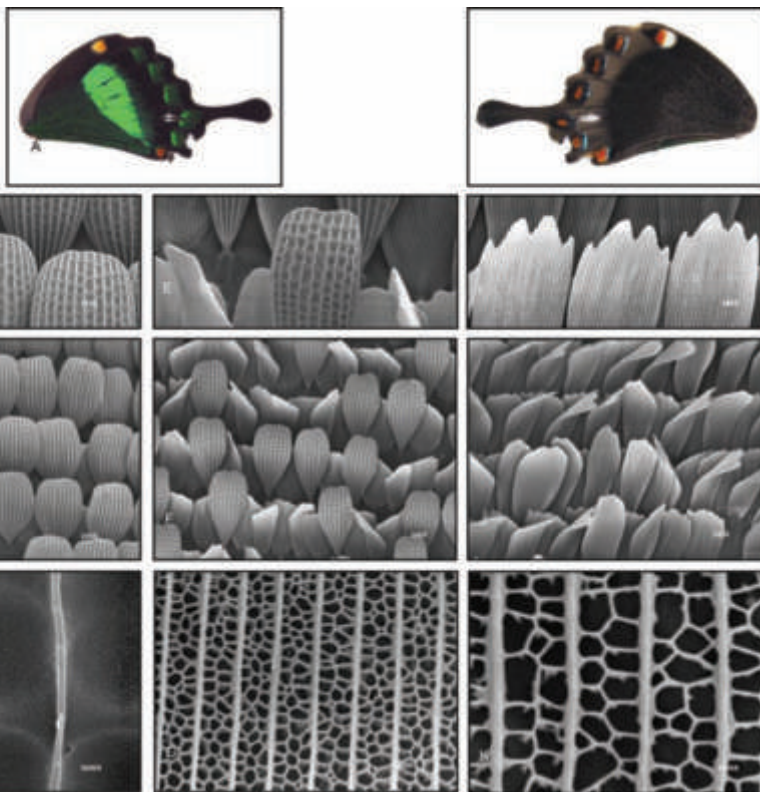
Students Study Butterfly Wing Ultrastructure

Students taking the graduate course Scanning Electron Microscopy, taught by University Professor Harry T. Horner, often are in search of interesting subject matter. The Department of Entomology's Dr. Mary Harris was asked by Dr. Horner and two of the graduate students, Heather Babka and Sugun Cai, if there was a project they could work on involving butterflies.

Harris, the founding curator of the Christina Reiman Butterfly Wing, suggested looking at the fine structure of wing scales of butterflies exhibiting both pigment and structural coloration, specifically to compare scales from species in different families exhibiting these traits. Babka and Cai were given wings from *Papilio palinuris* (Papilionidae) and *Morpho peleides* (Nymphalidae), which they prepared and photographed.

Each student was struck by the beauty of the wings they could perceive with the naked eye and further by the beauty revealed with microscopy.

In a poster prepared as their final project, Babka and Cai state, "the multicolored iridescent and non-iridescent wings provide beauty that is further enhanced by the use of a digital camera,



Papilio palinuris wings shown with SM and SEM. A-G represent the upper side of the wing. B-D are iridescent parts. E-G are non-iridescent parts. I-K represent non-iridescent, lower side of the wing.

stereomicroscope (SM), and scanning electron microscope (SEM). Images from these microscopic instruments illustrate the color and the fine structure of portions of the wings (scales)."

A sample of their work is shown above. —Mary Harris

Department of Entomology, October 2007



Go to <http://www.ent.iastate.edu/about> and move your mouse over a person to find out who it is.



Rice Leads Third Field Trip to Tanzania

“This trip was unbelievable—it gave me the opportunity to see and do many things that may not have been possible otherwise.” “Beautiful, vast, wild, natural—I guess I thought it would be all these things but I was overwhelmed by the scale.” “The trip gave me a renewed sense of wonder and passion for wildlife.” “There is nothing I can ever do that will be like this.”

These are just a few of the comments made by students that participated in Biology 394, International Field Trip in Biology, Natural History of the Serengeti. Marlin Rice led his third field trip to east Africa during May 7–23 where the class visited Serengeti, Tarangire, and Lake Manyara national parks, Ngorongoro and Olmoti craters, and the active volcano Ol Doinyo Lengai (Mountain of God). Students experienced four different ecosystems, recorded observations on the wildlife and

bird fauna, visited an AIDS orphanage, and interacted with the Maasai.

The class consisted of 17 students, six of which were entomologists: graduate students Nina Richtman, Nick Schmidt, Matt Wihlm, recent graduate Brendan Dunphy, undergraduate Maegan Oelmann, and alumnus Clint Pilcher.

Highlights of the trip included observing the Serengeti zebra/wildebeest migration, lions hunting wildebeest in Ngorongoro Crater, hot-air ballooning along the Serengeti’s Seronera River, a midnight climb of Ol Doinyo Lengai, visiting a traditional Maasai village, interacting with the children at the orphanage, and bushwalks through jungle gorges and acacia savannas. The class also squeezed in a little entomology by climbing a termite mound, photographing dung beetles, and capturing scorpions. —*Marlin E. Rice*



Top: Brendan Dunphy and Matt Wihlm, teaching assistants, strike a “classic” safari pose during the field trip. Bottom: Anna MacDonald is impressed by the size of the giant dung beetle. Left: Maegan Oelmann photographs a lion hiding behind her vehicle during a wildebeest hunt in Ngorongoro Crater.



Rats, DDT and Extension Entomology at Iowa State

On May 8, 1914, President Woodrow Wilson signed the Smith-Lever Act and called it “one of the most significant and far-reaching measures for the education of adults ever adopted by the government.” Congress had stated the purpose of the Act was “to aid in dif-fusing among the people of the U.S. useful and practical information on subjects related to agriculture and home economics, and to encourage the application of the same.” It was from this auspicious beginning that the Cooperative Extension Service was formed.

By 1917, Iowa State College had embraced the Act and employed E. V. Walter as its first extension entomologist. Walter wrote

in his second annual report, dated July 11, 1919, that “Extension work in Entomology in Iowa has been done under a considerable handicap this past year. The influenza epidemic in October and November closed all public meetings in the state and restricted travel to some extent. Later in February and March,

the roads were in such a shape as to be impassable except to pedestrians and on this account a number of meetings were postponed two and three times and some finally given up entirely. On one occasion it required two days to make a farm visit

eight miles from town.” The influenza had been a serious problem and reliable estimates indicate that 550,000 U.S. citizens died the winter of 1918–1919. In spite of disease and bad roads, Walter and his assistant, H. E. Jaques, had spent 119 days in the field, held 55 meetings, visited 273 farms, and reached 3,061 Iowa citizens.

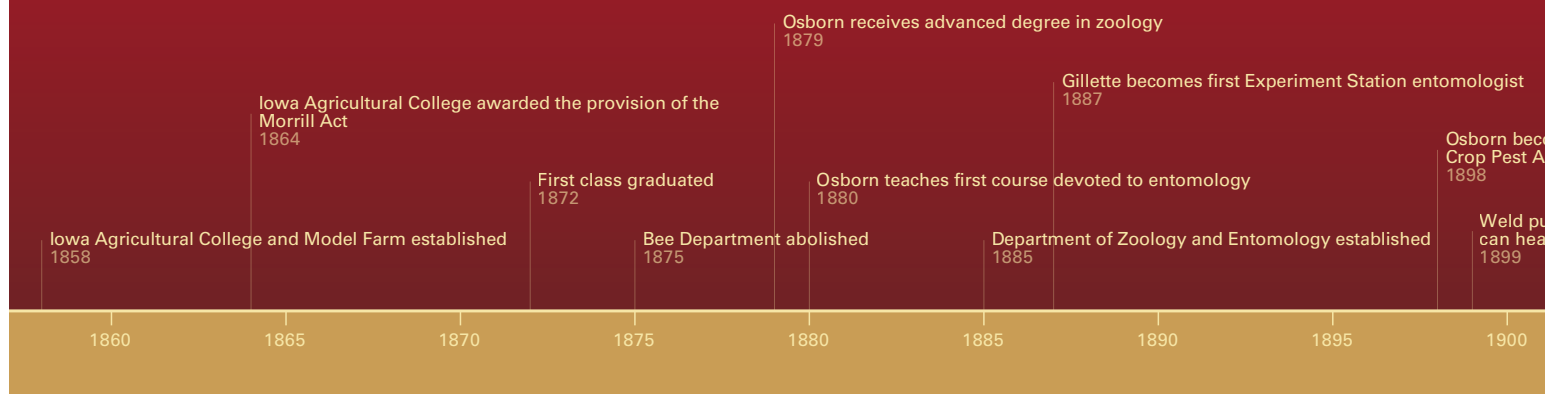
The study of insects was originally combined in

the Department of Entomology and Zoology and for reasons that will most likely remain a mystery to us, Extension entomologists were given responsibility for rat control. Fred D. Butcher wrote in his 1922–1923 annual report that “... 45 counties were visited during the year. In presenting a project on



An applicator for granular insecticide or poisoned bait. C.J. Drake (left) and C.H. Richardson. October 3, 1938.

Iowa State University Timeline of Entomology



the control of injurious insects and rodents, 134 meetings were held with an attendance of 3,475 people.” He noted that “The ‘Des Moines Register’ again sponsored a statewide ‘Rat Campaign’ carried on during the last two weeks of March. Good interest was shown with a kill of 598 rats taking the prize.” On-farm wooden corn cribs were notorious for holding large numbers of rats, and in his 1927 report, Butcher wrote that during one farm demonstration he dug out 110 rats.

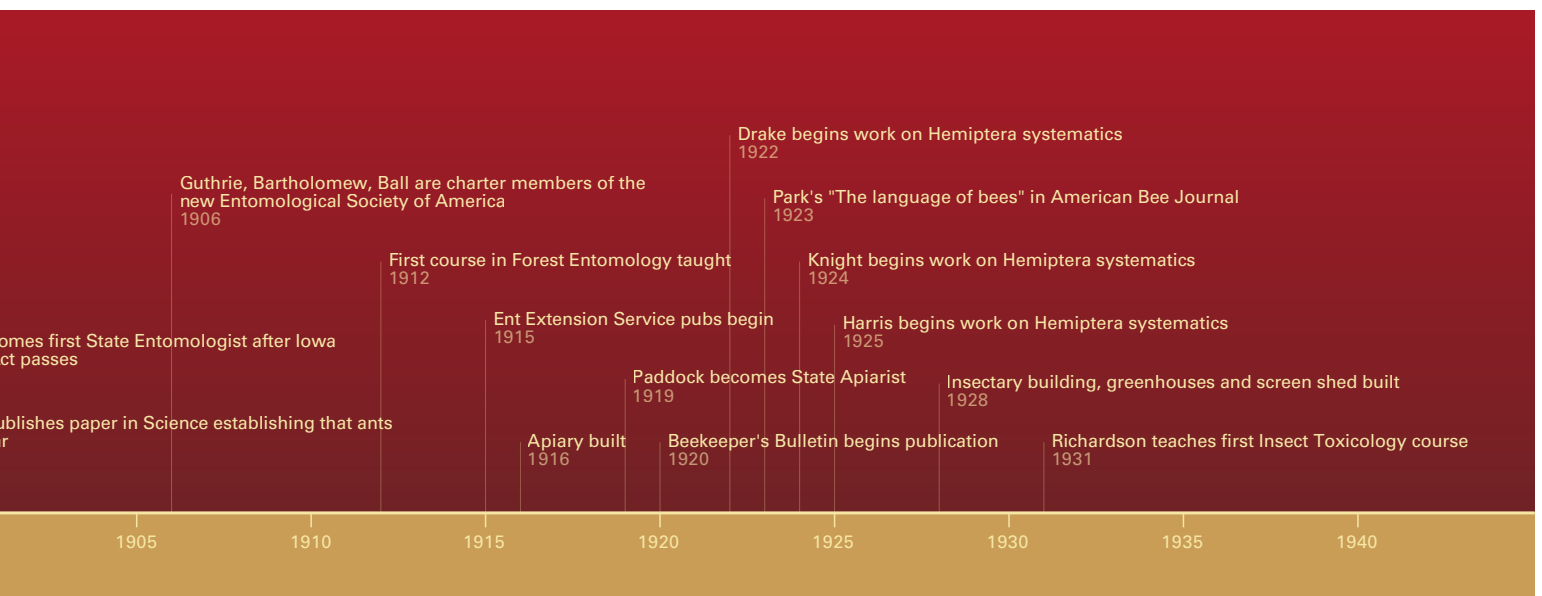
In 1934, chinch bugs were devastating grain crops in at least 50 Iowa counties. Extension entomologist A. D. Worthington stated that “even though an organized campaign was conducted the damage caused by the insect amounted to some \$20,000,000.” He confessed “that after three years of careful study with the bugs I know very little about controlling them.” He had conducted 178 meetings and demonstrations with a total attendance of 19,532 persons during the year on all aspects of entomology, and probably rat control as well, and even though resistant crops were recommended, a ditch filled with liquid creosote along field borders was the standard control method. The chinch bug problem apparently went unabated for several more years. Extension entomologist H. D. Tate noted in his 1938–1939 annual report that “... 1,512 farmers used 55,204 gallons of creosote to maintain nearly 1,000 miles of barrier in chinch bug control.” Tate and his colleagues had conducted 221 meetings during the year and he answered 770 letters! He apparently resigned that same year.

In 1942, an insect that would have consequences for decades to come invaded Iowa. The European

corn borer devastated grain production in the state and after World War II, chemical control became a major tool in managing this pest and preventing yield loss. DDT was widely used in 1950 and Extension entomologist Harold Gunderson sent a letter to county extension directors reporting on farm activities for the year. He noted that “... 1,301,250 gallons of 25% DDT emulsion concentrate” had been used on 1,735,000 acres for corn borer control. He obviously was quite proud of their efforts and finished his letter saying “You fellows are good. Keep it up.” But the rats were still a problem and in 1944 he stated that they were contaminating or destroying 60 million bushels of corn in Iowa.

Extension education and the management of insects have changed dramatically over the past 90 years. The plagues of grasshoppers, chinch bugs, and European corn borers are seldom seen by Iowa farmers; roads are now passable during bad weather; and although farmer meetings are still conducted, information is often delivered electronically. George Washington Carver said that it was simply service to another that measured a man’s success in life. Extension entomologists are presented with many great opportunities for service, thereby fulfilling the land-grant mission and Smith-Lever Act by taking the university to the citizens of the state. In 2008, extension entomologists at Iowa State University are still devoted to the service and education of Iowans. Thankfully, we don’t have to deal with rats. —Marlin E. Rice

[See also the list of extension entomologists from 1918 to present on page 25. -Ed.]



History of the USDA Corn Insects Research Unit

The USDA's European Corn Borer Laboratory was transferred from Toledo, OH, and West Lafayette, IN, to the ISU Research Farm at Ankeny, IA, in 1950. Its mission was to develop measures to control the European corn borer, which had recently invaded Iowa from the east. Research was conducted on varietal resistance, insecticide efficacy, and insect biology. As funding increased, research was initiated in insect physiology, insect pathology, ecology, and economic thresholds. In 1976, the scope of the research mission was broadened by USDA-Agricultural Research Service (ARS) to include all corn insects except the corn rootworm complex and wireworms, and the name was changed accordingly to the Corn Insects Research Unit.

In 1992, the Unit relocated to the Genetics Laboratory, owned and operated by ISU and located next door to the Insectary, pending the sale of the Research Farm at Ankeny. In 1997, ARS combined the Corn Insects Research Unit with the Field Crops

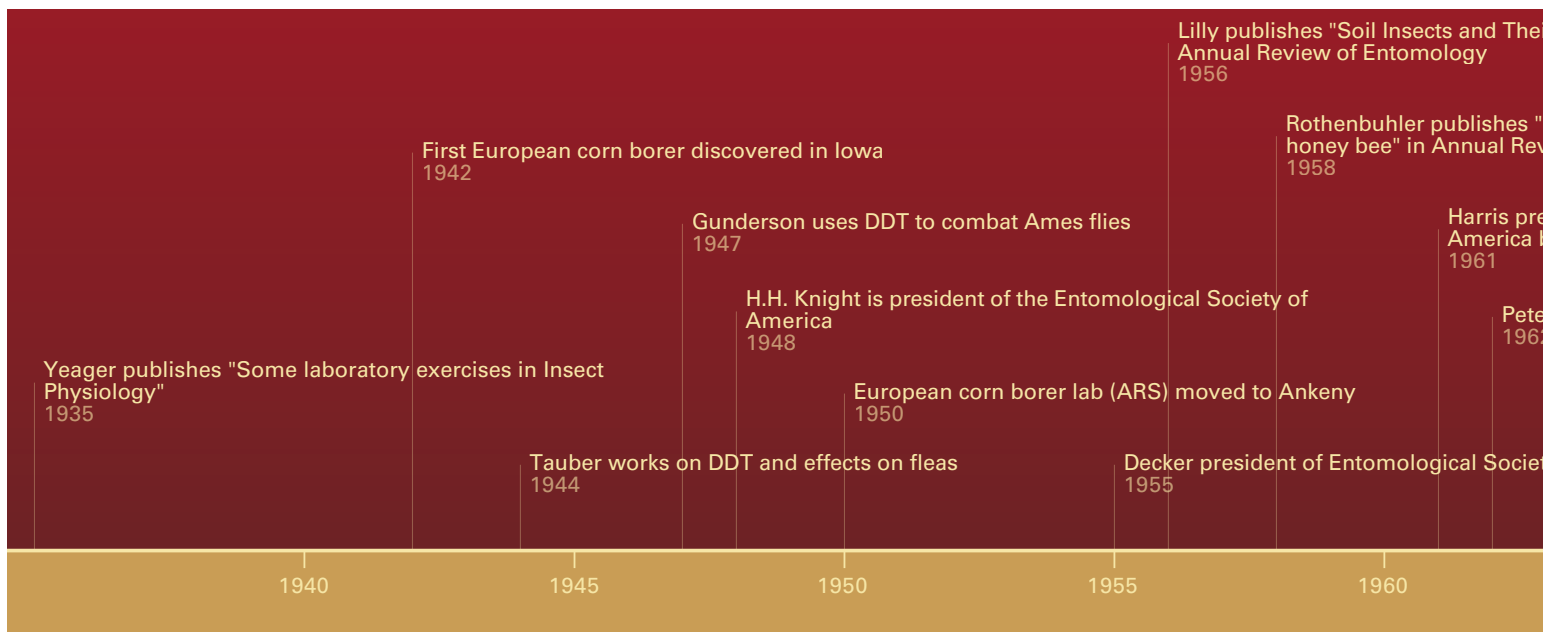
Research Unit to form the current Corn Insects and Crop Genetics Research Unit (CICGRU). The entomologists in the unit are still located in the Genetics Laboratory, and they have maintained their association with the Department of Entomology. Unit field research is conducted on University and privately owned property. Financial support for the laboratory comes from the USDA-ARS, Iowa Agriculture and Home Economics Experiment Station, grants-in-aid, and competitive grants.

The research at the Corn Insects Research Unit is a highly cooperative effort with the Iowa Agriculture Experiment Station and the Department of Entomology at ISU. The scientists have academic status (collaborator) within the Department of Entomology and are members of the faculty of the Graduate College. In this capacity, they serve on program of study committees for graduate students, as major professors, and on various other committees within the department

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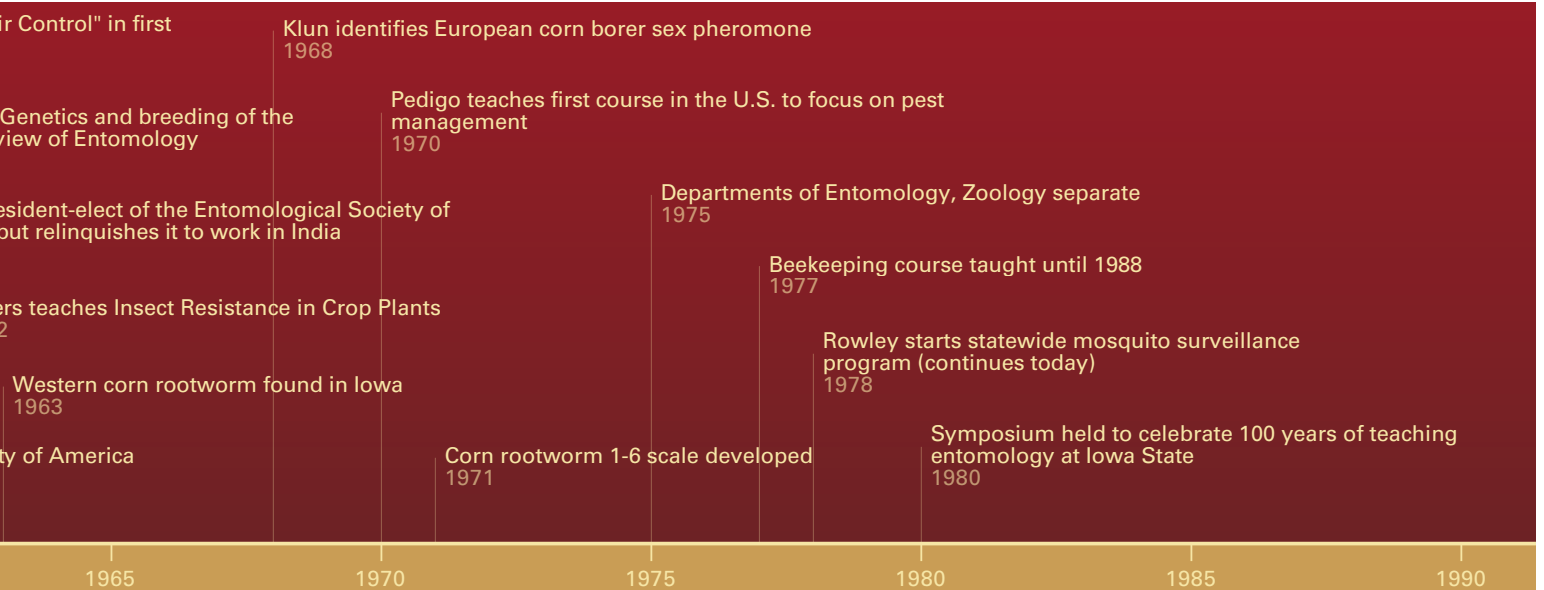


A systematic entomology class, Dr. H. H. Knight presiding. Dr. Herbert Osborn is at left (he was visiting). January 11, 1930.



Chronological list of Entomology faculty 1879–present

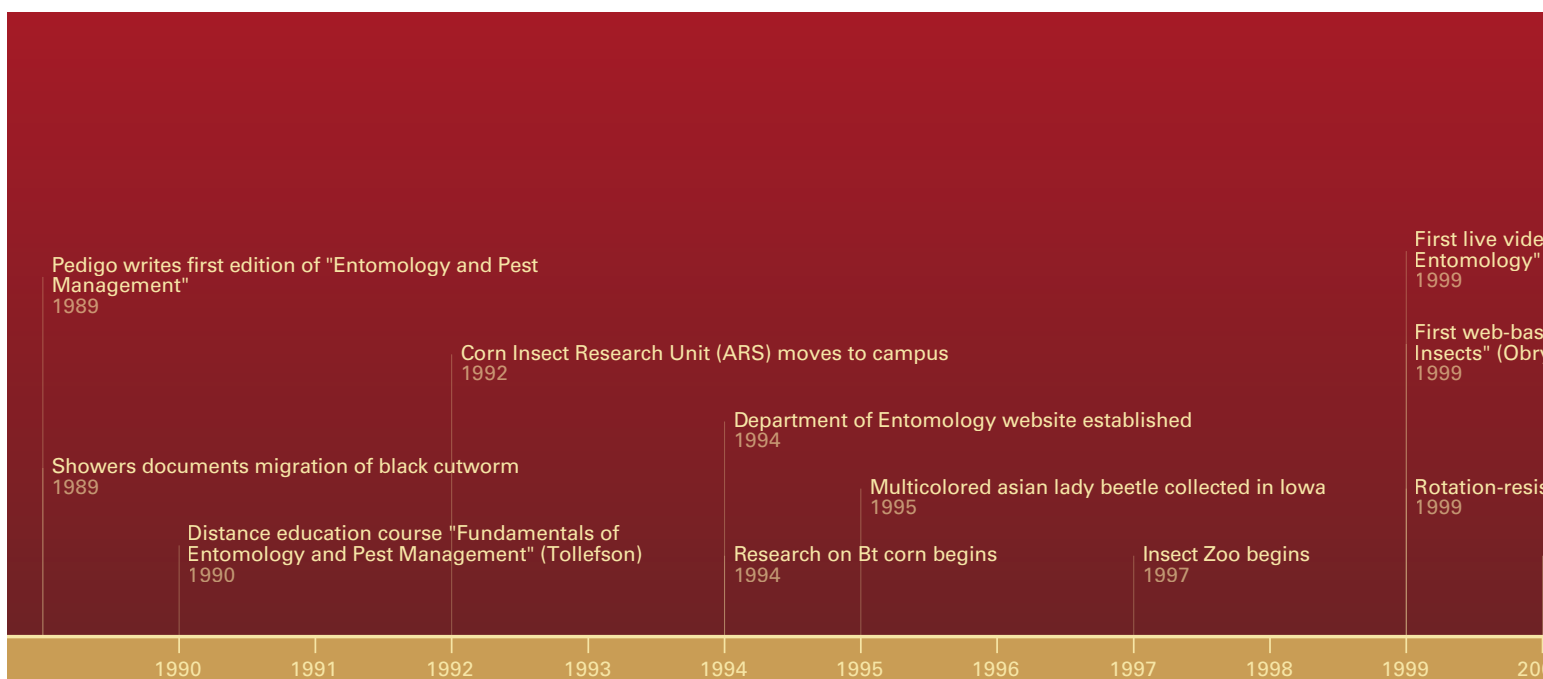
Faculty member	Time at ISU	Area of expertise
Lyric Bartholomay	2006 – present	Medical entomology, mosquito molecular biology
Matt O'Neal	2004 – present	Integrated pest management, soybeans
Thomas Sappington	2003 – present	Population dynamics, Corn Insects ARS
Douglas Sumerford	2002 – present	Population genetics, Corn Insects ARS
Jeffrey Beetham	1998 – present	Molecular parasitology, leishmania parasites
Gregory Courtney	1997 – present	Systematics, lower flies, Blephiceridae
Bryony Bonning	1994 – present	Insect virology; endocrinology, JH esterase
Russell Jurenka	1994 – present	Physiology, pheromone production female moths
Richard Hellmich	1994 – present	Genetics, Corn Insects ARS
Thomas Baker	1992 – 2004	Chemical ecology, pheromones, currently at Penn. State U.
Marlin E. Rice	1988 – present	Extension field crops
Wendy Wintersteen	1988 – present	Extension, Dean of the College 2006-present
John Obrycki	1985 – 2004	Biological control, currently Dept. Head, U. of Kentucky
Kenneth Holscher	1982 – present	Extension, livestock
Richard Wilson	1980 – 2000	Apiculture; Plant Introduction Station USDA
David Foster	1980 – 1988	Extension
Sharron Quisenberry	1980 – 1981	Extension, currently Dean, Virginia Tech. U.
Joel Coats	1978 – present	Toxicology, natural product chemistry
Lee Townsend	1978 – 1978	Extension
James Mertins	1977 – 1984	Biological control, insect pathology, currently USDA NVSL
Donald Lewis	1977 – present	Extension
Elliot Krafusur	1976 – 2006	Population genetics, house fly, tsetse fly, face fly
Jon Tollefson	1975 – present	Insect pest management, corn insects
Les Lewis	1975 – present	Insect pathology; ECB lab ARS, Head of corn research ARS at ISU
Elwood Hart	1974 – 2002	Forest entomology
James Jarvis	1973 – 1990	Economic entomology, ECB lab ARS
Clayton Beegle	1973 – 1975	Biocontrol
William Showers	1973 – 1995	Insect behavior, pheromones; ECB lab ARS
Jerald DeWitt	1972 – present	Extension, currently Director, Leopold Center
Wayne Rowley	1968 – 2004	Medical entomology, mosquito bionomics
Stephen Ryan	1968 – 1976	Extension, pesticide safety
Larry Pedigo	1967 – 2001	Integrated pest management, soybeans
Robert Lewis	1967 – 1997	Systematics, fleas
Edwin Berry	1967 – 1993	Insecticides; ECB lab ARS
Robert Lynch	1967 – 1978	Economic thresholds; ECB lab ARS
James Jarvis	1966 – 1990	Insect resistant plant breeding, ECB lab ARS
Jerome Klun	1965 – 1976	Insect biochemistry, ECB lab ARS, currently at USDA-ARS Beltsville
Kenneth Shaw	1963 – 1997	Acoustical behavior leafhoppers and katydids
Ian Campbell	1963 – 1965	Forest entomology



Feature

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Faculty member	Time at ISU	Area of expertise
Kenneth Knight	1962 – 1966	Mosquito biology (President of ESA 1975)
John Mutchmor	1962 – 1989	Physiology, thermal acclimation
Harold Stockdale	1961 – 1992	Extension, field crops
Don Peters	1959 – 1970	Economic entomology, corn insects
Edwin Hibbs	1955 – 1965	Insect bionomics, plant-insect interactions
Paul Dahm	1953 – 1987	Toxicology
Wilbur D. Guthrie	1951 – 1989	Plant resistance, ECB lab ARS
Philip F. Bonhag	1951 – 1955	Morphology, ultrastructure
Tom Brindley	1950 – 1974	Economic entomology, grain and forage crops, ECB lab ARS
Walter Rothenbuhler	1950 – 1962	Apiculture, genetics
John H. Lilly	1948 – 1957	Economic entomology, soil insects
Earle Raun	1948 – 1966	Extension; ECB lab ARS
Thomas Hibbs	1948 – 1965	Economic entomology
Wayne Porter	1948 – 1951	Unknown
James Slater	1947 – 1953	Systematics, plant-insect interactions
Ellis Hicks	1947 – 1974	Mites, arthropods of bird nests
Jean Laffoon	1946 – 1974	Systematics, mosquitoes
Harold Gunderson	1939 – 1971	Extension
H. D. Tate	1938 – 1939	Extension
Floyd Andre	1934 – 1938	Economic entomology, systematics, thrips
Oscar E. Tauber	1934 – 1973	Returned to ISU; Dean, College of Agriculture Insect physiology; circulation, hemocytes
J. Franklin Yeager	1930 – 1935	Insect physiology; hemolymph
Charles H. Richardson	1928 – 1953	Insecticide toxicology
George C. Decker	1926 – 1944	Economic entomology
Halbert M. Harris	1925 – 1961	Systematics, Nabidae and others
Harvey L. Sweetman	1925 – 1928	Economic entomology, biological control
Harry H. Knight	1924 – 1976	Systematics, Miridae and others (described 1,300 species)
Carl J. Drake	1922 – 1965	Systematics, Tingidae, Salidae and others (wrote 511 papers)
Walter H. Wellhouse	1921 – 1956	Teaching, graduate student advising
F. A. Fenton	1919 – 1925	Acting chief of entomology experiment station 1920
F. B. Paddock	1919 – 1952	Apiculture, state apiarist
E. D. Ball	1919 – 1922	Systematics, leafhoppers
O. Wallace Park	1918 – 1954	Apiculture
Henry E. Ewing	1909 – 1921	Parasitology, mites, ticks, chiggers
C. E. Bartholomew	1904 – 1917	Teaching, apiculture
Joseph E. Guthrie	1901 – 1922	Systematics, morphology (wrote <i>Snakes of Iowa</i> 1926)
H. E. Summers	1898 – 1915	Systematics
Clarence P. Gillette	1888 – 1891	Systematics, economic entomology
Herbert Osborn	1879 – 1898	Economic entomology



Insect Zoo Faces Uncertain Future

The Insect Zoo has grown rapidly since its inception in 1997 and continues to be an extremely visible educational outreach tool for the Department of Entomology and for ISU. The Insect Zoo engages between 200 and 350 groups each year, comprising >12,000 people across Iowa. Even as the Zoo delivers its exciting message about insects, biology and Iowa State University to K-12 students and others in Iowa, it also provides training opportunities in insect science education for ISU students and educators.

Everyone is interested in insects because everyone is positively (honey bees, butterflies) and negatively (mosquitoes, cockroaches) impacted by insects. The Zoo capitalizes on this universal interest through hands-on, minds-on outreach programming by educating Iowans about arthropods and the critical role they play in all ecosystems. Through program development and delivery, the Zoo also trains educators.

Funding for the Insect Zoo has recently become an issue that may be of interest to you and fellow lovers of all things entomological. The Entomology Department may no longer be able to support the Zoo through its budget within the College of Agriculture and Life Sciences as it has since 1997. The Zoo is seeking funding partnerships with other ISU campus units and programs whose students benefit from Zoo activities: Biomedical Illustration, Natural Resource Ecology and Management, the Colleges of Design and Engineering, the Science with Practice program and the George Washington Carver Internship Program, to name but a few. The Zoo would greatly value



Freshman Erick Hernandez gains experience in entomological outreach by discussing hissing cockroaches with patrons of the Octagon Arts Festival in Ames.

tax-deductible contributions from our constituency of distinguished alums and other interested individuals. —Angela Tague

[Please use the donation form included with this newsletter to support the zoo. -Ed.]



Lyric Bartholomay, Assistant Professor

Research in the Bartholomay laboratory spans basic and applied research in medical entomology. Current projects include an exploration of mosquito blood cells (hemocytes) in the context of virus infection, antiviral responses in the ovaries and developing follicles in mosquitoes infected with West Nile or La Crosse viruses, and comparative analysis of hemocyte responses in three tick species commonly found in Iowa.

During the summer, the lab also operates mosquito and tick and mosquito- and tick-borne disease surveillance programs. Data from surveillance operations, descriptions of research projects, and a list of publications can be found on the medical entomology laboratory website:

<http://www.ent.iastate.edu/medent>



Members of the medical entomology laboratory (October 2007) include (left to right) Brianne Simonsen (undergraduate), Drew Dust (rotating student, Molecular, Cellular, and Developmental Biology [MCDB] program), Grishma Parikh (Ph.D. student, MCDB program), Lyric Bartholomay (PI), Jon Oliver (M.S. student, entomology), Erica Hellmich (M.S. student, entomology), Renee Hodgkins (rotating student, Immunobiology program), Brad Tucker (lab manager), Brendan Dunphy (entomology graduate, class of 2007).

Joel Coats, Professor

Our current and recent studies on the environmental fate and effects of agrochemicals include projects that address the veterinary antibiotics in soil and water, insecticidal protein toxin in transgenic crops (e.g., Bt corn), and phytoremediation of conventional pesticides in soil, water, and plants.

We study the movement, degradation, and persistence of the agrochemicals (including natural insecticides) in the environment, and we develop new bioassays for the evaluation of possible non-target effects.

New or improved analytical methods for detection and quantification of residues also are developed in our laboratory. Funding for the research projects has come from the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, the Center for Health Effects of Environmental Contamination at the University of Iowa, and the Iowa State Water Resources Research Institute at Iowa State University.

Our research in the insect toxicology area is focused primarily on plant-derived products that have insecticidal, insect repellent, or antifeedant properties. Current and recent projects include studies on compounds or extracts from plant essential oils (terpenes), cyanogenic glycosides, and glucosinolates.

Insecticidal spectrum of activity, selectivity, mode of action, and metabolism are investigated using insect pests as model organisms. Synthesis of derivatives and analogs yields novel insecticides or repellents and provides series of closely related



Members of the toxicology laboratory include (front row, left to right): Amanda Shoeman (office assistant), Ashley Bienemann (lab assistant), Gretchen Paluch (Ph.D. student). Middle row: Kyle Guyer (lab assistant), Nick Behrens (M.S. student), Joel Coats (PI and interim department chair), Keri Henderson (Ph.D. student), Fan Tong (Ph.D. student), Ashley Jessick (M.S. student). Back row: Aaron Gross (M.S. student), Ian Murphy (M.S. student), Andrea Cook (lab assistant).

compounds for use in quantitative structure–activity relationships to help explain their modes of action.



Bryony Bonning, Professor

Bryony Bonning's research group conducts fundamental research in insect physiology and insect pathology and applies knowledge gained toward development of new technologies for management of insect pests. Highlights of 2007 included the use of a large insect virus to produce an infectious small insect virus (see associated article *Of Aphid and Bee Viruses*) and Zhiyan Liu's NSF-funded research on regulation of development in the vinegar fly, *Drosophila melanogaster*. Zhiyan demonstrated that overproduction of the juvenile hormone esterase (JHE) binding protein Dmp29 resulted in a plethora of antijuvenile hormone effects, including reduced longevity, fecundity, and, in collaboration with ISU entomologist Russ Jurenka, reduced abundance of aggregation and courtship pheromones. Without the appropriate pheromones, males cannot tell males from females, and they exhibit male-male courtship behavior with long lines of males each attempting to court the male in front. Unexpectedly, both sexes also were hyperactive. Work is now underway to elucidate the physiological basis for the observed phenotypes and specifically what role Dmp29 plays in the biology of JHE to facilitate degradation of juvenile hormone.



Left to right: Wendy Sparks (Ph.D. student, genetics), Zhiyan Liu (Ph.D. student, genetics), Sijun Liu (assistant scientist), Huarong Li (postdoctoral research associate), Nina Richtman Schmidt (Ph.D. student, entomology and microbiology), Bryony Bonning (PI), Narinder Pal (postdoctoral research associate), Hailin Tang (Ph.D. student, toxicology), and S. Sivakumar (postdoctoral research associate).

Of Aphid and Bee Viruses

Several projects in the Bonning lab deal with novel virus-based strategies for management of insect pests, such as the use of an aphid virus for crop protection.

To conduct research on the small RNA aphid virus *Rhopalosiphum padi* virus (RhPV: Dicistroviridae), Sandhya Boyapalle screened various insect cell lines to find a line that would support replication of the virus in vitro.

For unknown reasons, it has not been possible to establish insect cell lines from certain insects, such as aphids and bees. As a backup strategy, Sandhya and Narinder Pal used the baculovirus expression vector system (BEVS), which is commonly used as a lab tool for recombinant protein production in lepidopteran cell lines, for production of infectious RhPV. This work, conducted in collaboration with W. Allen Miller, ISU Depart-

ment of Plant Pathology, showed for the first time that the BEVS can be used for production of an infectious heterologous virus.

The research was published in the *Journal of Virology*, the most prestigious of the virology journals (Pal et al. [2007] *J. Virol.* 81: 9339–9345). Importantly, this method sets a precedent for in vitro production of the small RNA viruses of bees, which is essential for research on these viruses at the molecular level. The presence of one of the bee viruses, the Israeli acute paralysis virus, correlates with honey bee colony collapse disorder (Cox-Foster et al. [2007] *Science* 318: 283–287).

—Bryony Bonning



Gregory Courtney, Professor

Research in the Courtney lab focuses on insect taxonomy and aquatic entomology, with emphasis on revisionary systematics, phylogenetics of true flies (Diptera), and biodiversity of aquatic insects.

Much of the research aims to describe insect taxa and elucidate their evolutionary relationships. Projects have focused on lower (nematoceros) Diptera, including the families Axymyiidae, Blephariceridae (net-winged midges), and Psychodidae (moth flies), and the superfamily Tipuloidea (crane flies). Lab members have been especially active in revisionary and phylogenetic studies of aquatic Diptera. Aquatic flies are unique in that most species cross the interface and, thus, affect energy exchange between freshwater and terrestrial ecosystems. Unfortunately, our understanding of these processes, and of freshwater ecosystems in general, is stymied by the lack of information on biodiversity and on phylogenetic hypotheses through which these processes can be placed in a historical context.

The Courtney lab has been addressing these issues through studies of aquatic-insect communities in North America, Europe, Australasia, South America, Madagascar, and Southeast Asia. Results

are providing insight on regional biodiversity and the biogeographic relationships between faunas. Resultant data also have important implications for the use of aquatic insects as bioindicators of water quality.

In 2007, Courtney was promoted to Professor; appointed as courtesy faculty member in the Department of Ecology, Evolution, and Organismal Biology; and became the chair of the Ecology and Evolutionary Biology Interdepartmental Graduate program.



Courtney research lab (clockwise from left): Greg Courtney (PI), Matt Wihlm (M.S. student), Jessica Davis (Ph.D. student); Matt Petersen (Ph.D. student), Becky Brown (Ph.D. student).

Leslie Lewis, USDA Research Leader

The Lewis lab deals with the role of indigenous insect pathogens in suppressing insect pests of corn. Current research involves defining the relationships between *Nosema pyrausta* and European corn borers exposed to Bt corn. A new project is being initiated on the ecology of the microsporidium infecting the western bean cutworm and preparation of the description of this microsporidium.

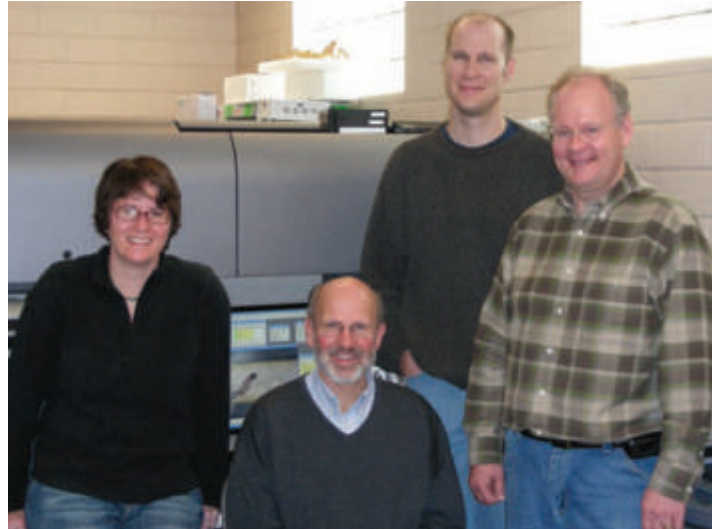
Lewis works alongside Jean Dyer, who oversees insect rearing; Robert Gunnarson, who serves as laboratory and field manager; and Miriam Lopez, who is investigating the nontarget effects of transgenics on insect pathogens. Lewis also supervises Erica Simbro, a graduate student currently employed by Pioneer.



Richard L. Hellmich, USDA Research Entomologist

Rick Hellmich is a lead scientist in the USDA-ARS, Corn Insects and Crop Genetics Research Unit. His lab has focused on evaluating possible effects of transgenic corn on nontarget insects and managing insect resistance to transgenic corn. Currently, he is working with government, regulatory, industry, and university scientists in the United States and Europe to develop standardized approaches to test potential effects of genetically modified (GM) crops on nontarget insects. This includes an effort to improve and harmonize existing laboratory protocols. He believes a core group of harmonized tests to assess nontarget effects of GM plants would foster communication among scientists and regulators and ultimately would contribute to science-based decisions related to the regulation of these plants. Jarrad Prasifka, a postdoctoral associate, and Rick, along with Les Lewis, and Galen Dively (University Maryland), have funding from USDA, Biotech Risk Assessment Grants (BRAG) to develop protocols for field evaluation of nontarget organisms in Bt crops. This project has led to two papers by Jarrad in *Environmental Entomology*. Also, Rick and Jarrad, along with David Onstad (University Illinois) and Blair Siegfried (University Nebraska), have funding from a second BRAG to research effects of new Bt products on insect resis-

tance management strategies for European corn borer. Rick also is overseeing an Environmental Protection Agency/Agricultural Research Service interagency agreement with 14 researchers from nine universities and a private company. This past year, Rick was invited to make presentations in China, Austria, and Poland and to participate in the European Food Safety Authority meeting in Italy.



Cindy Backus (student worker), Richard Hellmich (PI), Jarrad Prasifka (postdoc), and Keith Bidne (research technician).

Russell Jurenka, Professor

Research in the Jurenka lab focuses on the G protein-coupled receptor (GPCR) that is involved in signaling pheromone production in female moths. This receptor binds pheromone biosynthesis activating neuropeptide (PBAN), the peptide hormone that stimulates pheromone biosynthesis. Man-Yeon Choi has been the primary researcher on this project. He cloned and sequenced the gene that encodes the PBAN-receptor from *Helicoverpa zea*. The project has been funded by a Binational Agricultural Research and Development (BARD) grant with a collaborator in Israel, Ada Rafaeli. The Rafaeli lab works with *H. armigera*, so Choi cloned and sequenced the same gene from this insect and found it to be nearly identical. Choi also created

some chimera receptors made with sequences from *Drosophila melanogaster* genes. This work was used by Peter Stern, Weizmann Institute of Science in Israel, and Lian Yu, Beijing Normal University in China, to model the receptor by using molecular dynamic simulations. This was the first 3-D model created for a GPCR from an insect. These studies will be useful in identifying small molecules that could act as agonists or antagonists for interfering with insect physiology.

The Jurenka lab also has collaborated on research projects with the Krafzur lab on tsetse fly population dynamics and physiology and with the Bonning lab on pheromone production in *D. melanogaster*.



Matt O'Neal, Assistant Professor

Since starting in 2004, my goal as the soybean entomologist is the development of economic and environmentally sustainable management of soybean insect pests.

My graduate students and I are focused on the most significant insect pest for soybean, the soybean aphid. This invasive pest has increased insecticide use, with ~2–4 million acres treated in Iowa during outbreaks. My approach is to attack this pest across the full spectrum of integrated pest management tools; from insecticides to biological control to host plant resistance. Below is a recap from the perspective of those conducting the work.

Nicholas Schmidt has studied the impact of predators on soybean aphids. Nick completed an M.S. and is staying at ISU to pursue his Ph.D, exploring ways to conserve beneficial insects in soybean fields. Although Nick was the first to sign-on, Kevin Johnson was the first student to show up. And he was quickly put to work. Kevin was a coauthor on the recently published economic threshold for the soybean aphid. Kevin also serves as a technician for the lab, leading our insecticide evaluation program. Recently Kevin presented this work at the ISU Integrated Crop Management conference, repeatedly reminding me that twice as many attended his talk as mine.

Wayne Ohnesorg is studying reduced-risk insecticides and a survey of native aphids as part of a risk assessment for a classical biocontrol program targeting soybean aphid. Wayne surveyed aphids and their associated natural enemies in more than 25 prairies around central Iowa. While tracking the diversity and phenology of aphids, he has discovered at least two new species of aphids.

Mariana Chiozza joined the lab in 2007 and is co-advised by Gustavo MacIntosh (Biochemistry,



From left to right, front row: Greg Vannostrand (undergraduate assistant), Nicholas Schmidt (Ph.D. student), Matt O'Neal (PI), and Felicitas Avendano (postdoc). Back row: Kevin Johnson (Ph.D. student) and Wayne Ohnesorg (M.S. student). Not pictured is Mariana Chiozza (M.S. student).

Biophysics and Molecular Biology). She is exploring host plant resistance as a management tool for soybean aphids, including studies of the physiological response of soybean to aphid herbivory.

Felicitas Avendano is a postdoctoral scientist. A parasitologist, her interest is the multitrophic interactions among nematodes, insect herbivores, and their respective host plant. With Greg Tylka (Plant Pathology), we are exploring how soybean cyst nematode and soybean aphids affect each other and soybean. Although her research keeps her very busy, Felicitas takes time out each semester to serve as an instructor for an undergraduate biology course at ISU.

On a personal note, the O'Neal clan added a new member in 2006. Marlys keeps her new sister Aedine very busy with lessons she learns in kindergarten; both leave their parents exhausted. Elaine continues her work at the Richmond Center and counseling her husband.



Marlin E. Rice, Professor

The past year was a great year. Both Jeff Bradshaw (Ph.D.) and Dave Dorhout (M.S.) finished their degree programs, and Dave is now employed as an entomologist by Pioneer Hi-Bred International. Jeff is working as an extension postdoc and will finish a major soybean insect website in June. Research associate Royce Bitzer was hired this year to assist in the continuing research of evaluating transgenic corn for performance against western bean cutworms, black cutworms, corn earworms, and stalk borers. He also is working on a side project measuring the biodiversity and phenology of *Cerambycidae* on blooming dogwood.

During May, I led my third “International Field Trip in Biology—Natural History of the Serengeti” class to northern Tanzania. Seventeen students were exposed to four ecosystems, a diversity of charismatic megafauna, the Maasai culture, and an AIDS orphanage (see companion article). Although it required a lot of extra effort to prepare for and supervise the field trip, the impact of the biodiversity and culture on the students was monumental, and for a few—life changing (two students got engaged to each other after the trip). Study Abroad programs are strongly supported at ISU, and Dean Wintersteen has stated that international opportunities are a “hallmark of our College of Agriculture and Life Sciences student experience.”

Extension opportunities remain a major component of my responsibilities. Educational



Marlin Rice with a leopard tortoise on the Tanzania field trip. See full story on page 9.

information was delivered through a multitude of agribusiness and grower meetings during the year in addition to the delivery of electronic information. In December, I stepped down as the executive editor of the *Integrated Crop Management* newsletter; a task I had held for 19 years. During that time, the newsletter developed into the only full-color extension crops newsletter published by a land-grant university. Subscriptions then increased from 1,464 to 3,344. Later it was placed free on the world-wide web with the assistance of John Van Dyk. In 2007, the number of page views reached 1,084,237.

Jon Tollefson, Professor

The overall goal of the Corn Insect Research Project is to develop management strategies for pest insects of corn. This includes understanding the basic biology and ecology of insects associated with corn and continues through the identification and evaluation of management strategies.

A pressing issue at the present time is the adaptation of corn rootworms to crop rotation. The project is monitoring the spread of the rotation-resistant variants of the corn rootworm species in Iowa, and it is developing and evaluating monitoring and management systems.

Service to Iowa agriculture includes monitoring performance of registered insecticides and evaluating new chemical and genetic engineering tools

for suppressing corn rootworm injury that are more economical, efficacious, and environmentally compatible. Given this end, the project maintains a viable, progressive, and scientifically sound product evaluation program.

The project’s reputation has grown internationally and collaborations with international scientists have evolved. The project is currently evaluating 12 Serbian (Maize Research Institute, Zemun Polje) commercial corn lines for corn rootworm resistance and it is developing breeding material with rootworm tolerance by using the parental lines of the Serbian hybrids in combination with exotic (U.S.) germplasm.

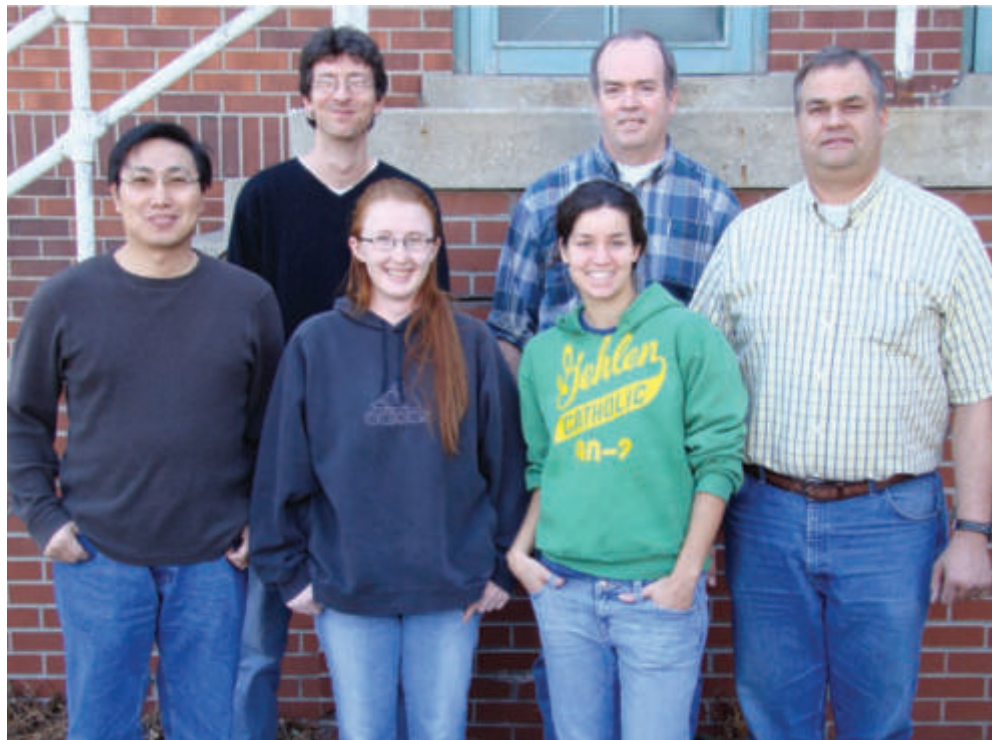
Tom Sappington, USDA Research Entomologist

Our laboratory is devoted to insect ecology, with a primary interest in dispersal and migration of corn insect pests. To tackle this topic, we use a combination of techniques and both direct and indirect strategies.

Former Ph.D. student Brendon Reardon (graduated 2006) conducted mark–release–recapture experiments to investigate short-range dispersal of European corn borer adults of different ages and mating status. For long-range movement, we use molecular markers and population genetics analyses to obtain estimates of gene flow, an indirect measure of dispersal.

Postdoc Kyung Seok Kim has developed microsatellite DNA markers for both western corn rootworm and European corn borer, and he is using them to characterize genetic structuring and gene flow among populations.

Postdoc Nick Miller is examining mitochondrial DNA sequences and developing single-nucleotide polymorphism (SNP) markers for western bean cutworm to examine the effects of the ongoing invasion of the Corn Belt on its population structure. He also is developing SNP markers for western corn rootworm in collaboration with postdoc



Left to right: Kyung Seok Kim (postdoc), Nick Miller (postdoc), Lisa Fraser (undergraduate), Meghan Minner (undergraduate), Tom Sappington (research group leader), and Randy Ritland (research technician).

Brad Coates in Doug Sumerford’s lab. David Dorchout, a recent M.S. student in Marlin Rice’s lab and short-time technician for ARS before hiring-on at Pioneer, used laboratory flight mills to study intrinsic variation in European corn borer flight behaviors related to age, gender, and mating status.

Meghan Minner and Lisa Fraser are undergraduates, capably assisting Kyung Seok and Nick in the lab. Randy Ritland is the senior technician who coordinates logistics for field and many lab studies.

Doug Sumerford, USDA Research Entomologist

My research involves exploring the genetics and ecology of Bt-resistant Lepidoptera. I use Bt-resistant colonies of European corn borer to map regions of the European corn borer genome affecting Bt-resistant traits. I also am researching fitness costs of resistant alleles by using the same colonies and molecular markers. As western bean cutworms become more of a concern in the Corn Belt, their impact on Bt resistance management strategies will need to be assessed. We are in the early stages of research that will focus on the risk of

western bean cutworms becoming resistant to Bt proteins in the field. The development of adequate resistance monitoring tools for western bean cutworms also will be evaluated due to the difficulty in rearing them in the laboratory. I work with Brad Coates, a postdoctoral associate, on development of molecular markers for use with Bt-resistant European corn borers, and Jim Robbins, an entomologist and insect rearing specialist, on the production of media to bioassay Bt resistance.



Jeff Beetham, Associate Professor

The primary vector-borne disease focus of our lab has been visceral leishmaniasis, a potentially fatal disease of humans and animals caused by protozoan parasites within the genus *Leishmania*. Infection occurs when a parasitized female sandfly bloodfeeds on an animal. Leishmania pass through several morphologically distinct stages during development within the sandfly. However, only the terminal stage can infect vertebrates. This stage-specific infectiousness is thought to be partially attributable to another stage-specific characteristic of terminal stage parasites, the ability to survive in vertebrate blood. The parasite needs to survive in blood for the 20 minutes to an hour that it takes for entry into host cells, wherein parasites are shielded from the blood. Other parasite stages that develop in the sandfly are killed after just a minute or two in vertebrate blood by a group of blood proteins called complement proteins that are key players in innate immunity.

In a recent study by postdoctoral researcher Amanda Ramer-Tait, terminal stage parasites and nonterminal stage parasites were incubated in human serum (with ISU Human Subjects Review Board approval kindly donated on Halloween by

ISU volunteers) and then assessed for survival and for amount of bound complement protein. Results based on fluorescent-activated cell sorting and on western blot protein analyses suggest that although both parasite stages bind the same amount and kinds of complement proteins, complement proteins bound to terminal stage parasites are somehow masked from the parasite surface. Current experiments using electron microscopy will extend the results by determining at high resolution just where the bound complement proteins are located.

A separate study by Ph.D. graduate students Rebecca Dahlin-Laborde, Eric Scolaro, Soi Meng Lei, Nathan Romine, and lab scientists Christian Bartholomay (M.S.) and Dennis Byrnes (Ph.D.) is examining several segments of Leishmania genomic DNA that, when placed into Leishmania cells at a stage that is killed by human blood, cause the cells to survive in the blood. Each of the genomic DNA segments contains 10-12 genes. Ongoing experiments seek to determine which genes within the segments confer survival in blood and to determine the mechanism by which the genes act.

VanDyk's Book Number One on Amazon.com

John VanDyk, adjunct assistant professor and systems analyst for the department, maintains the department's websites, which collectively received >30 million hits in December 2007.

Many of the >50 websites John maintains run on software called Drupal. Drupal is a freely available website framework that is used on many popular websites. Britney Spears' website uses Drupal, as do the websites of Amnesty International, Novell, Yahoo! Research, and *Popular Science*. It is an open source software project, which means that many people contribute code to improve Drupal. John has been a contributor since 2004.

The web-based distance education courses that John teaches (Introduction to Insects and Insects and Society) both use Drupal as well.

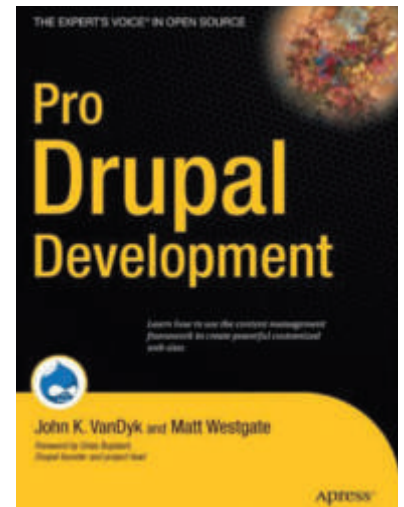
In 2005, John began writing for 2 hours a night, working on a book documenting how Drupal works and the best practices. Coauthor Matt

Westgate was a computer programmer/analyst for the entomology department and worked with John from 2001 to 2005. He currently runs Lullabot, a successful consulting company.

The 428-page book, titled Pro Drupal Development, was published by Apress in April 2007, and on April 16

it was the number one best seller on all of Amazon.com. It has since sold >10,000 copies.

John is currently at work on a second edition.



Donald Lewis, Professor

The entomology department sesquicentennial coincides with my 31st year as ISU Extension urban entomologist. The tools and techniques of providing useful information to the public about insects found in and around the home have changed in 3 decades, but the basic process of helping people and providing information they can understand and use has not.

This past year, we accomplished a merger between the Iowa Insect Diagnostic Clinic and the Plant Disease Clinic. Diagnosis of arthropod and

plant samples has long been a part of our extension entomology and plant pathology programs. Harold "Tiny" Gunderson, extension entomologist from 1939 to 1971, handled clientele requests for insect diagnosis and information and regularly used client-sent samples in hands-on training sessions for graduate students on Saturday mornings (in a time when all entomology graduate students were expected to have knowledge of applied entomology).

Merger of the separate Insect Diagnostic Clinic and the Plant Disease Clinic has been a topic of discussion off and on for 20 years. The integration of separate clinics produced a "one-stop-shop" for clinic clientele (county extension offices, growers and commercial producers, and the general public). The new, interdepartmental, ISU Plant and Insect Diagnostic Clinic combines services previously provided by the departments of Entomology, Plant Pathology, Horticulture, and Agronomy into a multispecialty clinic located in 327 Bessey Hall.

Continued on page 25



Ken Holscher and Donald Lewis.

Ken Holscher, Associate Professor

Since initially being employed as a 100% Livestock Extension Entomologist in 1982, Ken Holscher has seen his appointment change significantly over the years in terms of added extension and teaching responsibilities. Although still having sole leadership for the development of extension education programs pertaining to livestock and poultry pest management, Holscher has assumed similar leadership in the area of public health pest management and stored grain pest management, and he also provides major assistance in support of extension education programs related to urban pest management, youth, and 4-H entomology, the Insect Diagnostic Clinic, the Certified Crop Adviser Program, Iowa Agricultural Aviation Association

Fly-In Clinics, and the Pesticide Applicator Certification Training Program.

Holscher also has taken on a significant teaching appointment conducting courses that annually attract >450 students and account for >1,000 student contact hours. These courses include Biology 211–Principles of Biology I, Entomology 201–Introduction to Insects, Entomology 211–Insects and Society, Entomology 283–Pesticide Applicator Certification, Entomology 372–Livestock Entomology (both on campus and distance education sections), Entomology 493–Workshop on Insect Management (co-instructor with Jon Tollefson), and Entomology 590F–Special Topics in Medical and Veterinary Entomology.

Extension entomologists* at Iowa State University, 1918–present

Name	Responsibility	Years
E. V. Walter	All areas	1917–1919 ^a
Fred D. Butcher	All areas	1922–1927 ^a
A. D. Worthington	All areas	1934–1937 ^a
H. D. Tate	All areas	1938–1939
Harold R. Gunderson	All areas	1939–1971
Earle S. Raun	All areas	1955–1961
Harold J. Stockdale	All areas	1961–1982 ^b
Stephan Ryan	Household & PAT	1968–1976
Jerald R. DeWitt	Livestock/Youth & IPM	1972–1985 ^c
Jerald R. DeWitt	Pest Management & the Environment	2003–2006 ^d
Donald R. Lewis	Household & Horticulture	1977–present
Lee Townsend	All areas	1978–1979
Sharron Quisenberry	Livestock and Forage Crops	1980–1982
David Foster	Field Crops	1980–1988
Kenneth H. Holscher	Livestock and Public Health	1982–present
Wendy K. Wintersteen	IPM & PAT	1988–1995 ^e
Marlin E. Rice	Field Crops	1988–present

IPM, integrated pest management; PAT, pesticide applicator training.
 *Employed at least half-time as an extension entomologist.
^a Beginning or ending years of service not confirmed.
^b Moved to administration, Chair, Department of Entomology.
^c Moved to administration, Program Leader, Agriculture and Natural Resources.
^d Moved to administration, Director, Leopold Center for Sustainable Agriculture.
^e Moved to administration, Dean, College of Agriculture and Life Sciences.

Lewis, continued from page 24

Laura Jesse (Ph.D., ISU Entomology, 2006, and former interim extension urban entomologist) serves as the combined clinic entomologist.

Although most of my responsibilities remain in extension (household and horticultural insect pests). I team-teach one interdisciplinary course a year. In even-numbered years, I teach the insect portion of an integrated pest management (IPM) class for turfgrass majors. In odd-numbered years, I teach a tropical crops study-abroad course with a 10-day trip during spring break to Costa Rica where our students learn about production and marketing of bananas, pineapples, coffee, and other great-tasting crops.

I am a co-investigator on IPM projects with apples and muskmelons, and for the past 3 years, I have enjoyed working on a grant that provides horticultural enterprise programming to Amish and Mennonite vegetable producers in Iowa.

Did you know?

Jerry DeWitt has been appointed Director of the Leopold Center for Sustainable Agriculture at Iowa State University for three years, 2007–2009.

2007 Graduations

Jeffrey Bradshaw graduated with a Ph.D. in August with co-majors in entomology and plant pathology. The title of his dissertation was, "Bean pod mottle virus biology and management in Iowa." He is currently employed as an extension postdoc in the department. Marlin Rice was his major advisor.

Rebecca Dahlin-Laborde graduated in December with a Ph.D. in genetics from the laboratory of Jeff Beetham. Rebecca is currently a postdoctoral researcher at the Mayo Clinic in Rochester, MN.

David Dorhout graduated with an M.S. in entomology in May. The title of his thesis was, "Ecology and behavioral studies of the western bean cutworm (Lepidoptera: Noctuidae) in Iowa." He is currently employed as a research entomologist with Pioneer Hi-Bred International in Johnston, IA. Marlin Rice was his major advisor.

Lindsey Gereszek graduated in May with an M.S. in toxicology and biochemistry. She has been hired as a chemist at the Iowa Department of Agriculture and Land Stewardship Pesticide Laboratory in Ankeny, IA. Joel Coats was her advisor.

Zhiyan Liu graduated with a Ph.D. in genetics in May. Her dissertation was titled, "Subcellular location and function of a putative juvenile hormone esterase binding proteins in *Drosophila melanogaster*." Zhiyan has joined a lab at Harvard Medical School to conduct research on development of the eye, using *Drosophila* as a model organism. Bry-



Zhiyan Liu shakes ISU President Gregory Geoffroy's hand at graduation, while her major professor, Bryony Bonning, looks on.

ony Bonning was her major advisor.

Kelsey Prihoda graduated in May with an M.S. in toxicology. She has been hired to be an ecotoxicologist at Pioneer Hi-Bred's research center in Johnston, IA. Joel Coats was her advisor.

The following entomology undergraduates graduated in 2007: **Nicholas Behrens, Joseph Carson, Brendan Dunphy, and Melinda Theide.**

History, continued from page 12

and college. Cooperative research is conducted with scientists in entomology, agronomy, statistics, plant breeding, plant pathology, molecular biology, and microbiology, and with faculty and students in the Ecology, Evolution, and Organismal Biology program at ISU.

The mission of the entomologists in the CICGRU is to develop environmentally sound strategies to manage pest insects of corn. The research effort is directed primarily toward the European corn borer, the black cutworm, and more recently the corn rootworm complex and western bean cutworm. To carry out the mission of managing these insects, there is ongoing research in the areas of biologi-

cal control and insect pathology, insect resistance management, genetics, behavior, and population ecology. The research effort is conducted by a staff of four scientists, four postdoctoral scientists, six technicians, and an office automation assistant. Presently there are two graduate students studying under the direction of researchers at the laboratory (one student in insect resistance management and one student in insect pathology). Although most of the ongoing research in the Unit is germane to corn production in Iowa, it is also national and international in scope. —*Leslie C. Lewis and Tom Sappington*

Relay for Life



Members of the Entomology Department and friends participated in ISU's annual Relay for Life to raise money for the American Cancer Society. Team "Lighten Bugs" raised \$1,735. Thanks to Patti Prasifka, the team also won an award for their creative "camp site," which included a silent auction that featured several insect-related items. Members of the team were Bryony Bonning, Rebecca Brown, Emily-Jean Fuerst, Gregory Fuerst, Joyce Hornstein, Ellen Johnsen, Linda Naeve, Marie Mayer, Matt O'Neal, Jim Oleson, Frankie Oleson, Jarrad Prasifka, Patti Prasifka, Nina Richtman, and Nick Schmidt.

Entomology Graduate Students Wed



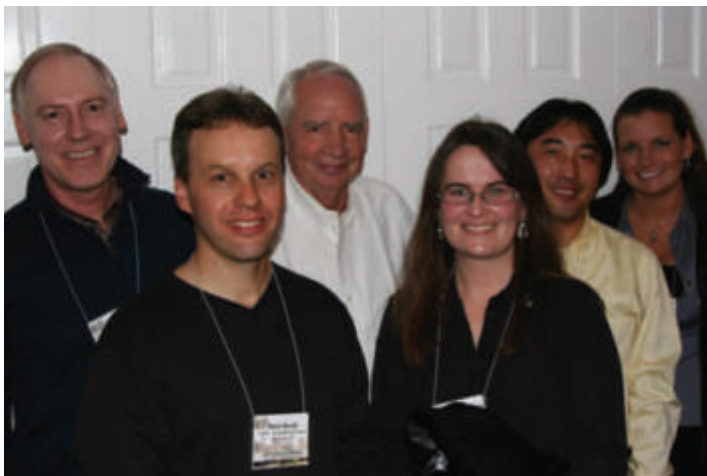
Nick Schmidt and Nina Richtman, graduate students in the labs of Matt O'Neal and Bryony Bonning, respectively, tied the knot in August. The newlyweds honeymooned in Hawaii over the winter break.

World Swim Against Malaria

Eight students in Dr. Lyric Bartholomay's Insects and Our Health class took part in the third Ames World Swim Against Malaria. The three swims have raised \$4,780 in sponsorship, which at \$5 per bednet is the equivalent of 47 children saved. For more information, see the website www.worldswimagainstmalaria.com/



Scenes from the ISU Alumni Mixer at the 2007 ESA Annual Meeting



Les Shipp (Agriculture and Agri-Food Canada), Mark Novak (California Department of Public Health [CDPH]), Wayne Rowley (retired, ISU), Lyric Bartholomay (ISU), Renjie Hu (CDPH), and Jennifer Remmers (U.S. Navy, Pearl Harbor).



Luis Gomez (Dow AgroSciences), Karla Gomez, Tim Nowatzki (Pioneer Hi-Bred International), Rayda Krell, Patti Prasifka (ISU), and Jarrad Prasifka (USDA-ARS Ames).



Elsie Burbano (University of Hawaii-Manoa), Yong-Lak Park (West Virginia University), Megan O'Rourke (Cornell University) and Robyn Rose (EPA Washington, DC).



Juliana and Lamar Buckelew (Bayer Corporation) with son, Charles; Laura Anne Weiser Erlandson (SUNY Institute of Technology); and Carol Pilcher (ISU).

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

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