

# IOBC-NRS NEWSLETTER

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## The Implications of a Plant's Unseen Protectors For Biological Control.



Many plant species are protected from granivory and herbivory by fungal and bacterial endophytes—microbes that live intercellularly in the seed and vegetative tissues and produce toxins like alkaloids. Likely the best studied example of this mutualism involves grasses and fungi within the Clavicipitaceae. Asexual endophytic fungi are dependent on the plants as a means of perpetuation. In return, the fungi produce alkaloids that defend the seeds from competitors, seed

predators, and pathogens. Although there are some costs associated with endophyte infection, reductions in seed predation and herbivory that are experienced by endophyte-infected plants compensate for these costs. Endophytic interactions have broad implications for biological control in numerous ways, some of which are discussed below.

**Seed predation.** Post-dispersal granivores shape the density and dispersion of weeds within agro-ecosystems, and these granivores (carabids, crickets, and ants) are gaining attention from weed ecologists as biological control agents. Grasses are some of the most preferred seeds by many granivores due to their often small size and weak seed coats. It is well known that the mycotoxins from endophytes harm granivores, the extent of these effects on weed biological control under natural conditions remains to be well explored.

**Tri-trophic interactions.** Several studies indicate that herbivores fed endophyte-infected plant tissue are poorer hosts for parasitoids. Currently, the mechanisms for this interaction is

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## Joint IOBC Nearctic and Neotropic Regional Sections Biocontrol Conference



Wendy Romero won the ANBP student prize award for poster presentations.

The Nearctic and Neotropic Regional Sections of the International Organization of Biological Control co-organized and co-convened a joint meeting on "Biological Control in the Americas – Past, Present and Future" May 11-13, 2010 in Niagara Falls, Ontario, Canada. With the rapid movement of invasive pests worldwide and especially on a north-south axis, we thought a meeting of biocontrol researchers, IPM practitioners and biocontrol producers would be timely and build on the collaboration that is already occurring within the Americas. There were 136 participants from 17 countries. The keynote speaker for the meeting was Dr. Jacques Brodeur, President of IOBC Global, who provided

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## MESSAGE FROM THE PRESIDENT:

**Changes in IOBC**

*IOBC-NRS  
Elections are here  
again!*

Things are sure busy in the biocontrol area. Everyone's field season is wrapping up. Climate change is certainly making an impact on biological control. Recently, I attended the IOBC Global Council meeting in Wageningen, The Netherlands and the farewell retirement symposium for Joop van Lenteren, General Secretary of IOBC Global, from Wageningen University. From the last Global Newsletter, you can see many changes and activities that are occurring in IOBC. Also, you can read about the retirement symposium for Joop and his Lifetime Achievement Award from the worldwide biocontrol industry. The biggest change that came out of the Council meeting is a proposed change in our name – to make it shorter! The Council is proposing to change the name from “**The International Organization for Biological Control of Noxious Animals and Plants**” to “**The International Organization of Biological Control**”. The rationale is that the current name does not include the control of plant pathogens. This is a rapidly developing field of biological control and our new name is more inclusive to include new disciplines. Also, IOBC Global is working with CABI to assist in updating BIOCAT, a global database on classical biological control. This database will be free to all IOBC members. A link will be added to the NRS web site once the database is revised.

At the joint NRS and NTRS Biocontrol Meeting in Niagara Falls, Canada, the Global Working Group on “Benefits and risks associated with exotic biological control agents” held their first symposium. In addition, a proposal was made to establish another Working Group (WG) on “The use of generalist predators in biological control” by James Harwood, Department of Entomology, University of Kentucky, KY and Jonathan Lundgren, USDA-ARS, North Central Agricultural Research Laboratory, Brookings, SD. This WG will initially be a NRS Regional WG. If interested in participating, please contact one of the co-organizers.

You will see in this newsletter that NRS is electing a new Governing Board. Please review the nominations and vote!

Remember, your Governing Board represents you.

***Your membership is crucial to our society!***

***If you have not renewed your membership for 2010, please take a moment to do so! Contact Stefan Jaronski (bug@midrivers.com) with questions.***

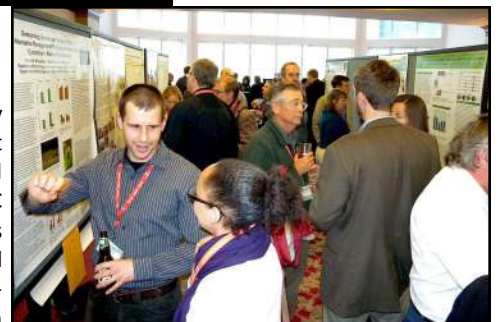
*Les Shipp  
Agriculture and Agri-Food  
Canada*

**Wrap up of the IOBC-NRS/NTRS Joint Meeting**

an update on the IOBC Commission on “Biological Control and Access and Benefit Sharing”. The scientific program covered a wide range of biocontrol topics on arthropod, plant pathogen and weed pests. Ten symposia were organized with 47 presentations. In addition, 39 posters were displayed. The local arrangements committee organized a diverse and interesting tour one afternoon which included some of the different biocontrol activities undertaken in the Niagara region and also some of the local sights. The tour ended with a banquet at one of the premier wineries in the area. A social mixer and poster viewing occurred the first evening. The Association of Natural Biocontrol Producers (ANBP) organized a symposium on “Challenges and Successes in Augmentation Biological Control for North America” and assisted in the organization of the meeting. The ANBP also sponsored two student poster awards which were awarded to

Wendy Romero (Masters student at University of Guelph) and Doo-Hyun Lee (Ph.D. student at Cornell University). In addition, The ANBP held their annual meeting on May 13. The IOBC Global Working Groups “Benefits and risks associated with exotic biological control agents” and “Egg parasitoids” organized a symposium each at the meeting. Feedback from the participants indicated that the meeting was a big success due to the dedication and hard work from the organizing committee and all the sponsors that contributed to the meeting. PDF versions of some of the oral presentations will be available shortly on the NRS web site. A recommendation was suggested that the next joint NRS/NTRS meeting be convened in 3-4 years and held in Central/South America.

*Les Shipp  
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## Candidates for the IOBC Election

### President-Elect

#### Jonathan Lundgren

Jon is a research entomologist with USDA-ARS in Brookings, SD, where he studies generalist predator ecology and integrating biological control into modern cropping systems. Lundgren received his B.Sc and M.S. at University of Minnesota (1998, 2000), and his PhD in entomology at University of Illinois (2004). He has been a member of IOBC since 2001, served has been an active member of the governing board since 2006, revising the newsletter and website, assisted with the organization of the and spearheading the IOBC-NRS Education Curriculum of short courses.



### Vice President

#### Michael Brownbridge

Brownbridge earned his B.Sc and Ph.D. degrees at the University of Newcastle upon Tyne. After post-docs at Ben Gurion University (1984-1987) and ICIPE in Kenya (1987-1990), he took a Professorship at the University of Vermont (1990-2005). In 2005, Michael moved to New Zealand to work with AgResearch. Brownbridge currently works for Vineland Research and Innovation Centre as Research Director in Horticultural Production Systems (since 2009). Current projects and interests in pest management in greenhouse and nursery ornamentals, turf pest and weed management, crop diversification and new wines.

### Corresponding Secretary

#### Donald Weber

Don is research entomologist with USDA ARS Invasive Insect Biocontrol and Behavior Lab in Beltsville, Maryland. He holds a Masters from UC Berkeley and PhD from UMass Amherst. Don has researched biological and other non-chemical methods of pest management for fruit and vegetable crops in nine US states, Canada, and Switzerland. His broad interests include combination of natural enemies and pheromones, nocturnal sampling, and effects of cover crops and organic practices on pest and natural enemy complexes.



### Secretary-Treasurer

#### Stefan Jaronski

Stefan Jaronski obtained his M.S. (1972) in parasitology and Ph.D. (1978) in entomology (insect pathology) from Cornell University, where he studied Microsporidia in blowflies and mosquitoes, respectively. After two postdocs, he changed from medical entomology to agricultural pests. Jaronski worked in industry Abbott Laboratories and Mycotech Corp.) for 17 yrs, where his research involved commercial develop-

ment of *Beauveria bassiana* and *Bacillus thuringiensis* against a wide variety of insects. Jaronski joined USDA ARS Northern Plains Agricultural Research Laboratory in Sidney MT in March 2000 as Research Entomologist. Jaronski's research at Sidney centers on grasshopper pathogens on U. S. rangeland. Jaronski has been a member of Nearctic Regional Section since 1993, and served as IOBC NRS member-at-large 2000-2002, and secretary-Treasurer from 2002-date.

## Candidates for IOBC-NRS Members-at-Large

### Steve Naranjo

Dr. Naranjo is Research Leader and Entomologist with the USDA-ARS, Arid-Land Agricultural Research Center in Maricopa, Arizona. He received a B.S. in Zoology from Colorado State University in 1978, a M.S. in Entomology from the University of Florida in 1983 and a Ph.D. in Entomology from Cornell University in 1987. He completed postdoctoral work with USDA-ARS in South Dakota before joining ARS in Arizona in 1990. His research interests include conservation biological control, insect population ecology, risk assessment of transgenic crops with particular focus on non-target natural enemies, and sampling and decision aids for IPM. He served as Principal Editor of *Crop Protection* 1995-2006 and currently



serves as Subject Editor for Environmental Entomology. He has been a member of Western Regional Project in Biological Control since 1990 (Chair in 1997), and a member of IOBC since 1988.

### Paula Shrewsbury

Dr. Paula Shrewsbury is an Associate Professor and Extension Specialist in Ornamental and Turf IPM at the University of Maryland. Her program focus is to identify methods to restore community dynamics to create sustainable ornamental and turfgrass systems, with an emphasis on biological control and conservation of natural enemies. Paula has been a member of IOBC since 1994.



### Cynthia Scott-Dupree

Cynthia is a Professor in the School of Environmental Sciences - University of Guelph and has been a faculty member since 1986. She received her Master of Pest Management (1983) and her Ph.D. (1986) from the Dept. of Biological Sciences at Simon Fraser University, Burnaby, B.C. Her research interests include integrated management of insect crop pests using environmentally compatible control methods and the impact of agro-ecosystems (horticultural and greenhouse) on non-target beneficial insects such as pollinators - honey bees, bumble bees and native bees, and biological control agents.



## Biocontrol Musing: Where's the Toids?

Many of us like to proclaim that virtually all insects are attacked by numerous parasitoid species. But the fact is that there are plenty of insects and other arthropods that are simply not attacked by parasitoids at all. I believe that the entire orders Ephemeroptera, Odonata and Plecoptera (for example) are entirely free of parasitoid attack. The same can be said for many other aquatic insect groups, including most aquatic Diptera. And what about mites? Have you ever heard of a parasitoid attacking a mite? I haven't. They're too small, you say, but some mites are larger than the hosts of egg parasitoids such as

mymarids and trichogrammatids. Perhaps the strangest is the family Adelgidae – the pine and spruce aphids. They have no known parasitoids! Some produce galls or have other protective structures like wax filaments, but these sorts of features don't seem to have stopped parasitoids of other herbivores. Adelgids are closely related to aphids, which obviously support plenty of parasitoid species. I'd be interested in any hypotheses for why mites and adelgids, in particular, are seemingly parasitoid free.

*George Heimpel*  
Dept Entomology  
Univ Minnesota



*Libellula vibrans*, one of many insect taxa thought to be parasitoid-free.

Havill & Footit. 2007. *Ann Rev Entomol* 52: 325-349.

## RESEARCH BRIEFS

unclear, although it seems more likely an artefact of host quality rather than any direct effects of the defensive chemistry of the endophytes on the higher trophic levels. Nevertheless, biological control programs that target herbivores (especially grass-feeding species) should bear in mind that endophytes could influence these interactions.

**Effects on weed biocontrol programs.** Biological control of invasive weeds using herbivores and pathogens is highly dependent on the defensive capabilities of the weed itself. Endophytic fungi and bacteria have been isolated from various weeds, and may increase their ability to outcompete other plants, as well as influence their interactions with herbivores. The importance of microbial defenses against herbivory on weed biocontrol programs merits further attention.

**Environmental interactions.** Populations and species of grasses and other plants are differentially infected with endophytes, but we are just beginning to understand the physiological and envi-

ronmental mechanisms that influence when and where endophytic mutualisms will appear within plant populations. These interactions have important implications for how these grasses interact with sympatric insect communities. Moreover, fungal genotypes affect insects differently, adding another level of complexity to these interactions.

The take-home message of this discussion is that endophytic mutualisms are pervasive throughout the plant kingdom, and likely influence many aspects of biological control. Clearly, the many manifestations of microbial symbioses in plants and insects are a crucial, if not often overlooked, factor that affects food web dynamics.

These various interactions will be discussed at length in the upcoming symposium **“Unseen Alliances: Microbial Symbioses that Affect Biological Control”** (Jen White and myself as co-organizers), to be presented the ESA meeting in San Diego on Tuesday evening. Speakers include Keith Clay, Molly



Hunter, Jen White, and myself. We hope you can join us!

*Jonathan Lundgren  
IOBC-NRS Newsletter Editor  
Jonathan.Lundgren@ars.usda.gov*

### IOBC-NRS Education Curriculum

If you are thinking about organizing a short course on some aspect of biological control for 2011 or beyond, IOBC-NRS can help! Small grants (around \$1,000-2,000 per course) are available to facilitate and promote our discipline.

## IOBC-NRS Sponsored Shortcourse: Insect Pathology



An IOBC sponsored “Insect Pathology Short Course” was held on the University of Illinois campus June 7-11, 2010. The course summarized the infectious diseases of insects and their use in biological control/IPM programs. Twenty participants learned diagnostic techniques for each pathogen group in ‘hands on’ laboratory sessions. Microbial control, epizo-

otology, and diseases of beneficial insects were also covered. Course instructors were Richard Humber, USDA/ARS, Ithaca, NY, Lawrence Lacey, USDA-ARS, Yakima, WA and Lee Solter, Illinois Natural History Survey/University of Illinois.

*Lee Solter  
IL Nat Hist Survey  
Urbana, IL*

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International Organization for Biological Control. Nearctic Regional Section  
Organisation Internationale de Lutte Biologique Contre: Section de la Region Nearctic

**Visit our new website: [www.iobcnrs.com](http://www.iobcnrs.com)**



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

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*to:*

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