

IOBC-NRS NEWSLETTER

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Marshall Johnson Receives IOBC-NRS Distinguished Scientist Award



Dr. Marshall Johnson (left) has advanced entomology during the past three decades by developing successful IPM programs in several cropping systems. Marshall's work has focused on conservation biological control, specifically the integration of natural enemies into systems where heavy pesticide use is common such as vegetable crops. Almost 100 of his publications specifically deal with aspects of natural enemy biology or ecology including suppression of pest populations, classical biological control, mass rearing natural enemies, sampling natural enemy populations, host specificity, use of entomopathogenic nematodes, lethal and sublethal impacts of pesticides on natural enemies, and pesticide resistance in natural enemies. To achieve integration, he not only focused on the biology and ecology of natural enemies, but also examined various components of the agro-ecological system to determine how pesticide applications could be reduced. This included the

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Be Aware of Predatory Meetings (not the predation we like)

Excerpt from: <http://scholarlyoa.com/2013/01/25/omics-predatory-meetings/>

"Now new evidence has surfaced revealing that OMICS, which is also in the business of organizing scientific conferences, has been 1) using the names of scientists, oftentimes without their permission, to invite participants to their meetings, 2) promoting their meetings by giving them names that are deceptively similar to other well-established meetings that have been held for years by scientific societies, and 3) refusing to refund registration fees, even if their meetings are cancelled... For example, OMICS uses the name Entomology-2013 for one of its conferences, the same name (minus the hyphen) that the Entomological Society of America (ESA) uses for its annual meeting. Moreover, ESA plans to host the International Congress of Entomology (ICE) in 2016 in Orlando, Florida. Coincidentally (or not?), OMICS uses a very similar name, the "International Conference of Entomology," for its meeting, also to be held in Orlando."



*Jon Lundgren
sets the theme
for 2013-2014*

MESSAGE FROM THE PRESIDENT: **Expanding the focus of our society**

Before beginning, several notes of thanks are needed. First, Les Shipp (recently named an honorary member of IOBC) has been associated with the Governing Board for many years, most recently as Former President, and our leadership team is losing a key player. His knowledge and experience will be sorely missed, but his service to our society and our discipline will not soon be forgotten. Thank you, Les.

I step into big shoes- Doug Landis was an excellent President and hopefully his vision and expertise will continue to help guide us as we move forward into the next few years. His leadership kept membership up, provided several strong symposia for the EntSoc National Meeting, and helped to establish the Early Career Outstanding Scientist in Biological Control Award. Many thanks, Doug.

Also, we welcome new members to the Governing Board. Jana Lee has stepped into the Corresponding Secretary position, James Harwood is now the Treasurer and is already doing great things, and Cesar Rodriguez-Saona, Rose Buitenhuis, and Jim Nechols are our members-at-large. We look forward to working with these wonderful additions to the team!

Over the next few years, our society will secure its place as the nation's leading biological control society, and lead new endeavors to advance biological control from an academic endeavor to one that is widely recognized and can be practiced on every farm. To accomplish this, the Governing Board and I are putting together a roadmap to increase conservation biological control by providing clear and dynamic practical solutions for farmers who want to conserve natural enemies on their farm, and working with other organizations and agencies to align biological control with biodiversity conservation initiatives and eventually incentivize the practice of conservation biological control on farms. A big part of this plan is to improve our role as an educational tool, and to take better advantage of our diverse and expert membership as tools to disseminate the messages of our society. Additional details on these plans (that are already taking shape) will be forthcoming in future e-mails and newsletters!

*Jonathan Lundgren, President
USDA-ARS, Brookings SD
Jonathan.Lundgren@ars.usda.gov*

Continued from page 1 **Marshall Johnson**

development of sampling methods to time control actions as well as the determination of pest impact on crop yields to determine the need for control actions.

Currently, Marshall is an Extension Specialist at the University of California at Riverside focusing on tree fruit and orchard crops. Marshall's impact on biological control is also demonstrated by his leadership and teaching. To name a few, these include serving as the Chair of the Western Regional Committee on Biological Control; ESA Subsection on Biological Control; and as the President of the IOBC-NRS. He served seven years as an editor of the journal *Biological Control* –

Theory and Application in Pest Management. He has trained the next generation by teaching a biological control course at University of Hawaii at Manoa from 1983 to 2000. Eleven of his graduate students have conducted research on aspects of biological control. Marshall has published > 240 publications. Of these, more than 155 were refereed including journal articles, book chapters, and review articles. His published works have been cited over 4,100 times in the scientific literature (Google Scholar Profile).

*James Hagler
USDA-ARS, Maricopa AZ*

Brett Blaauw Receives Robert J. O'Neil Outstanding PhD Award



Brett Blaauw is completing his PhD from Michigan State University with Dr. Rufus Isaacs. In his research, Brett explored the benefit of wildflower plantings to support natural enemies on farms. Brett's studies have led to new insights into the role of patch size on the response of natural

enemies to flowering plants, showing that even small patches can support significant levels of biological control (Ecol Ent). Brett has been keen to determine the effect of beneficial insects on pest control and pollination, contributing to our understanding of biodiversity-ecosystem function relationships and broadening the view of this so that landowners' efforts to support biological control might also be motivated by their concerns for pollinator conservation. His studies have provided some

important answers to practical issues about the effectiveness of on-farm flower plantings for supporting beneficial insects, without increasing pest populations (J Appl Ecol).

Brett is committed to the application of his research, and gave 10 extension-outreach talks in 2011 alone. He has provided talks to apple, cherry, and blueberry grower groups, to environmental nonprofit organizations, has been invited by conservation districts and garden groups, and has talked at formal extension meetings. Notably, Brett has a talent for graphic art. He wrote and illustrated for the publication (Rodriguez-Saona et al. 2012). His posters are visually appealing as well as scientifically solid, and they have won awards at MSU and at the annual ESA meeting. Of the many excellent materials he has produced, of great note are the video that earned him the ESA video prize at the annual meeting and the video on preparing native plantings. He has also been very willing to share his skills when a colleague needs some graphic artwork.

*Rufus Isaacs
Michigan State University*

Maggie Douglas Receives Outstanding Master's Student Award



Maggie Douglas (left) received her MS degree at Penn State University with Dr. John Tooker. Her research focuses on developing crop rotations that are less reliant on synthetic chemical inputs. As her project began, it quickly became apparent that the pri-

mary pest of concern was not an insect species, but slugs. Consequently, Maggie focused her energy on learning as much as possible about slugs, and determined that a few carabid beetle species specialized on slugs and could effectively protect crop plants. However, she then determined that insecticidal seed treatments might be disrupting potential biological control of slugs. This interesting finding could help explain slug outbreaks in large numbers of mid-Atlantic no-till fields in the past ten years.

The quality of her research is evidenced by her receiving a Northeast SARE Graduate Fellowship and a Sigma Xi Grant-in-Aid, invitations to present at the American Malacological Society Annual Meeting and in a symposium on unanticipated consequences of seed treatments at the Entomological Society of America (ESA) in 2012, and winning the student presentation award at ESA in 2011.

*John Tooker
Penn State University*

Steve Frank Receives IOBC-NRS Early Career Award



Dr. Steven Frank (left) started as an MS student at the University of Maryland with Dr. Shrewsbury where he documented increased predation with conservation strips in golf courses. He continued with his PhD with Drs. Shrewsbury and Denno describing how alternative food affected biological control by omnivorous carabids. As a postdoc at Texas A & M with Dr. Micky Eubanks, Steve investigated if aphids serve a beneficial role in cotton by attracting natural enemies and

inducing plant defenses. Currently, Steve is an Assistant Professor at North Carolina State University. In 2010, Steve published a review of Banker Plant systems that has already been cited 23+ times and triggered a flurry of banker plant research. Steve has also worked on ways to reduce non-target effects of pesticides in nurseries and urban landscapes. Recently, he was co-PI on a USGS grant to determine the mechanisms that underlie pest outbreaks that result from urban heat islands and global warming.

Steve is committed to training the next generation of biological control researchers and practitioners through mentoring and teaching. Three of his graduate students were awarded SARE grants or an EPA Star Fellowship. He has also mentored three undergraduates who presented at professional meetings. Steve has published 19 peer-reviewed articles, 3 book chapters, and 24 invited presentations. His laboratory is very busy with 16 active grants.

Paula Shrewsbury
University of Maryland



Biocontrol Musing: A Better Worm

Hybridization (or admixture) is hardly ever used to improve biological control agents. I don't know why this is because it seems to be a really good idea, especially given findings over the past decade or so of how important this can be for invasion success in general. Of only 2 or 3 cases attempted that I know of, the best example is one in which two strains of a single entomopathogenic nematode species were mated to create a better hybrid. This nematode attacks the pecan weevil in the S.E. United States and apparently two strains were available – an Italian strain that was highly virulent but also very susceptible to heat and desiccation and another strain that had low virulence but great heat and desiccation tolerance. The two

strains were mated and *voila*: a new hybrid strain that had high virulence and heat/desiccation tolerance! Similar forms of heterosis have been seen in parasitoids as well, and Fred Legner opined years ago that those cases in which biological control was improved by the addition of a new strain of parasitoid may have been due to hybridization rather than by strain replacement, which had always been the presumed mechanism. I have noticed an uptick recently in studies of hybridization and admixture in biological control agents – for example, at least two papers in a recent special issue of the journal *Evolutionary Applications* on biological control & evolution highlighted this strategy. Hopefully this increased interest will lead to more concrete cases of improvement in the not-too-far future.

George Heimpel
University of Minnesota

Benvenuto, C., et al. 2012. Intraspecific variability in the parasitoid wasp *Trichogramma chilonis*... *Evol Applications* 5:498-510.

Legner, E. F. 1972. Observations on hybridization and heterosis in parasitoids of synanthropic flies. *Annals Ent Soc Am* 65:254-263.

Shapiro-Ilan, D. I., et al. 2005. Targeted improvement of *Steinernema carpocapsae* for control.... *Biological Control* 34:215-221.

Szucs, M., et al. 2012. Hybrid vigor in the biological control agent, *Longitarsus jacobaeae*. *Evol Applications* 5:489-497.

RESEARCH BRIEFS

Biocontrol of Spotted Wing Drosophila –Parasitoid Baiting Project–2012

The Spotted Wing Drosophila (SWD, *Drosophila suzukii*) is a vinegar fly native to Southeast Asia that lays its eggs in ripening small fruits. Since its first detection in 2008 on the West Coast of North America, SWD has been at the top of the list of concerns for fruit producers and pest management specialists. By the action of the female's saw-like ovipositor and subsequent feeding by larvae and decay organisms, infested fruit is rendered unmarketable before it is harvested.

Since 2011, researchers at the Oregon State University Department of Horticulture have been monitoring for biological control organisms that may help control populations of SWD. Native to Asia, SWD does not have known associations with North American insect fauna, and importation of parasitic wasps from Asia is on the distant horizon. A growing body of research supports the theory that indigenous parasitoids can have an impact on invasive pest populations (Magal et al. 2008). If resident natural enemies have a significant effect on the pest population, then importation of exotic species for biological control may not be necessary. Conducting a survey of native parasitoid fauna will also establish a base level of parasitism, so that success rates of imported natural enemies can be compared.

From May to October, sentinel parasitoid bait stations are placed in various locations in the Willamette Valley. Sites are located in or near agricultural settings and are selected for diverse vegetation and minimal use of pesticides, thereby increasing the likelihood of capturing resident parasitoids. Each bait station consists of a hanging tent trap with a dish of yeast-based fly food or a dish of seasonal fruit (Figure 1). In each dish, SWD host larvae of all development stages feed. For comparative purposes, traps baited with *Drosophila melanogaster* larvae and traps baited with no larvae are placed in the same sites. Resident parasitoids locate the stations and lay eggs in the larvae or pupae. Dishes are collected on a weekly basis and are kept in the lab to allow any parasitoids to develop and emerge (Figure 2). Parasitoids are counted, collected and identified.

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Figure 1. A sentinel parasitoid bait station in an abandoned cherry orchard (top left); raspberries baited with SWD larvae (top right); measuring out larvae onto a dish filled with food medium (bottom).



Figure 2. Stacks of collected baits awaiting wasp emergence.

RESEARCH BRIEFS

Predators and Pathogens of Spotted Wing *Drosophila*

Potential predators and pathogens are also being evaluated for control of SWD at the USDA-ARS Entomology lab in Corvallis, OR. Trials with applying nematodes to infested diet or blueberries have been done with *Heterhabditis bacteriophora* Oswego, *Steinernema feltiae* sn, and *S. carpocapsae*. Very little infection was observed when nematodes were applied in close range on moist media (diet or blueberry & wet filter paper). Given the difficulty of getting infection in this scenario, it is unlikely that these nematodes will be efficacious at a bigger scale of release. Trials to directly spray adults with *Beauveria bassiana*, *Metarhizium anisopliae*, and *Isaria fumosorosea* are underway. If promising, trials at larger scales under more natural conditions are planned. Mortality has been observed with *I. fumosorosea* directly sprayed onto adult flies in lab studies conducted in Mexico (Naranjo-Lázaro et al. 2012).

The minute pirate bug, *Orius insidiosus*, suppressed the egg or larval stage of SWD in laboratory studies. Control under semi-natural conditions was not significant but requires further testing with hanging blueberries. In the latter case, *Orius* was released into mesh-covered blueberry plants growing in pots, and most infested blueberries had dropped to the ground. Preliminary laboratory trials with *Atheta coriaria*, a rove beetle, show predation. Larger scale trials are planned to assess whether this ground predator might reduce SWD population among fallen fruit.

Jana Lee
USDA ARS, Corvallis OR

Adult male infected with
I. fumosorosea
photo by Naranjo-Lázaro



Naranjo-Lázaro, J. M., et al. 2012. Avances en la selección de cepas de hongos entomopatógenos como agentes de control microbiano de adultos de *Drosophila suzukii* matsumura (Diptera: Drosophilidae). Pp. 523-526. En: Memoria del XXXV Congreso Nacional de Control Biológico. Ed. la Benemérita Universidad Autónoma de Puebla, Pue., del 7 al 9 de Noviembre. ISBN: 978-607-9098-18-6.

Parasitoid Baiting Project—2012

Continued from page 5

The generalist species *Pachycrepoideus vindemmiae* (Pteromalidae) is regularly collected from both SWD and *D. melanogaster*-baited traps (Figure 3). Currently, average parasitism rate of SWD in the field by this species hovers around 3%, indicating that *P. vindemmiae* has a minor effect on SWD populations in the Willamette Valley. A second species of parasitoid wasp has been collected in lower numbers and is currently being identified.

Betsey Miller, Danny Dalton, Vaughn Walton, Jeff Miller
Oregon State University



Figure 3. Parasitism by *P. vindemmiae* can be detected by looking at pupal cases. SWD emerges from a hinged flap in the pupal case (top), while *P. vindemmiae* chews its way out through a circular hole (bottom left). You can see the wasp developing inside of the fly pupal case (bottom right).

Magal, C., et al. 2008. Control of invasive hosts by generalist parasitoids. *Mathematical Medicine and Biology* 25:1-20.

TOYS OF THE TRADE

Disclaimer: *Toys of the Trade* highlights tools that may be of interest to researchers in biological control. Mention of a proprietary product does not constitute a recommendation by the IOBC.

Electrified Insects

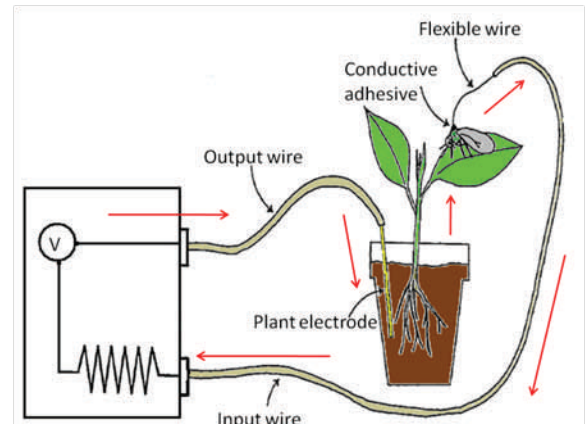
The electrical penetration graph (EPG) technique is a powerful tool for measuring the feeding behavior of arthropods. In EPG, the insect is wired into an electrical circuit with a host plant. The insect then acts as a variable switch and the circuit is completed when its mouthparts are inserted into the plant. By measuring the changes in voltage over time (which are displayed as visible patterns called waveforms) the number and durations of different activities such as salivation, phloem or xylem ingestion, can be measured. While this tool has traditionally been used for piercing-sucking insects such as aphids, leafhoppers and psyllids, it could also elucidate other types of behaviors of other arthropods. This is especially true for the all-new and modern AC-DC EPG monitor. For example, an electrical circuit can also be completed as a wired caterpillar chews on a leaf, a tick feeds on blood, or a parasitoid stings a host.

What are untapped areas that have potential in biological control research?

- Monitor the feeding events and duration of hemipteran predators on pests, or monitor their omnivorous habits of supplemental plant feeding. A waveform generated by a probing *Orius* was observed during preliminary trials.
- Observe and quantify different stages of hymenopteran oviposition. EPG can separate putative egg deposition from fluid secretion based on preliminary trials.
- Aphids are well-studied with EPG, many of the waveforms have been identified when an aphid probes, salivates in the phloem, ingests phloem or xylem sap. These specific feeding behaviors are also associated with virus acquisition or inoculation. Why not study behavioral changes when aphids are parasitized to elucidate alterations brought on by biological control to the aphid-virus interaction.

Where can I learn more?

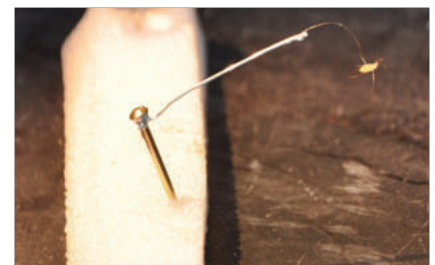
On July 22-27, 2013, there will be a hands-on instruction workshop taught by Elaine Backus at California State University, Fresno State ("Fresno State"), contact Elaine.Backus@ars.usda.gov



Basic components of EPG and circuit (red arrows), modified from Walker (2000).



EPG set up with a raspberry plant, probes, and monitor.



Aphid tethered to gold wire. No coffee drinking.

My graduate student and I (Corresponding Secretary) took this course in 2010. Danielle Lightle said "It was a great learning experience and fun time meeting other EPG-ers from all over. Afterwards, I have used EPG to study aphid feeding in raspberry for several projects."

Walker, GP. 2000. Beginner's guide to electronic monitoring, pp. 14-40. In GP Walker and EA Backus [eds.], Principles and applications of electronic monitoring... Ent Soc America, Thomas Say Pub.

TOYS OF THE TRADE

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Wind tunnels, olfaction arenas, and volatile collection systems have long been the tools of chemical ecology. Many of these tools have applications for biocontrol research, especially questions dealing with insect behavior, attraction to plant volatiles, and evaluating biological control agents.

- Parasitoid search efficiency or effectiveness of a pheromone can be analyzed with a low-speed, laminar flow wind tunnel.
- Host specificity can also be tested within Teflon/glass arenas.
- To study insect performance, the ultra-low-friction flight mill logs flight revolutions of even small-bodied insects.
- Plant volatiles can influence predator/parasitoid attraction and distinguishing between target and non-target hosts. Collection and analysis of volatile organic compounds (VOCs) require precise airflow and minimal background odors. Equipment include a benchtop or portable volatile collection system that provide regulated airflow and clean air supply for repeatable headspace sampling, and accessories (leaf chambers, adsorbent VOC traps).

With a degree in mechanical engineering from Ohio University, tinkering has always been a passion for Bryan Banks. Bryan's interest in developing creative solutions to ecological research began while helping with his wife's graduate research and as a lab technician for Dr. Thomas C. Baker in the Entomology Department at Penn State University. Later, Bryan founded VAS (Volatile Assay Systems) which provides the tools mentioned. He runs VAS from his workshop in Rensselaer, New York. Bryan takes pride in his work and enjoys knowing that people are conducting successful research with his products.

For more information visit

www.vassays.com

Bryan Banks
VAS

4-arm olfaction arena (left), portable assay system (right)



The International Organization for Biological Control presents the short course
Basic and Applied Ecology of the Coccinellidae

Instructors

Jonathan Lundgren, USDA-ARS, Brookings, SD

John Obrycki, University of Kentucky, Lexington, KY

Beth Choate, Allegheny College, Meadville, PA

Ted Evans, Utah State University, Logan, UT

Natalia Vandenberg, USDA-SEL, Beltsville, MD

Where: Richardson Wildlife Center, near Amboy, IL

When: June 24-28, 2013

What: The coccinellid course will explore current basic and applied aspects of morphology, nutritional ecology, dispersal, chemical ecology, reproductive biology, and conservation biological control. The venue is a successful prairie restoration site, and learning the basics



behind this success story and its implications for biological control will be discussed. The course is unit based, and couples hands-on laboratory/field experiences with lecture-style presentations by world leaders in the field of coccinellid natural history.

Tentative cost: \$500 (including meals and lodging)

Class space is limited and will fill quickly

Please contact Jonathan Lundgren

(Jonathan.Lundgren@ars.usda.gov) by May 15.

Call for IOBC-NRS Awards!

IOBC-NRS Distinguished Scientist Award

Nominees must have spent most of their career in the Nearctic Region, and have made significant contributions to biological control., but need not be members of IOBC.

Early Career Outstanding Scientist Award

Nominees should be no more than 10 years post PhD and have made significant contributions to the field of biological control through research, teaching, and/or extension/outreach. Nominees must have spent most of their career in the Nearctic Region and be a current IOBC member.

Application guidelines: Nomination narratives for the Distinguished and Early Career Award are restricted to one page in length and should contain a thorough but concise summary of the principal contributions of the nominee. The nominator should include the names and current contact information of both nominator and nominee on a separate page. A copy of the nominee's CV (no page limit) should also be included that provides the nominee's professional record (employment affiliations), prior awards, description of biological control related activities, publications lists, and extramural grant record.

Please submit nominations by June 15, 2013 to: Jonathan Lundgren, Jonathan.Lundgren@ars.usda.gov

IOBC Graduate Student Awards

The IOBC-NRS sponsors two Graduate Student Awards — The Robert O'Neil Award for Outstanding PhD Student in Biological Control, and a Master's-level award — to be awarded to students whose contributions are likely to shape the future of biological control. The recipients will be recognized at the IOBC-NRS Symposium held at the ESA Annual Meeting in November 2011, Reno, Nevada. Winners will receive cash awards (\$300 for PhD, \$200 for Master's), and the PhD winner will also give a research presentation during the IOBC Symposium and Meeting. All students enrolled in a graduate program in Bermuda, Canada, or the U.S., and who are members of the IOBC at the time of the application deadline are eligible.

Application guidelines: Students should send: a letter that details the significance of their research and its relevance to biological control; a CV that includes contact information; and two letters of recommendation. See IOBC NRS website for information on previous winners and specific criteria for assessment of nominations.

Please submit application materials by June 15, 2013 to Don Weber, Don.Weber@ars.usda.gov



The main topic of the XVIth European Carabidologists Meeting reflects the variety of interactions that exist between carabid beetles and man, and which are subject of high quality carabidology research. Carabid beetles represent an important component of natural food webs, both preying and being preyed upon. Understanding these food webs and more specifically the role of carabid beetles within these complex interactions is important not only for successful landscape and habitat management, restoration and conservation, but also for augmentation of ecosystem services provided by carabid beetles. These services, such as pest and weed seed predation in agricultural and forest systems, usually re-

main unnoticed despite their notable economic value.

September 22-27, 2013, Prague, Czech Republic

<http://europeancarabidology.eu>



Photo: Petr Klimeš

International Organization for Biological Control Nearctic Regional Section
 Organisation Internationale de Lutte Biologique Section de la Region Nearctique

Visit our website: www.iobcnrs.com

The International Organization for Biological Control—Nearctic Regional Section Newsletter is published 3 times a year to provide information and to further communication among members of the Region (Bermuda, Canada, & the United States).

Send items for the IOBC-NRS Newsletter to:

Newsletter Editor, Jana Lee

Horticultural Crops Research Unit
 USDA-ARS

Corvallis, OR 97330 USA

E-mail: Jana.Lee@ars.usda.gov

Upcoming Events in 2013

4-8 March 4th International Symposium on Biological Control of Arthropods. Pucón, Chile, Contact Tania Zaviezo tzaviezo@uc.cl www.isbca.org

5 March International Branch of the Entomological Society of America. Pucón, Chile. Contact RNWiedenmann@gmail.com

13-17 May 2nd International Symposium on the Molecular Detection of Trophic Interactions. Lexington, Kentucky. Contact Organizer James Harwood, James.Harwood@uky.edu; see website <http://www.ca.uky.edu/mti2/>

3-6 June 3rd International Entomophagous Insects Conference. Orford, Québec. Contact organizers Guy Boivin boiving@agr.gc.ca or Jacques Brodeur jacques.brodeur@umontreal.ca

24-28 June Basic and Applied Ecology of Coccinellidae short course. Richardson Wildlife Center, Illinois. Contact organizer Jonathan.Lundgren@ars.usda.gov

22-27 July Electrical Penetration Graph Workshop. Fresno State University, California. Contact organizer Elaine.Backus@ars.usda.gov

10-14 August American Phytopathological Society Annual Meeting, Austin, Texas. Contact BFord@scisoc.org <http://www.apsnet.org>

9-13 September 12th International Symposium "Ecology of Aphidophaga" Belgrade, Serbia. Info: <http://aphidophaga12.bio.bg.ac.rs/>

22-27 September 16th European Carabidologist Meeting. Prague, Czech Republic. <http://europeancarabidology.eu>

18-24 October 150th Entomological Society of Ontario Annual Meeting, jointly with the Entomological Society of Canada, Guelph, Ontario Info: Nicole.McKenzie@hcsca.ca <http://www.entsocnt.ca>

10-13 November Entomology 2013, the 61st Annual Meeting of the Entomological Society of America, Austin, Texas. Email Meet@entsoc.org <http://www.entsoc.org>

ESA International Branch Meeting to be held at ISBCA 2013

The International Branch of the Entomological Society of America will hold its Branch Meeting Tuesday, March 5, at the 4th International Symposium on Biological Control of Arthropods, at Pucón, Chile. The International Branch is a recent addition to ESA, and the Branch meeting is being held in conjunction with ISBCA to allow attendees to participate. The Branch meeting will be from 1600 – 1800 h on March 5. The Branch meeting is open to all; IOBC members may wish to join the International Branch to help further entomological interests and activities around the globe.



For any questions, please contact: Rob Wiedenmann, ESA President (RNWiedenmann@gmail.com); Debi Sutton, ESA staff member responsible for membership (DSutton@entsoc.org); or Aziz Ajlan, Vice-President of the International Branch (aajlan@hotmail.com).

All three will be attending ISBCA 2013.