

Entomology@Purdue

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The Changing Field of Crop Pest Management

Indiana has long been known as a corn and soybean state – typically the state ranks 4th or 5th nationwide in production of both commodities. Dedicating such a large fraction of the landscape to these crops means that there is a need for agricultural chemicals to manage pests. In fact, pest management in field crops has long been one of the major uses of agricultural pesticides. For example, application of soil insecticides to manage the western corn rootworm (the key pest of corn worldwide) was, until recently (2003), the largest single use of insecticide in the US.

The tools that we use to address these pest challenges are currently undergoing a period of tremendous change. New and innovative strategies are helping producers manage their pest challenges more efficiently than ever before. In the Field Crops IPM program at Purdue, we constantly evaluate these technologies, not just in terms of the “bottom line” of insect mortality and crop yields, but also by quantifying some of the longer-term risks associated with these newer technologies. Our approach combines basic concepts of pest management with the study of insect behavioral ecology to identify holes in current strategies and identify areas for improvement.

The rise in interest in ethanol and subsequent high corn prices could not have come at a better time for Indiana corn producers, many of whom are reporting unprecedented yields. This is due to a combination of factors, including earlier planting and improved hybrids. A novel pest management technology for the key pest, the Western Corn Rootworm (WCR), also has played a role in increasing yields. These products are known by the generic term “Bt corn” referring to the genetic modification of

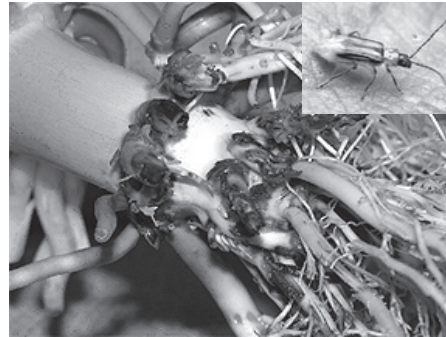
corn plants to produce a bacterial toxin that is lethal to insects. Because the insecticide is produced by the plant as part of its genetic makeup, this “in-plant protection” means that growers need not worry about mixing chemicals, handling pesticide, or non-target effects upon beneficial organisms such as earthworms. Adoption of this technology has been rapid, with US acreage more than doubling each year since the introduction

of the first product in 2004, when approximately 2.4 million acres planted through the last growing when over 10 million acres of these Bt products were planted. As with any “feel-good” story there is a caveat – the specter of resistance. Although resistance has not been documented in field

populations of WCR, this tremendously adaptable pest has evolved resistance to a wide variety of pest management strategies in the past.

Mindful of this risk, entomologists and the EPA worked together to design a risk management plan that would minimize the risks of resistance development in the field. Although Bt corn is highly effective against rootworms, a small percentage (typically between 5-10% at present) of rootworms do survive to adulthood feeding on Bt plants. To minimize the chances of resistance development, “Bt survivors” must be prevented from mating with one another and producing offspring that may share their parents’ ability to survive exposure. To ensure there are sufficient “non-Bt” beetles to mate with any of these survivors, an area within each field is planted to provide a non-Bt “refuge.” This will provide a reservoir of susceptible rootworms that will hopefully mate with any

(Continued on page 2)



Western corn rootworm larval feeding damage.





Steve Yaninek

From the Head Bug

Entomology in Indiana Before Purdue

In the fall issue of the newsletter, I gave a synopsis of a presentation I was preparing on fifty years of entomology at Purdue for the Entomological Society of America annual meeting in Indianapolis. My research took me back through the recorded history of entomology in Indiana and at Purdue. I found the journey fascinating, so I'll share some of my discoveries in a series of columns starting with a sketch about entomology in Indiana before Purdue was established in 1869. I found several sources for this information; perhaps most intriguing are articles by former Purdue faculty B. E. Montgomery, M. C. Wilson, and H. O. Deay in "A Symposium on A Century of Entomology in Indiana," published in the Proceedings of the Indiana Academy of Sciences in 1955.

With that introduction, we jump back to the early 19th century when the newly established "northwest" territory of Indiana (which included all of present day Indiana, Illinois, Wisconsin, and parts of Michigan and Minnesota) became a destination for post-independence traders and settlers moving west. Early visitors were both annoyed and impressed by insect pests. Travelers along the Ohio River and northern trade routes through the future state mentioned nuisance insects like gnats, flies, bedbugs (apparently some things just don't change), and "mosquitoes" (remember malaria was endemic in this area during the 19th

century). Armyworm damage to corn and timothy was so severe that farmers devised novel mechanical methods of pest control including horse-drawn logs passed through the fields in furrows to kill the marching hordes.

Arguably one of the most famous entomologists ever associated with Indiana was also one of the earliest - Thomas Say, a renowned systematist and the father of American Entomology. Thomas Say first passed by Indiana on the Ohio River in 1819 on his way from Pittsburgh to St. Louis, then again in 1823 when he crossed the state from Fort Wayne (it was an actual fort then) to Chicago as the zoologist on Long's Expedition to the Source of the St. Peter's River, and finally in 1826 as part of the expedition known as The Boatload of Knowledge (really!) when he settled in New Harmony, Indiana where he lived until his death in 1834. While in New Harmony, he finished his famous three volume series "American Entomology, or Descriptions of the Insects of North America." Among the more than 1500 American insects he described were 26 economically important insects found in Indiana including well-known pests such as Hessian fly, peach tree borer, and plum curculio.

Not much of entomological significance happened in Indiana for many years after the death of Thomas Say. There were collections and biological notes made by a few amateur entomologists, but it would be 20 years (1854) before Asa Fitch was appointed as the first professional entomologist in the United States (in New York state), and 50 years (1884) before F. M. Webster joined Purdue with USDA to become the first professional entomologist in Indiana. More about Webster and others in the next column "Entomology at Purdue: The Early Years, 1869-1920."

~Steve Yaninek~

(Continued from page 1)

beetles from the Bt parts of the field. With this rationale in mind, the EPA has mandated that 20% of each Bt field must be planted to refuge, or non-Bt corn.

That's the theory - what we don't know is whether it works as well as we hope. We are still in the infancy of these technologies and there are many unanswered questions about how beetles will respond in these fields. For example, there are several different refuge configurations that growers can use: they may choose to place the 20% refuge in a single block on one side of the field, or they may "split the planter" and plant the refuge in strips within the field. This results in a significant difference in the distance that beetles must travel between the refuge and Bt zones in order to mate. **Paul Marquardt** is an MS student in our lab, and his project investigates this question in commercial corn fields, in an attempt to get an idea of how far rootworm beetles will go to find a mate - in other words, we are attempting to answer the question: "Which refuge is the best refuge?" There are other comparisons of interest between Bt and refuge beetles. We are also investigating the effects of other refuge options upon beetle emergence and mating. A doctoral candidate in our laboratory, **Alex McKinnis**, is examining whether seed mixes (also called Refuge in a Bag) may be an appropriate choice for the future. The challenge lies in whether we can protect refuge seed with a seed-applied insecticide in order to keep this strategy economically viable under high pest pressure.

Although many of our studies focus closely on beetle behavior and movement, all of our experiments are conducted within the context of how these factors impact the development of resistance in beetle populations in the field. The ultimate goal is keeping this technology as a highly economical option for producers over the long-term.

~Christian Krupke~

Department News

New Arrival

Mahmoud El-Nour and his wife, Hayam, have a new son, Mohammed. Their baby boy arrived on the evening of March 1, 2007. Mahmoud is an Urban Entomology lab technician working with **Changlu Wang** and **Grzegorz Buczkowski**.

Administrative/Professional Staff Promoted

Cheryl Bluett and Dr. **Chris Pierce** received official announcements of promotion from Randy Woodson, Glen W. Sample Dean of Agriculture. Cheryl and Chris were advanced to the next designated level of ranking for Administrative/Professional Staff in the College of Agriculture. Cheryl

is the Business Assistant in the Entomology Business Office. She has BS degrees in Accounting and Business Administration, and has been a member of the department for three years. Chris, an Extension Entomologist, is State Survey Coordinator for the Indiana Cooperative Agricultural Pest Survey (CAPS). He earned his PhD in Entomology at the University of Illinois, and has also been with the department for three years.

Outstanding Service to Students in Entomology

Congratulations to **Arwin Provonsha** for being selected for the 2006-2007 Entomology Outstanding Service to Students award. He will be honored at the College of Agriculture spring awards reception in April. Arwin has also been nominated for the same award in the College of Agriculture.

Clean Stock Initiative in Costa Rica

In early March, Randy Woodson, the Dean of Agriculture, and Steve Yaninek joined **Cliff Sadof** on a trip to Costa Rica. The purpose of the trip was to learn more about a project Cliff started to reduce the number of insect pests being imported into the US on exotic ornamental plants. The visit was hosted by Tamara Benjamin, who



Dean Woodson, Cliff Sadof and students look for insects in *Dracaena* field.

is project Co-PI and a Purdue colleague from the Department of Forestry and Natural Resources with a joint appointment at the project host institution, CATIE (Centro Agronómico Tropical de Investigación y Enseñanza). They visited project facilities at CATIE, an organic farm, and a selection of ornamental producers and packing houses in the main ornamental production zones of the country. Six local graduate students are involved in the program. Cliff's project is an integral part of a Caribbean Safeguard Initiative that will help build trade capacity in the region. This interesting project will doubtless engage other department members such as **Jeff Holland**, who has already been invited to lend a hand during the next year.

Julia Prado is a Visiting Scholar from Ecuador working with Cliff Sadof on the Emerald Ash Borer Program. Julia is translating EAB educational materials into Spanish

for workers in Indiana's nursery industry. She received an MS degree in Ecological Agriculture from CATIE in Costa Rica where she worked on developing sampling methods for the ornamental clean stock program. Julia hopes to join Purdue's Entomology Department this fall as a graduate student.

Also joining Cliff from CATIE is **Mildred Linkimer**, a graduate student in Ecological Agriculture. She worked with Cliff in Costa Rica on improving the quality of ornamentals exported to the US. Her main interest is how the landscape ornamental production fields affect pest problems. Mildred is an exchange student at Purdue taking entomology classes.



CATIE STUDENTS: Mildred Linkimer (left) and Julia Prado

2007 ESA-NCB in Winnipeg

Purdue was represented by five students and two faculty members. The Purdue Field Crops Team was recognized with the 2007 Entomological Education Project Award for the Extension Publication "Corn and Soybean Field Guide – 2007 Edition." The award was presented by The Board Certified Entomologists of Mid-America. One of our alums, **Mike Culy** (BS '79, MS '82, PhD '87) received the NCB Honorary Award of Merit for his outstanding contributions to the Branch. Another, **Dave Hogg** (BS '71, MS '74) was nominated as the Branch candidate for ESA President this fall. Other alumni in attendance included **Ken Preuss** (BS '54), **Rob Wiedenmann** (PhD '90), **Luis Cañas** (MS '96, PhD '00), **Phil Sloderbeck** (MS '77), **Tom Myers** (BS '73), and **Kevin Steffey** (BS '72).

The incoming president is Rick Weinzierl, and the meeting is scheduled for Columbus, Ohio next March 24-27, 2008. Steve Yaninek was elected as ESA-NCB president for 2009. The venue for that meeting is tentatively scheduled for Missouri, but the date is as yet undecided.

Rich Edwards Hosts Italian Colleagues



CONSORZIO BOARD MEMBERS AT WHITE COUNTY EXTENSION OFFICE: Ten members of the governing board of the Consorzio di Difesa visited Rich Edwards in February, 2007. Accompanied by Dr. Mauro Agosti, who serves as leader of Technical Service for the Consorzio, they were on a study and fact finding trip to Indiana.

The Consorzio is a farmer organization that was established in 1976 to provide crop insurance services to its members. The aims of the Consorzio have evolved over the years to include a new Technical Service with activities similar to those of the university-based extension service in the United States. As a result of the introduction of the invasive species *Diabrotica virgifera virgifera* LeConte into the region of the Consorzio, the group is working on ways to manage

this new problem. It is likely that this insect was directly introduced into the Lombardy Region from the United States. Although many questions concerning *Diabrotica* biology and management in the region have been answered through research carried out by Consorzio personnel, new questions have surfaced. Therefore, a new project is being submitted to their regional government. **Rich Edwards** will serve as the scientific advisor to the project.

Capstone Program Enhanced

The Entomology Capstone Experience is a two course, credit program designed to prepare students for the professional competency demands of the workplace. The first course introduces students to the process of formulating a question, designing a project of experiment to answer that question, summarizing and analyzing results, and organizing and presenting information. Students will select a mentor for day-to-day advice and to periodically review the student's progress. A project outline will also be completed in this section. In the second course, students are allowed to complete a small research or outreach project, internship, or participate in the study abroad program, and in addition, submit a written report or poster. The reports and posters will be posted to the Entomology web with project titles and names of the students, advisors, and mentors. This section of the course will also demonstrate the process of developing a high quality presentation by the use of visuals, PowerPoint development, presentation summary, and other skills. Students will give oral presentations to the Entomology department in their final undergraduate semester.

Development Update

Campaign Gala for President's Council Members

Current members of the President's Council will be invited to a campaign gala on the evening of June 30, 2007. Please hold the date for this special celebration and make your plans to join us as we reflect on our successes in the Department of Entomology.

Your contributions support our students in a range of learning, discovery, and engagement activities. This academic year we've supported undergraduate research, international travel to visit Monarch butterflies in Mexico, Linnean Team participation in the ESA North Central Branch meeting in Winnipeg, representation to a national minority recruitment conference, and enrollment in a special insect pathology course in Illinois.



The Honor Roll recognizes new gifts to the department July-December 2006.

Monarch Club (\$1000 up)

C. W. Bartholomai
Karen M. and Dr. Robert D. Tarver
Anonymous

Honey Bee Club (\$500-\$999)

Bernice B. and Dr. J. Kevin DeMarco

Firefly Club (\$101-\$499)

Frank E. Bohman, Jr.
Donald H. Brown
Dr. Clarence Arthur Callahan
Dr. Peter E. and Georgia C. Dunn
Peter R. Johnson
Dr. William J. and Margaret M. Fischang
Dr. Jack D. Maxwell
Dennis A. and Babara S. Rone
Dr. Erik Stephan Runstrom
Dr. Robert D. and Nancy E. Waltz
Carolyn Workman

Mayfly Club (up to \$100)

Dr. Marlin K. and Shey Bergman
Karen McIntosh Bernhard
Dr. Ronnie M. Bitner
Kevin D. and Ruth A. Black
Larry W. and Janet E. Bledsoe
Robert M. and Joyce E. Brattain
Mary C. Clark
Gregory L. Davies
Dr. Robert S. and Patricia A. Edgecomb
Ronald D. and Nance Crane Gardner
Frederic and Dolores Goldberg
John M. and Jessica Gretencord
Christopher D. Harlow
Joseph A. Isbell
Dr. Stephen R. and Bonnie Johnson
Dr. Clinton Y. Kawanishi
Eliphalet A. Kelly
George T. and Rose LaRocca
Dr. Jesusa C. Legaspi and
Dr. Benjamin A. Legaspi, Jr.
Dr. Henry R. Lawson
Pamla L. Mackey

(Continued in next column)

Mayfly Club (continued)

Nicole L. Mason
Eric M. McDonald
Dr. Michael L. and Katherine A. McManus
Gary L. Miller
Dr. Richard L. Miller
Thomas V. and Waynetta C. Myers
Jack E. and Elizabeth J. Naugle
Dr. Forrest L. and Donna J. Oliveria
Fritz W. and Anne T. Schumann
Richard E. and Louella Shade
Robert W. Safarik
Dr. Tony L. Smolek
Dale D. Stanton II
Dr. Stella S. Wen

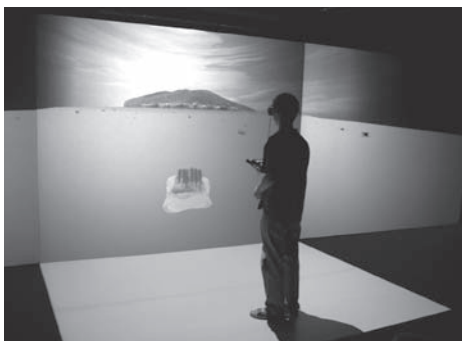
Outreach Update

Robotic Beetle Battles and Virtual Reality Bugs

In the insect world, battles between insects are commonplace. Ants fight with other species of ants. Queen bees will fight to the death in a hive. Male crickets, cockroaches, and beetles battle each other for territory. Especially among giant beetles, such battles are spectacular. Bug Bowl attendees this year had the opportunity to recreate these beetle battles using robotic beetles. Participants chose from one of four battle beetle types: Hercules, Caucasus, Japanese, or Giraffe Stage-Beetle. In head-to-head competition between two beetles, the first beetle turned over or pushed out of the arena lost the battle.



ROBOTIC BEETLE BATTLE: Entomology students demonstrate a battle with remote controlled beetles.



VIRTUAL REALITY BUGS EXHIBIT: The experience allows the user to see multi-dimensional interactions in real-time.

Virtual Reality Bugs is a simulation created by Jeff Holland. Participants wear special glasses to make the images come out of the screen. Different species of insects fly around a simulated environment and the user can 'fly' around within the environment by pointing a controller as the simulation is running.

"X-BUGS" Featured at Wonderlab Museum

On March 24th, Arwin Provonsha presented a program at the WonderLab Museum in Bloomington, Indiana, a very impressive children's science museum. To promote the museum's March theme of 'athletics,' Arwin created a program on the athletics of insects. The program, entitled "X-Bugs," demonstrates the super-human abilities of insects, such as running, jumping, seeing, smelling, and their ability to 'transform' from one kind of insect into something completely different in the course of their lifecycle. Arwin involves the children with special props that help explain insect abilities.



X-BUGS: Recent visitors to the department were eager to model the Official Roachill Downs racing hat (left), giant silk moth antennae, and bug eyes used in Outreach Programs for children.

Entomology Students

Students Elected to Phi Beta Kappa



Nick Seiter



Kyanne Reidenbach

Nicholas Seiter and **Kyanne Reidenbach** have been elected to the honorary society of Phi Beta Kappa. The prestigious honor goes to college seniors who demonstrate intellectual integrity, tolerance for other views, and have pursued a broad program of study in the liberal arts and sciences.

Jay Bailey Reports on Disney Internship



Jay Bailey

My experience at Disney is really good. I have learned a lot about IPM strategies in greenhouses and in labs. I have learned about such insects as the leafminer fly, aphid species, white-fly species, and mites.

I am also learning more about the beneficial insects that feed on them, as well as parasitic wasp species, lacewings, different lady beetles, predatory mites, etc. I have learned how to rear the insects and about what type of beneficial insects are out there to take care of the pests. I can't really do much research. Therefore, while I am learning more details about certain insects and getting some new experience, it hasn't been all that challenging for me.

Student Scholarship Awards Presented at the 71st Annual Pest Management Conference



L-R, FRONT ROW: Dr. Linda Mason, Scholarship Committee Chair; Tabby Carroll, Norm Ehman/Univar USA Scholarship; Wai-Han Chan, Oser Family Scholarship; Margaret Schwinghammer, J. T. Eaton Scholarship; Wan-Tien Tsai, A-Mark Pest Management Scholarship; Emily Kraus, George Gould Scholarship; Jennifer Gordon, George Noffsinger/POW Scholarship; Venu Margam, Bill Brehm Scholarship. **MIDDLE ROW:** Nick Seiter, Bob Oakes/Weisburger Scholarship; Ryan Yutzy, IPMA Memorial Scholarship; Jessica Platt, George Gould Scholarship; Kristi Jukovich, Andy Owens/POW Scholarship; Marissa McDonough, NPMA Scholarship and the R.W. Williams Pest Control Conference Award; Jody Green, IPMA Memorial Scholarship; Amy Lockwood, Bill Brehm Scholarship; Emily Shebish, George Gould Scholarship; Michael Skvarla, C. C. Alexander Scholarship; Katherine Buckley, Bill Brehm Scholarship; Nichole Holmes, Pat Baker/POW Scholarship; Nichole Holmes, Pat Baker/POW Scholarship, Autumn Nance, Bill Brehm Scholarship; Kim Deakins, Duane Edwards/Arab Scholarship; Victoria Caceres, Pest Control Magazine Scholarship. **BACK ROW:** Dr. Dale Whitaker, Dean of Resident Instruction (Scholarship Presenter); Matt Paschen, IPMA Scholarship; Walter Bauldauf, Gerald Leeb Scholarship; Matt VanWeelden, J. J. Davis Scholarship; John Shukle, IPMA Scholarship; Jon Larson, Rhodes Family Scholarship; Jacob Rowland, J. J. Davis Scholarship; Ed Russell, IPMA Scholarship; Ruth Allhands, BASF Scholarship; and Greg McGraw, Austin Frishman Scholarship.

2007 Spring Graduates

Undergraduates

Tiffany Bennett, BS, pursuing employment opportunities post-graduation.

Wai-Han Chan, BS, accepted to MS program at the University of Florida.

Autumn Nance, BS, applying for graduate school.

Jessica Platt, BS, accepted to MS program at the University of Florida.

Nick Seiter, BS, accepted to MS program at Purdue University.

Emily Shebish, BS, applying for graduate school.

Tabor Wilson, BS, applying for law school.

Graduates

Brad Barnd, MS, accepted to Purdue Forestry and Natural Resources PhD program.

Victoria Fickle (BS '04), MS, seeking employment in Iowa and a future degree in environmental law.

Marissa McDonough, MS, applying for graduate school.

Barbara Sanchez-Neri, MS, taking a year off to study for the GRE and search for a doctoral program.

Adam Tyler, MS, plans a teaching career in Entomology.



Thomas Say Society

The Thomas Say Entomological Society has a busy spring planned. One upcoming activity is a trip to the Cincinnati Zoo to take an inside tour of the "insectarium." Bug Bowl keeps the members busy with volunteer work and preparation for their popular Chocolate Covered Cricket booth. This sale is the only fundraiser of the year for the group, and pays for everything from dinner for their meetings to gas money for any trips. Some members are currently working on a faculty tree, a diagram connecting past and current faculty members back to their graduate school advisors. Officer elections will be held at the end of April in conclusion of another eventful year.

A Blooming Career for Shujuan Li



Shujuan Li

My interest in insects began early in my life. My father was a beekeeper when I was a young girl. I always saw many honeybees swarming and flying in our yard. Sometimes they even "snuck" into my bedroom at night and stung me when I disturbed them. I went out to find baby cicadas on summer evenings, and even tasted them after my grandparents cooked them! I raised my own silkworms in elementary school and tried to get silk from them. I asked my father many questions: Why do honeybees sting? What will happen to them after they sting? How can they produce honey? Why is cicada so delicious? How can I get silk from silkworm? This curiosity guided me to entomology and has shaped my life ever since.

I eagerly enrolled in entomology classes as an undergraduate student of the Department of Plant Protection at China Agricultural University (CAU). During my senior year, I worked with Dr. Wanzhi Cai to revise a key to the species of Pentatomidae (Heteroptera) and to study the taxonomy of Asopinae (Heteroptera: Pentatomidae) from Henan Province. During my master's studies, also at CAU, I developed molecular techniques for phylogenetic analyses of Reduviidae (Heteroptera), and was involved in two field trips to study insect biodiversity. I also assisted Dr. Cai in a study of the morphology of Harpactorinae (Heteroptera: Reduviidae). This experience with phylo-

genetic analyses using both morphological and molecular characteristics was the basic approach I used for my PhD research.

At Purdue, I have worked with Dr. **Virginia Ferris** and Dr. **Chris Oseto** to pursue my PhD. My research focuses on systematics and biogeography of sunflower seed weevils (Coleoptera: Curculionidae). I have performed phylogenetic analyses for the weevil subfamily Erihinae based on 18S nuclear rDNA, and developed a molecular method to separate red sunflower seed weevils and gray sunflower seed weevils. I have studied the matrilineal genetic structure and female-mediated gene flow in gray sunflower seed weevils using 16S mitochondrial rDNA. While conducting this project, I was able to isolate and characterize several microsatellite markers from gray sunflower seed weevils to study the population genetics of this species. We plan to describe one new sunflower seed weevil species.

I shared my knowledge and enthusiasm about insects while serving as a teaching assistant for several entomology courses, including ENTM 105, 207, and 210, and I enjoyed my teaching experience and interactions with students at Purdue University. I learned a lot from the faculty members I worked with and interacted with. I really appreciate my teaching experience at Purdue.

I have really enjoyed my life here. I feel grateful and deeply indebted to my graduate committee and Dr. Steve Yaninek for their unwavering support. I thank all the faculty, staff, and graduate students from the department for being such a wonderful and dynamic group of people. Like my fiancé Al Fournier (PhD '05) said, my stay at Purdue has flown so quickly. I wish I would have more opportunities to hang out and enjoy the company of everyone here.

~Shujuan Li~



Alumni News

William S. Bowers (MS '59, PhD '62) is a Professor Emeritus of Entomology & Chemical Ecology at the University of Arizona where he served as Department Head from 1984-1988. Bill was also a Professor of Entomology at Cornell University, a Visiting Director of Research at the International Centre of Insect Physiology & Ecology in Nairobi, Kenya, and an Insect Physiologist for the USDA for 10 years. Receiving the John V. Osmun Professional Achievement Award in 2000 is testament to his extensive list of prestigious awards and contributions to the profession. He describes John Osmun as the "Builder of an Entomology Empire. A remarkable leader, educator and scientist." Howard Deay was "an early mentor - strict, rigid, and doubter of my role of entomologist, but who became a friend and supporter of my career." Bill has been happily married to Patricia for 47 years. He has 5 children, a rewarding career, and is now retired and looking for more mischief.



Ray Cloyd

Ray Cloyd (MS '95, PhD '99) recently joined the Department of Entomology at Kansas State University as an Associate Professor. Previously, he held the same position at the University of Illinois for nearly seven years where he received numerous awards in Extension, including the University of Illinois Outstanding/Innovative Program Team Award, the College of Agricultural, Consumer and Environmental Sciences Faculty Award for Excellence, American Society of Horticultural Science, Outstanding Publication Award, and an Early Career Award from the Illinois Chapter of Epsilon Sigma Phi. People that Ray was associated with during his time at Purdue are his major advisors, Richard Edwards and **Cliff Sadof**. His is also a new dad to daughter Allison Rose, born in December, 2006.

Steven Derr (BS '79) started as an Environmental Toxicologist, then became a Professor of Biology, and Associate Professor in Physiology. In 1982, he became Doctor of Chiropractic Medicine and retired from that profession in 1998. Steven remembers Drs. Dobson, Fischang, Chandler, and Osmun as "all great people with great insights."

Heather Fehner (BS '97) moved to Chicago after graduation and took a position as a Field Entomologist for a local pest control company. After three years, she went into the world of finance and is currently a Portfolio Manager in commercial lending. Heather is still deeply interested in the field of entomology and hopes to return to the arena, whether professionally or in graduate school in the future. "I miss it!", she said. Heather made a trip to Purdue last July and stopped in to see the Bug Barn. "It was amazing."

Michael Merchant (MS '84) is an Extension Urban Entomology Specialist for the Texas Cooperative Extension at Texas A & M University. He received the award of Distinguished Service to ESA Certification Program in 2003 and Distinguished Achievement Award in Extension in 2005. Michael has several favorite memories to share; **Larry Bledsoe** and his Thoreau-like bachelor lifestyle, Dave Matthews as one of the first Extension professionals he knew (and one of the nicest entomologists he had ever met), the informal and friendly department atmosphere, and cockroach escapees with brightly colored number tags running across his desk in the 'bullpen' in Entomology Hall. He has been married to his sweetheart, Heather for 27 years, and has 3 great kids, none whom elected to become entomologists.

Donald C. Baxter (BS '51) reports that he got lucky with Sonitrol Corporation and retired in 1974. Donald has 5 children and 13 grand children to keep him company in sunny Key West, Florida.

Alberto Fereres (MS '88), a professor at Consejo Superior De Investigaciones Cientificas in Madrid Spain, has been working in the field of insect-virus-plant interactions insect feeding behaviour and plant virus epidemiology since 1984. His lab is currently working on aphid behaviour and biological control of aphids.

Fred Goldberg (BS '65) founded Pest Management Associates, Inc., a termite and pest control, and consulting company in 1976, which recently merged with another company. Fred is now retired. He has represented the Pennsylvania pest control industry's One Voice on the governor's pesticide advisory board for the past 17 years, co-authored an IPM manual for schools in Pennsylvania, and is co-founder of Pennsylvania Accredited Wood Destroying Insect Inspection program. Fred remembers John Osmun and Bill Butts, two great teachers, mentors, and fine individuals.



Patricia Larrain-Quiroz

Patricia Larrain-Quiroz (MS '89) is at the Agriculture Research Center in Laserna, Chile, leading some projects on IPM, mainly on grape production. Patricia is married to alum, Carlos Quiroz (PhD '90).



Carlos Quiroz

Carlos Quiroz (PhD '90) is Director of the Regional Research Center for the National Institute for Agricultural Research. He served as National Director of IPM Projects of National Institute for Agricultural Research during 2000-2004. He remembers the splendid courses with **Al York**, **Tom Turpin**, **Bob O'Neil**, **Pete Dunn**, and many others. He also remembers a lot of very good friends. Carlos and his wife, Patricia Larrain-Quiroz '89, have three children and they send greetings from La Serena, Chile.



Calendar

May

- 14 John V. Osmun Professorship Celebration
- 20 - 26 Emerald Ash Borer Awareness Week

June

- 26 4-H Entomology Science Workshop

July

- 21 Tippecanoe County Butterfly Count

August

- 8-19 Indiana State Fair
- 15 Purdue Day at the Indiana State Fair

From the editor

With each issue of **Entomology@Purdue** we keep you up to date on what's happening in the Department of Entomology and with Alumni. Won't you please take a moment to help keep us up to date with you?

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Please include your name, address, degree, major and year of graduation. Photographs, if submitted, will be returned.

To update your contact information online, go to:
<www.entm.purdue.edu/alumni>

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