Entomological Society of America
Eastern Branch

80th Annual Meeting
March 20-23, 2009
Hilton Towers
Harrisburg PA



The Program Encapsulated – 2009

Friday, March 20

Afternoon	Registration	12:00-5:00	Lancaster Lobby
	Local Arrangements	12:00-5:00	New Governor
Evening	President's Informal Reception	6:00-8:00	Carlisle

Saturday, March 21

Morning:	Registration	8:00-5:00	Lancaster Lobby
	Local Arrangements	8:00-5:00	New Governor
	Student Poster Competition	8:00-7:30	Carlisle
	Submitted posters	8:00-7:30	Carlisle
	Student-sponsored Symposium	8:00-12:00	York
	Vegetable and Field Crops Symposium	8:00-12:00	Lancaster
	Turf Symposium	8:00-12:00	Gettysburg
Afternoon:	Student Oral Presentation Competition	1:00-5:00	York
Evening:	President's reception	6:00-8:30	York
	Linnaean Games	9:00-11:00	Lancaster

Sunday, March 22

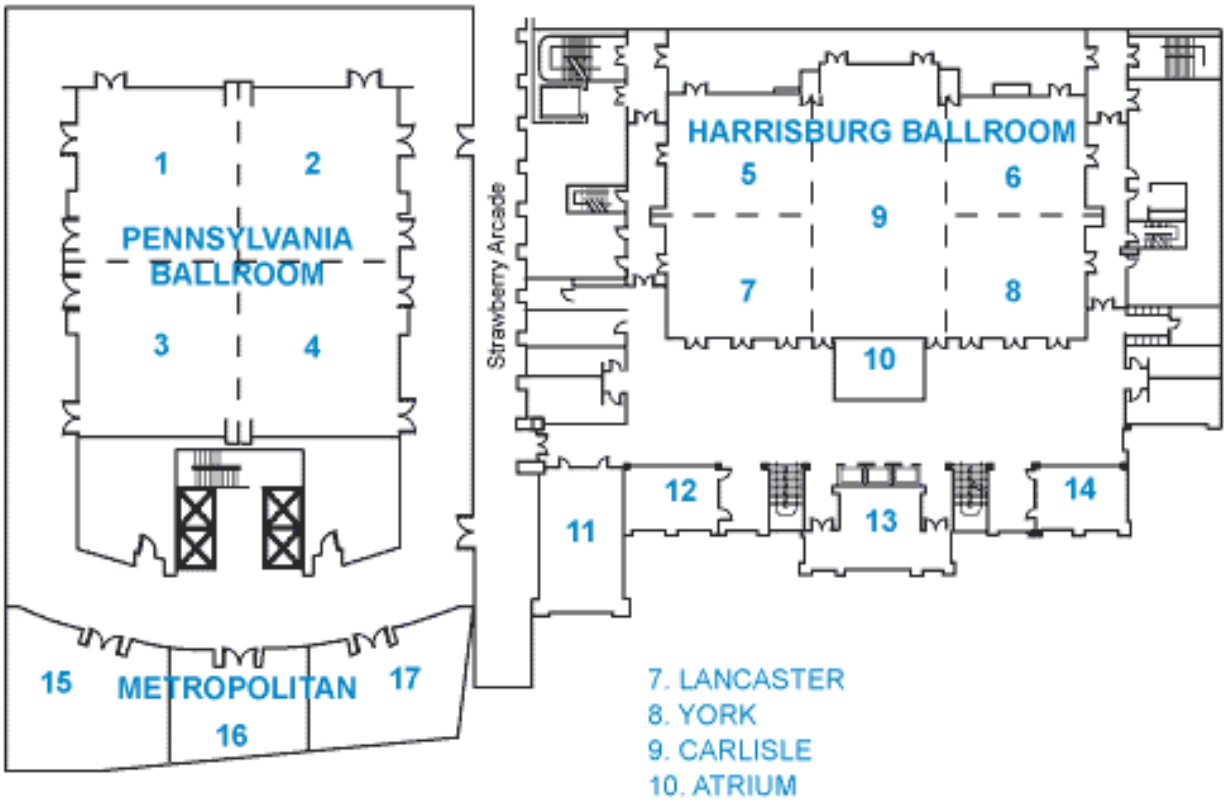
Morning:	Registration	8:00-5:00	Lancaster Lobby
	Local Arrangements	8:00-5:00	New Governor
	Executive Committee Meeting	8:00-10:00	Lebanon
	IDEP Symposium	8:00-12:00	Lancaster
	Small Fruit Symposium	8:00-12:00	York
	Submitted Talks	8:00-12:00	Gettysburg
Afternoon:	It's a Bug's World	1:00-5:00	Whittaker Center
	Ornamentals Symposium	1:00-5:00	Lancaster
	Biological Control Symposium	1:00-6:00	York
	Submitted talks	1:00-5:00	Gettysburg
Evening:	Social and Cash Bar	5:30-6:00	Carlisle
	Banquet and Awards	6:00 – 8:30	York/Lebanon
	Speaker: Bernd Heinrich, University of Vermont "The Hot-Blooded Insects"		

Monday, March 23

Morning:	Registration	8:00-12:00	Lancaster Lobby
	Final Business Meeting	8:00-9:00	Lebanon
	Industry Symposium	9:00-12:00	Lancaster
	Adjourn	12:00	

Floor Plan

THE HILTON HARRISBURG - SECOND FLOOR



1. SUSQUEHANNA
2. ALLEGHENY
3. DELAWARE
4. JUNIATA
5. GETTYSBURG
6. LEBANON
7. LANCASTER
8. YORK
9. CARLISLE
10. ATRIUM
11. LELAND BOARDROOM
12. BRIDGEPORT BOARDROOM
13. THE NEW GOVERNOR BOARDROOM
14. BRADY BOARDROOM
15. METROPOLITAN A
16. METROPOLITAN B
17. METROPOLITAN C

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2009 Eastern Branch ESA Award Winners

ESA Achievement Award in Teaching

Dr. Bill Lamp became an entomologist on the day he stepped in the headwaters of the Mississippi River and discovered the diversity in form and function of aquatic insects. He has never lost this enthusiasm for insect life, and has made teaching the science behind entomology a priority in his career, in spite of having a minority instructional appointment at the University of Maryland. Now an Associate Professor in the Department of Entomology, Bill received his B.S. in Zoology from the University of Nebraska, M.S. in Entomology from The Ohio State University, and Ph.D. in Entomology/Weed Science from the University of Nebraska. Since arriving at Maryland in 1985, Bill has taught undergraduate and graduate courses in the areas of Integrated Pest Management and Plant Protection, Biology of Insects, and Aquatic Entomology and Freshwater Biology. Teaching evaluations from these courses consistently rave about Bill's teaching style and his ability to make students want to learn more. In addition, through his mentoring Bill has provided science-based lab and field experience to a total of 52 students including 5 high school students and 5 Entomology Honors students, and has served as academic advisor to almost 400 students. He has demonstrated excellence in teaching through his engaging instructional techniques, emphasis on experimental methods, contagious passion for insects, and his positive impact on the high school, undergraduate, and graduate students who have taken his classes or conducted original research in his lab. By using insects as models to illustrate both the importance as well as the fun of science, Bill exhibits his commitment to promoting entomology.

ESA Achievement Award in Extension

Dr. Dini Miller is an Associate Professor in the Department of Entomology at Virginia Tech. and is the Urban Pest Management Extension Specialist for the state of Virginia. She is the director of the Virginia Fire Ant Working group and heads the Virginia School IPM program. She has been the project director for the Virginia Pest Management Association's "pre-treatment termiticide application" training program.

Dr. Miller's research program focuses on integrated pest management methods for control of insect pests in structures. For the last several years, Dr. Miller has been involved in termite, cockroach and ant research evaluating the efficacy of baits and other control products. The major focus of her research in the last four years has been on evaluating bed bug management methods, both in the laboratory and in the field. She has six graduate students working in diverse areas including Red Imported Fire ants, the ecological succession of pest ant species in Puerto Rican housing developments, and bed bug biology and behavior.

Dr. Miller received her Ph. D. in 1998 from the University of Florida where she studied German cockroaches and urban entomology under Dr. Philip Koehler.

Eastern Branch L. O. Howard Distinguished Achievement Award

Dr. Larry Hull is a professor in the Department of Entomology at Penn State University He joined the Department in 1997 and he is located at the Fruit Research and Extension Center in Biglerville. He is a native of south-central Pennsylvania and a graduate of Mount Saint Mary's University (BS) and The Pennsylvania State University (PhD). Dr. Hull's research and extension programs in deciduous tree fruit crops encompass many IPM tactics such as biological control, sampling systems, economic thresholds, pheromone mating disruption, and reduced and selective use of chemical insecticides and their toxicity and selectivity towards natural enemies. He and colleagues have recently initiated an area-wide pheromone mating disruption project for the management of both the codling moth and oriental fruit moth on pome and stone fruits on over 1700 acres in Pennsylvania. He and his graduate students (13) and post-doctoral scholars (9) have published numerous scientific papers (78 referred, 12 book-chapters, over 400 technical papers, and over 50 extension publications) to further the development and implementation of IPM programs for deciduous fruit systems throughout Pennsylvania and the mid-Atlantic region. From 1998 until 2006 Dr. Hull served as the Director of the Fruit Research and Extension Center. He was awarded the Alex and Jessie C. Black Award for Excellence in Research in the College of Agricultural Sciences at Penn State in 2008. He enjoys golf and spending time with his family.

John Henry Comstock Award

Dr. Scott Geib attended Michigan State University where he received his B.Sc. in Zoology and Entomology through the Lyman Briggs School of Natural Science with honors. While at Michigan State, Scott worked for 5 years at the USDA Forest Service North Central Research Station on forest insect research under the guidance of Drs. Robert Haack and Therese Poland. There, Scott participated in a variety of research projects, including Emerald Ash Borer, Asian longhorned beetle, and invasive bark beetle research.

After graduating from MSU, Scott pursued his doctoral degree at the Pennsylvania State University under the guidance of Drs. Kelli Hoover in Entomology and Ming Tien in Biochemistry and Molecular Biology. There, Scott focused his research on the microbial ecology and biochemistry of the Asian longhorned beetle, with a focus on wood degradation in this insect and applications to increasing efficiency of cellulosic ethanol production. This work included chemical analysis of lignin degradation in insects, which resulted in a recent publication in *Proceedings of the National Academy of Sciences*. Through collaboration with the U.S. Department of Energy Joint Genomics Institute, Scott also worked on metagenomic analysis of the microbial community in the Asian longhorned beetle, as well as enzymatic and proteomic analysis. Upon receiving his PhD in 2008, Scott received a USDA NRI Postdoctoral Fellowship in Biobased Energy and Bioproducts to continue his work on the Asian longhorned beetle gut at the Department of Biochemistry and Molecular Biology at Penn State, but is still active within the Department of Entomology through collaborative projects and undergraduate mentoring.

Eastern Branch Herbert T. Streu Meritorious Service Award

Eric Day has been at Virginia Tech since 1986 as Manager of the Insect Identification Laboratory. He received his Masters Degree in Entomology from the University of Illinois in 1986. Eric has been an active participant in Eastern Branch activities starting as a projectionist at his first meeting in Philadelphia. His service to the Eastern Branch and The Society continued to grow with his various appointments on such committees as Local arrangements and Linnaean Games, and the ESA Common Names Committee. Eric has also served as member and chair of the Insect Detection, Evaluation, and Prediction Committee (IDEP) for several years. In addition to chairing IDEP, Eric has organizing and co-organizing symposia, and is credited with starting the IDEP "Show and Tell" event where preserved specimens and literature of exotic pests impacting the Eastern Branch area are put on display. Since 2003, he has been the Treasurer of the Eastern Branch, as well as Chair of the Site Selection Committee.

Friday March 20, 2009

Afternoon

Registration	**Lancaster Lobby**	**12:00-5:00**
Paul Semtner, Virginia Tech		
Local Arrangements	**New Governor**	**12:00-5:00**

Friday March 20, 2009

Evening

Presidents Informal Reception	**Carlisle**	**6:00-8:00**
(open to all attendees, including students)		

Saturday March 21, 2009

Morning

Student Poster Competition	**Carlisle**	**8:00-7:30**

See Appendix A for abstracts of poster of this section
[Author attendance at posters required during Presidents Informal Reception]

Organizer: Timothy Tomon, Carnegie Museum of Natural History, Pittsburgh, PA

1. Resistance, movement and rotation distance in the Colorado potato beetle, *Leptinotarsa decemlineata* (Say). Kathleen Schnaars Uvino; CUNY Graduate Center; Biology- EEB; 365 5th Avenue, Manhattan NY

2. Attraction of *Harminia axyridis* (Coleoptera: Coccinellidae) using attractant plants. Folukemi Adedipe, West Virginia University; Entomology Program; Morgantown, WV 26505, Vicki Kondo, West Virginia University; Entomology Program; Morgantown, WV 26505, Yong-Lak Park, West Virginia University; Entomology Program; Morgantown, WV 26505

3. Variation in the laboratory susceptibility of turf-infesting white grubs (Coleoptera: Scarabaeidae) to a series of biological, biorational and chemical control products. Anuar Morales, 630 W. North St; Barton Lab; Geneva, New York 14456, Daniel C. Peck, 630 W. North St; Barton Lab; Geneva, NY 14456

4. Aggregative oviposition behavior of viburnum leaf beetle [*Pyrrhalta viburni* (Paykull)] and plant defenses of North American and European viburnums. Gaylord A. Desurmont, 180 insectary; Ithaca , NY 14850, Paul A. Weston,

5. Determining whole tree siricid density using characteristic half meter bolts of Red and Scot's pine. Patrick Eager, Department of Environmental and Forest Biology, SUNY-ESF, 106 Illick Hall 1 Forestry Drive, Syracuse, NY 13210

6. A revision of the few Indian species of genus *Dolichogenidea* (Hymenoptera:Braconidae:Microgastrinae). Kavitha Govindasamy, 42-49 Colden St,; # 1F; Flushing, NY 11355

Saturday, March 21, 2009

Morning

Submitted Poster Presentations Carlisle 8:00-7:30

See Appendix B for abstracts of poster of this section
[Author attendance at posters during Presidents Informal Reception]

8. The ants go marching one by one: Benefits of using ant trails to detect scale insects on magnolias. Adrianna Szczepaniec, 4112 Plant Sciences Bldg; University of Maryland; College Park, MD 20742, Michael J. Raupp, 4112 Plant Sciences Bldg; University of Maryland; College Park, MD 20742

9. The effects of dietary regime on post-starvation feeding in *Drosophila melanogaster.* Jannett Dinsmore, Department of Biology; SUNY New Paltz; New Paltz, NY 12561, Aaron T. Haselton, Department of Biology; SUNY New Paltz; New Paltz, NY 12561

10. Life history and biology of *Hormosianoetus mallotae* (Histiostomatidae: Astigmata: Acari), an obligatory inhabitant of water-filled treeholes. Norman J. Fashing, Department of Biology; College of William and Mary; Williamsburg, VA 23187-6483

11. Reproductive isolation mechanisms between *Chrysoperla lucasina* and *Chrysoperla agilis*. Summer E. Payne, 33 Briar Cliff Road; Mansfield, CT 06250

12. Hybrid mating patterns in green lacewings. Peter D. Meaney, 6 Cedar Court; Everett, MA 02149

13. Tree composition of New York riparian forests in advance of emerald ash borer. Peter J. Rockermann, SUNY-ESF; 1 Forestry Drive; Syracuse, NY 13210, Catherine L. Landis, SUNY-ESF; 1 Forestry Drive; Syracuse, NY 13210, Melissa K. Fierke, SUNY-ESF; 1 Forestry Drive; Syracuse, NY 13210

14. Virginia survey of beetles in the Family Silphidae. Shana Beirne, Richard D. Fell, and Douglas G. Pfeiffer, Dept. of Entomology; Virginia Tech; Blacksburg, VA 24061

15. Foliage Feeding Tests of *Eucryptorrhynchus brandti* (Harold) (Coleoptera: Curculionidae), a potential biological control agent of tree-of-heaven, *Ailanthus altissima.* Nathan Herrick, S. M. Salom, L. T. Kok and T. McAvoy, Department of Entomology; Blacksburg, VA 24061

16. Grassland restoration for the repatriation of the regal fritillary butterfly, *Speyeria idalia* (Drury). V. Tilden(1), M. Swartz (1), J. Hovis (2), D. McNaughton (1), and N. Hoffman (1), (1) The Pennsylvania State University, Fort Indiantown Gap, Building 11-19, Annville, PA 17003; (2) Department of Military and Veterans Affairs, Fort Indiantown Gap, Building 11-19, Annville, PA 17003

17. Critical resource assessment for the regal fritillary butterfly, *Speyeria idalia* Drury (Tribe: Argynnini) at the Fort Indiantown Gap National Guard Training Center, Annville, Pennsylvania. Mark Swartz, Betty Ferster and Gregory Paulson The Shippensburg University, Department of Biology, Shippensburg, PA 17257

18. Developmental consequences of heat stress resulting from flesh fly and blow fly maggot masses. David B. Rivers, Timothy Ciarlo and Michael Spelman Department of Biology, Loyola College in Maryland, Baltimore, Maryland 21210

19. A graphic representation of declining first generation ECB adult populations in New Jersey. Kristian Holmstrom and Joseph Ingerson-Mahar, Rutgers University; 243 Blake Hall; 93 Lipman Dr; New Brunswick, New Jersey 08901

Saturday March 21, 2009

Morning

Student-sponsored Symposium **York** **8:00-12:00**

"Fragmented Glimpses into the Paleoentomological Past"

Organizers: Akito Y. Kawahara, University of Maryland
Daniel Schmehl, Pennsylvania State University

8:00 Introduction – Akito Kawahara, University of Maryland

8:05 **Keynote lecture: Insect pollination strategies on Mesozoic gymnosperms**. Conrad Labandeira, Curator of Paleoentomology and Department Chairman, Dept. of Paleobiology, US National Museum of Natural History, Smithsonian Institution

8:40 **Integrating fossils and phylogeny in ants and bees.** Seán Brady, Phil Ward, Ted Schultz, Brian Fisher, and Bryan Danforth, Dept. of Entomology, US National Museum of Natural History, Smithsonian Institution

9:15 **Fossil placement and divergence estimation in Isoptera**. Jessica Ware *(2008 ESA-EB Comstock Award Winner),* Dave Grimaldi and Michael Engel. American Museum of Natural History

9:50 **99 Million-Year fossils, leaf mine morphology, and the evolution of leaf mining moths (Lepidoptera: Gracillarioidea)**. Akito Kawahara University of Maryland

10:25 BREAK

10:40 **A Brief Look at the Evolutionary History and Diversity of Curculionoidea**. Will Kuhn, Virginia Tech, Blacksburg, VA

11:15 **Role of gut microorganisms in cellulose degradation by the Asian longhorned beetle, *Anoplophora glabripennis*.** Scott Geib (Penn State University) *(2009 ESA-EB Comstock Award Winner)*

11:50 Adjourn

Saturday March 21, 2009

Morning

Vegetable and Field Crops Symposium Lancaster 8:00-12:00

"Northeast Vegetable and Field Crops Symposium"

Organizers: Tom Kuhar, Virginia Tech Eastern Shore AREC, Painter, VA
D. Ames Herbert, Jr., Virginia Tech, Tidewater AREC

8:00 **Introduction**. Tom Kuhar, Virginia Tech

8:05 **New entomology faculty in the northeast and future research**. John Tooker, Penn State University

8:10 **New entomology faculty in the northeast and future research**. Cerruti Hooks, University of Maryland

8:15 **Nocturnal predation: The night shift in vegetable & field crops**. Donald Weber, USDA-ARS-BARC

8:40 **Update on Dectes stem borer management in soybeans**. B. Cissel and J. Whalen, University of Delaware

9:00 **Control of European corn borer in bell peppers with Rynaxypyr applied thru a drip irrigation system**. Gerald Ghidiu, Rutgers University

9:15 **New insecticides from Syngenta**. Erin Hitchner, Syngenta Crop Protection

9:30 **Corn earworm moth methomyl and cypermethrin resistance monitoring**. D. Ames Herbert, Jr., S. Malone, T. P. Kuhar, E. L. Blinka, Virginia Tech, and H. E. Portillo, and J. P. Saienni, Dupont Stine-Haskell Lab, Newark, DE

9:50 BREAK

10:00 **Evidence of off-site benefits of Bt corn use in vegetable crops**. Galen Dively, University of Maryland; Tom Kuhar, Virginia Tech, Joanne Whalen, University of Delaware , and Jerry Ghidiu, Rutgers University

10:25 **Organic insecticides for vegetables: What works and what doesn't**. Galen Dively and Terry Patton, University of Maryland

10:50 **Assessment of the potential damage and economic impact of stink bugs on soybeans in the Mid-Atlantic**. Gerald Brust, G. Dively, T. Patton, University of Maryland; and J. Whalen, B. Cissel, University of Delaware; and D. Ames Herbert and S. Malone, Virginia Tech

11:20 **General discussion**

Saturday March 21, 2009

Morning

Turf Symposium **Gettysburg** **8:00-12:00**

"Turf Symposium"

Organizers: Albrecht M. Koppenhöfer, Rutgers University
Benjamin A. McGraw, Rutgers University

8:00 **Biology and management of the annual bluegrass weevil: A historical perspective**. Pat Vittum, University of Massachusetts

8:20 **Spatiotemporal analysis of annual bluegrass weevil on golf course fairways**. Masanori Seto, Cornell University

8:40 **Annual bluegrass weevil pyrethroid resistance**. Daryl Ramoutar, University of Rhode Island

9:00 **New strategies for ABW management with emphasis on pyrethroid resistant populations**. Richard Cowles, Connecticut Agricultural Experiment Station

9:20 **Impact of endemic and applied entomopathogenic nematodes on annual bluegrass weevil populations**. Benjamin McGraw, Rutgers University

9:40 **White grub management with entomopathogenic nematodes**. Albrecht Koppenhöfer, Rutgers University

10:00 Break

10:20 ***Bacillus thuringiensis* ssp. *japonensis* for white grub management**. Steve Alm, University of Rhode Island

10:40 **Oriental beetle mating disruption**. Albrecht Koppenhöfer, Rutgers University

11:00 **New chemistries for turf insect pest management**. Charles Silcox, DuPont Professional Products

11:20 **Pest status of European crane flies in the Northeast**. Daniel Peck, Cornell University

11:40 **Conservation of natural enemies for turfgrass insect suppression**. Paula Shrewsbury, University of Maryland, and Steve Frank, North Carolina State University

Saturday March 21, 2009

Afternoon

Student Oral Presentation Competition* **York** **1:00-5:00**

*See appendix C for abstracts of talks for this session

Moderator**:** Arthur Agnello, Department of Entomology, Cornell University, New York State Agricultural Experiment Station, Geneva, NY

1:00 **Development and efficacy of a novel fabric fiber net impregnated with discriminatory insect repellent** Emily N. Bick, 65 Seminole Way; Short Hills, NJ 07078

1:12 **Bean leaf beetle (*Cerotoma trifurcata*) feeding preference and defoliation impact on snap beans** Meredith E. Cassell, Blacksburg, VA 24060, Thomas P Kuhar, Painter, VA 23420, Peter B Schultz, Virginia Beach, VA 23455

1:24 **Multigenerational dispersal of an introduced and native *Laricobius* species within eight HWA infested hemlock stands** Gina A. Davis, Scott M. Salom, and Loke T. Kok, Virginia Tech; 216A Price Hall; Blacksburg, VA 24061

1:36 **Efficacy of selected insecticides against healthy and parasitized [*Telenomus podisi* Ashmead (Hymenoptera: Scelionidae)] eggs of the brown stink bug, *Euschistus servus* (Say) (Hemiptera: Pentatomidae).** Amanda L. Koppel, Department of Entomology; Blacksburg, VA 24061, D. A. Herbert, S. Malone, Tidewater AREC; 6321 Holland Road ; Suffolk, VA 23437 , D. E. Mullins, Department of Entomology ; Blacksburg, VA 24061

1:48 **Weed hosts for onion thrips and their potential role on epidemiology of Iris yellow spot virus in onion fields.** Erik A. Smith, Department of Entomology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456, Antonio DiTomasso, Department of Crop and Soil Sciences; Cornell University; Ithaca, NY 13850, Marc Fuchs, Department of Plant Pathology and Microbiology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456, Anthony M. Shelton, and Brian A. Nault, Department of Entomology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456

2:00 **Evaluation of plant extracts in the management of the invasive European red ant *Myrmica rubra* Linnaeus (Hymenoptera: Formicidae).** Kerry W. Bernard, School of Biology and Ecology; University of Maine, Orono, ME 04469, Eleanor Groden, School of Biology and Ecology; University of Maine, Orono, ME 04469, Frank A. Drummond, School of Biology and Ecology; University of Maine, Orono, ME 04469

2:12 **Synergies between biological and neonicotinoid insecticides for the curative control of the white grubs *Amphimallon majale* and *Popillia japonica*.** Anuar Morales, and Daniel C Peck, 630 W. North St; Barton Lab; Geneva, New York 14456

2:24 **Is a positive learning experience more important than herbivore-induced plant volatiles in host finding by a generalist parasitoid wasp?** Christina M. Harris, 120 Chemical Ecology Lab; Orchard Road; Penn State University; University Park, PA 16802, James H. Tumlinson, 111 Chemical Ecology Lab; Orchard Road; Penn State University; University Park, PA 16802

2:36 **Who did you say you were again? Premating reproductive isolation in green lacewings.** Suegene Noh, 75 N Eagleville Rd, U-3043; Ecology and Evolutionary Biology Department; University of Connecticut; Storrs, CT 06269-3043

2:48 **The reclassification of species of genus *Apanteles foerster* (Hymenoptera:Braconidae:Microgastrinae) in India.** Kavitha Govindasamy, 42-49, Colden St,; # 1F; Flushing, NY 11355

3:00 **Close session**

Saturday March 21, 2009

Evening

President's Reception	**York**	**6:00-8:30**
Linnaean Games	**Lancaster**	**9:00-11:00**

Sunday March 22, 2009

Morning

Executive Committee Meeting	**Lebanon**	**8:00-10:00**
IDEP Symposium	**Lancaster**	**8:00-12:00**

"Current Threats"

Organizer: Robert B. Trumble, Entomologist Maryland Department of Agriculture, Plant Protection and Weed Management Section, Annapolis, MD

8:00 **Introduction**

European Woodwasp:

8:05 **Attack of the Woodwasp: An Update on the *Sirex noctilio* infestation in the northeastern U.S**. Kelley E. Zylstra(1) and V. Mastro(2). (1) USDA APHIS PPQ Syracuse NY, (2) USDA APHIS PPQ, Buzzards Bay MA

Emerald Ash Borer:

8:30 **Five-year patterns of ash decline and subsequent ecological impacts due to EAB in southeastern Michigan**. Kamal JK Gandhi, Annemarie Smith, Robert P Long, Robin AJ Taylor, and Daniel A Herms

8:55 **The emerald ash borer invasion: How can a secondary pest threaten the existence of an entire genus?** Dan Herms, Department of

Entomology, The Ohio State University, Ohio Agricultural Research and Development Center, 1680 Madison Ave. Wooster, OH

9:25 **Trials and tribulations in the land of the emerald ash borer**. Dick Bean, State Survey Entomologist, Maryland Department of Agriculture, Plant Protection and Weed Management, Annapolis, MD

9:50 **Break**

European Crane Fly:

10:05 **Predicting the introduced ranges of *Tipula oleracea* and *Tipula paludosa* using ecological niche modeling**. Matthew Petersen, Department of Entomology, Barton Lab, NYSAES, Cornell University, 630 W. North Street Geneva, NY

Asian Longhorned Beetle:

10:30. **Update on the Asian longhorned beetle in North America**. Michael Bohne, Forest Health Group Leader, US Forest Service State and Private Forestry, Durham Field Office, Durham, NH

10:55 **Discussion**

11:15 **Adjourn**

Sunday March 22, 2009

Morning

Small Fruit Symposium **York** **8:00-12:00**

Current Advances in Small Fruit Entomology

Organizer: Cesar Rodriguez-Saona, Department of Extension Specialists, Rutgers University, Chatsworth, NJ

8:00 **Introductory Remarks**. Cesar Rodriguez-Saona, Rutgers University, Chatsworth, NJ

8:05 **Caneberries and Japanese beetle: The perils of working with an abundant species**. Laura Maxey, Curt Laub, Ryan Mays, and Doug Pfeiffer, Department of Entomology, Virginia Tech University

8:25 **Recent Advances in Grape Pest Management in Quebec**. Noubar J. Bostanian, Horticultural Research and Development Center, Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, Charles Vincent, Horticultural Research and Developement Center, Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, and Jacques Lasnier, Co-Lab R&D Inc., Granby

8:45 **Mechanically-applied mating disruption for control of grape berry moth**. Luis Teixeira, Keith Mason, and Rufus Isaacs, Department of Entomology, Michigan State University

9:05 **Seasonality and control timing for grape berry moth**. Mike Saunders and Jody Timer Department of Entomology, Pennsylvania State University

9:25 **Distribution of blueberry maggot populations on commercial farms in NJ**. Dean Polk, Cesar Rodriguez-Saona, and Peter Oudemans, PE Marucci Center for Blueberry & Cranberry Research & Extension, Rutgers University

9:45 **BREAK**

9:55 **Blueberry fruit flies in tree tops?** Frank Drummond, Judith Collins, Department of Biological Sciences, University of Maine, and Cesar Rodriguez-Saona, Department of Entomology, Rutgers University

10:15 **Genotypic variation for resistance to gypsy moth in cranberries**. Cesar Rodriguez-Saona, and Nicholi Vorsa, PE Marucci Center for Blueberry & Cranberry Research & Extension, Rutgers University

10:35 **Monitoring blueberry maggot**. Charles Vincent, Horticultural Research and Development Center, Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, Sonia Gaul, Atlantic Food and Horticulture Research Center, Agriculture and Agri-Food Canada, Kentville, N.S., Kenna MacKenzie, Atlantic Food and Horticulture Research Center, Agriculture and Agri-Food Canada, Kentville, N.S., Agnieszka Kwasniewska, McGill University, Ste-Anne-de-Bellevue, and Chris Buddle, McGill University, Ste-Anne-de-Bellevue

10:55 **Host plant-based lure for monitoring grape berry moth: An update**. Greg Loeb, Department of Entomology, Cornell University, NYSAES, Geneva, NY.

11:15 **Integrated management of root weevils in strawberry**. Kenna MacKenzie, Agriculture and Agri-Food Canada, Nova Scotia, Canada

11:35 **Concluding Remarks**

Sunday March 22, 2009

Morning

Submitted Oral Presentations **Gettysburg** **8:00-12:00**

Moderator: Peter Jentsh, Cornell University, Hudson Valley Laboratory

8:00 **Creating multilingual audio-visual web presentations for an international audience.** Douglas G. Pfeiffer, Dept. of Entomology; Virginia Tech; Blacksburg, VA 24061, Myroslava Ishchuk, Dept, Applied Linguistics; Lviv Polytechnic University; Lviv, Ukraine, Olena Cholovska, Ecoterra, Lviv Ukraine, Josef Tedeschini, Plant Protection Institute; Durres, Albania, Ejup Çota, Plant Protection Institute, Durres Albania, Vladimir Todirash, Institute for Plant Protection and Ecological Agriculture; Chisinau, Moldova

8:12 **Integrating alternative strategies To manage pear psylla, *Cacopsylla pyricola* (Foerster) and Fabraea leaf spot, *Fabraea maculata*, in northeast pear orchards**. Peter J. Jentsch, Cornell University's Hudson Valley Lab; 3357 Route 9W; Highland, New York 12528, David A. Rosenberger, Cornell University's Hudson Valley Lab; 3357 Route 9W; Highland, New York 12528

8:24 **A fixed spray system for applying pesticides to high-density apple plantings.** Arthur M. Agnello, Dept. of Entomology; NYS Agric. Expt. Sta.; 630 W. North St.; Geneva, NY 14456-1371, Andrew J. Landers, Dept. of Entomology; NYS Agric. Expt. Stn.; 630 W. North St.; Geneva, NY 14456-1371

8:36 **Are native bees important pollinators of pumpkin in New York**? Derek R. Artz, and Brian A. Nault, Department of Entomology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456

8:48 **Thrips sampling in Virginia.** Heather E. Andrews, Price Hall; Virginia Tech; Blacksburg, VA 24060, Thomas P. Kuhar, Eastern Shore AREC; 33446 Research Dr.; Painter, VA 23420, Ames Herbert, Tidewater AREC; 6321 Holland Rd.; Suffolk, VA 23437, Pete Schultz, Hampton Roads AREC; 1444 Diamond Springs Rd.; Virginia Beach, VA 23455, Sean M. Malone, Tidewater AREC; 6321 Holland Rd.; Suffolk, VA 23437, Gerald Brust, Upper Marlboro Facility; 2005 Largo Rd.; Upper Marlboro, MD 20774

9:00 **Carrot weevil, *Listronotus oregonensis*, oviposition and feeding damage on carrot in New Jersey.** Joseph Ingerson-Mahar, Rutgers University; 243 Blake Hall; 93 Lipman Dr.; New Brunswick, NJ 08901

9:12 **A graphic representation of declining first generation ECB adult populations in New Jersey.** Kristian Holmstrom and Joseph Ingerson-Mahar, Rutgers University; 243 Blake Hall; 93 Lipman Dr; New Brunswick, New Jersey 08901

9:24 **Contact cues in the mating behavior of the woodwasp *Sirex noctilio.*** Katalin Böröczky, Center for Chemical Ecology; The Pennsylvania State University; 117 Chemical Ecology Lab; University Park, PA 16802, Damon J. Crook, USDA, APHIS, PPQ; Otis ANGB, MA 02542, Tappey H. Jones, Department of Chemistry; Virginia Military Institute; Lexington, VA 24450, Victor C. Mastro, USDA, APHIS, PPQ; Otis ANGB, MA 02542, James H. Tumlinson, Center for Chemical Ecology; The Pennsylvania State University; 111 Chemical Ecology Lab; University Park, PA 16802

9:36 **Role of Outreach in invasive species management.** Maya E. Nehme, 501 ASI Bldg; University Park, PA 16802, David P. Baker, 300 Rackley B.ldg; University Park, PA 16802, Kelli Hoover, 501 ASI Bldg; University Park, PA 16802

9:48 **Male, interrupted: Mating duration and sperm transfer in the emerald ash borer and its native congener the bronze birch borer**. Claire E. Rutledge, Department of Entomology; The Connecticut Agricultural Experiment Station; 123 Huntington St.; New Haven, CT 06504

10:00 **Quarantined rearing and biology of the weevil, *Eucryptorrhynchus brandti* (Harold) (Coleoptera: Curculionidae).** Nathan Herrick, S. M. Salom, L. T. Kok and T. McAvoy, Department of Entomology; Blacksburg, VA 24061

10:12 **Hardening of teneral *Anaplophora glabripennis* and timing of adult emergence from pupal gallery.** Vicente Sánchez and Melody A. Keena, USDA Forest Service, Northeastern Research Station, Center for Forest Health Research, Hamden, CT

Sunday March 22, 2009

Afternoon

Ornamental Symposium **Lancaster** **1:00-5:00**

"Native plants, Insects, and Pest management in Ornamentals"

Organizer: Brian Kunkel, University of Delaware

1:00 Introduction & Welcome

1:05 **Stress effects on tree resistance to woodborers: The role of coevolutionary history (and lack thereof).** Dan Herms, Dept. of Entomology, The Ohio State University

1:50 **A mass rearing method for the dogwood borer, *Synanthedon scitula* (Lepidoptera: Sesiidae).** Daniel Frank, Dept. of Entomology, Virginia Tech

2:20 **Using an IPM Approach for management of white pine weevil, *Pissodes strobi* (Peck), in Pennsylvania Christmas Tree Plantations**. Sarah Pickel, PA Integrated Pest Management Program, PA Dept. of Agriculture

2:50 **Break**

3:00 **Can alien plants support generalist insect herbivores**. Meg Ballard Dept. of Entomology & Wildlife Ecology, University of Delaware

3:30 **The impact of native plants on biodiversity in suburban landscapes**. Karin T. Burghardt, University of Delaware

4:00 **Bird foraging preferences on native and non-native landscape trees**, Christy Beal, Dept. of Entomology & Wildlife Ecology, University of Delaware

4:30 **Open Mike: Field reports, results of efficacy trials, new products, or current issues**. Brian Kunkel, Dept. of Entomology & Wildlife Ecology, University of Delaware; Tim Abbey, PSU Cooperative Extension, Penn State University

Sunday March 22, 2009

Afternoon

Biological Control Symposium **York** **1:00 pm – 6:00 pm**

Eighty Years of Biological Control in the Northeastern U.S.

Organizer: Roger Fuester, USDA-ARS Beneficial Insects Introduction Research, Newark, DE

1:00 **Introduction**. Roger Fuester, USDA

1:05 **Biological control of adelgids.** Scott Salom, Virginia Tech University

1:40 **Biological control of tussock moths**. Ann Hajek, Cornell University

2:15 **Biological control of chrysomelid and coccinellid beetles**. Donald Weber, USDA-ARS, Beltsville, MD, and Richard Casagrande, University of Rhode Island, Kingston, RI.

2:50 **Biological control of scarabaeid beetles**. Ana Legrand, University of Connecticut, CT.

3:25 **BREAK**

3:40 **Biological control of wood boring beetles**. Roger Fuester, Michael Smith and Jian Duan, USDA-ARS, Newark, DE.

4:15 **Biological control of alfalfa insects in the Eastern Branch**. William Day, USDA-ARS, Newark, DE.

4:50 **Biological control of leafmining sawflies**. Roy Van Driesche, University of Massachusetts, MA.

5:25 **Biological control of weeds with insects**. Bernd Blossey, Cornell University, NY.

6:00 **Adjourn**

Sunday March 22, 2009

Afternoon

Submitted Oral Presentations **Gettysburg** **1:00-5:00**

Moderator**:** Greg Krawczyk, Department of Entomology, Pennsylvania State University

1:00 **Applications of unmanned aerial vehicles to pest management.** Yong-Lak Park, West Virginia University; Entomology Program; Division of Plant and Soil Science; Morgantown, WV 26505

1:12 **Requiem, a new insecticide/miticide for use in eastern US specialty crop fruit and vegetable production.** Henry B. Highland, AgraQuest, Inc. 1069 Eisenhower Dr.; Nokomis, FL 34275

1:24 **Recruit HD, a new termite bait from Dow AgroSciences: Product concept overview and bait matrix development.** Mike Tolley, Joe DeMark, Joe Eger, Ronda Hamm, Matt Messenger, Mike Lees, Ellen Thoms, Mark Fischer, Jackie McKern,

1:36 **Recruit HD, a new termite bait from Dow AgroSciences: termite hit rate, bait consumption, durability, and colony elimination.** Jackie McKern, Joe Eger, Mike Tolley, Matt Messenger, Ellen Thoms, Mike Lees, Mark Fischer, Mike Melichar, Joe DeMark, Ronda Hamm

1:48 **Phylogenetic synthesis of morphological and molecular data reveals new insights into the evolution and classification of the Tipuloidea (Diptera).** Matthew J. Petersen, Department of Entomology; Cornell University; Geneva, NY 14456, Matthew A. Bertone, Department of Entomology; North Carolina State University; Raleigh, NC, Gregory W. Courtney, Department of Entomology; Iowa State University; Ames, IA 50010, Brian M. Wiegmann, Department of Entomology; North Carolina State University; Raleigh, NC

2:00 **Genetic patterning of the appendages in *Tribolium* flour beetles and**

considerations of mouthpart homologies. David R. Angelini, American University, Department of Biology, Hurst Hall 101
4400 Massachusetts Avenue, NW

2:12 **Observations on the mite genera *Hericia* and *Fusohericia*, inhabitants of sap flux on trees (Acari; Algophagidae).** Norman J. Fashing, Department of Biology; College of William and Mary; Williamsburg, VA 23187-6483

2:24 **Fitness costs associated with insecticide resistance in the house fly.** Jeffrey G. Scott, Entomology Dept.; Comstock Hall; Cornell Univ.; Ithaca, NY 14853

Sunday March 22, 2009

Afternoon

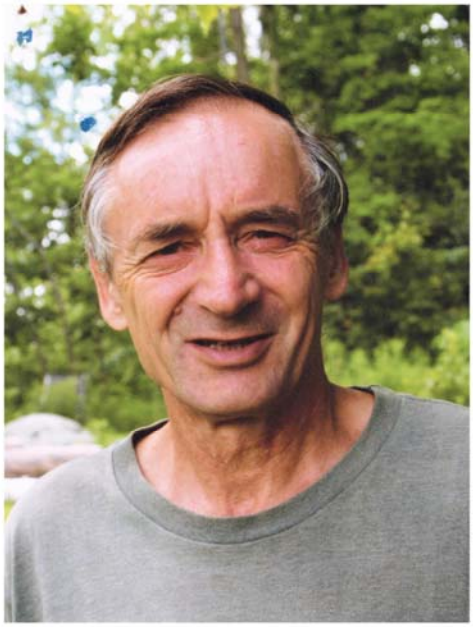
Public Outreach Program **Whittaker Center** **1:00-5:00**

It's a bug's world

Organizer: Faith Kuehn, Delaware Department of Agriculture, Dover, DE

Sunday March 22, 2009	**Evening**	
Social and Cash Bar	**Carlisle**	**5:30-6:00**
Banquet and Awards Presentations	**York/Lebanon**	**6:00-8:30**

2009 Eastern Branch ESA Banquet speaker



Bernd Heinrich author of
The Snoring Bird
Ecco/HarperCollins*Publishers*
Photo Credit: Rachel Smolker

Presentation title: "The Hot-Blooded Insects"

Dr. Bernd Heinrich grew up in Maine, lining bees, hunting deer, and watching birds. He received his bachelors and masters degrees in zoology at the University of Maine, Orono. His research focused on Euglena respiratory metabolic biochemistry. In 1970, he received a doctorate in zoology with distinction from the University of California, Los Angeles, where he was working on trying to decipher if and how some moths may regulate their body temperature in flight. Dr. Heinrich taught Physiological Entomology for ten years in the Entomology Department at UC Berkeley at which time he had moved on to deciphering mechanisms of body temperature regulation in bumblebees and social thermoregulation in honeybees. This, buttressed by other work with other insects, mostly dragonflies, dung beetles and butterflies, led to the synthesis of insect thermoregulation and his magnum opus: The Hot-Blooded Insects. His attachment to upper New England, and Maine in particular, where he grew up and did all his field and behavior work with bees, eventually prompted his decision to return home. In 1981, he accepted a Zoology position at the University of Vermont. He started work on thermoregulation in winter moths, and after finishing that he was satisfied with his thermoregulation project and started one on social foraging in ravens.

Sunday March 22, 2009

Evening

Linnaean Games **Lancaster** **9:00-11:00**

Coordinator – Douglas G. Pfeiffer

Monday March 23, 2009

Morning

Final Business Meeting **Lebanon** **8:00-9:00**

Industry Symposium **Lancaster** **8:00-12:00**

Meeting Pest Management Challenges with New Technologies

Organizers: Jackie McKern, Dow AgroSciences, Christiansburg, VA,
Erin Hitchner, Syngenta Crop Protection, Elmer, NJ

9:00 **Introduction**

9:05 **Vitamin C: a cure for the common caterpillar?** Carlos Avila, University of Arkansas

9:30 **RNAi as a new concept for insect control**. Tom Hashman, Devgen Inc., West Chester, PA

9:55 **CIDETRACK pheromone distribution system in tree fruit**. Janet Haworth, Trece Inc., Tucson, AZ

10:25 **Increased insecticidal activity and broadened control spectrum with Syngenta's Agrisure® Viptera corn trait**. Aaron Franssen, Ryan Kurtz, Von Kaster, Jon Sagers, David O'Reilly, Wayne Fithian, Andre Crespo, and Bruce Battles, Syngenta Seeds, Inc., Research Triangle Park, NC

10:50 **Break**

11:05 **New advancements in Lepidopteran trait technology and the impact on resistance management and refuge requirements**. Bryan Dillehay, Monsanto Company, St Louis, MO

11:30 **Efficacy and durability of rootworm control with Herculex RW and SmartStax**. Nick Storer, DowAgroSciences, Indianapolis, IN

11:55 **In-the-bag seed refuge for insect resistance management**. Speaker TBA

12:20 **Discussion**

APPENDIX A
Student Poster Competition Abstracts

Resistance, movement and rotation distance in the Colorado potato beetle, *Leptinotarsa decemlineata* (Say).

Kathleen, Schnaars Uvino; CUNY Graduate Center; Biology- EEB; 365 5th Avenue, Manhattan NY.

The evolution of resistance is a classic example of evolution in action. We ask whether resistance to imidacloprid is associated with reduced ability or motivation to move long distances. Movement is not only important in the life history of the Colorado potato beetle but also affects our ability to manage beetle population size and resistance evolution. Crop rotation is a widely practiced technique to delay and reduce colonizing populations. If resistant individuals are less able or willing to fly or walk long distances, crop rotation can also reduce the resistance of colonizers of rotated fields, and can be part of a resistance management strategy. Resistance costs in L. decemlineata include reduced fecundity, delayed hatching, lower overwinter survival, and slower sprint speeds, but not mating success. In this study we tested two predictions based on the hypothesis that movement is a cost of resistance: Are beetles flying from an overwintering site less resistant than emerging beetles walking from that site? Are colonists on rotated fields less resistant than colonizers of continuously planted fields? As grower management approaches can affect resistance, the grower was used as a statistical unit, and pairs of rotated and continuously planted fields were identified from several farms. Sufficient adults were collected from 3 pairs of fields from 3 different growers. Each adult received one treatment of 1 of 8 doses of 2ml Imidacloprid (neonicotinoid pesticide) and placed in a petri dish with fresh potato foliage and water and scored daily for seven days.

Attraction of *Harminia axyridis* (Coleoptera: Coccinellidae) using attractant plants

Folukemi Adedipe, West Virginia University; Entomology Program; Morgantown, WV 26505, Vicki Kondo, West Virginia University; Entomology Program; Morgantown, WV 26505, Yong-Lak Park, West Virginia University; Entomology Program; Morgantown, WV 26505

Natural enemies controlling pests can be influenced to take up residence within cropping systems by providing suitable habitat for them. This study was conducted to determine if *Harmonia axyridis* Pallas (Coleoptera: Coccinellidae) could be attracted into cropping area using attractant plants. Ten potential plants that can attract and provide H. axyridis with nectar and pollen were selected. These plants include dill (*Anethum graveolens*), tansy (*Tanacetum vulgare*), goldenrod (*Solidago* spp), sunflower (*Helianthus annuus*), yarrow (*Achillea* spp.), butterfly weed (Asclepias *tuberosa*), morning glory (*Ipomoea* spp.), dandelion (*Taraxacum officinale*), bugleweed (*Ajuga reptans*) and marigold (*Tagetes tenuifolia*). Paired choice tests were carried out and chi-square test was used for data analysis. The results of this study showed that there was significance difference in the plant preference by H. axyridis; sunflower and dill were the

most effective attractant plants and dandelion and goldenrod was the least effective. This study suggested that selective companion planting could encourage biological control by attracting high population of *H. axyridis* and keep them within cropping area.

Variation in the laboratory susceptibility of turf-infesting white grubs (Coleoptera: Scarabaeidae) to a series of biological, biorational and chemical control products
Anuar Morales, 630 W. North St; Barton Lab; Geneva, New York 14456, Daniel C. Peck, 630 W. North St; Barton Lab; Geneva, NY 14456.

White grubs are the most widespread and damaging pests in turfgrass habitats of the Northeast U.S. and their management is highly dependent on chemical pesticides. Because this complex includes eight species, opportunities for pest management in this system would be enhanced by understanding how susceptibility to control products varies across taxa. The objective of this laboratory study was to measure variation in the susceptibility of four invasive species of white grubs to 18 registered and experimental insecticides used as curative controls. Across white grub species, the most efficacious biological and chemical insecticide alternatives were *Steinernema scarabaei* and chlorpyrifos, respectively. Biorationals were highly variable across target species. For biorational and chemical insecticides, *Amphimallon majale* was the least susceptible species. For biologicals, *Popillia japonica* was the least susceptible. Considering all control products, *Anomala orientalis* was the most susceptible. The magnitude of variation in susceptibility across white grub species supports the idea that a single product will not reliably suppress populations of all taxa, and highlights the need for pest management practitioners to diagnose and differentiate scarab species before any intervention. This differential susceptibility could have brooder consequences for grub management, if a numerically dominant target species is more completely suppressed than a co-occurring species.

Aggregative oviposition behavior of viburnum leaf beetle [*Pyrrhalta viburni* (Paykull)] and plant defenses of North American and European viburnums
Gaylord A. Desurmont, 180 insectary; Ithaca , NY 14850, Paul A. Weston,

P. viburni, an invasive chrysomelid native to Eurasia, causes extensive loss of several *Viburnum* species in the Northeast U.S and Canada. *P. viburni* eggs are laid in small groups in cavities females excavate in the terminal twigs of susceptible shrubs, which they cover with a frass-like protective secretion. It was recently discovered that *P. viburni* females prefer to lay eggs on twigs already infested by other females: we hypothesized that this aggregative oviposition behavior helps *P. viburni* to overcome plant defenses. To test our hypothesis, we first determined the correlation between plant defenses against oviposition and egg survivorship by monitoring larval emergence from twigs showing different levels of plant defenses. We found a strong negative correlation between the amount of plant defenses and larval emergence for both *Viburnum dentatum* (North America) and *V. opulus* (Europe). We then determined the correlation between the number of egg masses present on a twig and amount of plant defenses/twig mortality by sampling naturally infested viburnums in the field for four viburnums: *V. dentatum*, *V. rafinesquianum*, *V. trilobum* (North America), and *V. tinus*

(Europe). On North American viburnums egg masses were negatively correlated with plant defenses and positively correlated with twig mortality. On *V. tinus*, egg masses were positively correlated with plant defenses and independent from twig mortality. These results show that aggregative oviposition helps *P. viburni* to overcome plant defenses on the North American viburnums tested, but not on *V. tinus*.

Determining whole tree siricid density using characteristic half meter bolts of Red and Scot's pine

Patrick Eager, Department of Environmental and Forest Biology, SUNY-ESF, 106 Illick Hall 1 Forestry Drive, Syracuse, NY 13210.

Current procedures for determining *Sirex noctilio* (Hymenoptera: Siricidae) density involve extensive felling and rearing operations whereby entire trees are felled and caged, and *S. noctilio* emergence is recorded. This process is costly in terms of the time it takes to fell, transport, cage, and monitor emergence in the logs. The objective of this study was to determine if it was possible to quantify whole tree *S. noctilio* density using characteristic half meter bolts of *Pinus resinosa* and *Pinus radiata.* This would allow researchers to use much less of the tree in order to determine *S. noctilio* density. Nineteen trees were felled, cut into half meter bolts and dissected via a log splitter, and *S. noctilio* larvae in each bolt were recovered and noted to establish within tree distribution. A regression equation was created using *S. noctilio* density in bolts and whole tree *S. noctilio* density in order to determine if certain bolts could be used to characterize whole tree density. Because all trees have not yet been dissected, the final statistical analyses have yet to be performed, although a preliminary analysis indicated a possible relationship between *S. noctilio* densities in certain bolts and whole tree *S. noctilio* density.

A revision of the few Indian species of genus *Dolichogenidea* (Hymenoptera: Braconidae:Microgastrinae)

Kavitha Govindasamy, 42-49,Colden St.; # 1F; Flushing, NY 11355

The Oriental species of genus *Dolichogenidea* viz.,*mujtabai* Bhatnagar, *hyblaeae* Wilkinson, *fakrulhajiae* Mahdihassan, *prodeniae* Viereck, *stantoni* Ashmead, *fistulae* Wilkinson, *heterusiae* Wilkinson, *symithae* Bhatnagar are reviewed. Key to the species, detailed descriptions on their taxonomy including genitalia studies, illustrations of diagnostic characters and also specimen examined contains the host relationship and distribution are provided. Key words: Dolichogenidea , India and Taxonomic review.

APPENDIX B
Submitted Poster Abstracts

The effects of dietary regime on post-starvation feeding in *Drosophila melanogaster*

Jannett Dinsmore, Department of Biology; SUNY New Paltz; New Paltz, NY 12561,
Aaron T. Haselton, Department of Biology; SUNY New Paltz; New Paltz, NY 12561

Dietary restriction has been shown to extend lifespan and alter nutrient metabolism in all model organisms studied to date. Conflicting reports exist in the Drosophila melanogaster dietary restriction literature regarding compensatory ingestion on diets of varied quality. The intent of this research is to exam the effects of dietary regime on post-starvation ingestion of liquid diets in order to further characterize prandial behavior in D. melanogaster. Adult flies were aged for 10 days on 1 of 4 solid diets varying in caloric/nutrient content ranging from dietary restriction to nutrient enriched. After 10 days, flies were starved for 24 hours and then allowed to feed for 5 minutes on 1 of 4 liquid diets varying in caloric/nutrient content. Our results suggest that dietary restriction in *D. melanogaster* leads to an exaggerated bias of post-starvation feeding toward calorie-rich food. Ongoing studies are investigating the effects of aging on post-starvation compensatory ingestion.,

Life history and biology of *Hormosianoetus mallotae* (Histiostomatidae: Astigmata: Acari), an obligatory inhabitant of water-filled treeholes

Norman J. Fashing, Department of Biology; College of William and Mary; Williamsburg, VA 23187-6483.

Water-filled treeholes are in reality tiny ponds in the woodland ecosystem and provide a unique habitat for a number of different organisms that make up the treehole community. The community is a detritus based system that relies primarily on decomposing leaves from the autumn leaf drop as an energy source. Among the arthropod inquilines is a histiostomatid mite, *Hormosianoetus mallotae*, an obligate inhabitant that filters microorganisms and other organic matter from the fluid. While larvae, protonymphs, tritonymphs and adults are found in the treeholes throughout the year, deutonymphs are present only in May and June when conditions are optimal for population growth by the treehole residents. Deutonymphs therefore do not form in response to adverse conditions, but rather to serve purely as dispersal agents for colonizing new treeholes and for out-crossing among populations. Deutonymphs are phoretic on another obligate treehole inhabitant, species in the syrphid fly genus *Mallota* that are also found as adults only during that same time of year. *Hormosianoetus mallotae* is arrhenotokous and disperse only as female deutonymphs, dispersants mating with their haploid male offspring. Females are ovoviviparous, retaining eggs in the reproductive system during embryonic development and giving birth to fully formed larvae. Development from egg to adult is approximately 14 days for males and 20 days for females. Like other mite inhabitants of the treehole community, *H. mallotae* is a K-selected species.

Tree composition of New York riparian forests in advance of emerald ash borer
Peter J. Rockermann, SUNY-ESF; 1 Forestry Drive; Syracuse, NY 13210, Catherine L. Landis, SUNY-ESF; 1 Forestry Drive; Syracuse, NY 13210, Melissa K. Fierke, SUNY-ESF; 1 Forestry Drive; Syracuse, NY 13210.

Emerald ash borer (EAB) is an invasive wood-boring beetle originally discovered in Michigan in 2002. The insect's fast expanding range is encroaching on New York State. Emerald ash borer specializes on ash (*Fraxinus* spp.) trees, resulting in 100% mortality. To date, tens of millions of trees have been killed in Michigan and Ohio. Vulnerability of New York forests to EAB is unknown, as the ash component of these forests has not been well documented. In particular, ash may be especially important in riparian corridors where riparian forest health affects not only the immediate terrestrial biota but is critical to aquatic dependent biota and water quality. This project provided the unique opportunity to study the pre-invasion composition of riparian forests and assess the degree of damage that EAB will have on New York's watersheds. The main objective of this study was to quantify ash composition in riparian forests. These data will be useful in predicting riparian forest susceptibility and ensuing effects on water quality and ash dependent biota. This project surveyed forested riparian reaches across New York State during the summer of 2008. Twenty-five 50m x 30m fixed area vegetation plots were installed along five rivers, Cattaraugus Creek, Mohawk River, Oswegatchie River, Saranac River and Susquehanna River. Tree species and diameter of trees >10cm DBH were measured. In the 25 field plots 2,293 trees were encountered. There were 42 species, of which EAB vulnerable species included 3 white, 110 black and 388 green ash (*F. americana*, *F. nigra* and *F. pennsylvanica,* respectively). These data indicate that ash comprises 21.8% of riparian tree species in the rivers studied with a range of 6.5% to 47.9% by river. With 100% mortality of these trees, impacts are expected to be substantial for these unique and essential riparian habitats as well as ash dependent biota.

Virginia Survey of beetles in the Family Silphidae
Shana Beirne, Department of Entomology; Virginia Tech; Blacksburg, VA 24061, Richard D. Fell, Department of Entomology; Virginia Tech; Blacksburg, VA 24061, and Douglas G. Pfeiffer, Dept. of Entomology; Virginia Tech; Blacksburg, VA 24061.

Surveys for beetles in the family Silphidae were conducted in different areas of Virginia using baited pitfall traps. Surveys were conducted for two (2) summers. Virginia was split into five (5) eco-regions: the Appalachian Plateau, the Valley and Ridge, the Blue Ridge Mountains, the Piedmont, and the Coastal Plain region. A different county was chosen in each region during each summer, with collections focused in forests or protected land areas. Over the two summers, 11 species and 4 genera of silphids were recorded; within the *Nicrophorus* species, *Nicrophorus tomentosus* and *Nicrophorus orbicollis* being the most commonly collected.

Grassland restoration for the repatriation of the regal fritillary butterfly, *Speyeria idalia* (Drury)
Tilden, V.*(1), M. Swartz (1), J. Hovis (2), D. McNaughton (1), AND N. Hoffman (1)

(1) The Pennsylvania State University, Fort Indiantown Gap, Building 11-19, Annville, PA 17003; (2) Department of Military and Veterans Affairs, Fort Indiantown Gap, Building 11-19, Annville, PA 17003.

The grassland endemic regal fritillary butterfly (*Speyeria idalia*) has seen an extreme contraction of its range, most notably in the eastern United States. One of the only two remaining populations in the East is found at Fort Indiantown Gap (FIG) in Annville, PA. At FIG soil disturbance and fire created by military training have sustained one of the largest native warm-season grasslands in the Mid-Atlantic region providing a refuge for the regal as well as many other rare flora and fauna. In an effort to preserve this species a grassland restoration and regal repatriation effort has been proposed to return the butterfly to landholdings having a historic or probable occurrence. We have secured funding to implement this project at several sites throughout PA and have developed partnerships with agencies that are interested in being involved. Sites selected include Gettysburg National Military Park (GNMP) and Memorial Lake, Swatara, and Bald Eagle State Parks. As part of a graduate thesis, the site at GNMP was partially assessed for appropriate resources and experimental restoration treatments were completed. Habitat at the state park sites was evaluated, management plans were developed, and initial restoration efforts have begun. From here the project will proceed with site specific management while continuing to develop new partnerships with the hope of ultimately restoring grasslands and repatriating the butterfly to areas throughout the northeast United States.

Critical resource assessment for the regal fritillary butterfly, *Speyeria idalia* Drury (Tribe: Argynnini) at the Fort Indiantown Gap National Guard Training Center, Annville, Pennsylvania

Mark Swartz, Betty Ferster and Gregory Paulson. The Shippensburg University, Department of Biology, Shippensburg, PA 17257.

The rare butterfly species, *Speyeria idalia*, resides at only two locations in the East with the largest, most stable population being located at Ft. Indiantown Gap National Guard Training Center (FIG-NGTC) in Annville, PA. Its continued existence at this location is probably due to repeated disturbances created by military activities and periodic wildfires which maintain early successional habitats such as old fields and eastern prairies. By maintaining these habitat types larval and adult hosts as well as warm season bunch grasses for resting larvae, pupae, and adults are promoted. At FIG-NGTC, fields that are *S. idalia*-occupied typically contain these three vegetative factors which are crucial for survival while fields that are either *S .idalia*-unoccupied or have a very low abundance of this butterfly may lack one or all of these factors. This study uses data collected in 2004 and 2005 and focuses on the differences in these three habitat components between fields that are *S. idalia*-occupied and fields that are *S. idalia*-unoccupied.

APPENDIX C

Student Competition, Oral Presentation Abstracts

Development and efficacy of a novel fabric fiber net impregnated with discriminatory insect repellent

Emily N. Bick, 65 Seminole Way; Short Hills, NJ 07078.

The most important harmful interaction and the one that causes the most misery and hardship is the linkage among arthropods, humans, and disease (Goddard, 2000). The Malaria Foundation International estimates that every 30 seconds a child dies of malaria, one of many insect born diseases (United States Department of State, 2006). Insect repellents have long been sought for use against harmful insects (Mumcuoglu, 1997). The available repellents suffer from various deficiencies. Among the most prevalent deficiencies are their failure to discriminate between harmful and beneficial insects, their limited duration of effectiveness and limited shelf life. Long-duration nets impregnated with a renewable insect repellent, suitable for repelling vectors of disease, may be prepared by temporarily attaching a discriminatory insect repellent encapsulated (Lee, 2007) in polymethyl methacrylate microspheres (PMMA) to cotton fibers. With a 95% confidence level, these nets were more effective than nets made from untreated thread or thread treated with N, N-diethyl-m-toluamide ("DEET"). The impregnated nets were 50% more effective than DEET-treated nets after 24 hours. A novel impregnation technique involving the temporary attachment of micro spheres made permanent by mechanical twisting. This method assures even dispersion of the repellent and minimizes thread disintegration, repellent fouling. It also overcame several other difficulties associated with the use of existing commercial repellent-impregnated fabric. Fibers containing encapsulated repellent yield a 200% improvement in discriminatory repellency as compared to using discriminatory repellent alone.

Bean leaf beetle (*Cerotoma trifurcata*) feeding preference and defoliation impact on snap beans

Meredith E Cassell, Blacksburg, VA 24060, Thomas P Kuhar, Painter, VA 23420, Peter B Schultz, Virginia Beach, VA 23455.

The bean leaf beetle (BLB), *Cerotoma trifurcata* (Forster), is an important pest of legume crops in the eastern and central U.S. Adults feed on leaves and scar pods. The majority of research on this pest has focused on soybeans. On the Eastern Shore of Virginia, snap beans and lima beans are important crops along with soybeans, and relatively high populations of BLB occur. In 2007 and 2008, we conducted laboratory and field choice experiments to determine potential host plant preferences of BLB. In the lab, using paired leaf-disc bioassays, BLB consumed more leaf area of lima and snap bean over soybean. No differences were found between snap and lima bean. In field pairings of the aforementioned legumes, more beetles infested snap bean and lima bean plants over soybean. Results of both experiments suggest a host plant preference for snap bean and lima bean over soybean. An additional study was conducted to assess the effect of BLB leaf feeding on snap bean yield. We used a leaf-hole punch to

remove 0, 25, 50 and 75 % of the total leaf area. Two groups were evaluated: the group one received two defoliation sessions, which imitated early-season defoliation pressure only, while the second group received four defoliation sessions, which represented season-long feeding pressure. Plants receiving 50% or more defoliation for both groups experienced significant yield losses as compared to the control. Regression analysis revealed a strong linear relationship between percentage defoliation and yield loss in snap beans.

Multigenerational dispersal of an introduced and native *Laricobius* species within eight HWA infested hemlock stands

Gina A. Davis, Virginia Tech; 216A Price Hall; Blacksburg, VA 24601, Scott M. Salom, Virginia Tech; 216A Price Hall; Blacksburg, VA 24061, Loke T. Kok, Virginia Tech; 216A Price Hall; Blacksburg, VA 24061.

Introduced from the Pacific Northwest, *Laricobius nigrinus* Fender continues to show promise as a biological control agent for hemlock woolly agelgid, *Adelges tsugae* Annand, in the eastern United States. Understanding the dispersal potential of this introduced predator in its newly established range may facilitate strategic planning of future release locations. A native predator of pine bark adelgid, *Laricobius rubidus* LeConte, can also complete its life cycle on HWA and was commonly recovered on infested hemlocks. The morphologically indistinguishable larvae of both predators were recovered from HWA infested hemlock branch samples and identified using molecular diagnostic assays. In spring of 2007 and 2008 up to 16 points at various distances from four *L. nigrinus* established release sites were sampled for dispersal of the F2-F3 and F3-F4 generations, respectively. In addition, four newly colonized release sites were sampled in 2008 to represent dispersal of the parent generation. The parent generation dispersed approximately 10 meters from the release areas while the F2-F3 and F3-F4 generations dispersed approximately 100 and 300 meters from the release areas, respectively. Where eastern white pine was a forest component, *L. rubidus* was abundant on hemlocks with building HWA populations, and absent from stands lacking eastern white pine. The dispersal dynamics of the congeners provide an estimate of predator populations over time.

Efficacy of selected insecticides against healthy and parasitized [*Telenomus podisi* Ashmead (Hymenoptera: Scelionidae)] eggs of the brown stink bug, *Euschistus servus* (Say) (Hemiptera: Pentatomidae)

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The brown stink bug, *Euschistus servus*, is a major pest of many crops. Although various insecticides are commonly used to control nymphs and adults, little is known about how they affect eggs, or the egg parasitoid, *Telenomus podisi*, which may be developing inside. Field trials and laboratory bioassays were conducted to determine insecticide efficacy against healthy and parasitized eggs. Healthy and parasitized *E.*

servus egg masses were obtained from lab-reared colonies. Common field rates of acephate, lambda-cyhalothrin, spinosad, and thiamethoxam were tested on parasitized eggs, while these four plus dicrotophos, beta-cyfluthrin, and imidacloprid were tested on healthy eggs. In the bioassay, egg masses were dipped into insecticide/water solutions (water as the control) for one second and assessed for mortality after two weeks. For the field trials, treatments were randomly assigned to soybean plots using a 4-replicate, randomized complete block design. Egg masses were pinned to leaves in each plot, and pesticides were applied using standard field application equipment. Egg mortality was assessed after two weeks. There was significant mortality of parasitized eggs with all insecticides in both the dip test (P = <0.0001), and the field trials (P = <0.0001). There was no significant mortality of healthy eggs in field trials, but there was significant mortality in the dip bioassay with dicrotophos (P = 0.0013), imidacloprid (P = 0.0016), and acephate (P = 0.0026). Implications for stink bug and beneficial insect management will be addressed.

Weed hosts for onion thrips and their potential role on epidemiology of Iris yellow spot virus in onion fields.

Erik A. Smith, Department of Entomology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456, Antonio DiTomasso, Department of Crop and Soil Sciences; Cornell University; Ithaca, NY 13850, Marc Fuchs, Department of Plant Pathology and Microbiology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456, Anthony M. Shelton, Department of Entomology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456, Brian A. Nault, Department of Entomology; Cornell University; New York State Agricultural Experiment Station; Geneva, NY 14456.

Onion thrips, *Thrips tabaci* Lindeman, is a serious yield-reducing pest of onion and the sole vector of Iris yellow spot virus (IYSV), a yield-reducing pathogen of onion. *Thrips tabaci* acquires IYSV as a first instar when feeding on an infected plant and then transmits the pathogen as an adult to other plants. Because *T. tabaci* and IYSV attack plant species other than onion, identifying common hosts for both *T. tabaci* and IYSV is important for understanding the potential spread of IYSV from these hosts into onion fields. Perennial and winter-annual weeds bordering onion fields are likely sources for *T. tabaci* and IYSV, but have not been identified. In western New York in 2008, common weed species were sampled every other week through the growing season near five commercial onion fields. All weed species were identified in transects along the borders of onion fields, and tissues or entire plants from 61 of the most common perennial and winter-annual weed species were collected and numbers of immature thrips were recorded. A sub-sample of thrips larvae from each weed species was reared to adulthood to identify species in which *T. tabaci* utilize as a host. Results indicated that *T. tabaci* can reproduce on 18 perennial and winter-annual weed species. Of these weed species, only a few may be hosts for IYSV. This information will be used to target perennial and winter-annual weeds that might play an important role in the spread of IYSV.

Evaluation of plant extracts in the management of the invasive European red ant

***Myrmica rubra* Linnaeus (Hymenoptera: Formicidae**).
Kerry W. Bernard, School of Biology and Ecology; University of Maine, Orono, ME 04469, Eleanor Groden, School of Biology and Ecology; University of Maine, Orono, ME 04469, Frank A. Drummond, School of Biology and Ecology; University of Maine, Orono, ME 04469.

Myrmica rubra is an aggressive stinging ant that has become a major pest for some coastal Maine communities and continues to expand its range. Colonies spread by budding and instances of translocation by colonized potted plant materials have been observed. The repellency of spearmint, peppermint, neem, and d-limonine to *M. rubra* were tested in the laboratory and in Acadia National Park. Efficacy varied by extract and application. Ants were more effectively prevented from colonizing new nest sites than from foraging. Spearmint and neem oils restricted colonization of plant pots in laboratory and field trials. Plant extracts show potential for preventing the spread of *Myrmica rubra* using least-toxic methods.

Synergies between biological and neonicotinoid insecticides for the curative control of the white grubs *Amphimallon majale* and *Popillia japonica*
Anuar Morales, 630 W. North St; Barton Lab; Geneva, New York 14456, Daniel C Peck, 630 W. North St; Barton Lab; Geneva, New York 14456.

Root-feeding white grubs are a widespread and damaging pest complex in turfgrass habitats of the Northeast U.S. Their management is highly dependent on chemical pesticides, but previous works has shown promising possibilities for reduced-risk control via synergies between entomopathogenic nematodes and neonicotinoid insecticides. To understand the breadth of potential synergies, we screened numerous combinations of biological and sublethal doses of neonicotinoid insecticides against third instar white grubs under controlled laboratory conditions. The most promising combinations were advanced to pot studies conducted in the greenhouse and then to field trials featuring microplots with artificially infested populations. To reveal variation across white grub species, trials were conducted on *Amphimallon majale* and *Popillia japonica*. For *A. majale*, synergistic combinations of *Heterorhabditis bacteriophora* with imidacloprid and clothianidin were detected in the laboratory, greenhouse and in the field. Under field conditions, some synergistic interaction was detected among overwintered insects (174 DAT) but not late fall insects (30 DAT). For *P. japonica*, synergistic combinations of *B. bassiana* and *M. anisopliae* with both neonicotinoids were detected in the laboratory and greenhouse, but did not persist in the field. Overall, in this study, fungi and neonicotinoid combinations had greater synergistic potential *for P. japonica*, while nematodes and neonicotinoids had greater synergistic potential for A. majale. Synergistic combinations of biological control products with reduced rates of neonicotinoid insecticides could be a promising approach for the curative control of white grubs and as an IPM tool for the suppression of other soil insect pests.

Is a positive learning experience more important than herbivore-induced plant volatiles in host finding by a generalist parasitoid wasp?
Christina M. Harris, 120 Chemical Ecology Lab; Orchard Road; Penn State University;

University Park, PA 16802, James H. Tumlinson, 111 Chemical Ecology Lab; Orchard Road; Penn State University; University Park, PA 16802 .

Insect herbivores often induce plant volatiles while feeding, which can attract natural enemies to the herbivores. *Cotesia marginiventris* (Hymenoptera: Braconidae) is a generalist parasitoid of Noctuid caterpillars, and its attraction to *Spodoptera exigua*-induced plant volatiles has been widely demonstrated. The ability of *C. marginiventris* to learn different volatile blends associated with various stimuli, such as food or host presence, has also been shown, but little is known about how this generalist parasitoid distinguishes between host species. Our data suggests that *Trichoplusia ni* serves as a sub-optimal host species for *C. marginiventris*, while *S. exigua* yields high parasitoid emergence. We also found that *T. ni* and *S. exigua* induce different volatile blends in cotton. Here, flight tunnel assays were used to determine the importance of these differentially induced volatiles in host finding by *C. marginiventris*. We found that this generalist parasitoid wasp does not distinguish between the two blends; rather a positive oviposition experience on the preferred host (*S. exigua*) is required to elicit flight behavior towards plants damaged by either host species. These results may explain why higher parasitism of *T. ni* has been observed in the Southern U.S. in patches near S. exigua-damaged plants.

Who did you say you were again? Premating reproductive isolation in green lacewings

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Premating reproductive isolation (RI) is expected to evolve prior to postmating RI between incipient species. I tested whether premating RI was present among the five putative sister species of the *Chrysoperla carnea* species group found in Europe. *C. carnea* (Neuroptera: Chrysopidae), originally thought to occur across most of the northern hemisphere, was shown to be a complex of 15+ cryptic species based on species-specific mating signals. Previous studies on North American green lacewings within the *carnea* group have observed very little postmating RI, along with minor genetic differentiation between the species, therefore indicating recent rapid speciation. Different degrees of premating RI exist among the species. This may simply be due to the relative similarity or dissimilarity in song characters, and may not be correlated with age since divergence.

The reclassification of species of genus *Apanteles foerster* (Hymenoptera: Braconidae:Microgastrinae) in India

Kavitha Govindasamy, 42-49, Colden St.; # 1F; Flushing, NY 11355

Microgastrine parasitic wasps which play an important role in regulating lepidopteran pest populations. They are particularly important components in many biological control programmes which should be placed within the framework of a natural and predictive classification, this note briefly reviews the group’s nomenclature and recommends the generic placement of species of genus *Apanteles foerster* under different genera based

on the classification proposed by Mason(1981) . Key words: *Apanteles*, generic placement, India.

APPENDIX D
Symposium Abstracts

Student Symposium

Insect pollination strategies on Mesozoic gymnosperms

Keynote lecturer: Conrad Labandeira
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Pollination strategies of fossil insects and seed plants have almost always been placed in the context of derived holometabolous insect lineages and their angiosperm mutualists. Recent evidence indictes that pollination mutualisms extend much deeper in the Mesozoic, minimally into the Middle Jurassic and possibly Late Triassic, based on a variety of evidence. Fluid feeding in several major clades of early derived holometabolous insects bearing siphonate proboscides and other mouthpart features associated with nectarivory, palynivory and pollination in modern insects, provides the best documentation for these ancient associations with plants. Paleobotanical features of plant fructifications, including elongate, accommodating micropyles, tubes that traverse fleshy integumental distances which connect the surfaces of ovulate scales with inner ovulate micropyles, and other channel-like features of nonangiospermous seed plants indicate an underappreciated guild of mid Mesozoic pollinators. These poorly known associations probably were extirpated with the rise of angiosperms, and replaced by more efficient angiocentric associations typical of more modern insect pollinators.

Integrating fossils and phylogeny in ants and bees

Seán Brady[1], Phil Ward[2], Ted Schultz[1], Brian Fisher[3], and [4]Bryan Danforth
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Fossils can play critical roles in improving our understanding of the phylogeny, historical biogeography, and divergence dates of many insect groups. We discuss examples highlighting the importance of incorporating fossil information into evolutionary studies of ants and bees. We summarize the fossil record for the origins of both taxa, followed by several case studies that combine fossils and molecular phylogeny in bulldog ants, dolichoderine ants, and halictid sweat bees.

Fossil placement and divergence estimation in Isoptera

Jessica L. Ware[1], Dave Grimaldi[1] and Michael Engel[2, 1]Division of Invertebrate Zoology, American Museum of Natural History, Central Park West at 79th St, New York, NY, 10024; [2]Division of Entomology, Natural History Museum, University of Kansas, Lawrence, Kansas 66049, USA

Fossils are commonly used for calibration when doing molecular dating to estimate lineage divergence times. Molecular divergence estimates usually exceed paleontological estimates, a phenomenon that has been attributed to errors occurring at any number of steps in the dating process. Branch length error often misleads divergence estimation, whether due to conflicting genes, model selection, or calibration points. We combined molecular and morphological datasets from Isoptera, in exclusion or inclusion of fossil taxa, which were then partitioned and analyzed in MrBayes using doublet and GTR + I + G; models. The recovered phylogenies were analyzed in r8s using penalized likelihood and calibrated using different fossil treatment methodology. We used recovered divergence estimates to examine relative differences between fossil treatment methods.

99 Million-Year fossils, leaf mine morphology, and the evolution of leaf mining moths (Lepidoptera: Gracillarioidea)

Akito Kawahara, University of Maryland

Leaf mining moths in the Gracillarioidea (Lepidoptera) are one of the oldest groups in the diverse clade Ditrysia, which constitutes nearly 98% of the diversity of Lepidoptera. Gracillarioidea are the primary group of plant-mining Lepidoptera, and life history data exist for host plants, feeding habit, mine morphology, and mine location for many extant and extinct species. The abundance of such data, along with a rich fossil record, makes Gracillarioidea an ideal group for fossil calibration analyses and understanding the evolution of herbivorous insects. A preliminary examination of leaf mine morphologies for both extant and extinct taxa will be presented, highlighting the key morphological characters that may be useful for identifying leaf-mine fossils and calibrating phylogeny.

A Brief Look at the Evolutionary History and Diversity of Curculionoidea

William Kuhn, Department of Entomology, Virginia Tech University, Blacksburg, VA 24061

The superfamily Curculionoidea (Coleoptera), often called the snout beetles or weevils, includes Curculionidae, the true weevils, as well as approximately 6 other families. This magnificent group represents one of the most speciose superfamilies in the animal kingdom, containing at least 60,000 species worldwide. Weevils exhibit a rich diversity, utilizing a wide variety of niches. This presentation offers a brief review of the fossil

record of Curculionoidea and describes many of its included families as well as several interesting subfamilies of Curculionidae.

2009 ESA-EB Comstock Award Talk:

Role of gut microorganisms in cellulose degradation by the Asian longhorned beetle, *Anoplophora glabripennis*

Scott Geib[1], John Carlson[2], Ming Tien[1], Kelli Hoover[3. 1] Department of Biochemistry and Molecular Biology, Penn State University, University Park, PA, [2]School of Forest Resources, Penn State University, University Park, PA, [3]Department of Entomology, Penn State University, University Park, PA

The Asian longhorned beetle (ALB) is an invasive species introduced into the U.S. from China. Like other wood-feeding insects, ALB must acquire its nutrition by degrading lignocellulose to obtain nutrients and energy. Cellulolytic enzymes in the ALB gut may originate from symbionts, the insect itself, or some combination of the two. We surveyed for bacterial and fungal community composition from the gut of mid-instar larval ALB fed in different host tree species using culture dependent and independent community analysis. In larvae the gut was found to harbor a rich variety of bacterial and fungal species, including several unique genera known to play a role in wood decay. Also, the complete suite of cellulolytic enzymes (endo- and exo-glucanases as well as beta-glucosidases) were detected in beetle guts using specific substrates, including an assay that provides direct evidence of lignin degradation in this insect. Meta-transcriptomic and proteomic analysis has revealed a suite of genes involved in wood degradation, including insect, fungal, and bacterial derived enzymes. This research may provide identification of unique microbial species and enzymes that can be utilized to increase the efficiency of cellulosic ethanol production.

APPENDIX E

Submitted Oral Presentation Abstracts

A fixed spray system for applying pesticides to high-density apple plantings
Arthur M. Agnello, Dept. of Entomology; NYS Agric. Expt. Sta.; 630 W. North St.; Geneva, NY 14456-1371, Andrew J. Landers, Dept. of Entomology; NYS Agric. Expt. Stn.; 630 W. North St.; Geneva, NY 14456-1371,

Pesticide application to tree fruits using airblast sprayers can be inefficient and inaccurate, resulting in spray drift, off-target contamination, and ineffective pest control. A spray system fixed into the tree canopy was used to apply all seasonal sprays to a commercial planting and was compared with a conventional sprayer. A high-density Gala planting received all pesticide and thinning sprays through a system of microsprinkler nozzles attached to polyethylene tubing running along the rows and supplied by a central tank and pumping station. Insect and disease control, thinning results, and spray deposition data were compared with a section of the orchard treated using a tractor and airblast sprayer. Sprays were applied quickly and efficiently, each taking only a few minutes to completely cover all the trees in the fixed-spray section of orchard. In-season sampling sessions revealed identical zero-damage levels in both spray treatments from leaf- or fruit-infesting insects. Fruit harvest evaluation showed comparable levels of clean fruit (96-97%) in the two halves of the block. Spray deposition in different canopy sectors, as measured by a dye tracer, was comparable using either method. This type of arrangement could offer benefits in pesticide application efficiency and accuracy while maintaining crop protection efficacy and production quality in modern apple plantings.

Male, interrupted: Mating duration and sperm transfer in the emerald ash borer and its native congener the bronze birch borer.
Claire E. Rutledge, Department of Entomology; The Connecticut Agricultural Experiment Station; 123 Huntington St.; New Haven, CT 06504.

Mating duration in insects ranges from seconds to days. Within taxa, and within species, mating duration is sensitive to both physiological and ecological factors. The genus *Agrilus* (Buprestidae: Coleoptera) contains many pest species, including the invasive *A. planipennis* the Emerald Ash Borer (EAB). The mating behavior of EAB was examined and compared to that of two native *Agrilus* spp. *A. anxius*, the Bronze Birch Borer (BBB) and *A. bilineatus*, the Twolined Chestnut Borer (TLCB). It was found that all three species shared a distinctive, and highly stereotyped mating behavior. However, mating duration averaged 6-12X times longer for EAB (1 h) than for the two native species (<10 m). We separated mating pairs of BBB and EAB at different time intervals during mating and dissected females to determine if sperm had been transferred. It was found that both species transferred sperm as a spermatophore during the last stage of mating,

consistent with a mate-guarding hypothesis. Details of the sperm structure of both species were examined at the light microscopy level.

Requiem, a new insecticide/miticide for use in eastern US specialty crop fruit and vegetable production

Henry B. Highland, AgraQuest, Inc. 1069 Eisenhower Dr.; Nokomis, FL 34275.

Advances in isolation and identification techniques in recent years has led to the increased discovery of novel plant compounds for use in pest management. The area of biopesticides has benefited from this, leading to the discovery of Requiem (QRD 400, QRD 416), a plant extract derived from *Chenopodium ambrosioides* var. *ambrosioides*, a plant closely related to common lambsquarter. Several extract components work in concert, via several modes of action, including respiration inhibition and a breakdown of the insect integument, to control a broad range of soft bodied insects. Extensive testing at from 1-4 qts/acre in different crop and field environments have shown Requiem to provide good control of a broad array of soft bodied insect and mite pests, including thrips, mites, whiteflies, mealybugs and leafminers. No known problems with any mix partners have been noted, and Requiem has been shown in trials to be safe for beneficials, and its different modes of action makes it an excellent rotation partner for resistance management. This product shows immediate and residual control of pests. It is less persistent in the environment than many synthetic chemistries, and controls immature and adult stages. Requiem has been shown to be effective for use against pests prone to resistance. Plant testing at labeled rates across an array of common crops has indicated little potential for it to cause any adverse plant effects or phytotoxicity. Field testing indicates that Requiem has particularly good activity on thrips and whiteflies. In production agriculture Requiem will have a significant fit on fruits, vegetables and tree and vine crops. Requiem is safe to many beneficial insects, is short lived in the environment, has a 0 day pre-harvest interval, and 4 hour re-entry interval, and is safe to mammals and bees. Requiem was approved for use with a section 3 EPA label and no residue tolerance on December 23, 2008.

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