Dear Friends of Cornell Entomology,

We hope you enjoy this version of our annual newsletter, which serves to update you on the amazing efforts and accomplishments of our faculty, staff, students and alumni during this very productive year at Cornell!

This year has resulted in major changes as we strive to maintain our traditional strengths in Entomology, respond to the needs of a changing discipline, and improve our outreach to society. We have completely revamped the design and content of our website (entomology.cals.cornell.edu) and we have joined the modern world with a presence on Facebook (facebook.com/cornellentomology) and Twitter (twitter.com/cornellento). Hopefully, many of you also are aware of our new online newsletter at Tumblr (cornellentomology.tumblr.com), where you can check in on us at any time.

Our faculty, staff and students continue to make local, national and global contributions to our understanding of basic arthropod science and to solving some of the most pressing problems of our time. In this issue, we highlight a sampling of that work, including stories about our incredibly creative undergraduate majors (pg. 5), our graduate students and Jugatae club (pgs. 7-8). In addition, we’ve been honored by the generosity of our alumni with recent gifts (pg. 3). This year, we welcomed new members to our department and said a bittersweet goodbye to many retiring colleagues and devoted staff members (pg. 6). We also were saddened by the loss of several former faculty, alumni and friends over the past year (pg. 14).

I am extremely proud of the accomplishments of our faculty, staff and students and am humbled to guide our Department forward as the first female chair in our 140+ year history. Like the rest of the world, we face difficult financial challenges, but I am confident that the will and talent of our Entomology community, including you -our Entomology friends- will allow us to overcome these challenges. In fact, I am writing this letter on the eve of Insectapalooza- our annual insect fair and extravaganza. This year we partnered with the College of Agriculture and Life Sciences (CALS) and the University to celebrate Cornell’s Sesquicentennial (150 year anniversary) Celebration with the theme “150 Years, 150 Bugs”. Stay tuned for photos of the event and updates on Facebook and Tumblr. I believe John Henry and Anna Botsford Comstock would be truly amazed and proud of what we’ve accomplished!

Sincerely,
Laura C. Harrington
Entomology Department Chair
Dry Future Climate Could Reduce Orchid Bee Habitat, Cornell Chronicle

By—Krishna Ramanujan

During Pleistocene era climate changes, neotropical orchid bees that relied on year-round warm, wet weather found their habitats reduced by 30 to 50 percent, according to a Cornell study that used computer models and genetic data to understand bee distributions during past climate changes.

In previous studies, researchers have tracked male and female orchid bees and found that while females stay near their nests, male orchid bees travel, with one study concluding they roam as far as 7 kilometers per day. These past findings, corroborated by genetic data in the current study, reveal that males are more mobile than females.

The study, published March 14 online in the journal Molecular Ecology, has important implications for future climate changes.

“The dataset tells us that if the tendency [in the future] is to have lower precipitation, in combination with deforestation, the suitable habitat for the bees is going to be reduced,” said Margarita López-Uribe, the paper’s first author and a graduate student in the lab of Bryan Danforth, Cornell professor of entomology and co-author of the study.

The good news is that since male orchid bees habitually travel far, they can keep bee populations connected and healthy.

“The males are mediating genetic exchange among populations, maintaining connectivity in spite of fragmentation of habitats,” said López-Uribe. “This is a possible mechanism bees could use to ameliorate the negative impacts of population isolation resulting from future climate changes and deforestation,” she added.

By looking at current climate and bee distributions, López-Uribe and colleagues assessed parameters of climate conditions that each of three bee species within the genus Eulaema could tolerate physiologically, including temperature and precipitation variability. She found that one of the three species, Eulaema cingulata, was three times more tolerant to a variety of climatic conditions.

By proceeding with the caveat that physiological tolerance has remained constant – species tend to be evolutionarily conservative about shifting their niches – the researchers used computer models to simulate past bee distributions based on climate conditions in the Pleistocene. The results showed that in the past, during periods when the neotropics had lowered precipitation, each species experienced significant reduction in suitable habitat, with E. cingulata maintaining the largest geographical ranges.

Climate and ecological niche computer model simulations were closely matched by genetic data of the two less tolerant orchid bee species. The genetic data included mitochondrial markers, which are only inherited from females, and nuclear markers, which come from males and females. The mitochondrial DNA showed that individual bees in one geographic area were more closely related to each other than to bees from other areas. The findings suggest the maternal lines of these bees

Cont. on page 3
Dry Future Climate Could Reduce Orchid Bee Habitat Continued

remained in the area and shared the same pools of DNA over time. But the bi-parental nuclear DNA showed more variation between individuals within an area, offering evidence that males traveled and shared their DNA with other regional groups.

Orchid bees live in the neotropics, an ecozone that includes part of South and Central America, the Mexican lowlands and the Caribbean islands. They are one of the most important pollinators, visiting many types of plants, including some 700 species of orchids that are exclusively pollinated by these bees.

Co-authors include Kelly Zamudio, Cornell professor of ecology and evolutionary biology, and Carolina Cardoso, a researcher at the Universidade Federal de Minas Gerais in Brazil.

The study was funded by the Organization of Tropical Studies, Grace Griswold Endowment, Mario Einaudi Center for International Studies, Lewis and Clark Exploration Fund, Explorer’s Club Exploration Fund and the National Science Foundation.


Pest to Pest from CALS Notes, George Weigel’s PennLive Blog

Could this pesky weed tree and annoying insect have value after all? According to this PennLive blog post, the pointy-leafed tree that you see so often along roadsides and neglected fields - tree-of-heaven, or Ailanthus altissima - is a favored host plant of the brown marmorated stink bug, the shield-shaped bug best known for invading our homes in winter.

Cornell entomologist Peter Jentsch says he is heartened that this otherwise nuisance tree has some value as a diversionary tool to draw stink bugs away from damaging crops, such as soybeans and apples, and the blog author points to it as a great example of nature using one pest to counteract another. But he suspects stink bugs are not going to do enough damage to trees-of-heaven that the prolific, spreading species is eliminated.

Donations and Gifts

The Department of Entomology was recently honored with generous gifts from the estates of alumni John and Henrietta Simeone and Willard and Dorothy Whitcomb.

Willard Whitcomb earned his PhD from Cornell in 1947. He went on to serve in the US Army during WWII and then became a Professor of Entomology at the Univ. of Arkansas and then Univ. of Florida Gainsville. Willard was also a consultant for the United Nations and did considerable research in South America.

John Simeone earned his PhD from Cornell Entomology in 1961. He was a Naval officer at Normandy in WWII and then went on to be a Professor and Chair in Entomology and Environmental and Forest Biology at SUNY Upstate in Syracuse NY where he served for 55 years. Henrietta served as a librarian at Harvard, Yale, Syracuse University and Syracuse High School.
Workshop on Spotted Wing *Drosophila* (SWD)

**Greg Loeb’s** lab hosted a workshop provide training on the identification of *Drosophila* species that are collected in monitoring traps, with particular emphasis on a new invasive fruit fly, spotted wing *Drosophila* (*D. suzukii*).

The main goal of the workshop was to provide hands-on experience in processing trap samples and distinguishing characteristics of adult male and female spotted wing *Drosophila* relative to other species often found in baited traps.

**Attendees were Cornell Cooperative Extension Educators throughout NY State along with assistants involved in the spotted wing *Drosophila* state monitoring program organized by NYS IPM program at Cornell.**

**Instructors:** Johanna Elsensohn, Anna Wallingford, Steve Hesler (all from the Loeb Lab); Julie Carroll (NYS IPM), John Jaenike (U of Rochester) and Greg Loeb (Entomology)

**Sponsors:** Cornell Entomology, NY State IPM, and NSF grant DEB-1231099 to A. Douglas, J. Jaenike, and G. Loeb titled “Dimensions: Animal-microbial interactions as an engine of phyletic and functional diversity: insights from interactions between drosophilids and their resident microbiota.”

**Photos on right hand side by Greg Loeb at SWD workshop. SWD photo by M. Hauser, CDFA**

Spotted Wing *Drosophila*, *Drosophila suzukii* from NYS Integrated Pest Management

Spotted wing *Drosophila* deserves notice because, unlike other fruit and vinegar flies, which lay their eggs on past ripe or rotting fruit, they lay their eggs inside fresh fruit, often before harvest. Aside from the superficial scars left by the female’s ovipositor (her egg-laying device), most damage is done by the larva feeding inside the fruit. After only a few days, the fruit skin becomes dimpled or wrinkled, forming craters in the fruit, and making it susceptible to decay and rots. It is possible, however, for early-stage larvae or eggs to leave no visible impact on the fruit.

The spotted wing *Drosophila* is a vinegar or fruit fly of East Asian origin. It has been in Hawaii since the 1980s, but was first discovered in California in 2008, and Florida, Utah, the Carolinas, and Michigan in 2010. By 2013, it was reported from most of the continental US, except Arizona, Nevada, New Mexico and South Dakota. It has many hosts, but is most often attracted to raspberries, blueberries, day-neutral strawberries, grapes, cherries, peaches, plums, and other late-season, soft-flesh fruits.

Just as one could imagine from the insect’s common name, male spotted wing *Drosophila* have a single black spot on the tips of their wings. Females lack this particular trait, making them more difficult to identify, but both genders have distinct red eyes. What sets female spotted wing *Drosophila* apart from other fruit flies is the dark brown to black, saw-tooth edges that line either side of her ovipositor. While spotted wing *Drosophila* generally have striped abdomens like so many other fruit flies, females tend to have a wider black band at the very end. Spotted wing *Drosophila* are a medium sized fruit fly, generally about 0.08-0.12 inches long.

**Top: Adult male on blueberry**

**Middle: Adult female and male**

**Bottom: Larvae in fruit**
Spotlight on Incredibly Impressive Cornell Entomology Students

Two of Cornell Entomology’s undergraduate students have been mentioned in a Business Insider article titled 19 Incredibly Impressive Students At Cornell by Mellissa Stanger and Melia Robinson. “These 19 students are building schools, companies, and new technologies that are shaping the future.”

Hope Batcheller, entomology undergraduate from the class of 2014, has travelled the world collecting footage and audio recordings of birds. “She’s the co-captain of Cornell’s World Series of Birding team and the co-founder of the Young Birders Network, a website that allows young birders to connect and learn while giving their adult advocates resources to encourage and support.”

Graham Montgomery, class of 2015, is an avid photographer and entomologist currently working in the lab of Bryan Danforth. Already he has “discovered a species of insect previously unknown to science” and “holds about 12 records, the industry’s name for documenting a species’ existence for the first time.” Some of Graham’s photos are featured on the Entomology website and Facebook page.

According to CALS Notes “Graham’s passions are characterized by his drive to gather unique and wondrous glimpses of the natural world.”

Graham is also an active member of the Snodgrass and Wigglesworth Undergraduate Entomology Club, which organizes student insect collecting trips, camping expeditions and helps to put on Cornell’s popular Insectapalooza event each fall.

He also volunteers as an editor for the website Bug Guide, which enables the general public to upload photographs of insects and have them identified by entomologists. “The site has identified something like 30,000 insect species via photographs,” he said. “It’s kind of like the Lab of Ornithology’s eBird site, only for bugs.” Because of its ease and efficiency, Graham himself prefers to identify insects via photography rather than use the traditional method of collecting. In fact, taking pictures plays an important role in Graham’s life, both in his academic pursuits and as a hobby.

Some other great stories to check out @ http://cornellentomology.tumblr.com/

• Male *Scudderia pistillata* katydids defend their acoustic duet against eavesdroppers—acoustic duets—in which the female reveals herself to the advertising male—are a common means of establishing a temporary, pre-mating pair bond within Phaneropterinae katydids. Such duets, however, are especially susceptible to eavesdropping males that orient to signaling females and interrupt the established duet.

• Kill flies by alternating pesticides, monitoring need —Old-fashioned fly swatters may be the most foolproof housefly killer, but for dairy farms, insecticides are the practical choice. Unfortunately, with the repeated use of the same insecticides, flies develop resistance through genetic mutations that make these products less effective.

• They’re baaaack... or maybe never went away?—A new infestation of Asian longhorned beetles (ALB) has emerged on Long Island. State officials estimate 4,500 trees in central Long Island will have to be destroyed to create a buffer zone to stop the spread. Since 1996 over 20,000 trees have been sacrificed. There are fears that the beetles will spread to upstate New York and cripple the maple syrup industry.
Comings and Goings

The Department of Entomology is delighted to announce the appointment of Dr. Kyle Wickings as Assistant Professor in Soil Arthropod Ecology, Dr. Scott McArt as a Research Scientist, Dr. Marina Caillaud as Lecturer, Holly King as Administrative Assistant to the Associate Chair in Geneva and Rita Stucky as Student Services Representative. Kyle received his B.S. in Environmental Studies from the University of Buffalo and his Ph.D. in Ecology from the University of Georgia. He was a postdoctoral research associate at Michigan State University and at the University of New Hampshire. Scott earned his PhD in Entomology from Cornell and was a postdoctoral researcher at the University of Massachusetts conducting research on plant defenses before starting in the department. Marina received her Ph.D. from the Universite Paris-Sud. We welcome Holly back to Entomology, where she began many years ago as a lab assistant, and Rita, who came to us from the Department of Molecular Biology and Genetics.

This year the department also said farewell to Nicholas Calderone (Associate Professor and Master Bee Keeper), Donald Rutz (former Department Chair, Director of the NYS IPM Program and Professor of Veterinary Entomology), Harvey Reissig (Professor of Entomology specializing in Integrated Pest Management), Nancy Reissig (Administrative Assistant to the Associate Chair in Geneva) and Laurie McCall (Student Services Representative). We thank them for their years of dedication and service, and we wish them the best.

Side (top to bottom): Kyle Wickings, Scott McArt, Marina Caillaud, Holly King, Rita Stucky
Bottom (left to right): Donald Rutz and Laura Harrington; Nick Calderone; Harvey Reissig; Nancy Reissig and Laurie McCall
Awards and Honors

Students and Postdocs

- **Kristen Brochu** was awarded the Outstanding Graduate Teaching Assistant for CALS, 2013/2014.
- **Heather Connelly** won first place at ESA in the graduate student 10 minute paper competition, 2013.
- **Aloy Gu** was awarded best poster at the annual Entomology Department Symposium held by the Jugatae Club, 2014.
- **Sara Hermann** won first place at ESA in the graduate student 10 minute paper competition, 2013.
- **Sarah Jandricic** won second place at ESA in the graduate student 10 minute paper competition, 2013.
- **Xiaowei Li** won the PhD oral competition at the 2014 Eastern Branch meeting of ESA.
- **Brett Morgan** was awarded Academic Excellence for CALS, 2013-2014.
- **Erin Morris** won the 2013 USDA-AFRI Student Travel Grant at ESA.
- **Mia Park** was awarded 2013 USDA-AFRI Student Travel Grant at ESA.
- **Stephen Peczyłak** was recognized for Academic Excellence for CALS, 2013-2014.
- **Erik Smith** won second place at ESA in the graduate student 10 minute paper competition, 2013. Erik also won best talk at the annual Department Symposium held by the Jugatae Club, 2014 and was awarded the 2014 Paul Chapman Graduate Student Fellowship.
- **Michael Wolfin** was selected as the 2014 winner of both the George G. Gyrisco Graduate Student Award in Applied Entomology and the Michael Villani Award for Geneva Graduate Students. Each consists of $1000 that will be used in support of his research efforts.

Faculty

- **Bryan Danforth** has been selected as ESA’s recipient of the Thomas Say Award for his significant and outstanding work in the fields of insect systematics, morphology, or evolution, 2014.
- **Ron Gardner**, coordinator of Pesticide Safety in the Pesticide Management Education Program (PMEP) received the Emmett R. Gauhn Memorial Award, the NYS Association for Food Protection's highest honor, at the 2013 Annual Conference. This award recognized Ron for his outstanding service to this organization during his 30-year career at Cornell.
- **Peter Jentsch** was named superintendent of the Hudson Valley Laboratory, 2013.
- **John Losey** was selected as the Eastern Branch nominee for the ESA Distinguished Award in Extension, 2014.
- **Tony Shelton** is part of a 10-member team that was awarded the Entomological Society National IPM Team Award at the ESA National Meeting. The **Risk Assessment of Bt Plants on Beneficial Non-target Arthropods (NTA) IPM Team** members include Jörg Romeis (Agroscope, Switzerland), Anthony Shelton (Cornell, USA), Steve Naranjo (USDA-ARS, USA), Richard Hellmich (USDA-ARS, USA), Morven McLean (Center for Environmental Risk Assessment, USA), Alan Raybould (Syngenta, UK), Marco Candolfi (Innovative Environmental Services, Switzerland), Jian Duan (USDA-ARS, USA), Joseph Huesing (Purdue, USA), Raymond Layton (Pioneer Hi-Bred, USA), 2013.
- **Dan Wixted**, Extension Support Specialist for PMEP, was recognized for his outstanding contribution to pesticide safety education by the American Association of Pesticide Safety Educators. He was honored as an AAPSE Fellow which “is the highest recognition bestowed by AAPSE.” Fellows are nominated because of their superior achievement in research, education, public service, recognition, and service, 2013.
Snodgrass and Wigglesworth Undergraduate Club written by Kyle DeMarr, Club President

Snodgrass and Wigglesworth, Cornell’s undergraduate entomology club, continues to extend beyond classroom teaching and enrich students through outreach events, department visits, and weekly presentations by faculty and graduate students.

This past fall, many of our members volunteered for the department-wide, public outreach event "Insectapalooza". SnodWiggs engaged one-on-one with patrons to discuss the natural history of insects, effects of pests on society and agriculture, and ways to become involved in promoting local ecosystems. Also in the fall, three of our members traveled to Williamsburg, VA to experience the Entomological Society of America: Eastern Branch meeting. From participating in the Linnaean Games competition, meeting with Cornell alumni, and witnessing the breadth and applications of an entomology degree firsthand, they had a blast!

Not to be outshone by autumnal activities, we also hosted our yearly spring break trip. Following last year’s visit to Texas A&M University, we toured University of Florida at Gainesville and University of Central Florida’s graduate programs. We were graciously hosted during these trips by Heather McAuslane and Derek Woller. Supplying undergraduates with information on graduate education has remained a staple of SnodWigg’s mission. Our visits to these universities were both fun and enriching.

What’s on the horizon for the club? SnodWiggs will continue to travel to important conferences, meet and talk with the public, visit schools, and find time to fit in an ice-cream social or two.

Jugatae, Cornell Graduate Student Entomology Club

This year the Jugatae Club hosted the third annual Jugatae Entomology symposium, which was a great success. Dr. David Grimaldi, curator of the American Museum of Natural History, and Cornell alumnus (’86), gave an excellent keynote lecture.

Dr. Kyle Wickings, a new faculty member in the department, led the day with an equally impressive overview of the type of research his lab is initiating.

Students and postdocs were well represented, and each of the three sessions were presented to capacity audiences comprised of faculty, staff and students from over three different departments on campus.

Thanks to Suzi Claflin, Mia Park and Dan Olmstead for making the event a huge success.

History of Jugatae: from A Brief History of Cornell University and Its Department of Entomology by Edward H. Smith, Professor of Entomology, Emeritus.

Named by John Henry Comstock after his Lepidoptera wing classification, the first meeting was held in 1897 and was meant to be used as a way to present research reports, book reviews and collection expedition reports. Eventually it took on a social aspect of tea and cookies with a get acquainted reception at the beginning. Jugatae was originally a formal function run by the faculty. Since 1938 there was a divide amongst students and faculty about how to run Jugatae eventually led to today’s Jugatae. There are two sections, the invited seminar with coffee, cookies and get togethers mainly run by the faculty and the graduate club which meets to discuss papers, research and findings. The graduate club is a democratic group which votes yearly for it’s officers.
Pests Eat Their Way to Bigger Yields

Most farmers fight a constant battle against damaging insects. In a plant science version of “keep your friends close but your enemies closer,” Cornell researchers are working with a common potato pest to see if they can activate the natural defenses of potato plants by managing the bugs, rather than eradicating them. The researchers aim to harness the plants’ physiological responses to environmental stress—such as infestation—as a sustainable pest control strategy that increases yields and reduces insect damage at the same time.

With seed funding from a 2011 Academic Venture Fund (AVF) award, entomologist Jennifer Thaler led a multidisciplinary team that worked with farmers in the Andes to learn more about how infestation by the local scourge of tuber moths actually helped some potato plants to produce more potatoes at harvest time—up to double the usual yield. These plants responded to a moderate infestation by increasing their production: in plant parlance, they “overcompensated” by ramping up production above the losses caused by the insect.

A team member’s previous research had identified one Colombian potato variety that responds to moth damage with robust yields. The AVF fieldwork pinpointed a second variety that is an effective trap crop. By growing a decoy plant that the moths especially like to eat alongside the potato with powerful natural defenses, farmers are able to control the amount of damage to the majority of their crop: enough damage to activate the extra growth, without excessively taxing the plant. This push-pull strategy could help farmers around the world get bigger harvests from each acre of existing farmland, without pesticides.

Now plant biologist Georg Jander and entomologist Katja Poveda, collaborators on the AVF research, are launching a study of the overcompensating potato variety to determine what genetic and physiological factors kick-start the plant’s growth. “Once we have identified the mechanisms by which the tuber moth promotes tuber growth,” Jander explained, “we can apply these mechanisms to increase yield in other potato varieties.” The new project recently received three-year funding of $498,000 from the U.S. Department of Agriculture (USDA).

Potatoes are indigenous to the Andes and remain a staple crop in South America, where more than 3,000 varieties are grown. The AVF-funded research confirmed local farmers’ interest in sustainable pest control. “We learned that farmers value the health benefits from an alternative pest management strategy much more than we anticipated,” Poveda said. “They are aware of the health consequences of using insecticides and willing to change to alternatives if they do not compromise the productivity of the crop.” In the third year of the USDA grant, the Cornell team will return to Colombia to test the potato in field trials across different altitudes, soils, and climate conditions.

An important goal of the Academic Venture Fund is to promote effective teamwork across departments. A postdoctoral associate in the Department of Entomology when the AVF research began, Poveda is now an assistant professor. She continues to collaborate with faculty who contributed to the AVF research in Colombia, including Miguel Gómez (Applied Economics). “My collaboration with Miguel helped me to understand more about the farmers’ needs. I think it will be a lifelong collaboration,” she reflected. “We plan to investigate the ecological and economic consequences of plant-pest and plant-pollinator interaction in different crops—not just in tropical countries, including Colombia, but also in New York State.”
Graduating Student Activities and Plans

Undergraduate

Tate Lavitt graduated with the Cornell Entomology class of 2014. He entered Cornell as a Biology major, after taking Dr. Rayor’s spider biology class he knew that he wanted to study Entomology. He grew up in Manhattan and attended a small boarding school, Millbrook School in Dutchess county. At Cornell he played Polo for the Men’s Varsity team, #2 in the country. He was very involved with his fraternity, Alpha Delta Phi, and was elected to sit on the executive board of the Inter-fraternity Council. He also sat on the class of 2014 council. He found that through all four years at Cornell, no other department was as excited to teach their students. The Entomology faculty had a contagious enthusiasm for their field and made a large university feel small and inviting. During the summers at Cornell, Tate worked with horses and played polo, which he continues to do post-graduation. Currently he is working on a species description of a new Eupsilia moth with Dr. David Wagner and Dr. Dale Schweitzer at the University of Connecticut. After completion of this research, he plans to apply to jobs in the medical device industry, specifically sales. “Thank you Cornell Entomology for an amazing four years.”

Tessa Lessord received an A.A.S. in Agriculture Technology at SUNY Alfred and was ecstatic to continue at Cornell in the following fall. She found Cornell to be overwhelming at first, considering the fact that she was meeting freshmen that were more motivated and significantly more knowledgeable entomologists. It wasn’t long, however, before she found her place. Tessa worked in the Cornell University Insect Collection and also volunteered in Dr. John Losey’s lab. Her favorite classes were Applied Entomology in the Field and Insect Conservation Biology. Now, she is working on her Master’s Degree with Dr. Brian Nault on the Geneva Campus. Tessa will be conducting research on entomopathogenic nematodes as a biocontrol agent against plum curculio, a tree fruit pest that is prolific in the northeast.

Brett Morgan graduated with majors in Entomology and Plant Sciences. Two of the highlights of his time at Cornell were serving as President of the Snodgrass & Wigglesworth Club and working in the Cornell University Insect Collection. He recently completed the California Academy of Sciences Ant Course in Borneo, and will be donating his ant collection to his former workplace. This fall, Brett will be interning in Switzerland with UrbanFarmers, a company developing rooftop aquaponics systems. He is planning on gaining more research experience before applying to graduate programs related to evolutionary biology and ants.

Graduate

Evan Hoki graduated with a Master’s in Entomology. During his graduate education, he studied the nine-spotted lady beetle, C. novemnotata, in Dr. John Losey’s lab. Specifically, he focused on how the replacement of the nine-spotted lady beetle by non-native lady beetles affects aphid population in agricultural systems. He just accepted a position at the Strong Museum of Play's Dancing Wings Butterfly Garden as their Manager of Live Collections and Chief Entomologist. He started working there in July of this year.

Margarita Lopez Uribe earned her PhD degree on the gene flow and population structure of solitary bee species. She is broadly interested in understanding the evolutionary processes that shape genetic diversity in wild bees to help design conservation and management plans that help enhance these native pollinators. During her time at Cornell, she was an active

(continues on next page)
Graduating Students, Continued

member of the Naturalist Outreach Practicum Program and Insectapalooza. Margarita recently moved to Raleigh, NC to begin a postdoctoral position in North Carolina State University where she will be investigating the effect of urbanization on bee health. She plans to continue her active involvement in outreach programs at NC State.

Other Recent Graduates:
Graduate: Monica Kersch-Becker, Mia Park and Luci Kavi
Undergraduate: Hope Batcheller, Jun Lee, Kevin Moran, Stephen Pecylak and Giuseppe Tuminello

In Bangladesh with *Bt* Brinjal Farmers by Tony Shelton

*April 9, 2014 -*

While visiting Bangladesh to conduct environmental safety assessments for *Bt* brinjal and help farmers develop resistant management programs to ensure the long-term durability of *Bt* eggplant, I visited Haidul Islam’s *Bt* brinjal fields on April 9. Mr. Islam was the same farmer whose crop the *Financial Express* on April 7 alleged was ridden with insects that Mr. Islam was spraying with insecticides.

I found the exact opposite to be true. Mr. Islam and his associate proudly showed me his field of *Bt* brinjal. It was free of pest damage, and they were very pleased with the crop. Normally, they would have already sprayed insecticides on the plants to control the brinjal fruit and shoot borer, but did not have to since the plants resisted their attack. They were pleased to see no borer injury — as were the rest of us who were there inspecting the crop.

*Bt* brinjal resists the brinjal fruit and shoot borer — by far the most destructive pest of brinjal. Females lay their eggs on young vegetative shoots, and the emerging larvae bore into the plant and kill the shoots. Larvae from eggs laid on the fruit also bore into the fruit, making it unmarketable. Neither conventional nor organic sprays provide good control because the young caterpillars burrow into the plant as soon as they hatch. To build up sufficient residues for the larvae to be exposed to the insecticide, all the eggplant tissue must be soaked with insecticide.

*Bt* brinjal also allows farmers to use “integrated pest management,” or IPM, to control minor brinjal pests like aphids, thrips, leafhoppers, and whiteflies. Some of these pests can be controlled by other insects — biological control agents like ladybird beetles and lacewings. These beneficial insects are harmed by conventional and organic insecticide sprays. In using resistant plants instead of pesticides to control the borers, farmers allow beneficial insect populations to flourish.

Coupling insect-resistant plants with integrated pest management is a long-term sustainable strategy that is better for the environment, better for farmers, and better for consumer health.

Because of the usual intense use of insecticide sprays to control fruit and shoot borers, some consumers refer to harvested eggplants from South Asia as “pesticide bombs.” *Bt* brinjal is a far safer and healthier way for farmers to control the pest and market their fruit.
Western Flower Thrips by Jeff Scott

Western flower thrips, Frankliniella occidentalis (Pergande) (Thysanoptera: Thripidae) are tiny, but are considered one of the most economically important pests of agrcultural crops worldwide. They cause substantial losses not only through direct feeding, but also by transmitting viruses. Due to their small size and secluded behavior, chemicals are the most effective way to achieve control them. However, intensive insecticide use combined with a short generation time, high fecundity and their haplodiploid reproduction system promote rapid development of resistance. Resistance to most insecticides has been reported in F. occidentalis. Spinosad, an environmentally-friendly macrolide insecticide, is not an exception. Although the mechanism of resistance is due to a change in the target site, the precise mechanism is not known. Understanding this mechanism is very important for resistance monitoring efforts. One recent study proposed that a G275E mutation in a nicotinic acetylcholine receptor gene (nAChRα6) led to spinosad resistance. In collaboration with scientists at the Chinese Academy of Agricultural Sciences (Wenjie Hou, Qiulei Liu, Lixia Tian, Qingjun Wu, Youjun Zhang, Wen Xie and Shaoli Wang) and the University of Florida (Joe Funderburk), Cornell scientists Keri San Miguel and Jeff Scott examined resistant thrips from the USA and China. They concluded that the proposed mutation was not responsible for spinosad resistance. Thus, additional work is necessary to identify the cause of this important resistance mechanism. Their work was reported in Pesticide Biochemistry and Physiology (2014, 111:60-67).

Sex Proteins May Help Fight Mosquito-borne Diseases Cornell Chronicle

By—Krishna Ramanujan

Better understanding of mosquito seminal fluid proteins – transferred from males to females during mating – may hold keys to controlling the Asian tiger mosquito, the world’s fastest-spreading invasive species, found in the U.S. and elsewhere. This mosquito is an important vector for dengue and chikungunya fevers as well as dog heartworm. These seminal fluid proteins, it turns out, have profound effects on the female mosquito’s physiology post-mating, including rendering future eggs infertile and curbing the female’s appetite for blood.

For the first time, researchers from Cornell University and the College of Wooster have identified 198 seminal fluid proteins in the Asian tiger mosquito (Aedes albopictus).

The findings were reported June 19 in the journal Public Library of Science Neglected Tropical Diseases.

“Our results provide a foundation for future studies to investigate the roles of individual seminal fluid proteins on feeding and reproduction in this mosquito,” said Laura Harrington, Cornell professor of entomology and a co-author of the paper. Kathryn Boes, a postdoctoral researcher at the College of Wooster, is the paper’s lead author.

“Our paper is a significant step forward in our understanding of the mating biology of this species and will bring us closer to our goal of identifying novel targets for mosquito control,” Harrington added.

The researchers have been studying genes that express seminal fluid proteins, and trying to understand their functions and effects on the female after they are transferred. One possibility is to use these insights to develop genetically modified mosquitoes that can no longer transmit dengue, for example.

“Whether transgenic mosquitoes will be accepted or not is another issue,” said Harrington.

In past research, the scientists identified seminal fluid proteins in...

Cont. on page 13
Sex Proteins Continued

male *Aedes aegypti* mosquitoes, which is related to the Asian tiger mosquito and also spreads dengue fever, chikungunya and yellow fever viruses, among other diseases. When comparing the proteins from the two mosquitoes, the researchers found only about 36 percent were similar between the two species.

“That’s not surprising, because we find that seminal fluid protein genes are rapidly evolving,” said Harrington. The comparable proteins point to genes that are likely conserved through evolution, suggesting they have important functions, and offering targets for further research.

Co-authors include Mariana Wolfner, Cornell Professor of Molecular Biology and Genetics, and Laura Sirot, Assistant Professor of Biology at the College of Wooster.

The study was funded by Cornell University Agricultural Experiment Station’s USDA Hatch funds and the National Institutes of Health.

Controlling Alfalfa Snout Beetles adapted from Watertown Daily Times, Steve Virkler

Experts are recommending a two-pronged approach to combatting alfalfa snout beetles, both by introducing predator worms and by planting more resistant strains of alfalfa. “We need to get the pressure down before we introduce resistant alfalfa,” Elson J. Shields, Professor of Entomology at Cornell University, Ithaca, told more than 50 area farmers during the inaugural Lowville Farmers Co-op winter forage forum Tuesday at the Lowville Elks Lodge.

Shields, who has conducted research on the beetle since the late 80s, said that trials and research continue to produce more resistant strains of the plant, but a large concentration of snout beetles will still decimate even the hardiest of crops. That’s why he is pushing farmers to apply nematodes, which feed on the larvae of snout beetles and other insects, to their alfalfa crops. “We think we’ve gotten it down to where it’s pretty economical,” said Shields.

Nematode applications have cost farmers about $30 per acre to do it themselves or $60 per acre to have Cornell staff do it for them, he said. However, research has indicated that the predator worms — because they will move to find larvae — may be spaced out in rows from six to 11 inches apart and still achieve full-field coverage, Dr. Shields said. That drops the per-acre cost for do-it-yourselfers to between $5 and $10, depending on how heavily the field is infested. “How many ways do we blow five bucks?” Shields said. In contrast, the beetle costs farmers an estimated $350 to $500 per acre each year, he said.

The alfalfa snout beetle, an invasive species that likely came to Oswego in boat ballasts in the 19th century, has marched through the north country ever since. The insects lay eggs at the root of alfalfa plants. Larvae feed on plant roots, severely damaging the vital forage and rotation crop critical to dairy and other livestock farmers. “This is not a dainty insect,” said Julie L. Hansen, senior research associate in the department of plant breeding at Cornell. “It doesn’t nibble. It takes big bites.” Since undertaking greenhouse research in 2002, Hansen said, beetle resistance in alfalfa has improved dramatically, and the newer varieties started to be tested in field trials a few years ago. “However, even the most hardy strains would still be classified only as “moderately resistant,” she said.

Research since 2007 on 189 fields throughout Northern New York has shown success in controlling the snout beetle with a single application of nematodes, preferably done a couple of weeks after a cutting during the field’s second year of alfalfa, Shields said.

The worms also appear to survive in fields through crop rotations to corn and even soybeans, with at least one field showing a high nematode concentration in a year when corn had been planted, he said. The Cornell professor speculated that in that instance, the predator worms were feasting on corn rootworm larvae, noting they are “generalists” that will devour almost any grubs they come across.

Nematodes can be purchased through Cornell, but Mr. Shields suggested that farmers request them before cutting alfalfa to allow time for breeding the worms.

Joseph R. Lawrence, a former educator at Cornell Cooperative Extension of Lewis County who now works for the Lowville Farmers Co-op, said interested farmers could contact either him or Extension Field Crops Educator Michael E. Hunter for more information.
Obituaries: We are saddened to report the passing of the following alumni and faculty.

Richard C. Back BS '43, PhD '51, died March 31, 2013. Richard attended Cornell University for his bachelor's degree in entomology. He served for three years in the South Pacific during World War II in the US Navy Reserves, receiving a Battle Star in December 1944. He continued his Naval service after the war as a medical entomologist, and received his commission as an Ensign, and as Lieutenant. He then returned to entomology and insect toxicology, earning a MS from Iowa State '48, and PhD from Cornell University '51. In a career that spanned thirty-five years, Dr. Back worked as an entomologist developing and registering agricultural products.

Otelia Francis Bodenstein MS '36, of Hanover VA, passed away on November 29, 2013. Entomologist at the Depart of Agriculture Experimental Farm at Beltsville MD and active in Community affairs.

Gene R. DeFoliart PhD '51, of Madison WI passed away on January 3, 2013. Medical and veterinary entomologist, expert on mosquito born arboviruses, emeritus professor of entomology at U of Wisconsin Madison, taught at U of Wyoming. Also was veteran, editor and active in professional and religious affairs.

John Graham MS '59, of Evans GA, passed away on June 26 2012. He was a retired entomologist from North Carolina State U, he became a computer programmer, worked on atmospheric carbons for the Environmental Protection Agency, was a veteran, active in community affairs.

Ellis W. Huddleston PhD '60—of Las Cruces, NM passed away on April 1, 2013. Entomology professor and department head of entomology, plant pathology and weed science at New Mexico State U. Researched the impact of insects on rangeland and crops to improve global food production. Also taught at Texas Tech, founder and research director for Pesticide Application Technologies, USAID advisor, veteran, and was active in community and professional affairs.

Stanley W. Meso BA '57 of Longview, WA passed away on October 19, 2013. He was a retired entomologist of the US Forest Service, Owner of Sweet N Unique Toys, veteran, model train collector, remote control airplane hobbyist, and photographer.

Woodrow W. Middlekauff PhD’41 of El Macero, CA passed away on May 19, 2013 at the age of 100. He was an Emeritus Professor of Entomology at the University of California Berkley, veteran of World War II, hunter and fly fisherman.

Mary Harvey Ross BA’47 PhD’51 of Blacksburg, VA passed away on July 6, 2012. Attended Cornell University where she obtained her B.A., M.A. and Ph.D. Dr. Ross’s distinguished career in Entomology at Virginia Tech spanned 38 years, and she was awarded Professor Emeritus in 1997. She was a pioneer in the research of genetics and behavioral studies of the German cockroach. She was awarded the Alumni Award for Excellence in Research from Virginia Tech in 1983.


Maurice Tauber, passed away on October 6, 2014 at the age of 82. Professor Emeritus of the department of Entomology at Cornell University, his research embraced ecological, evolutionary, and behavioral questions, and involved both beneficial and pest species from eight insect orders. The research yielded fundamental insights into insect photoperiodism, dormancy, development, and speciation.
New Course: ENTOM 3340 Tropical Field Entomology by Bryan Danforth

This course will introduce students with a background in basic entomology (Entom 2120, or equivalent), ecology (BioEE 1610), or evolutionary biology (BioEE 1780) to insect biodiversity, ecology and behavior in a neotropical rainforest environment.

The course will take place during the winter inter-session (Jan. 4-18, 2015) and will be offered at the La Selva Biological Station in Costa Rica. The course will include insect survey and collecting methods, observation and experimentation on insect ecology and behavior, large and small-group research projects, scientific writing, and discussion of a set of research papers on the biology of neotropical insects.

La Selva provides an ideal location for the course because the research station provides housing and meals, laboratory space, microscopes, transportation to and from the airport in San Jose, and a well-marked trail system for students to carry out their collecting and experiments. There is long tradition of entomological research at La Selva and amazing resources (libraries, plant and insect collections, local expertise) available to the class. The current director (Carlos de la Rosa) is an entomologist.

Instructors, Professor Bryan Danforth, Senior Extension Associate Jason Dombroskie, and graduate students Mary Centrella and Kristen Brochu are looking forward to teaching this course this winter.

More Than a Century of Beetles by James Liebherr

If you are on the second floor near the Insect Collection, you’ll see that beetles have taken over the entrance to the interactions room. The poster commemorates the more than 100 beetles of the genera Mecyclothorax and Bembidion known so far from the island of Tahiti. These were recently revised by Entomology Professor Jim Liebherr, and he worked up the poster for colleagues at the Natural History Museum, Paris, where all the primary types are deposited. Another copy of the poster was given to Jean-Yves Meyer, of the Institut de Recherche, Papeete, Tahiti, for hanging in his office. For both posters, Jim saved postal charges and potential damage by hand delivery. Jean-Yves met Jim halfway at the recent meeting of the International Society of Island Biology held at the University of Hawaii, Manoa. The beetles represent an astounding radiation, as nearly all of the 100 are known only from a single massif on Tahiti. These massifs represent the various flanks of the Tahiti Nui and Tahiti Iti volcanoes with peaks from 1500-2200 m elevation that are isolated by 1000-1700 m deep valleys. For those using English units, that would be valleys over a mile deep on an island of only 1045 square kilometers (oh yes, that is 404 square miles). For comparison, Tompkins County’s area is 476 square miles.
Help Us Fly High

Stay connected and help us fly! Many of you have fond memories of your time in the Department of Entomology and of your professors and classmates. We remain committed and as passionate as ever about our science and our students.

We now have new opportunities for you to stay in touch with us: our department website, Facebook, Twitter, and Tumblr, (see the URLs above).

With declining support from the State of New York and other financial challenges, we are always in need of your help so that we can continue to offer a top notch education and maintain our cutting edge research and extension programs. Please consider a pledge or donation to Cornell Entomology. You can designate how you want the funds to be used or you can give to our Entomology Excellence Fund, which supports all sorts of opportunities for our department to stay on the cutting edge of research and instruction.

Checks can be mailed to:
Senior Director of Alumni Affairs and Development
College of Agriculture and Life Sciences
274 Roberts Hall
Ithaca, NY 14853

Please contact Laura Harrington (lch27@cornell.edu) for like more information or to discuss other giving opportunities.