



Microbial Biocontrol of Arthropods, Weeds, and Plant Pathogens: Risks, Benefits and Challenges

**The National Conservation Training Center, Shepherdstown,
West Virginia (USA)**

November 28 – December 1, 2010

Microbial Biocontrol of Arthropods, Weeds and Plant Pathogens: Risks, Benefits and Challenges – November 28-December 1, 2010, National Conservation Training Center, Shepherdstown, WV.

Microbial control of arthropods, weeds, and plant pathogens still remains underutilized, in part, due to knowledge gaps, challenging regulations, relatively limited funding opportunities for applied microbial biocontrol projects, perceptions of risk, and other factors. The intent of this microbial biological control symposium is to bring together microbial ecologists, population biologists, microbial geneticists, conservation biologists, and sociologists to showcase the “state of the science” of microbial biological control, provide a balanced discussion on perceptions of risk, and identify strategies to improve public trust and support for microbial biological control. This information will then be used to develop a position paper to help enhance communications about the state of the science and inform regulatory policy.

Day 1 (Sunday, Nov. 28, 2010)

3:00 - 5:30 PM	Registration
5:30 - 6:30 PM	Dinner
6:30 – 7:45 PM	Reception (no host bar).
8:00 – 9:00 PM	Keynote Address: Metagenomics: Challenges and opportunities for microbial control. Karen Nelson , J. Craig Venter Institute, Rockville, MD.

Day 2 (Monday, Nov. 29)

8:00 - 8:15 AM	Welcome and opening remarks. Bob Nowierski , USDA, National Institute of Food and Agriculture (NIFA), Washington, DC.
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Charge to the Symposium Participants:

1. How can we communicate more effectively with each other (researchers, regulators)?
2. What is the key message the public needs to hear to increase their likelihood of accepting the use of microbes for biocontrol?
3. What are the top 2-3 issues presented this week that you believe need further discussion? Please explain why.
4. What research should be conducted to facilitate regulatory decision-making?
5. What science do regulators feel is still needed?
6. Based on what you learned this week, what will you do differently in your work?

Plenary Session

Moderator: **Bob Nowierski**, USDA-NIFA, Washington, DC.

- 8:15 - 8:45 Microbial control of arthropods. **Brian Federici**, UC-Riverside, Riverside, CA.
- Five top themes/issues that will showcase the state of the science, including the way forward and what research is needed to help regulators.
- 8:45 - 9:15 Microbial control of weeds. **Raghavan “Charu” Charudattan**, Plant Pathology Department, University of Florida, Gainesville, FL.
- Five top themes/issues that will showcase the state of the science, including the way forward and what research is needed to help regulators.
- 9:15 - 9:45 Microbial control of plant pathogens. **Gary Harman**, Department of Horticultural Sciences; and Department of Plant Pathology, Cornell University, Ithaca, NY.
- Five top themes/issues that will showcase the state of the science, including the way forward and what research is needed to help regulators.
- 9:45 - 10:15 Break
- 10:15 – 12:00 Panel Discussion: Public issues/concerns regarding microbial biological control.
- Feedback from the Conservation Biology Community (**Bob Nowierski**, USDA-NIFA, Washington, DC).
 - Perceptions of risk with microbial biocontrol agents (whether true or false).
 - Examples of negative effects: disruption of food webs, competitive displacement, indirect effects of microbial agents.
 - Predicting unintended interactions/Non-target effects in field.
 - Positive effects of microbial control: What’s gone right? Benefits of microbial biocontrol in mitigation of ecosystem disruption, species loss, ecosystem restoration, etc.

Panel participants: **Mark Goettel**, Lethbridge Research Center, Agriculture and Agri-Food Canada, Lethbridge, Alberta, Canada; **Alan Watson**, Plant Science Department, McGill University, Ste. Anne de Bellevue, Quebec, Canada; **Peter Cotty**, USDA-ARS, School of Plant Sciences, University of Arizona, Tucson, AZ; **John Mumford**, Centre for Environmental Policy, Imperial College, London, UK. 10 minute presentations each, approximately 55 minutes for discussion.

12:00 - 1:00 PM Lunch

Plenary Session (continued)

1:00 - 1:45 Sociological strategies to allay perceptions of risk and encourage public/private support for microbial biocontrol projects. **Keith Warner**, Environmental Studies Institute, Santa Clara University, CA.

Regulatory Issues that Science Could Help Address

Moderator: **Alan Dowdy**, USDA-APHIS-PPQ, Riverdale, MD.

1:45 - 2:30 USDA-APHIS-PPQ - Scientific information needed to support decision-making. **Shirley Wager-Page**, USDA-APHIS-PPQ, Riverdale, MD.

1. What regulators need to understand.
What's the objective of the regulatory process?
What's the fundamental information needed?
2. Knowledge gaps.
What are the petitioners doing right?
Where are the opportunities to improve petitions?
What's generally missing from a petition?
What challenges do new technologies pose to the regulatory process?
What new technologies would facilitate the process – what tool(s) would facilitate regulation?
3. Decision making and communication.
How are decisions made?
Facilitating communication with scientists?
What are the different regulatory processes (by agency)?
Who in biological control needs to use each process (i.e., classical [foreign] agents vs. biopesticides [domestic or universal] vs. ecological approaches [soilborne pathogens])?
4. What scientists need to understand.
What are the regulatory limitations?

How does one recommend changes to the regulations or provide input in revising regulations?
 What are the limitations of the regulatory decision making process?
 How do regulators deal with scientific unknowns? How can scientists help?
 - Should secondary effects be anticipated, considered?
 - Impact of non hosts under artificial test conditions – crops, native plants, T&E species?

- 2:30 - 3:15 EPA - Scientific information needed to support decision-making. **Joel Gagliardi**, EPA, Arlington, VA.
- 3:15 - 3:45 Break
- 3:45 - 4:30 USFWS - Scientific information needed to support decision-making. **John Fay**, USFWS, Arlington, VA.
- 4:30 - 5:15 Transgenesis and paratransgenesis – status and future directions. **Alan Handler**, USDA-ARS, Gainseville, FL.
- 5:30 - 6:30 Dinner
- 6:30 – 8:00 Reception (no host bar)

Day 3 (Tuesday, Nov. 30)

Genetic Structure of Host and Microbial Pathogens

Moderator: **Bill Bruckart**, USDA-ARS, Fort Detrick, MD.

- 8:00 - 8:30 AM Genotypic/phenotypic variation in target host and microbial agents - implications for microbial control. **John Gaskin**, USDA-ARS, Sidney, MT.
- 8:30 - 9:00 Indigenous vs. non-indigenous microbial agents - implications for regulatory oversight. **Peter Cotty**, USDA-ARS, School of Plant Sciences, University of Arizona, Tucson, AZ.
- 9:00 - 9:30 Genetic Resolution - necessary levels of genetic resolution in microbial agents to minimize risks to non-target species. **Steve Rehner**, USDA-ARS, Corvallis, OR.
- 9:30 - 10:00 Panel Discussion regarding above topics. (**Gaskin, Cotty, Rehner**)
- 10:00 - 10:30 Break

- 10:30 - 11:00 Gene flow. **Ray St. Leger**, Department of Entomology, University of Maryland, College Park, MD.
- 11:00 – 11:30 Predicting persistence. **Stefan Jaronski**, USDA-ARS, Sidney, MT.
- 11:30 - 12:00 Panel discussion on above topics (**St. Leger, Jaronski**).
- 12:00 - 1:30 Lunch

Pre-release Evaluation of Candidate Microbials

Moderator: **Deb Fravel**, USDA-ARS, Beltsville, MD.

- 1:30 - 2:00 Foreign exploration - determining appropriate places to collect agents. **Juan Briano**, USDA-ARS-SABCL Hurlingham, Argentina.
- 2:00 - 2:30 Climate matching of host and microbial agents. **Lerry Lacey**, USDA-ARS, Wapato, WA.
- 2:30 - 3:00 Break
- 3:00 - 3:25 Physiological vs ecological host range. **Bill Bruckart**, USDA-ARS, Fort Detrick, MD.
- 3:25 - 3:50 Host specificity testing. **Dana Berner**, USDA-ARS, Fort Detrick, MD.
- 3:50 – 4:15 Inter-microbial agent interactions. **Virginia Stockwell**, Department of Botany and Plant Pathology, Oregon State University, Corvallis, OR.
- 4:15 – 5:00 Attributes for predicting efficacy and benefits of microbial agents. **Ernest Delfosse**, Department of Entomology, Michigan State University, East Lansing, MI. (Del will give an introductory presentation and then will lead a guided discussion with Briano, Lacey, Bruckart, Berner, and Stockwell).

Issues That Potentially Affect the Microbial Biocontrol Process.

- 5:00-5:30 Commercial Biocontrol Producer Problems. **Bill Stoneman**, Bio-Pesticide Industry Alliance, McFarland, WI.
- 5:30 - 6:30 Dinner
- 6:30 – 8:00 Reception (no host bar)

Day 4 (Wednesday, Dec. 1)

Post-Release Monitoring, Communication, and Public/Private Engagement in Projects

Moderator: **Stefan Jaronski**, USDA-ARS, Sidney, MT.

- 8:00 – 8:30 AM Release/application strategies (inoculation versus inundation). **Ann Hajek**, Department of Entomology, Cornell University, Ithaca, NY.
- 8:30 – 9:00 Tools for documentation of microbial agent establishment and persistence. **Dave Weller**, USDA-ARS, Plant Pathology Department, Washington State University, Pullman, WA.
- 9:00 - 9:30 Evaluation of microbial agent efficacy. **Wojciech Janisiewicz**, USDA-ARS, Kearneysville, WV
- 9:30 - 10:00 Monitoring strategies for evaluating non-target effects (positive and negative); predicting secondary effects a priori. **Ray Carruthers**, USDA-ARS, Albany, CA.
- 10:00 - 10:30 Break
- 10:30 - 11:00 Facilitating research and regulation of biological control: The role of petition reviews. **Peter Mason**, Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada.
- 11:00 - 11:30 Access and Benefits Sharing (ABS)/Convention on Biological Diversity (CBD): implications for microbial control. **Kim Hoelmer**, USDA-ARS, Newark, Delaware.
- 11:30 - 12:00 Developing monitoring strategies for land managers and the public at large. **Dale Woods**, California Department of Food and Agriculture, Sacramento, CA.
- 12:00 - 1:30 Lunch

Moderator: **John Lydon**, USDA-ARS, Beltsville, MD.

- 1:30 - 2:00 Effective communication of microbial control results (benefit) to the general public and government agencies to encourage the setting of appropriate policies. **Mrill Ingram**, Department of Geography, University of Wisconsin, Madison, WI.
- 2:00 – 2:30 Reporting out of Regulators – what they have learned from us and what they still need to get the message on? **Alan Dowdy**, USDA-APHIS-PPQ, Riverdale, MD.

3:00 - 3:45	Break
3:45 – 4:15	Reporting out of arthropod microbial control group and discussion, including the way forward and what research is needed to help regulators. Stefan Jaronski , USDA-ARS, Sidney, MT.
4:15 - 4:45	Reporting out of weed microbial control group and discussion, including the way forward and what research is needed to help regulators. Bill Bruckart , USDA-ARS, Fort Detrick, MD.
4:45 - 5:15	Reporting out of plant pathogen microbial control group and discussion, including the way forward and what research is needed to help regulators. Deb Fravel , USDA-ARS, Beltsville, MD.
5:15 - 5:30	Symposium wrap-up and closing remarks. Kevin Hackett , USDA-ARS, Beltsville, MD; Bob Nowierski , USDA-NIFA, Washington, DC.
5:30 - 6:30	Dinner
6:30 – 8:00	Reception (no host bar)

Day 5 (Thursday, Dec. 2)

8:30 AM - 12:00 PM **Closed session - Feds only**

Facilitator: Jane Berkow, UDA-APHIS-PPQ, Riverdale, MD.

- Develop outline for position paper from results of the symposium to be published in a scientific journal and used to inform policy-makers and scientists engaged in biological control.
- Determine writing assignments and a time-table for each of the sections of the position paper.
- Determine editors, writing format, etc.

Questions to address:

- How can the scientific community foster a more cohesive relationship with regulators?
- What do scientists need to do to facilitate registration of microbial agents?
- What do we know? What do we need to know? Encourage scientific community to work on these things.
- Make regulators more aware of: 1) what science should be brought to bear to facilitate the regulatory process; 2) what regulators feel is still needed; go forth and find the answers to these questions and share beyond the symposium participants.

Microbial Biological Control Symposium Steering Committee:

Bob Nowierski, Symposium Chair, USDA-NIFA, Washington, DC
Kevin Hackett, USDA-ARS, Beltsville, MD
Deb Fravel, USDA-ARS, Beltsville, MD
John Lydon, USDA-ARS, Beltsville, MD
Bill Bruckart, USDA-ARS, Frederick, MD
Stefan Jaronski, USDA-ARS, Sidney, MT
Alan Dowdy, USDA-APHIS-PPQ, Riverdale, MD
Kerry Britton, USDA-FS, Arlington, VA

Additional Contributors to the Planning of the Microbial Biological Control Symposium:

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Mickey McGuire, USDA-ARS, Fort Collins, CO
Bill Kemp, USDA-ARS, Fargo, ND

Symposium Group Leaders:

Microbial Control of Arthropods Leader – Stefan Jaronski, ARS, Sidney, MT
Microbial Control of Weeds Leader – Bill Bruckart, ARS, Fort Detrick, MD
Microbial Control of Plant Pathogens Leader, Deb Fravel, ARS, Beltsville, MD
Regulatory Issues Leader – Alan Dowdy, APHIS-PPQ, Riverdale, MD

Symposium Sponsors: USDA-NIFA, USDA-APHIS-PPQ, USDA-ARS, DOI-NPS.

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