

IOBC-NRS NEWSLETTER

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Governing Board

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The benefits of farmland weeds for biological control

Most farmers hate weeds, and understandably so. Weed populations are persistent and can quickly take over a farming operation if left unchecked. Recent research indicates that annual and perennial weeds in farmland may provide benefits to farming (http://www.ewrs.org/weeds_and_biodiversity.asp), including in helping to maintain biological control agents of insect pests.

Biological control agents evolved within highly complex and diverse habitats, and they use an array of prey and non-prey resources for food and habitat that are scarce or eliminated from cropland maintained as large monocultures. A case in point is soybeans, where adoption of glyphosate-tolerant crops have largely eradicated weeds from farmland and conserving natural enemies of soybean aphids is challenging. *Orius insidiosus*, a primary predator of the aphid, prefers to lay its eggs on weeds within soybean fields, and weeds support greater densities of the predator than soybean monocultures. Numerous other anecdotal examples exist in the literature, but biological control scientists have yet to develop a clear understanding of how weeds function to improve conservation of beneficial species, or how best to implement this strategy.

A major hurdle to using weeds to the benefit of farming is the zero-tolerance policy that most producers have for weeds on their farms. IPM is predicated on the notion that there is a tolerable population level for every pest, but a functional way of assessing how many weeds are tolerable has not been developed (in part because weed communities vary in their interactions with the crop). Nevertheless, there are approaches to weed management that may facilitate conservation biological control of insect pests. Some examples include 1) Manage weeds only until the crop can compete with them; 2) Implement crop rotations that eliminate or reduce the need for herbicides; 3) Integrate cover crops that add diversity to the system while keeping weed pressure down; and 4) Use herbicides in areas of the field where weeds are most dense, and allow spotty weed patches to persist. Also, as weeds evolve resistance to common herbicides, natural populations of weeds are going to become a growing component of agroecosystems once again, and biological control scientists should understand the implications of this for our discipline. Finally, this notion of diversifying cropland using weeds is a difficult sell for many farmers, and conservationists will only be successful if we tie the benefits back to farm profitability (i.e., involving economists in our biological control programs).

Jonathan Lundgren
USDA-ARS
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MESSAGE FROM THE PRESIDENT:

Biocontrol and NRS – A Prosperous Future

*A changing IOBC-
NRS governing
board*

Like they say “Time flies when you are having fun!”. My two year tenure as President of NRS is quickly coming to an end. It has been a very rewarding experience. The NRS is in good financial shape, membership is again on the rise, a new website has been developed, the Education Development Curriculum Committee is a big success, we are interacting more with other Biocontrol Associations such as the Association of Natural Biocontrol Producers and IOBC-Neotropical Regional Section and are initiating a new Working Group on “The use of generalist predators in biological control”. Also, our annual meetings are well attended. This year’s symposium is on “Unseen Alliances: Microbial Symbioses that Affect Biological Control”. Hear IOBC Distinguished Scientist Awardee, Richard Stouthamer, talk about “Are asexual parasitoids better for biological control?” and meet our new Ph.D. and Masters Graduate Student Awardees.

At the NRS business meeting in San Diego, we welcomed a new Governing Board and we are looking forward to hearing their suggestions for the future. I know that Doug Landis is well respected in the biocontrol field and will be a very capable President. As the biocontrol community has grown, IOBC Global and NRS have also become stronger with our networking and synergies with the different biological control groups and interests.

Lastly, I would like to thank all the members of the outgoing Governing Board. They did a great job fulfilling their respective duties and providing support whenever I asked, especially for the organization of the meeting in Niagara Falls, Canada. A special thanks goes to Marshall Johnson for his advice, insight and assistance as Past President.

Biocontrol is an exciting area and it has been a privilege to serve the Section.

Les Shipp
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Your new IOBC-NRS Governing Board!

The election results from October were tallied, and the next two years, the following candidates will be serving on the IOBC-NRS governing board. Thanks to those of you who voted.

Past President– Les Shipp

President– Doug Landis

President-elect– Jonathan Lundgren

Vice-president– Michael Brownbridge

Secretary-treasurer– Stefan Jaronski

Corresponding secretary– Don Weber

Members-at-large- Steve Naranjo

Paula Shrewsbury

Cynthia Scott-Dupree

Short Course on Biodiversity and Biological Control

A short course for North and Latin American is being organized for April, 2011. The course will be held in Cali, Colombia, at CIAT (International Center for Tropical Agriculture). Details will be forthcoming in January. If you are interested in participating, please contact the course organizers, Jonathan Lundgren (Jonathan.Lundgren@ars.usda.gov) or Kris Wyckhuys (K.Wyckhuys@CGIAR.ORG).



USDA Holds Meeting on Microbial Biocontrol

USDA's Agricultural Research Service, Animal Plant Health Inspection Service and the National Institute of Food and Agriculture jointly organized a meeting November 28-December 1, 2010, entitled, *Microbial Biocontrol of Arthropods, Weeds and Plant Pathogens: Risks, Benefits and Challenges*. The theme of the meeting was to explore knowledge gaps, challenging regulations, relatively limited funding opportunities for applied microbial biocontrol projects, perceptions of risk, and other factors that may underlie underutilization of microbial control of arthropods, weeds, and plant pathogens. The intent of this microbial biological control symposium was to bring together specific microbial ecologists, population biologists, microbial geneticists, conservation biologists, and sociologists, as well as federal biocontrol researchers and regulatory agency representatives, to showcase the "state of the science" of micro-

bial biological control, provide a balanced discussion on perceptions of risk, and identify strategies to improve public trust and support for microbial biological control. Of particular note were several presentations and a panel discussion regarding public issues and concerns regarding microbial control, and a thought provoking, plenary webinar participation by a sociologist, Dr. Keith Warner (Santa Clara University), entitled "Sociological strategies to allay perceptions of risk and encourage public/private support for microbial control projects," while Mrill Ingram (University of Wisconsin) talked about effective communication of microbial control research to encourage appropriate policies. Dale Woods, California Department of Food and Agriculture, spoke on developing biocontrol post-release monitoring strategies that involve land managers and the general public. The meeting was also an uncommon opportunity for

practitioners of microbial control of arthropods, weeds and plant pathogens to discover and dialog about their different and often quite considerable perspectives.

After the meeting attending federal scientists gathered for a half-day session to provide input into a USDA position paper intended to help enhance communications about the state of the science and better inform regulatory policy. This paper will be submitted as a forum article in a biology journal. In addition most of the presentations will be placed on a website for sharing with the larger scientific community. For more information, contact Stefan Jaronski at stefan.jaronski@ars.usda.gov.

Stefan Jaronski
IOBC-NRS Secretary-Treasurer
USDA-ARS
Sydney MT

Your membership is crucial to our society!
If you have not renewed your membership for 2011, please take a moment to do so! Contact Stefan Jaronski (bug@middrivers.com) with questions.

Augmentation Biological Control of Western Bean Cutworm with *Trichogramma ostriniae*.



***Trichogramma ostriniae* feeding on a droplet of honey. A human hair rests alongside, to give a sense of scale.**

Western bean cutworm (*Striacosta albicosta*) has been causing substantial concern as a pest of corn and beans in the Midwest and Great Plains of North America. Laboratory trials have found that the mass-produced strain of *Trichogramma ostriniae* (maintained at Cornell University) parasitizes eggs of the cutworm at high levels.

A regional project has formed to assess the usefulness of augmentative releases of *T. ostriniae* for this pest. Collaborators in Nebraska, South Dakota, and Indiana will join New York in field trials of these wasps during the 2011 growing season.

If you are interested in finding out more about this project, please contact the project coordinators, Mike Hoff-



An egg mass of Western Bean Cutworm. Photo by Frank Peairs.

mann (mph3@cornell.edu) or Jeffrey Gardiner (jg48@cornell.edu) in Entomology at Cornell University.

IOBC-NTRS Meeting Announcement

May 3-6, 2011, Havana, Cuba

Exchanges of Experiences in the Mass Production and Use of Biological Control Agents.

The objective of the meeting is to address the challenge of moving from scientific research to industrial production and the use of natural enemies by farmers. The meeting will focus on all issues related to mass production of biological control agent and their release methods, following the principles and practices of quality assurance, integrated with other sustainable agricultural practices.

The program will include a main conference, followed by organized sessions with invited oral presentations and papers submitted as posters. The presentations will serve as a basis for discussion and exchange, with the final aim of promoting the collaboration among scientists, biocontrol agent producers and farmers.

REGISTRATION FEES:

Delegates: 200.00 CUC (convertible currency)

Accompanying persons: 60.00 CUC

SESSIONS TOPICS:

1. Biodiversity in Latina America and the Provision of Natural Enemies: what are the possibilities or options?
2. Advances and Challenges for Mass Production, Quality Control and Release Methods of Natural Enemies.



The meeting will be held at the Palacio de Convenciones, Havana, Cuba

duction, Quality Control and Release Methods of Natural Enemies.

3. Registration of Natural Enemies and Access Benefit Sharing in Biological Control.
4. Recent Advances in Biological Control of the Tomato Leafminer *Tuta absoluta* and other Emergent Pest for the Region.
5. Biological Control and GMO's: what are the opportunities for combining these two approaches?
6. Impact of Educational and Extension Programs in the Use of Biological Control for Local Farmers in the Region.

For all questions concerning the IOBC/NTRS Scientific Programme, please contact

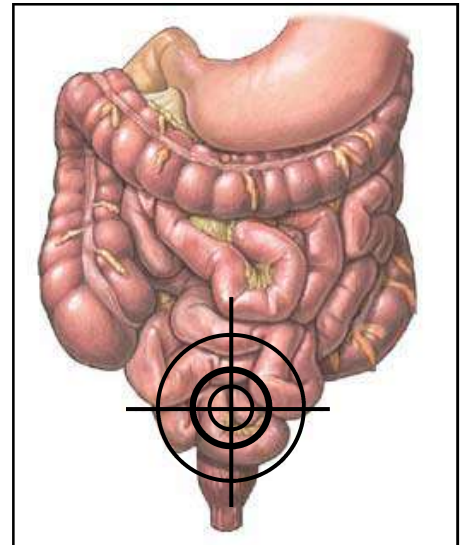
Leopoldo Hidalgo-Diaz directly:
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Biocontrol Musing: Gastro-intestinal biological control

It has been known for awhile that the diverse microbial flora in our guts is involved in resistance to pathogens. The term 'colonization resistance' refers to the action of these microbes in preventing pathogens such as *Salmonella* from colonizing our gastrointestinal tracts and causing disease. This is, of course, a form of natural biological control even if not traditionally recognized as such. Interesting as well are the attempts at manipulative biological control of human pathogens using this microflora. The best-studied of these systems involves the diarrhea-causing bacterial pathogen *Clostridium difficile*, which takes over the intestinal tract following routine antibiotic therapy. An obvious hypothesis explaining these flare-ups is that antibiotics kill off protective microbes that otherwise suppress *C. difficile* in our GI tracts. A recent

test of this hypothesis was performed on a patient suffering from severe *C. difficile* associated disease (CDAD) by performing – brace yourselves – a fecal transplantation from the patient's healthy husband into the patient's colon. The results were remarkable – the patient's CDAD symptoms vanished within several days and the composition of her stools shifted from microbiologically depauperate to normal during this time! Analyses of the microbial flora showed that *C. difficile* was totally eliminated from the patient's GI tract and it seems likely that members of the bacterial genus *Bacterioides* were involved in suppressing the pathogen. The case that I've described here is not the only such case by any means, but it serves as a nice example of biological control happening very close to home!



George Heimpel
 Dept Entomology
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Floch, M.H. 2010. J. Clin. Gastroenterol. 44, 529-530.

Khoruts et al., 2010. J. Clin. Gastroenterol. 44, 354-360.

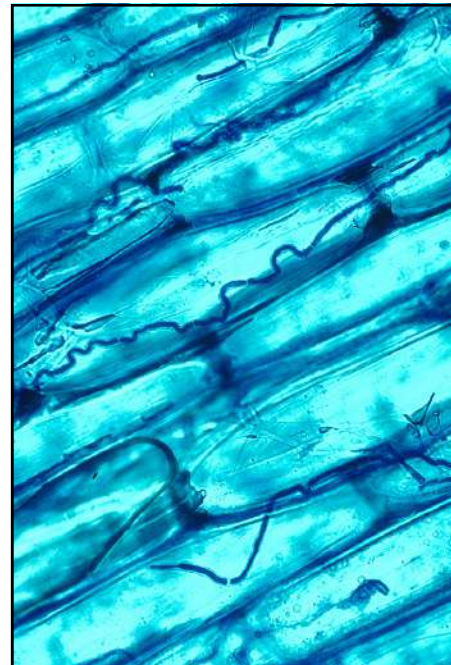
RESEARCH BRIEFS

Endophyte mutualists: Protecting grasses from their herbivores

We have been investigating the effects of fungal endophyte symbiosis on the success and ecological impacts of the invasive plant, tall fescue grass (*Lolium arundinaceum*), which is also widely planted for forage and turf grass production. Both the endophyte and host were introduced to the U.S. and other regions (New Zealand, Australia) from Eurasia, where the symbiotum is native. The endophyte, *Neotyphodium coeno-*

phialum, grows in the intercellular spaces of aboveground plant tissues and produces alkaloids that can protect plants against herbivory. These compounds include the ergot alkaloids, documented to be toxic to mammalian herbivores, as well as lolines and peramine, which can be effective insect deterrents.

Our work has shown that the presence of the endophyte can improve the ability of tall fescue to invade diverse plant communities, relative to endophyte-free plants. In addition, field experiments, in which we manipulated endophyte presence at the plot level (900 m²), showed much higher biomass of symbiotic tall fescue compared to endophyte-free, with corresponding reductions in the diversity of the resident plant community. Over time, plots with the endophyte remained as grass-dominated communities, whereas endophyte-free plots succeeded more rapidly toward forested systems. Experiments comparing fungal endophyte genotypes that differed in alkaloid profiles revealed that plant community composition can even vary with fungal genetic identity. Altogether, this work suggests that fungal endophytes, while invisible to the naked eye, can have striking effects on plant communities and



Tall fescue cells infected with *Neotyphodium* hyphae, an endophytic mutualistic fungus.

the dominance of their host plants. Ongoing work aims to test how commonly endophyte symbioses promote the establishment of invasive grass species in novel communities.

Jennifer Rudgers
Rice University
Houston, TX



Newsletter Wrap-up

Four years goes by fast, and it has been remarkable to see how this society has changed over my tenure as corresponding secretary.

The newsletter went color four years ago, and fully electronic last year. A Master's level graduate student award was created four years ago, to highlight student members that will no doubt shape the future of our society. With the input of the GB, our website was dramatically transformed last year in preparations for the international meeting in Niagara Falls

led by Les Shipp. Finally, the education curriculum has become an important service to our discipline that has produced three courses so far, with several more in preparation for 2011.

The future looks equally bright— Don Weber, the incoming Corresponding Secretary, has some great ideas for the newsletter and website that will make these resources even better. Don't forget to send him any pertinent content, and please be willing to contribute a short research brief if you receive a last-

minute, panicked e-mail!

It has been a real pleasure to prepare the newsletter every few months, and I look forward to serving the society as President-elect during Doug Landis' administration.

Jonathan Lundgren
IOBC-NRS Newsletter Editor
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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



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).

Send items for the IOBC-NRS Newsletter

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