

**NORTH CENTRAL BRANCH  
Entomological Society  
of America**

**59<sup>th</sup> Annual Meeting  
March 28-31, 2004**



President Rob Wiedenmann

**The Fairmont Kansas City  
At the Plaza  
401 Ward Parkway  
Kansas City, MO 64112**

# Contents

<b>Meeting Logistics .....</b>	<b>2</b>
<b>2003-2004 Officers and Committees, ESA-NCB .....</b>	<b>4</b>
<b>2004 North Central Branch Award Recipients .....</b>	<b>8</b>
<b>Program .....</b>	<b>13</b>
<b>Sunday, March 28, 2004</b>	
Afternoon .....	13
Evening .....	13
<b>Monday, March 29, 2004</b>	
Morning.....	14
Afternoon .....	23
Evening .....	42
<b>Tuesday, March 30, 2004</b>	
Morning.....	43
Afternoon .....	63
Evening .....	67
<b>Wednesday, March 31, 2004</b>	
Morning.....	68
Afternoon .....	72
<b>Author Index .....</b>	<b>73</b>
<b>Taxonomic Index.....</b>	<b>84</b>
<b>Key Word Index.....</b>	<b>88</b>
<b>Fairmont Kansas City Hotel Map .....</b>	<b>98</b>
<b>Notes.....</b>	<b>99</b>

## **Registration**

All participants must register for the meeting. Registration badges are required for admission to all sessions, mixers, and other functions. The meeting registration desk is located in the ballroom level outside the Salon meeting rooms. The registration desk will be open for check-in for those that pre-registered and for on-site registration at the following times:

Sunday	noon – 6:00 p.m.
Monday	7:30 a.m. – 5:00 p.m.
Tuesday	7:30 a.m. – 5:00 p.m.

## **Messages, Program Changes, Lost & Found**

A message board and tacks for posting announcements will be available near the registration desk. Notices concerning program changes should be submitted to the meeting registration desk. Lost and found items may be turned in and retrieved at the registration desk.

## **Spouses and Guests**

No formal spouse/guest program is planned. Information about the Kansas City and the Country Club Plaza area is available at the registration desk.

## **Employment Opportunity Center**

Employers are invited to post available positions, and job seekers are encouraged to post their vitae, in folders provided in the employment room.

## **Audio/Visual Equipment**

An audio/visual preview room is available for speakers to preview presentations. CDs with session papers or symposia are available for viewing on a computer in the A/V room. All meeting rooms will be equipped with an

LCD projector and laptop projector. PowerPoint presentations uploaded on the NCB web site will be downloaded and available for preview. Speakers who did not upload presentations prior to March 19 MUST provide to the program staff, in the A/V preview room, his/her PowerPoint presentation at least 24 hours before the beginning of the session. The A/V Room will be available the same hours as the registration desk is open (see above). PowerPoint presentations brought to the meeting must be on Zip disks or CD. We will not directly connect laptops for file transfer, because of incompatibility. Timers and pointers are available for moderators at the A/V Room.

### **Guidelines for Speakers and Moderators**

Speakers and moderators will follow standard practices for ESA meetings. Moderators are responsible for maintaining the printed schedule, by not starting any presentation prior to the scheduled time, and by not allowing a speaker to exceed the allotted time.

### **Poster Presentations**

Posters will be displayed in Salon III. Posters for all student competition sections are to be set up Sunday, March 28, between 4:00 p.m. and 8:00 p.m. These posters must be removed Monday between 6:00 and 8:00 p.m. Posters to be displayed Tuesday (remaining sections posters) are to be set up Monday between 8:00 and 10:00 p.m. These posters are to be removed before 12:00 p.m. Wednesday. Authors are requested to be present at their poster(s) to answer questions between 3:00 – 4:00 p.m. Monday, and 4:00 – 5:00 p.m. Tuesday. Poster authors must bring their own pushpins to attach posters to boards made of foamcore.

## **2003 – 2004 ESA NCB Officers and Committees**

### **President**

Robert N. Wiedenmann

### **President-Elect**

Gary J. Brewer

### **Past President**

Mike Gray

### **Secretary-Treasurer**

Ric Bessin

### **Governing Board Representative**

Scott Hutchins

### **Executive Committee Members-at-Large**

Fred Baxendale     Steve Yaninek     Jon J. Tollefson

### **Program Planning Committee**

Larry Charlet, Chair (ESA)   Paul Ode   Mark Boetel  
Ian MacRae   Rob Wiedenmann   Sonny Ramaswamy  
Gary Brewer   Jim Nechols   Ric Bessin  
John VanDyk   Steve Yaninek

### **Local Arrangements Committee**

Sonny Ramaswamy, Chair   Jim Nechols   Michal Roberts  
Subramanyam Bhadriraju   Srinu Kambhampati  
Greg Zolnerowich

### **Public Information/Public Relations Committee**

Phil Sloderbeck, Chair     Cliff Sadof

### **Nominating Committee**

Rick Foster, Chair   Murdick McLeod   Richard Hellmich

**Auditing Committee**

Von Kaster, Chair    Robert Behle    John Obrycki

**Resolutions Committee**

Donald Lewis, Chair    Ray Cloyd    Clinton Pilcher

**Location and Time Committee**

Sonny Ramaswamy, Chair    Steve Yaninek  
Todd DeGooyer

**Student Awards Committee**

Mark Boetel, Chair    Billy Fuller    W. Wyatt Hoback  
Denise Olson    Tiffany Heng-Moss    Russell Jurenka

**C. V. Riley Award Committee**

Joel Coats, Chair    John Foster    Wilamr Morjan  
David Horn    Lowell 'Skip' Nault    Gerald Wilde

**NCB Award of Merit Committee**

Gary Hein, Chair    Cathy Eastman    Wade French  
Z B Mayo    Marlin Rice

**National ESA Awards Committee**

Bill Hutchison, Chair    Lance Meinke    Luis Cañas  
Clair Rutledge    David Margolies    Chris Williamson

**Membership Committee**

Sue Ratcliffe, Chair    Kent Shelby    Phil Glogoza  
Eileen Cullen    J. P. Michaud    Steve Mroczkiewicz

**Archivist**

Ken Holscher

**Photo Salon Committee**

Tom Myers, Chair    Ric Bessin    Jerry DeWitt  
Jim Mertins    Frank Peairs    Phil Sloderbeck  
David Voegtlin

### **Student Affairs Committee**

Michal Roberts, Chair   Laura Campbell   Erin Hodgson  
Tom Eickhoff   Jonathan Lundgren

### **Strategic Planning Committee**

Dave Horn, Chair   Kevin Steffey   Gwen Pearson  
David Hogg   Mark Zajac

### **Linnaean Games**

W. Wyatt Hoback, Chair and Gamesmaster  
Mark Boetel   Jeremy Heath   Barbara Nead-Nylander  
Gary Hein   Russell Jurenka   Blair Siegfried  
Joel Coats   Joe Spencer   Rick Weinzierl   Dan Young

### **NCB-ESA Website (<http://esa.ent.iastate.edu>)**

John VanDyk, Webmaster  
Ian MacRae   John Lloyd   Dave Ragsdale

## **Special Events**

### **Awards Luncheon**

**Tuesday 12:00 – 1:15 p.m.**

**Salon IA & IB**

The Awards Luncheon will consist of presentation of major awards (e.g., C. V. Riley, J. H. Comstock, ESA Graduate Student Scholarship), BCE Awards, as well as North Central Branch winners of National ESA Awards.

### **ESA NCB Mixer**

**Tuesday 7:00 – 9:00 p.m.**

**Salon IA & IB**

A mixer open to all ESA meeting participants is scheduled for Tuesday evening from 7:00 to 9:00 p.m. Everyone is encouraged to attend. Plenty of excellent

food will be available so you will not need to worry about a meal that night. This is an opportunity for sharing conversation and ideas with fellow NCB members. The mixer will be preceded by the Linnaean Games Playoff between the winning student team and the old Masters in Salon II. Immediately following the Playoff will be the presentation of the winners of the Linnaean Games and Student Paper and Poster Awards.



**2004 NORTH CENTRAL BRANCH  
AWARD RECIPIENTS**

**2004 North Central Branch  
C. V. Riley Award**

**Shripat Kamble  
University of Nebraska-Lincoln**

Dr. Shripat Kamble is the 2004 winner of the North Central Branch's C. V. Riley Award. He is being recognized for his numerous accomplishments in research and extension, together with his many years of leadership and service to the ESA and the North Central Branch, and his professional stature among his colleagues. His research on the fate and efficacy of termiticides in various soils has been instrumental in helping pest control operators and homeowners understand the chronology of the insecticide breakdown and mobility and to estimate the duration of effective termite treatments.

Dr. Kamble has also made many significant contributions to the IR-4 program, as well as other applied entomological research projects. His training of graduate students and postdoctoral researchers has also helped extend the impact of his applied entomological research. His activities in the BCE Program have included serving as Director and receiving two awards. He has also been honored with several other awards and has been very actively involved in the International Congress of Entomology for the last three meetings. He has just been elected to his second term on the ESA governing board.

## 2004 ESA North Central Branch Graduate Student Scholarship Award

**Patricia L. Anderson**  
**Iowa State University**

Patricia L. Anderson is the 2004 winner of the ESA North Central Branch Graduate Student Scholarship Award. Patricia is a Ph.D. candidate at Iowa State University where she expects to complete her degree this fall. Her research is aimed at characterizing the effects of *Bt*-corn anthers on monarch butterflies. Patti's research showed that exposure to high levels of *Bt* anthers in the laboratory had adverse effects on monarch larvae; however, further studies on dose response and anther distribution showed that toxicologically relevant pollen densities are uncommon on milkweed leaves in cornfields. When larvae were exposed to anthers in field studies, no adverse effects were detected. Patti conducted a weight-of-evidence analysis of risk for anthers and concluded that *Bt* anthers alone are not likely to pose a significant risk to monarch butterflies.

Patti has given over 25 presentations at professional meetings, co-authored a book chapter, published two refereed journal articles and two extension publications, and has written three successful grant proposals. Patti has served on the ESA National Student Affairs committee and the ESA Rules and Meeting Review committees. As a member of the Student Affairs Committee, Patti chaired a subcommittee that was responsible for the development of the new *ESA Student Activity Award*. She has been a member of five Linnaean Game teams. Patti is also very active at Iowa State serving on ten

committees, president of the entomology graduate student organization, and volunteers at the ISU insect zoo and the Chistina Reiman Butterfly Garden. Patti has received several awards: the Herbert Osborn Award for professional performance, the Graduate Student Senate Leadership Award, and the Mark and Mary Andrews Scholarship for outstanding university service.

**2004 ESA North Central Branch  
J. H. Comstock Award**

**Michael E. Rogers  
University of Kentucky**

The 2004 North Central Branch ESA winner of the J.H. Comstock Graduate Student Award is Michael E. Rogers. Dr. Rogers received his Ph.D. in Entomology in December of 2003 from the University of Kentucky. Michael's dissertation research concerned the ecology, behavior, and conservation of native and introduced tephritid wasps that parasitize Japanese beetle and masked chafer grubs. He unraveled the wasps' seasonal biology and behavioral interactions with their hosts, including the first demonstration of parasitoids using species-specific kairomones from host frass and body odor to locate victims under the soil. His work showed that parasitism by *Tiphia* can be enhanced by providing certain nectar-producing flowers or other supplemental food, and also demonstrated how professional turf managers and homeowners who apply soil insecticides for grub control can modify the timing to conserve endemic biological controls.

As a graduate student, Michael authored five grant proposals that received over \$180,000 in extramural funding, was senior author for seven refereed papers in national or international journals, and authored a chapter on Tephritidae for the Encyclopedia of Entomology (2004). He gave several invited symposium presentations, co-organized a Formal Conference at the ESA national meeting, was active on UK's Linnaean Games and Student Debate teams,

and participated in many outreach activities. Michael also won the 2003 NCB-ESA Graduate Student Scholarship Award. Dr. Rogers recently joined the faculty at the University of Florida where he is an Assistant Professor with responsibilities for citrus IPM.

# **PROGRAM**

**March 28, 2004**  
**Sunday Afternoon**

**Registration**  
Noon – 6:00 p.m.

**NCB Executive Committee**  
**Business Meeting**  
8:00 a.m. – noon  
Conference Suite

**March 28, 2004**  
**Sunday Evening**

**Poster Set-Up**  
4:00 – 8:00 p.m.  
Salon III

**Insect Photo Salon**  
6:00 – 7:00 p.m.  
Salon IA & IB

**Linnaean Games Opening Round**  
7:00 – 9:00 pm  
**Gamesmaster: W. Wyatt Hoback**  
University of Nebraska at Kearney  
Salon IA & IB

**March 29, 2004**  
**Monday Morning**

**Continental Breakfast**  
7:00 – 8:00 a.m.

**Registration**  
7:30 a.m. – 5:00 p.m.

**Opening Session & Preliminary Business Meeting**  
8:30 – 10:00 a.m.  
Salon IA & IB

**Welcome**

**Call to Order**  
**Rob Wiedenmann, President**  
North Central Branch  
Entomological Society of America

**Local Arrangements Update**  
**Sonny Ramaswamy**

**Opening Remarks**  
**Kevin L. Steffey**  
President  
Entomological Society of America

**Paula Lettice**  
Executive Director  
Entomological Society of America

**ESA Governing Board Report**  
**Scott Hutchins**  
NCB Representative to Governing Board

**President's Address**

Rob Wiedenmann

**Preliminary Business Meeting**

**March 29, 2004**

**Monday Morning**

**BS/MS Student Competition Papers**

Sections A, Cd, D

10:30 a.m. – 12:00 p.m.

Pavilion I

Moderators:

**Michael E. Gray**, Department of Crop Sciences,  
University of Illinois, Urbana, IL 61801

**Richard M. Houseman**, Department of Entomology,  
University of Missouri, Columbia, MO 65203

- 10:30 001 Survival of immersion and anoxia in the tiger beetle, *Cicindela hirticollis*.  
**Mathew L. Brust** and William W. Hoback,  
University of Nebraska at Kearney, Kearney,  
NE, 68849, Charles B. Knisley, Randolph-  
Macon College, Ashland, VA
- 10:42 002 The effect of three types of light: halogen, mercury vapor and ultra violet on nocturnal species of carrion beetle including *Nicrophorus americanus* the federally endangered american burying beetle.  
**Daniel G. Snetten**, RR 3, Box 67, Colome, SD 57528, William W. Hoback, Department of Biology, University of Nebraska Kearney, Kearney, NE 68849



- 10:54 003 Male burying beetles (Coleoptera: Silphidae) increase bait attractiveness.  
**Brian D. Sass**, Jeffrey J. Hamik and William W. Hoback, 316 West 25 Street, University of Nebraska at Kearney, Kearney, NE 68849
- 11:06 004 Traps and product samples as indicators of stored-product insects in flour mills.  
**Andy R. Allen** and Bhadriraju Subramanyam, 201 Shellenberger Hall, Kansas State University, Manhattan, KS 66502
- 11:18 005 Trapping plum curculio (*Conotrachelus nenuphar* Herbst) in an Indiana apple orchard.  
**Craig Roubos**, 901 W. State Street, Purdue University, West Lafayette, IN 47907-2089
- 11:30 006 Coming out of the closet: a case study in forensic entomology.  
**Timothy E. Huntington**, Leon G. Higley and Frederick P. Baxendale, 202 Plant Industry, University of Nebraska-Lincoln, Lincoln, NE 68583

**March 29, 2004**  
**Monday Morning**  
**BS/MS Student Competition Papers**  
Sections Eb, F, Fa, Fb  
10:30 a.m. – 12:00 p.m.  
Pavilion VII

Moderators:  
**Kent S. Shelby**, USDA, ARS, Biological Control of Insects Research Lab, Columbia, MO 65203  
**Philip J. Boeve**, Monsanto Company, 9591 Fenner Road, Perry, MI 48872

- 10:30 007 Refinement of economic thresholds for defoliating insects on potato in central Nebraska.  
**Benjamin J. Zechmann** and Wyatt Hoback, 905 W. 25th St., University of Nebraska at Kearney, Kearney, NE 68849
- 10:42 008 The effect of cropping systems on variant western corn rootworm adult and egg densities.  
**Jared B. Schroeder**, Susan T. Ratcliffe and Michael E. Gray, 1102 South Goodwin Ave, S-320 Turner Hall MC-046, University of Illinois, Urbana, IL 61801
- 10:54 009 Diversity of stored product insects in midwestern feed mills.  
**Zeb Larson** and Subramanyam Bhadriraju, 201 Shellenberger Hall, Kansas State University, Manhattan, KS 66506
- 11:06 010 Differences in feeding behaviors of two chinch bug species on resistant and susceptible buffalograss and sorghum germplasm.  
**Wyatt G. Anderson**, Tiffany M. Heng-Moss and Frederick P. Baxendale, Department of Entomology, 202 Plant Industry Building, University of Nebraska-Lincoln, Lincoln, NE 68583-0816, Gautam Sarath, UNL East Campus, 332 Keim Hall , USDA-ARS, Lincoln, NE 68583-0939
- 11:18 011 Identifying resistance to aphids and aphid-transmitted viruses in potato.  
**Jeffrey A. Davis**, Edward B. Radcliffe, David W. Ragsdale and Christian A. Thill, 1980 Folwell Ave., 290 Hodson Hall, University of Minnesota-St. Paul, St. Paul, MN 55108

11:30 012 A model for predicting survival of confused flour beetle larvae during heat treatment of mills.  
**Dhanaraj Boina**<sup>1</sup>, Subramanyam Bhadriraju<sup>2</sup> and Sajid Alavi<sup>2</sup>, <sup>1</sup>Department of Entomology, <sup>2</sup>Department of Grain Science and Industry, Kansas State University, Manhattan, KS 66506

**March 29, 2004**

**Monday Morning**

**PhD Student Competition Papers**

Sections A, B, Ea, F, Fa, Fb

10:15 a.m. – 12:00 p.m.

Salon IA & IB

Moderators:

**Ted A. Wilson**, University of Missouri,  
Columbia, MO 65211

**Scott Hutchins**, Dow AgroSciences LLC,  
Indianapolis, IN 46268

10:15 013 Gene expression profiling in atrazine-treated *Chironomus tentans* using restriction fragment differential display-PCR (RFDD-PCR).  
**Troy D. Anderson** and Kun Yan Zhu,  
Department of Entomology, 123 Waters Hall,  
Kansas State University, Manhattan, KS 66506

- 10:27 014 Reduced trypsin-like proteinase activity is the major mechanism of resistance to Cry1Ab in a dipel-resistant european corn borer strain.  
**Huarong Li**, Department of Entomology, 123, Waters Hall, Kansas State University, Manhattan, KS 66506; Brenda Oppert, Grain Marketing and Production Research Center, USDA ARS, 1515 College Avenue, Manhattan, KS 66502; Randall A. Higgins, Lawrent L. Buschman, Kun Yan Zhu, Department of Entomology, 123, Waters Hall, Kansas State University, Manhattan, KS 66506; and Fangneng Huang, Department of Grain Science and Industry, Kansas State University, Manhattan, KS 66506
- 10:39 015 Development of enumerative and binomial sampling plans for soybean aphid.  
**Erin W. Hodgson**, Eric C. Burkness, David W. Ragsdale and William D. Hutchison, 219 Hodgson, 1980 Folwell Ave., University of Minnesota, St. Paul, MN 55108
- 10:51 016 Banded sunflower moth egg sampling and unrecognized sunflower yield loss.  
**Kirk D. Mundal** and Gary J. Brewer, Hultz Hall, North Dakota State University, Fargo, ND 58105
- 11:03 017 Molecular cloning and characterization of major digestive serine proteases from the first larval instar of hessian fly.  
**Omprakash -. Mittapalli**, Smith Hall 901 W. State St, Dept. Entomology, Purdue University, West Lafayette, IN 47907-2089, Richard H. Shukle, Smith Hall, 901 W. State St, USDA-ARS, Dept. Entomology, Purdue University, West Lafayette, IN 47907-2089
- 11:15 **BREAK**

- 11:30 018 Fecundity and progeny production of *Tribolium castaneum* (Herbst) following sub-lethal exposure to 50°C in the pupal and adult stages.  
**Rizana M. Mahroof** and Bhadriraju Subramanyam, 201 Shellenberger Hall, Department of Grain Science and Industry, Kansas State University, Manhattan, KS 66502, Paul W. Flinn, Grain Marketing and Production Research Center, USDA-ARS, Manhattan, KS 66502
- 11:42 019 Factors affecting adoption and implementation of Integrated Pest Management (IPM) in Indiana public schools: perceptions versus practice.  
**Alfred J. Fournier**, 901 West State Street, Purdue University - Entomology Dept., West Lafayette, IN 47907
- 11:54 020 Population genetics of the Indian meal moth *Plodia interpunctella* using microsatellite markers.  
**Tony Grace**, Srini Kambhampati, 123 Waters Hall, Kansas State University, Manhattan, KS 66506 and Bhadriraju Subramanyam, 306 Shellenberger Hall, Kansas State University, Manhattan, KS 66506

**March 29, 2004**

**Monday Morning**

**PhD Student Competition Papers**

Sections A, Ca, Cc, Cd, Ce, Cf

10:15 a.m. – 12:00 p.m.

Salon II

Moderators:

**Steve Yaninek**, Department of Entomology,  
Purdue University, West Lafayette, IN 47907-2089

**Richard Weinzierl**, Department of Crop Sciences,  
University of Illinois, Urbana, IL 61801

- 10:15 021 Phylogenetic analysis of *Chaenusa sensu lato* (Hymenoptera: Braconidae) using mitochondrial NADH 1 dehydrogenase gene sequences.  
**Robert R. Kula**, Gregory Zolnerowich and Carolyn J. Ferguson, 123 West Waters Hall, Kansas State University, Manhattan, KS 66506-4004
- 10:27 022 Host use by the exotic parasitoid, *Pimpla disparis* (Vierick).  
**Susan E. Moser**, 222 I-Building, University of Illinois, Urbana, IL 61802
- 10:39 023 *Frankliniella occidentalis* (Thysanoptera: Thripidae) and its predator *Amblyseius cucumeris* (Acari: Phytoseiidae) on impatiens.  
**Junrui Zhi**, James R. Nechols and David C. Margolies, Department of Entomology, 123 Waters Hall, Kansas State University, Manhattan, KS 66506
- 10:51 024 Influence of the surrounding landscape on incidence of the aphid-transmitted viruses potato virus Y and potato leafroll virus in seed potato.  
**Matthew W. Carroll**, Ian V. MacRae, Edward B. Radcliffe and David W. Ragsdale, 219 Hodson Hall, 1980 Folwell Ave., University of Minnesota, St. Paul, MN 55108
- 11:03 025 Effects of Bt-corn anthers on monarch butterfly larvae.  
**Patricia L. Anderson**, 110 Insectary Bldg., Iowa State University, Ames, IA, 50011, Richard L. Hellmich and Leslie C. Lewis, Genetics Laboratory c/o Insectary Bldg, USDA-ARS Corn Insects and Crop Genetics Research Unit, Ames, IA 50011
- 11:15 **BREAK**

- 11:30 026 The role of volatile sunflower chemicals in host selection by female banded sunflower (Cochylidae) and sunflower moths (Pyralidae). **Maboko S. Mphosi** and Stephen Foster, Hultz 202, North Dakota State University, Fargo, ND 58105
- 11:42 027 Control of sugarbeet root maggot (Diptera: Otitidae) by integrating *Metarhizium anisopliae* (Fungi Imperfecti) and cereal cover crops. **Ayanava Majumdar** and Mark A. Boetel, 202 Hultz Hall, North Dakota State University, Fargo, ND 58105, Stefan T. Jaronski, NPARL, 1500 North Central Avenue, United States Department of Agriculture-ARS, Sidney, MT 59270, Robert J. Dregseth and Allen J. Schroeder, 202 Hultz Hall, North Dakota State University, Fargo, ND 58105
- 11:54 028 Geographic and voltinism differentiation among North American *Ostrinia nubilalis* using mitochondrial DNA analysis. **Brad S. Coates**, Douglas V. Sumerford and Richard L. Hellmich, 113 Genetics Laboratory, Iowa State University, Ames, IA 50010
- 12:06 029 Community-level estimation of non-predatory chironomid production in a southern Illinois stream. **Denise A. Walther**, Matt R. Whiles, David W. Butler and Michael B. Flinn, Department of Zoology, Southern Illinois University, Carbondale, IL 62901-6501

**March 29, 2004**  
**Monday Afternoon**

**Symposium**  
**Challenges in Developing Action Thresholds for**  
**Ornamental Crops**  
1:30 – 5:30 p.m.  
Pavilion I

Organizers and Moderators:

**James R. Nechols and**  
**David C. Margolies**

Department of Entomology  
Kansas State University  
Manhattan, KS 66506

- 1:30 030 Introduction.  
**James R. Nechols**, Department of Entomology,  
Kansas State University, Manhattan, KS 66506
- 1:40 031 Integrated pest management in floriculture  
production systems: are action thresholds  
realistic?  
**Raymond A. Cloyd**, 384 National Soybean  
Research Laboratory, 1101 West Peabody  
Drive, University of Illinois, Urbana, IL 61801
- 2:10 032 Action thresholds for greenhouse bedding  
plants: a moving target.  
**George P. Opit**, James R. Nechols, David C.  
Margolies - all from the Department of  
Entomology, and Kimberly A. Williams,  
Department of Horticulture, Forestry, and  
Recreation Resources, Kansas State University,  
Manhattan, KS 66506
- 2:40 033 Developing site-specific action thresholds.  
**John P. Sanderson**, 135 Insectary Bldg., Dept.  
of Entomology, Cornell University, Ithaca, NY  
14853



- 3:10            **BREAK**
- 3:25    034    Sampling and thresholds for ornamentals: it works in cut roses.  
**Christine Casey**, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695, Michael Parrella, Department of Entomology, One Shields Avenue, University of California, Davis, CA 95616
- 3:55    035    How are pest management decisions made in managed landscapes?  
**Michael J. Raupp**, 4112 Plant Sciences Building, University of Maryland, College Park, MD 20742
- 4:25    036    Aesthetic thresholds and their development for the production and sale of ornamental crops.  
**Clifford S. Sadof**, Department of Entomology , 901 W. State St, Purdue University , West Lafayette, IN 47907-2089
- 4:55    037    Summary and Panel Discussion.  
**David C. Margolies**, Department of Entomology, Kansas State University, Manhattan, KS 66506

**March 29, 2004**  
**Monday Afternoon**

**Symposium**  
**New Products and Technologies for the Future**  
1:30 – 5:30 p.m.  
Salon IA

Organizers and Moderators:  
**Bhadriraju Subramanyam**  
Department of Grain Science and Industry  
Kansas State University  
Manhattan, KS 66506

**Nandi Nagaraj**  
Department of Entomology  
Kansas State University  
Manhattan, KS 66506

- |      |     |  |
|------|-----|--|
| 1:30 | 038 | Introduction.<br><b>Subramanyam Bhadriraju and Nandi Nagaraj</b> , 123 West Waters, Kansas State University, Manhattan, KS 66506                 |
| 1:35 | 039 | An overview of Yieldgard@corn insect traits.<br><b>Robert J. Starke</b> , Mailzone C3NE, 800 N. Lindbergh, Monsanto Company, St. Louis, MO 63167 |
| 2:00 | 040 | FMC product update.<br><b>Terry Mize</b> , 10100 N. Ambassador Drive, FMC Corporation, Agricultural Products Group, Kansas City, MO 64153        |

- 2:25 041 Yield and protection benefits of using Poncho™ seed treatment insecticide on corn.  
**Mike Schwarz**, P. Hewitt and B. May, Research Triangle Park, 2 T.W. Alexander Drive, Bayer CropScience, Raleigh NC, 27709, R. Knake, 1400 Preston Road, Suite 400, Gustafson Inc., LLC, Plano, TX 75093
- 2:50 042 Storgard® product line extension and Trécé relocation and future in Oklahoma.  
**Donna Lingren**, P. O. Box 129, 7569 Highway 28 West, Trécé, Inc., Adair, OK, 74330, Michael A. Mullen, 1710 Muirfield Drive, Statesboro, GA 30458
- 3:05 **BREAK**
- 3:20 043 Portable products for measuring temperature.  
**Jay Duenow**, 1201 Shaffer Road, Bldg. 2, P.O. Box 1820, Raytek Corporation, Portable Products Division, Santa Cruz, CA 95061
- 3:45 044 The new phosphine label.  
**Herb Yeaman**, 1207 Gordon Avenue, Degesch America, Inc., Richmond, VA 23224
- 4:10 045 ECO2FUME and VAPORPH3OS products and their application in the grain and food processing industries.  
**Brian McSwigan**, Cytex Industries, 5 Garret Mountain Plaza, Global Phosphine Gas, West Paterson, NJ 07424
- 4:35 046 Dow AgroSciences product update.  
**Suresh Prabhakaran**, 9330 Zionsville Road, Dow AgroSciences LLC, Indianapolis, IN 46268
- 5:00 047 What's new in Nikon microscopes.  
**Gary Tockman**, 2751 Highway 100, Boyce Scientific, Inc., Gray Summit, MO 63039

5:25 048 Conclusions.  
**Subramanyam Bhadriraju**, 201 Shellenberger  
Hall, Kansas State University, Manhattan, KS  
66506

**March 29, 2004**  
**Monday Afternoon**

**Symposium**  
**Established and Emerging Insect Pests of Oil Crops**  
**in the North Central Region**  
1:30 – 5:30 p.m.  
Salon II

Organizer and Moderator:  
**Denise L. Olson**  
Department of Entomology  
North Dakota State University  
Fargo, ND 58105

1:30 049 Classical biological control of soybean aphid.  
**Zhishan Wu**, George E. Heimpel and David W.  
Ragsdale, 219 Hodson Hall, 1980 Folwell Ave.,  
University of Minnesota, St. Paul, MN 55108,  
Keith R. Hopper, 501 S. Chapel St., USDA-  
ARS, Beneficial Insect Introductions Research  
Laboratory, Newark, DE 19713, David  
Voegtlin, 607 E. Peabody Dr., Illinois Natural  
History Survey, Champaign, IL 61820

2:00 050 Bean leaf beetle and bean pod mottle virus  
research and management in soybean: Two  
pests, one crop, several options, many questions.  
**Marlin E. Rice**, Department of Entomology,  
Iowa State University, Ames, IA, Jeffrey D.  
Bradshaw, Department of Entomology, Iowa  
State University, Ames, IA, and John H. Hill,  
Department of Plant Pathology, Iowa State  
University, Ames, IA

- 2:30 051 Sunflower midge: a pest management challenge.  
**Gary J. Brewer**, 1300 Albrecht Blvd., 202 Hultz Hall, North Dakota State University, Fargo, ND 58105
- 3:00 052 The palestriped flea beetle, *Systema blanda* (Melsheimer), as an emerging pest of sunflower and soybean in South Dakota.  
**Michael A. Catangui**, 230 Ag. Hall, Department of Plant Science, South Dakota State University, Brookings, SD 57007
- 3:30 **BREAK**
- 3:45 053 Insect pests of canola.  
**David Bragg**, Extension Entomology, Washington State University, Pomeroy, WA 99347-0190
- 4:15 054 Impact of seed size and reduced inputs on control of the crucifer flea beetle in canola.  
**Janet J. Knodel**, 5400 Highway 83 South, NDSU-NCREC, Minot, ND 58701, Denise Olson, Department of Entomology, Hultz Hall, North Dakota State University, Fargo, ND, 58105, Bryan Hanson and Robert Henson, Carrington REC, P.O. Box 219, NDSU, Carrington, ND 58421, Lorilie Atkinson, 5400 Highway 83 South, NDSU-NCREC, Minot, ND 58701
- 4:45 055 Biorational versus chemical insecticides for crucifer flea beetle control.  
**Denise L. Olson** and Frank Antwi, Department of Entomology, Hultz Hall, North Dakota State University, Fargo, ND 58105, Janet J. Knodel, NDSU, Highway 83 S, North Central Research and Extension Center, Minot, ND 58701

5:15 056 Cuphea – Exploring insect interactions with this new oil crop.  
**Robert W. Behle**, Terry A. Isbell and Steven C. Cermak, 1815 N. University St., USDA-ARS-NCAUR, Peoria, IL, 61604-3902

**March 29, 2004**  
**Monday Afternoon**

**Submitted Papers**  
**Sections B, Ca, Cc, Ce, D, Ea, F**  
1:30 – 4:00 p.m.  
Salon IB

Moderators:  
**Frank Arthur**  
USDA, ARS, Biological Research Unit  
Grain Marketing and Production Research Center  
Manhattan, KS 66502  
**Jamee Brandhorst-Hubbard**  
Department of Entomology  
University of Kentucky  
Lexington, KY 40546-0091

1:30 057 Ovarial patency in *Heliothis virescens*: pharmacological analysis of subcellular mechanisms.  
**Maciej A. Pszczolkowski** and Sonny Ramaswamy, 123 West Waters, Kansas State University, Manhattan, KS 66502, Asoka Srinivasan, Tougaloo College, Tougaloo, MI 39714

- 1:42 058 An evaluation of the effectiveness of DNA versus antibody-based techniques for studying predator-prey interactions in the field.  
**James D. Harwood** and John J. Obrycki, Department of Entomology, S-225 Agric. Science Center - North, University of Kentucky, Lexington, KY 40546-0091
- 1:54 059 Current and future prospects for biological control of weeds in Illinois.  
**Robert N. Wiedenmann**, Susan L. Post and Charles G. Helm, 607 E. Peabody, Illinois Natural History Survey, Champaign, IL 61820
- 2:06 060 Flight activity of aphid vectors of potato virus Y in Minnesota and North Dakota seed potato fields.  
**Erin E. Hladilek**, Robert A. Suranyi, Edward B. Radcliffe, David W. Ragsdale and Ian V. MacRae, 219 Hodson Hall, 1980 Folwell Ave., University of Minnesota, St. Paul, MN 55108
- 2:18 062 Evaluation of an automatic sprayer for the control of stable flies on pastured cattle.  
**David J. Boxler** and John B. Campbell, 461 West University Dr., University of Nebraska, WCREC, North Platte, NE 69101
- 2:30 063 Evaluation of several insecticide ear tags for horn fly control in western Nebraska.  
**John B. Campbell** and David J. Boxler, 461 West Univ. Dr. North Platte Ne. 69101, Univ. Nebraska, North Platte, NE 69101
- 2:42 **BREAK**
- 3:00 064 Altered pheromone response in an insecticide-resistant population of the codling moth.  
**Richard A. Weinzierl**, 1102 South Goodwin Avenue, University of Illinois, Urbana, IL 61801

- 3:12 065 The headsup network - using telemarketing for good instead of evil!  
**Ian V. MacRae**, UMN NWROC, 2900 University Ave, University of Minnesota, Crookston, MN 56716
- 3:24 066 Resistance to diatomaceous earth by stored-product insects.  
**Paul G. Fields**, 195 Dafoe Rd., Agriculture and Agri-Food Canada, Winnipeg, Manitoba, R2M 2K2, and Charles Adarkwah, Humboldt University of Berlin, Berlin, Germany
- 3:36 067 Soybean Aphid - How do we measure control ?  
**Brent A. Neuberger**, Bob S. Hooten and Gail G. Stratman, 12342 N. Road, FMC, Stromsburg, NE 68666

**March 29, 2004**

**Monday Afternoon**

**Student Competition Posters**

**All BS, MS, and PhD Posters**

1:30 – 5:00 p.m.

Salon III

(Authors present 3:00 – 4:00 p.m.)

- D068 Adult Japanese beetle (Coleoptera: Scarabaeidae) control on floribunda roses in the home landscape: cultural and chemical approaches.  
**Justin M. Vitullo** and Clifford S. Sadof, Smith Hall, 901 W. State Street, Purdue University, West Lafayette, IN 47907



- D069 Hymenoptera community structure of riparian buffers in Missouri: potential reservoirs of natural enemies for adjacent crops.  
**Johnathan G. White**, Dianne L. Hall and Robert W. Sites, 1-87 Ag Bldg., University of Missouri, Columbia, MO 65211
- D070 Promoters to improve the efficiency of artificial hybrid dysgenesis in *Tribolium castaneum*.  
**Kendra S. Siebert**, Entomology Department, West Waters Hall, Kansas State University, Manhattan, KS 66503, Marce D. Lorenzen, 1515 College Ave, USDA GMRL, Manhattan, KS 66502, Yoonseong Park and Susan J. Brown, Biology Department, Ackert Hall, Kansas State University, Manhattan, KS 66503, and Richard W. Beeman, 1515 College Ave, USDA GMRL, Manhattan, KS 66502
- D071 Predator-prey interactions involving minute pirate bug, thrips, and soybean aphid on soybean in Missouri.  
**Lisa N. Meihls**, Thomas L. Clark and Wayne C. Bailey, Department of Entomology, 1-87 Agriculture Building, University of Missouri, Columbia , MO 65211
- D072 Developing components of IPM for twospotted spider mite on greenhouse floricultural crops.  
**Kiffnie M. Holt**, George P. Opit, James R. Nechols and David C. Margolies, 123 West Waters Hall, Kansas State University, Manhattan, KS 66502
- D073 Photoperiodic induction of reproductive diapause in *Geocoris uliginosus* (Say) (Heteroptera: Geocoridae).  
**Sonja L. Brannon** and Kenneth V. Yeargan, S-225 Ag. Sci. Ctr N, University of Kentucky, Lexington, KY 40509

- D074 Does powdered sugar entering brood cells harm immature honeybees?  
**Nicholas P. Aliano** and Marion D. Ellis,  
Department of Entomology, 202 Plant Industry  
Bldg., University of Nebraska-Lincoln, Lincoln,  
NE 68583
- D075 Activity period of four species of carrion beetle  
on the Pine Ridge Indian Reservation of  
southwestern South Dakota.  
**Louden Whirlwind Horse**, PO Box 500, Little  
Wound High School, Kyle, SD 57752, Daniel  
G. Snethen, RR 3, Box 67, Colome, SD 57528,  
William W. Hoback, Department of Biology,  
University of Nebraska Kearney, Kearney, NE  
68849
- D076 Spilling the guts: carcass preparation by  
*Nicrophorus marginatus*.  
**Jeffrey J. Hamik**, Brian D. Sass and William  
W. Hoback, 316 West 25th Street, University of  
Nebraska at Kearney, Kearney, NE 68849
- D077 Movement and survival of *Ostrinia nubilalis*  
(Hübner) larvae in *Zea mays* L. hybrid seed  
production fields after destruction of male corn  
plants.  
**Kate T. Kronback**, Richard L. Hellmich,  
Douglas V. Sumerford and Leslie C. Lewis, 7  
Genetics Laboratory, Iowa State University,  
USDA, ARS Corn Insects and Crop Genetics  
Research Unit, Ames, IA 50011
- D078 Let there be light: behavioral responses of  
cowpea bruchids (*Callosobruchus maculatus*) to  
different wavelengths of light.  
**Matt R. Tarver**, Barry R. Pittendrigh, Eric S.  
Furgason, Richard E. Shade and Larry L.  
Murdock, 901 W. State St., Purdue University,  
West Lafayette, IN 47907

- D079 Preference for light sources in two tiger beetle species *Cicindela nevadica lincolniiana* Casey and *Cicindela togata globicollis* Casey.  
**William J. Allgeier** and Leon G. Higley, 202 Plant Industry Bldg., Department of Entomology, University of Nebraska-Lincoln, Lincoln, NE, 68583
- D080 Learning about predator prey relationships.  
**Tierney R. Berger**, W. Wyatt Hoback and Leon G. Higley, Plant Industry, University of Nebraska, Lincoln, NE 68504
- D081 Trap bias in burying beetle sampling protocols.  
**Austin L. Joy**, Jon C. Bedick, Jeffery Hamick, Brian Sass, John J. Riggins and William W. Hoback, 905 W. 25th Street, University of Nebraska at Kearney, Kearney, NE 68849
- D082 Evaluation of wet meadow restoration using soil invertebrate biodiversity.  
**John J. Riggins**, Department of Biology, 905 W 25th Street, University of Nebraska at Kearney, Kearney, NE 68849, Craig A. Davis, Department of Zoology, 430 Life Sciences West, Oklahoma State University, Stillwater, OK 74078, Kerri M. Skinner and W. Wyatt Hoback, Department of Biology, 905 W 25th Street, University of Nebraska at Kearney, Kearney, NE 68849
- D083 Developmental response of *Phormia regina* (Calliphoridae) to temperature.  
**Paul D. Nabity** and Leon G. Higley, 208 Plant Industry, University of NE-Lincoln, Lincoln, NE 68583-0816
- D084 The effect of plant hydration status on the growth of impatiens, the reproductive rate of western flower thrips, and thrip-related foliage damage.  
**Catherine A. Bohnert**, 2423 North Twyman Road, Avila University, Indep., MO 64058

- D085 Western corn rootworm beetle populations in fields planted to transgenic corn.  
**Amanda R. Schroeder** and Gerald E. Wilde,  
123 W. Waters Hall, Kansas State University,  
Manhattan, KS 66506
- D086 Estimating bean leaf beetle, *Cerotoma trifurcata* (Forster), damage in snap beans (*Phaseolus vulgaris* L.).  
**Kathleen V. Bennett** and William D. Hutchison, 219 Hodson Hall, 1980 Folwell Ave, University of Minnesota, St. Paul, MN 55108
- D087 Arthropod-weed interactions associated with glyphosate resistant soybean in Missouri.  
**Clinton G. Meinhardt**, Thomas L. Clark, Wayne C. Bailey, 1-87 Agriculture Building, University of Missouri - Columbia, Columbia, MO 65211, and Reid J. Smeda, 210 Waters Hall, University of Missouri - Columbia, Columbia, MO 65211
- D088 Gender composition of non-target coccinellids in Cry3Bb1 rootworm resistant maize.  
**Bradley L. McManus** and Billy W. Fuller, NPB box 2140c room 248c, South Dakota State University, Brookings, SD 57007, Perrine Lavelle, 16 rue Chevreul, L'Hay les Roses, France, 94240, Wade W. French, 2923 Medary Ave., Agricultural Research Service Northern Grain Insects Research Laboratory, Brookings , SD 57006, Mark A. Boetel, 256 Hultz Hall, 1300 Albrecht Blvd. P.O. Box 5346, North Dakota State University, Fargo, ND 58105-5346, Graham P. Head, 800 North Lindbergh Blvd, Monsanto Co., St. Louis, MO 63198, Mike M. Ellsbury, 2923 Medary Ave., Agricultural Research Service Northern Grain Insects Research Laboratory, Brookings, SD 57006

- D089 Plant insect interactions: an investigation of susceptible and resistant wheat to two aphid species.  
**Lisa D. Franzen**, Tulio B. Macedo, Tiffany M. Heng-Moss and Leon G. Higley, 202 Plant Industry Building, University of Nebraska-Lincoln, Lincoln, NE 68583-0816
- D090 Behavioral observations of soybean aphids, *Aphis glycines* Matsumura, to identify sources of resistance in non-host beans.  
**Andrea E. Ray-Chandler**, John Reese and Ralph Charlton, 123 West Waters Hall, Kansas State University, Manhattan, KS 66506
- D091 Effect of temperature on performance of Noviflumuron against the subterranean termite, *Reticulitermes flavipes* (Kollar).  
**Neil A. Spomer** and Shripat T. Kamble, Department of Entomology, 201 Plant Industry Bldg., University of Nebraska, Lincoln, NE 68583-0816
- D092 Expression and induction of two family 4 cytochrome P450 (CYP4) genes identified from *Chironomus tentans* exposed to atrazine.  
**Diana K. Londono** and Blair D. Siegfried, 202 Plant Industry building, East Campus, University of Nebraska-Lincoln, Lincoln, NE 68583, Gautam Sarath, 332 Keim Hall, East Campus, University of Nebraska-Lincoln, USDA-ARS, Lincoln, NE 68583
- D093 PCR-RFLP analysis on mitochondrial DNA in screwworms.  
**Sasi Maliphan**, Steven R. Skoda, Jeff T. Krumm and John E. Foster, 202PI Bldg., University of Nebraska at Lincoln, Lincoln, NE, 68506

- D094 Characterization of Cry1F resistance in laboratory selected European corn borer, *Ostrinia nubilalis* (Lepidoptera: Crambidae). **Eliseu J. Pereira**, 202 Plant Industry Bldg, University of Nebraska, Lincoln, NE 68583-0816, Bruce A. Lang, 301 Campus Dr, Mycogen Seeds, Huxley, IA 50121, Terence A. Spencer, 202 Plant Industry Bldg, University of Nebraska, Lincoln, NE 68583-0816, Nicholas P. Storer, 9330 Zionsville Rd, Dow AgroSciences, Indianapolis, IN 46268-1053, and Blair D. Siegfried, 202 Plant Industry Bldg, University of Nebraska, Lincoln, NE 68583-0816
- D095 Prey suitability of *Myzus lythri* for *Harmonia axyridis* and *Coleomegilla maculata*. **Bethzayda Matos**, 4 Insectary, Iowa State University, Ames, IA 50011 and John J. Obrycki, S-225 Agric. Sci. Bldg. North, University of Kentucky, Lexington, KY 40546-0091
- D096 Molecular markers for genetic variation in predatory mites. **Bhanu S. Konakandla**, Fengyou Jia, Yoonseong Park and David C. Margolies, Dept. of Entomology, Waters Hall, Kansas State University, Manhattan, KS 66506-4004
- D097 Within-plant distribution of twospotted spider mite, *Tetranychus urticae* Koch (Acari: Tetranychidae), on impatiens: development of a presence-absence sampling plan. **Fahad J. Alatawi**, G P. Opit, D C. Margolies and J R. Nechols, KSU, Manhattan, KS 66502

- D098 Crop colonization, feeding and reproduction by *Hippodamia convergens* as indicated by stable carbon isotopes.  
**Jarrad R. Prasifka**, Genetics Laboratory c/o Insectary, USDA - ARS Corn Insects Unit, Ames, IA 50011, Kevin M. Heinz, Texas A&M University, Department of Entomology, College Station, TX 77843-2475 and Kirk O. Winemiller, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843-2258
- D099 Biological control of the Indian meal moth on finished stored products using egg and larval parasitoids.  
**Matthew J. Grieshop**, Department of Entomology, Kansas State University, Manhattan, KS 66506, Paul W. Flinn, USDA Grain Marketing and Research Center, 1515 College Avenue, Manhattan, KS 66502 and James R. Nechols, Department of Entomology, Kansas State University, Manhattan, KS 66506
- D100 Population genetics and breeding structure of wood-feeding cockroaches of the genus *Cryptocercus*.  
**Benjamin T. Aldrich** and Srinu Kambhampati, 123 West Waters Hall, Department of Entomology, Kansas State University, Manhattan, KS 66506 and Elliot S. Krafur, Department of Entomology, Iowa State University, Ames, IA 50011
- D101 Survival of wheat curl mite on virus infected wheat plants.  
**Benjawan Siritwetiwat** and Gary L. Hein, Panhandle Res. & Ext. Center, 4502 Ave I, UNL, Scottsbluff, NE 69361 and Roy C. French, Dept. Plant Pathology, 406 Plant Sciences Hall, UNL, USDA, Lincoln, NE 68583

- D102 Manipulation of aggregation behavior of the European corn borer (Lepidoptera: Crambidae) in spring wheat.  
**Brendon J. Reardon**, Douglas V. Sumerford and Thomas W. Sappington, Genetics Laboratory, Iowa State University, Ames, IA 50011
- D103 Dispersal behavior of lesser grain borer, *Rhyzopertha dominica* (F).  
**Godfrey P. Ching'oma**, James F. Campbell, Sonny B. Ramaswamy and Bhadriraju H. Subramanyam, Entomology Department, 123 Waters Hall, Kansas State University, Manhattan, KS 66506
- D104 Dispersal of house flies (*Musca domestica* L.) in the agricultural and urban environment: population dynamics study using microsatellite markers.  
**Seemanti Chakrabarti**, Srinivas Kambhampati and Ludek Zurek, 123 West Waters Hall, Kansas State University, Manhattan, KS 66506
- D105 Is it safe? addressing questions on agricultural biotechnology through an educational website.  
**Douglas A. Golick** and Leon G. Higley, 202 Plant Industry Building, University of Nebraska-Lincoln, Lincoln, NE 68583
- D106 Measuring the effects of insecticides on bean leaf beetle mortality and repellency on soybeans.  
**Jeffrey D. Bradshaw** and Marlin E. Rice, Department of Entomology, 110 Insectary, Iowa State University, Ames, IA 50011
- D107 Phytophagous preferences of the multicolored Asian lady beetle (Col.: Coccinellidae) for autumn ripening fruit.  
**Robert L. Koch**, Eric C. Burkness, Suzanne J. Wold Burkness and William D. Hutchison, 219 Hodson Hodson Hall, 1980 Folwell Ave., University of Minnesota, St. Paul, MN 55108



- D108 Evaluation of diatomaceous earth plus methoprene to control the lesser grain borer (*Rhyzopertha dominica* (F.) in rough rice. **Yaowaluk Chanbang**, Kansas State University, Manhattan, KS, 66502, Frank Arthur, 1515 College Ave., USDA-ARS Grain Marketing and Production Research Center, Manhattan, KS, 66502, Gerald Wilde, Kansas State university, Manhattan, KS 66502
- D109 A novel approach for the study of *Diabrotica* larvae in transgenic and non-transgenic maize. **Pete L. Clark** and John E. Foster, 13 Plant Industry Building, University of Nebraska - Lincoln, Lincoln, NE 68583-0816
- D110 The impact of roundup ready cropping systems on soil dwelling mite populations. **Michal Roberts** and Gerald E. Wilde, 123 West Waters Hall, Kansas State University, Manhattan, KS 66506
- D111 Molecular mapping of sorghum genes expressing tolerance to damage by the greenbug (Homoptera: Aphididae). **Nandi J. Nagaraj**, John C. Reese, Mitch R. Tuinstra, Paul St. Amand, Michael C. Smith, Ken D. Kofoid, Leslie R. Campbell, M. B. Kirkham and Gerald E. Wilde, 123 West Waters Hall, Department of Entomology, Kansas State University, Manhattan, KS 66506

- D112 Population diversity and gene flow among European corn borer in the Midwestern corn belt.  
**Jeffrey T. Krumm**, 013 Plant Industry Bldg., University of Nebraska - Lincoln, Lincoln, NE 68583-0816, Thomas E. Hunt, Haskell Agricultural Laboratory, University of Nebraska-Lincoln, Concord, NE 68728, Steven R. Skoda, 305 Plant Industry Bldg, USDA, Lincoln, NE 68583-0938, Gary L. Hein, Panhandle Research & Extension Center, University of Nebraska-Lincoln, Scottsbluff, NE 69361, and John E. Foster, 312F Plant Industry Bldg., University of Nebraska-Lincoln, Lincoln, NE 68583-0816
- D113 Coleopteran-specific Cry3Bb1 Toxin has no adverse effect on earthworms exposed to soil containing corn roots or biomass.  
**Aqeel Ahmad**, Gerald Wilde and Kun Y. Zhu, 123 West Water Hall, Kansas State University, Manhattan, KS 66506
- D114 Activity of fatty acid amides and free fatty acids from alfalfa glandular trichomes on settling by the potato leafhopper.  
**Christopher M. Ranger**, Rudolph E. Winter and George E. Rottinghaus, Department of Entomology, University of Missouri-Columbia, Department of Chemistry and Biochemistry, University of Missouri-St. Louis, Center for Phytonutrient and Phytochemical Studies and Veterinary Medical Diagnostic Lab, University of Missouri, Columbia, MO 65201, Elaine A. Backus, Exotic & Invasive Diseases & Pests Research, USDA, ARS, PWA, Parlier, CA 93648

D115

Relationship between supercooling point and mortality at subzero temperatures in the Indian meal moth, *Plodia interpunctella* (Hübner).  
**Mario A. Carrillo**, Colleen A. Cannon, William F. Wilcke, Vance Morey, Nalladurai Kaliyan and William D. Hutchison, 219 Hodson Hall, 1980 Folwell Ave., University of Minnesota, Saint Paul, MN 55108

**March 29, 2004**

**Monday Afternoon**

4:15 – 5:15 p.m.

Salon IB

Business Meeting of the *Association of Indian Entomologists in North America* (AIENA)

Organizer and Current President:

**Ayanava Majumdar**

Department of Entomology, Hultz Hall

North Dakota State University

Fargo, ND 58105

**March 29, 2004**

**Monday Evening**

7:00 – 8:00 p.m.

Salon IA & IB

**Photo Salon**

8:00 – 10:00 p.m.

Salon IA & IB

## **Linnaean Games Semi & Final Rounds**

Moderator:

**W. Wyatt Hoback**

University of Nebraska at Kearney

**Poster Set-up**

8:00 – 10:00 p.m.

Salon II

**March 30, 2004**

**Tuesday Morning**

**Continental Breakfast**

7:00 – 8:00 a.m.

**Registration**

7:30 a.m. – 5:00 p.m.

**March 30, 2004**

**Tuesday Morning**

**Symposium**

**Western Corn Rootworm Variant on the Move:  
What Have We Learned Since the Mid-1990's?**

8:00 – 11:30 a.m.

Salon II

Organizers and Moderators:

**Michael E. Gray**

Department of Crop Sciences

University of Illinois

Urbana, IL 61801

**Eli Levine**

Center for Economic Entomology

Illinois Natural History Survey

Champaign, IL 61820

- |      |     |   |
|------|-----|---|
| 8:00 | 116 | Introduction.<br><b>Michael E. Gray</b> , 1102 S. Goodwin Avenue, S-320 Turner Hall, University of Illinois, Urbana, IL 61801   |
| 8:05 | 117 | How does crop diversity and phenology influence variant western corn rootworm population dynamics?<br><b>Michael E. Gray</b> , S-320 Turner Hall, 1102 S. Goodwin Avenue, University of Illinois, Urbana, IL 61801, Christopher M. Pierce, Department of Entomology, Entomology Hall, Purdue University, West Lafayette, IN 47907, Matthew E. O'Neal, Department of Entomology, Insectary Building, Iowa State University, Ames, IA 50011 |

- 8:25 118 Effects of local weather and soybean herbivory on the movement of rotation-resistant western corn rootworm beetles.  
**Joseph L. Spencer**, Center for Economic Entomology, Natural Resources Bldg, 607 E. Peabody Drive, Champaign, IL, 61820-6917, Scott A. Isard, 220 Davenport Hall, 607 S. Mathews Ave., Department of Geography, University of Illinois, Urbana, IL, 61801, Timothy R. Mabry, 503 S. Maplewood Ave., Monsanto Company, Williamsburg, IA, 52361, Eli Levine, Center for Economic Entomology, Natural Resources Bldg, 607 E. Peabody Drive, Champaign, IL, 61820-6917
- 8:45 119 Seasonal movement and disease transmission by western corn rootworm adults as the variant moves into an area.  
**Eli Levine**, Center for Economic Entomology, Illinois Natural History Survey, 607 E. Peabody Dr., Champaign, IL 61820
- 9:05 120 Western corn rootworm larval damage to first year corn in Minnesota.  
**Ken Ostlie**, Fritz Breitenbach and Lisa Behnken, Department of Entomology, University of Minnesota, St. Paul, MN 55108
- 9:40 121 The latest biological and economic results from simulations of the western corn rootworm variant models.  
**David W. Onstad** and D. W. Crowder, Department of Natural Resources and Environmental Sciences, University of Illinois, Champaign-Urbana, IL 61801
- 10:00 122 Western Corn Rootworm Genetics: The As & Ts and Cs & Gs.  
**Susan T. Ratcliffe**, 1102 S. Goodwin Avenue, S-316 Turner Hall, University of Illinois, Urbana, IL 61801

- 10:20 123 What have we learned from the U.S. Corn Belt variant experience that can be applied to the European scene? Is the variant in Europe?  
**Jon J. Tollefson**, 17 Insectary Bldg., Iowa State University, Ames, IA 5011-3140
- 10:40 124 Management recommendations for the variant western corn rootworm—It's deja vu all over again.  
**Kevin L. Steffey**, Turner Hall, 1102 South Goodwin Avenue, University of Illinois, Urbana, IL 61801

**March 30, 2004**  
**Tuesday Morning**

**BCE Symposium**  
**Urban Entomology Innovations in the**  
**North Central Region**  
8:00 – 12:00 p.m.  
Pavilion I

Organizers and Moderators:

**Suresh K. Prabhakaran**

Dow AgSciences  
5966 East Kitchen Lane  
Mooresville, IN 46158

**Shripat Kamble**

Department of Entomology  
University of Nebraska  
Lincoln, NE 68583-0816

- 8:00 125 Introduction.  
**Suresh K. Prabhakaran**, 5966 East Kitchen Lane, Dow AgroSciences, Mooresville, IN 46158

- 8:05 126 Diversity within significant arthropod groups found in mulch ecosystems.  
**Kyle K. Jordan**, Susan C. Jones, George Keeney, and Chad Schone, Department of Entomology, The Ohio State University, Columbus, OH 43210
- 8:20 127 Stable flies as urban pests and research needs.  
**David B. Taylor**, USDA, ARS, Midwest Livestock Insects Research Unit, University of Nebraska, Lincoln, NE 68583-0938
- 8:35 128 Stored product pest management activities at K-State: Research and impacts.  
**Subramanyam Bhadriraju**, 201 Shellenberger Hall, Kansas State University, Manhattan, KS 66506
- 8:50 129 The influence of sanitation on insect movement and response to pheromone traps.  
**Linda J. Mason**, Department of Entomology, 901 West State Street, Purdue University, West Lafayette, IN 47907
- 9:05 130 ProFume ® gas fumigant, a methyl bromide alternative for control of post-harvest stored product pests.  
**Suresh K. Prabhakaran**, 5966 East Kitchen Lane, Dow AgroSciences, Mooresville, IN 46158
- 9:20 131 Food-borne pathogen in flight: association of *Escherichia coli* O157:H7 with house flies.  
**Ludek Zurek** and M. J. Alam, 123 West Waters Hall, Kansas State University, Manhattan, KS 66506
- 9:35 132 Cockroach gel bait aversion and the development of a new gel bait formula.  
**Gary A. Braness**, Nonggang Bao and Tom Macom, 981 NC 42 East, Bayer Environmental Science, Clayton, NC 27520, Joe Barile, 7 Noreen Road, Mansfield, MA 02048



- 9:50 133 Movement preferences of *Reticulitermes flavipes* (Kollar) after disturbance in laboratory arenas  
**M. A. Schwinghammer** and R. M. Houseman, Department of Entomology, University of Missouri, Columbia, MO 65211
- 10:20 134 Consumption by and fitness of *Reticulitermes flavipes* (Kollar) pseudergates when offered mulches of varying composition and age.  
**O. P. Pinzon** and R. M. Houseman, Department of Entomology, University of Missouri, Columbia, MO 65211
- 10:35 135 Performance of noviflumuron in eliminating subterranean termite colonies in the Midwest.  
**Michelle S. Smith** and Suresh K. Prabhakaran, 9330 Zionsville Road, Dow AgroSciences, Indianapolis, IN 46268
- 10:50 136 Use of fipronil in exterior perimeter treatments for termite control in Nebraska.  
**Shripat T. Kamble**, 201 PI, Department of Entomology, University of Nebraska, Lincoln, NE 68583-0816, Robert W. Davis, 2605 Butler National Dr., BASF Specialty Products, Pflugerville, TX 78660 and Mark A. Coffelt, 7016 Mercier Ct., BASF Specialty Products, Kansas City, MO 64118
- 11:05 137 Premise retreats - data from field applications.  
**Michael Chapman**, Bayer Environmental Science, Placentia, CA 92870
- 11:20 138 Applications of molecular genetics in urban entomology.  
**Allen L. Szalanski**, Department of Entomology, University of Arkansas, Fayetteville, AR 72701

- 11:35 139 Molecular research on *Reticulitermes* caste differentiation: what we have learned in the past 3 years.  
**Michael E. Scharf**, 901 W. State St.,  
 Department of Entomology, Purdue University,  
 West Lafayette, IN 47907-2089
- 11:50 140 Closing Remarks.  
**Shripat T. Kamble**, Department of  
 Entomology, University of Nebraska, Lincoln,  
 NE 68583

**March 30, 2004**  
**Tuesday Morning**

**Submitted Papers**  
**Sections F, Fa, Fb,**  
 8:30 – 11:30 a.m.  
 Pavilion VII

Moderators:

**Robert W. Behle**, USDA-ARS  
 NCAUR, Peoria, IL 61604-3902  
**Thomas L. Clark**, Department of Entomology  
 University of Missouri, Columbia, MO 65211

- 8:30 141 The effects of different rootworm control products, different planting times, and different crop rotation sequences on rootworm larval injury and rootworm adult emergence.  
**Nathan L. Wentworth**, Kevin L. Steffey,  
 Michael E. Gray and Ron Estes, N-305 Turner  
 Hall 1102 S. Goodwin Ave., University of  
 Illinois, Urbana, IL 61801

- 8:42 142 Effect of clothianidin seed treatments and transgenic corn event MON863 on selected western corn rootworm life history traits.  
**Lance J. Meinke**, Department of Entomology, University of Nebraska, Lincoln, NE 68583-0816, Michael Schwarz, 2 T. W. Alexander Drive, Bayer CropScience, Research Triangle Park, NC 27709 and Ty T. Vaughn, 700 Chesterfield Parkway North, Monsanto Company, Chesterfield, MO 63198
- 8:54 143 Pyrethroid resistance to corn earworm in Midwestern U.S. sweet corn: comparisons with trends in the southern states.  
**William D. Hutchison** and Eric C. Burkness, 1980 Folwell Ave., Dept. of Entomology, University of Minnesota, St. Paul, MN 55108, Bryan Jensen, Dept. of Entomology, 1630 Linden Dr., University of Wisconsin, Madison, WI 53706, Roger Leonard, LSU Ag Center, 212 Macon Ridge Rd, Louisiana State University, Winnsboro, LA 71295, Tom L. Rabaey, 1201 N. 4th St, General Mills, Le Sueur, MN 56058, Robert L. Koch, 1980 Folwell Ave., Dept. of Entomology, University of Minnesota, St. Paul, MN 55108, Rick A. Weinzierl, Dept. of Crop Sciences-Entomology, S-522 Turner Hall, Univ. of Illinois, Champaign, IL 61801, Eileen Cullen and John L. Wedberg, Dept. of Entomology, 1630 Linden Dr., University of Wisconsin, Madison, WI 53706

- 9:06 144 Crop hosts for *Helicoverpa zea* in the cotton belt - implications for IRM.  
**Richard D. Voth**, Sakunta Sivasupramaniam, Graham Head and James W. Mullins, 800 N. Lindbergh Blvd. , Monsanto Co. , St. Louis, MO 63167, John Adamczyk and Jeffrey Gore, SIMRU, 141 Experiment Station Road, POB 346, USDA, Stoneville, MS 38776, Randy Luttrell, Dept. of Entomology, 319 Agri Bldg. , University of Arkansas, Fayetteville, AR 72701, Roger Leonard, Macon Ridge Research Station, 212 Macon Ridge Road, Louisiana State University, Winnsboro, LA 71295, John Ruberson, Coastal Plain Experiment Station, Rainwater Road, University of Georgia, Tifton , GA 31793, J. R. Bradley, Ryan Jackson and John Van Duyn, Vernon James Res. & Ext. Center, 207 Research Station Road, North Carolina State University, Plymouth, NC 27962
- 9:18 145 MIR604WR: a novel event for corn rootworm control in field corn.  
**Craig N. Nichols** and Roy S. Boykin, 410 Swing Road, Syngenta Crop Protection, Greensboro, NC 27409, Jon B. Sagers, Moez R. Meghji, Jeng S. Chen and Rob J. Wilde, 7500 Olson Memorial Hwy., Syngenta Plant Science, Golden Valley, MN 55427
- 9:30 146 3243M and MIR152V: Novel events for lepidopteran control in corn.  
**Steve Mroczkiewicz**, 3074 North Rob Roy Road, Syngenta Crop Protection, Attica, IN 47918, Clemens Chris, 495 County Road 1300N, Champaign, IL 61822, Boykin Roy, 410 Swing Road, Syngenta Crop Protection, Greensboro, NC 27409, James White, Moez Meghji and Rob Wilde, 7500 Olson Memorial, Syngenta Plant Sciences, Golden Valley, MN 55427
- 9:42 **BREAK**

- 10:00 147 Comparative biology of three cereal aphids on TAM 107 wheat.  
**Jawwad A. Qureshi** and JP Michaud, Department of Entomology, Kansas State University, Agricultural Research Center, 1232 240th Avenue, Hays, KS 67601
- 10:12 148 Selected grassy weeds as alternate hosts of the northern corn rootworm.  
**Isaac O. Oyediran**, 1-87 Agriculture Building, University of Missouri, Columbia, MO 65211-7140, Bruce E. Hibbard, 205 Curtis Hall, University of Missouri, Columbia, MO 65211, Thomas L. Clark, 1-87 Agriculture Building, University of Missouri, Columbia, MO 65211-7140
- 10:24 151 Flonicamid, a new aphicide for vegetable crops.  
**Robert S. Perry**, J Bahr and P Resner, FMC Corporation, 4874 Enchanted Valley Road, Middleton, WI 53562
- 10:36 152 Efficacy of spinosad on corn against stored-product insects.  
**Jaelyn Rowan**, Fangneng Huang and Subramanyam Bhadriraju, Kansas State University, Department of Grain Science and Industry, Manhattan, KS 66506

**March 30, 2004**  
**Tuesday Morning**

**Submitted Posters**  
**All Sections**

8:00 a.m. – 5:00 p.m.  
Salon III

(Authors present 4:00 – 5:00 p.m.)

- D153 Detection of nonsynonymous mutations in two toxin-binding regions on the cadherin candidate *Bacillus thuringiensis* resistance gene of *Ostrinia nubilalis*.  
**Brad S. Coates**, Douglas V. Sumerford and Richard L. Hellmich, 113 Genetics Laboratory, Iowa State University, Ames, IA 50010
- D154 Nutritional supplements for insects? the effect of selenium on resistance to baculovirus infection.  
**Kent S. Shelby** and Holly J. R. Popham, 1503 S. Providence Rd., USDA ARS BCIRL, Columbia, MO 65201
- D155 Fluorescent and ultrastructural studies of the teratocytes of *Microctonus aethiopoidea* (Hymenoptera: Braconidae) from the hemocoel of the host alfalfa weevil, *Hypera postica* (Coleoptera: Curculionidae).  
**Javad Habibi**, Dept. Entomology, Agriculture Building, University of Missouri, Columbia, MO, 65203, Kent S. Shelby, 1503 S. Providence Rd., USDA-ARS-BCIRL, USDA-ARS-BCIRL, Columbia, MO 65203, Ben Puttler, Dept. Entomology, Agriculture Building, University of Missouri, Columbia, MO 65203

- D156 Detection of resistance to Cry1Ab in a field collection of European corn borer (Lepidoptera: Crambidae).  
**Terence A. Spencer**, 202 P.I., East , University of Nebraska - Lincoln, Lincoln, NE 68583.0816, R L. Hellmich, Corn Insects and Crop Genetics Research Unit, Iowa State University, USDA ARS, Ames, IA 50011 and Blair D. Siegfried, 202 P.I., East , University of Nebraska - Lincoln, Lincoln, NE 68583-0816
- D157 Using flow cytometry to determine differential hemocyte counts in suitable and unsuitable stemborer hosts parasitized by *Cotesia flavipes*.  
**Marianne Alleyne**, 172 NRB, 607 E. Peabody Drive, Illinois Natural History Survey, Champaign, IL 61820, James B. Nardi, 320 Morrill Hall, 505 S. Goodwin Ave., Department of Entomology, University of Illinois at Urbana-Champaign, Urbana, IL 61801 and Robert N. Wiedenmann, 172 NRB, 607 E. Peabody Drive, Illinois Natural History Survey, Champaign, IL 61820
- D158 Method to estimate linkage relationships in the European corn borer.  
**Douglas V. Sumerford**, USDA-ARS-Corn Insects, Iowa State University, Ames, IA 50011
- D159 Binding analysis of Cry1 toxins in selected and susceptible populations of the European corn borer, *Ostrinia nubilalis*, (Crambidae).  
**Herbert A. Siqueira**, 202 Plant Industry Bldg, University of Nebraska, Lincoln, NE 68583-0816, Ronald D. Flannagan, 7250 NW 62nd Avenue, Pioneer Hi-Bred International, Inc. , Johnston, IA 50131-0552 and Blair D. Siegfried, 202 Plant Industry Bldg, University of Nebraska, Lincoln, NE 68583-0816

- D160 Host preference of a soybean aphid parasitoid, *Aphelinus albipodus* (Hymenoptera: Aphelinidae).  
**Zhishan Wu**, George E. Heimpel and Ruth J. Barth, 219 Hodson Hall, 1980 Folwell Ave., University of Minnesota, Saint Paul, MN 55108
- D161 *Megastigmus aculeatus* (Hymenoptera: Torymidae), a seed predator of *Rosa multiflora*.  
**Laura C. Jesse**, 4 Insectary, Iowa State University, Ames, IA, 50011 and John J. Obrycki, University of Kentucky, Lexington, KY 40546-0091
- D162 Microsatellite markers in three species of dampwood termites genus *Zootermopsis* (Isoptera: Termopsidae).  
**Benjamin T. Aldrich** and Srinu Kambhampati, 123 West Waters Hall, Department of Entomology, Kansas State University, Manhattan, KS 66506
- D163 Population density of *Nicrophorus americanus* the federally endangered American beetle in the Nebraska Counties of Blaine, Brown, Loup, and Rock.  
**Daniel G. Snethen**, RR 3, Box 67, Colome, SD, 57528, William W. Hoback, Department of Biology, University of Nebraska Kearney, Kearney, NE 68849
- D164 First-generation European corn borer damage distribution within cornfields and its relationship to moth distribution in grass.  
**Thomas W. Sappington**, Genetics Laboratory, Iowa State University, USDA-ARS, CICGRU, Ames, IA 50011
- D165 Arthropod communities in monocropped and black walnut intercropped alfalfa.  
**William T. Stamps**, Terryl L. Woods, Robert L. McGraw and Marc J. Linit, 1-41 Agriculture Bldg, University of Missouri, Columbia, MO 65211



- D166 Egg laying preference of female fungus gnats, *Bradysia* sp. nr *coprophila* (Lintner) (Diptera: Sciaridae) on three different commercially available bagged growing media.  
**Theresa L. Meers**, 1201 S. Dorner Dr., University of Illinois, Urbana, IL 61801, Raymond A. Cloyd, 384 NSRC, mc 637, 1101 West Peabody Drive, University of Illinois at Urbana Champaign, Urbana, IL, 61801
- D167 Status of three previously common, native lady beetle species in eastern South Dakota.  
**Louis S. Hesler** and Robert W. Kieckhefer, 2923 Medary Ave., USDA-ARS, Brookings, SD 57006 and Michael A. Catangui, AGH 230, Box 2207A, Plant Science Department, South Dakota State University, Brookings, SD 57007
- D168 Size-based reproductive behavior of northern corn rootworms.  
**Bryan W. French**, Leslie Hammack, Jason Flaskey and Dave Beck, USDA, ARS, 2923 Medary Ave., Northern Grain Insects Research Laboratory, Brookings, SD 57006
- D169 Transition to organic production: how will soil fertility, soil biology, and pest management be affected?  
**Catherine E. Eastman**, Edmond Zaborski, John T. Shaw and Jonathan Lundgren, 172 Natural Resources, 607 E. Peabody, Illinois Natural History Survey, Champaign, IL 61820; Michelle Wander and John Masiunas, University of Illinois, Urbana, IL 61801, Leslie Cooperband, University of Wisconsin, Madison, WI; Darin Eastburn, Deborah Cavanaugh-Grant, Daniel Anderson, and Martha Bazik, University of Illinois, Urbana, IL 61801

- D170 Spatial and temporal patterns of stored-product insect flight activity in a Kansas landscape.  
**James F. Campbell**, 1515 College Ave, USDA ARS GMPC, Manhattan, KS 66502, Olgaly Ramos-Rodriguez, Department of Entomology, Kansas State University, Manhattan, KS 66502 and Michael A. Mullen, 1710 Muirfield Drive, Statesboro, GA 30458
- D171 Association of insects in soybean fields and perimeter vegetation.  
**Stephen D. Danielson**, Department of Entomology, 202 P.I. Bldg, and Erin E. Blankenship, Department of Statistics, 103 Miller Hall, University of Nebraska--Lincoln, Lincoln, NE 68583
- D172 A comparison of macroinvertebrate community structure on artificial rock riffles to snag and exposed streambed habitats in Cache River, Illinois.  
**Joseph H. Rowlett**, Denise A. Walther and Matt R. Whiles, Department of Zoology, Southern Illinois University, Carbondale, IL 62901-6501
- D173 A consensus recommendation for soybean aphid control - 2004 field season.  
**Christina DiFonzo**, Michigan State University; Wayne Bailey, University of Missouri; Tracey Baute, Ontario Ministry of Agriculture & Food; Larry Bledsoe, Purdue University; Eileen Cullen, University of Wisconsin; Philip Glogoza, North Dakota State University; Mike Gray, University of Illinois; Bruce Easley & Ron Hammond, Ohio State University; Tom Hunt, University of Nebraska; Doug Johnson, University of Kentucky; Ken Ostlie & David Ragsdale, University of Minnesota; Marlin Rice, Iowa State University; David Voegtlin, University of Illinois

- D174            Application of Quadris® + Warrior® for soybean yield enhancement: Kentucky's experience in 2003.  
**Douglas W. Johnson**, Donald E. Hershman and James H. Herbek, 1205 Hopkinsville St., P.O. Box 469, University of Kentucky, Princeton, KY 42445-0469
- D175            The UNL South Central Ag Lab Entomology Web Site.  
**Terry A. DeVries**, South Central Ag Lab, University of Nebraska-Lincoln, P. O. Box 66, Clay Center NE 68933, and Robert J. Wright, Dept. of Entomology, 202 Plant Industry Bldg., University of Nebraska-Lincoln, Lincoln, NE 68583-0816
- D176            Entomology education in the Iowa Master Gardener Program.  
**Laura C. Jesse**, 4 Insectary, Iowa State University, Ames, IA, 50011, Donald R. Lewis and James P. Romer, Horticulture, Iowa State University, Ames, IA 50011
- D177            Summary of soybean stem borer management trials.  
**Phillip E. Sloderbeck** and Lawrent L. Buschman, Southwest Research and Extension Center, 4500 E. Mary St., Kansas State University, Garden City, KS 67846
- D178            Flonicamid: A novel insecticide for use in potato.  
**Sam Lockhart**, 1009 Leonards Way, FMC Corporation, Argusville, ND 58005

- D179 Transgenic corn for rootworm control: implementing IRM and IPM with uniform scouting procedures.  
**Marlin E. Rice**, 103 Insectary, Iowa State University, Ames, IA 50011, Eileen M. Cullen, University of Wisconsin-Madison, Madison, WI, Christina D. DiFonzo, Michigan State University, East Lansing, MI, Kenneth R. Ostlie, University of Minnesota, St. Paul, MN, Kevin L. Steffey, University of Illinois, Champaign-Urbana, IL, Jon J. Tollefson, Iowa State University, Ames, IA and Robert J. Wright, University of Nebraska-Lincoln, Lincoln, NE
- D180 A survey to develop benchmarks for entomological literacy.  
**William W. Hoback** and Kerri M. Skinner, 904 S. 25th Street, University of Nebraska Kearney, Kearney, NE 68849, Gwen A. Pearson, 113 Student Services Bldg., MSU, Michigan State University, East Lansing, MI
- D181 Soybean aphid-an interactive learning experience.  
**Palle Pedersen**, Marlin E. Rice, Brian Lang, Todd Vagts and Brent Brueland, Iowa State University, Ames, IA 50011
- D182 Corn response to mesotrione as affected by insecticide application method and rate.  
**Christina D. DiFonzo**<sup>1</sup>, Andrew J. Chomas<sup>2</sup>, Michael R. Jewett<sup>1</sup> and James J. Kells<sup>2</sup>, Departments of Entomology<sup>1</sup> and Crop & Soil Sciences<sup>2</sup>, Michigan State University, East Lansing, MI 48824
- D183 Characterization of Cry34Ab1/Cry35Ab1: evaluating fitness effects on corn rootworm larvae during exposure to roots.  
**Steve Lefko** and Rachel Binning, 7250 NW 62nd Ave, Pioneer Hi-Bred, Johnston, IA 50313

- D184 News from the western front: the soybean aphid in Nebraska.  
**Thomas E. Hunt**, Gerald W. Echtenkamp, Jarvi J. Keith, Jon E. Scott, William L. Kranz and Charles A. Shapiro, Haskell Agricultural Laboratory, 57905 866 Road, University of Nebraska, Concord, NE 68728
- D185 Increasing alfalfa quality and yield by managing insects on re-growth following cutting.  
**Gail G. Stratman**, Robert S. Perry, Howard L. Guscar, Brent A. Neuberger, and Robert S. Hooten, 4615 NW 86th Place, FMC Ag Products, Kansas City, MO 64154
- D186 Field investigations into the dose of Cry34/35Ab1 rootworm-protected corn.  
**Nicholas P. Storer**, Jon M. Babcock, Jeff M. Edwards and James W. Bing, 301 Campus Drive, Dow AgroSciences, Huxley, IA 40124
- D187 Western corn rootworm larval movement between transgenic (Cry3Bb1) corn, non-transgenic corn, and weeds.  
**Ted A. Wilson** and Bruce E. Hibbard, 205 Curtis Hall, University of Missouri, Columbia, MO, 65211
- D188 An introduction to the YieldGard® plus corn insect resistance management (IRM) plan.  
**Todd A. DeGooyer**, 800 N Lindbergh, Mailzone C3NE, Monsanto Company, St. Louis, MO 63167 and Robert J. Starke, Mailzone C3NE, 800 N. Lindbergh, Monsanto, St. Louis, MO 63167
- D189 Yield and root protection of YieldGard® rootworm as compared to conventional rootworm control methods.  
**Robert J. Starke** and Todd A. DeGooyer, Mailzone C3NE, 800 N Lindbergh, Monsanto Company, St. Louis, MO 63167

- D190 Efficacy of Cry34/35Ab1 event DAS-59122-7 against corn rootworm (Coleoptera:Chrysomelidae).  
**James W. Bing**, 301 Campus Dr., Mycogen Seeds, Huxley, IA, 50124, Jon M. Babcock and Jeff M. Edwards, 1349 Moingona Rd., Dow AgroSciences, Boone, IA 50036, Paula Davis, Laura Higgins, Mel Peters and Alejandra Pascual, 7100 N.W. 62nd Ave., Pioneer, Johnston, IA 50131
- D191 IRM science plan for DAS-59122-7 rootworm-protected corn; a novel corn rootworm plant-incorporated protectant.  
**Timothy M. Nowatzki**, Steve Lefko and Elizabeth D. Owens, 7250 NW 62nd Ave., P.O. Box 552, Pioneer Hi-Bred International, Inc., Johnston, IA 50131-0552
- D192 Evaluation of thiamethoxam is a protectant of stored seed corn.  
**Franklin H. Arthur**, 1515 College Avenue, GMPRC, Manhattan, KS 66502, Gerald Wilde and Bisong Yue, Department of Entomology, Kansas State University, Manhattan, KS 66502
- D193 Greenbug-resistant sorghum: an investigation of the physiological mechanisms.  
**Lisa D. Franzen**, Shauna L. Bose, Tiffany M. Heng-Moss, Tulio B. Macedo and Leon G. Higley, 202 Plant Industry Building, University of Nebraska-Lincoln, Lincoln, NE 68583-0816
- D194 Leafhopper and flea beetle populations in traditional and novel varieties of tall fescue.  
**Wayne C. Bailey**, Robert L. Kallenbach, Thomas L. Clark and Clinton G. Meinhardt, 1-87 Agriculture Building, University of Missouri, Columbia, MO 65211

- D195 Response by western corn rootworm (Coleoptera: Chrysomelidae) and southwestern corn borer (Lepidoptera: Crambidae) to YieldGard® Rootworm, YieldGard® Plus, and Poncho 1250 seed treatment and implications of IRM for MON863 on adoption of rootworm protected corn.  
**Robert D. Bowling**, 310 East First Street, Texas A&M, Dumas, TX 79029, Phillip E. Sloderbeck, Southwest Area Extension Office, 4500 E. Mary Street, Kansas State University, Garden City, KS 67846 and Roxanne A. Shufran, 6500 Amarillo Blvd. West, Texas Agricultural Experiment Station, Amarillo, TX 79106-1796
- D196 Vertical distribution of *Dectes* stem borer infestations in soybean.  
**Lawrent L. Buschman** and Phillip E. Sloderbeck, 4500 E. Mary St., Kansas State University, Garden City, KS 67846
- D197 Soybean aphid (*Aphis glycines*) in South Dakota: impact on soybean (*Glycine max*) development and yield.  
**Eric Beckendorf**, 230 Ag. Hall, Department of Plant Science, South Dakota State University, Brookings, SD 57007, Walt Riedell, USDA-ARS Northern Grains Insects Research Laboratory, Brookings, SD 57007 and Michael A. Catangui, 230 Ag. Hall, Department of Plant Science, South Dakota State University, Brookings, SD 57007
- D198 Relative abundance and foraging behavior of subterranean termites in date palm plantations of the United Arab Emirates.  
**Walid A. Kaakeh**, Department of Aridland Agriculture, College of Food Systems, P. O. Box 17555, United Arab Emirates University, Al-Ain, UAE

D199

Lab rearing techniques for blue bottle flies  
(*Calliphora* sp.) at the North Central Regional  
Plant Introduction Station.  
**Steve J. Hanlin** and Sharon McClurg, State  
Ave. & Mortensen Rd., Ames, IA 50011

**March 30, 2004**  
**Tuesday Afternoon**

Award Luncheon  
12:00 – 1:15 p.m.  
Salon IA & IB

**Rob Wiedenmann**, Master of Ceremonies

**March 30, 2004**  
**Tuesday Afternoon**

**Student Affairs Symposium**  
**Entomology in Prairie Ecosystems**  
1:30 – 5:00 p.m.  
Pavilion I

Organizers and Moderators:

**Jonathan G. Lundgren**, Center for Economic  
Entomology, Illinois Natural History Survey  
Champaign, IL, 61820

**Michal Roberts**, Department of Entomology  
Kansas State University, Manhattan, KS 66506



- 1:30 200 Diversity and ecology of the endophytic insect communities of two prairie perennials (Asteraceae: Silphium).  
**John F. Tooker**, 501 Ag Sciences & Industries Building, Department of Entomology, The Pennsylvania State University, University Park, PA 16802-3508
- 1:55 201 Mycorrhizal symbiosis and grasshopper development on tallgrass prairie plants.  
**Abigail Rogers Kula**, David Hartnett and Gail Wilson, Division of Biology, 232 Ackert Hall, Kansas State University, Manhattan, KS 66506
- 2:20 202 Macroinvertebrate communities and ecosystem function in backwater sloughs of the central Platte River: influences of hydrologic disturbance gradients and restoration activities.  
**Clinton K. Meyer** and Matt R. Whiles, Department of Zoology, Southern Illinois University, Carbondale, IL 62901-6501, Beth S. Goldowitz, Platte River Whooping Crane Maintenance Trust, Wood River, NE 68883 and Sara G. Baer, Department of Forestry, Southern Illinois University, Carbondale, IL 62901
- 2:45 203 Ants in the tallgrass prairie ecosystem.  
**James C. Trager**, P. O. Box 38, Shaw Nature Reserve, Gray Summit, MO 63039
- 3:10 **BREAK**
- 3:25 204 Seasonality and adult habitat use by four *Diabrotica* species at prairie-corn interfaces.  
**Laura A. Campbell** and Lance J. Meinke, 202 Plant Industry, University of Nebraska-Lincoln, Lincoln, NE 68583-0816

- 3:50 205 Heterogeneity and diversity in grassland ecosystems: implications for insect diversity.  
**Phil Fay**, 5013 Miller Trunk Highway, Natural Resources Research Institute, Duluth, MN 55811, Anthony Joern, University of Nebraska-Lincoln, School of Biological Sciences, Lincoln, NE 68588 and Jayne L. Jonas, University of Nebraska- Lincoln, School of Biological Sciences, Lincoln, NE 68588
- 4:15 206 Aphids of the prairie: can they survive current management practices?  
**David Voegtlin**, Illinois Natural History Survey, 607 E. Peabody Drive, Center for Economic Entomology, Champaign, IL 61820

**March 30, 2004**  
**Tuesday Afternoon**

**NCR-125 Symposium**  
**Conserving Natural Enemies in Urban and Agricultural Landscapes**  
 1:30 – 5:30 p.m.  
 Salon II

Organizers and Moderators:  
**Ashley B. Bennett**, Department of Entomology  
 University of Illinois, Urbana, IL 61801  
**Eric J. Rebeck**, Department of Entomology  
 Purdue University, West Lafayette, IN 47907-2089

- 1:30 207 Conservation biological control in ornamental landscapes.  
**Ashley B. Bennett** and Larry M. Hanks, 505 S. Goodwin, 320 Morrill Hall, University of Illinois, Urbana, IL 61801 and Cliff S. Sadof, 1158 Smith Hall, Purdue University, West Lafayette, IN

- 1:55 208 Flowering resource plants affect natural enemy abundance and euonymus scale population dynamics.  
**Eric J. Rebek** and Cliff S. Sadof, Department of Entomology, 901 W. State St., Purdue University, West Lafayette, IN and Lawrence M. Hanks, Department of Entomology, 320 Morrill Hall, 505 S. Goodwin Avenue, University of Illinois at Urbana-Champaign, Urbana, IL
- 2:20 209 Floral nectar in agroecosystems-evaluating the response of parasitoids.  
**Jana C. Lee** and George E. Heimpel, 219 Hodson Hall, 1980 Folwell Ave., University of Minnesota, Saint Paul, MN 55108
- 2:45 210 Ecology of conservation biological control in heterogeneous vegetable landscapes.  
**Janet L. Lawrence** and Casey W. Hoy, 1680 Madsion Ave, Department of Entomology, Thorne Hall, The Ohio State University/OARDC, Wooster, OH 44691
- 3:10 **BREAK**
- 3:25 211 Enhancing the biocontrol effectiveness of generalist arthropod predators by manipulating the detrital food web.  
**David H. Wise**, Dept of Entomology, S-225 Ag Sci Bldg - North, University of Kentucky, Lexington, KY 40546-0091
- 3:50 212 Compatibility of calico scale management practices with the conservation of natural enemies in the tree canopy.  
**Jamee L. Hubbard** and Daniel A. Potter, Department of Entomology, S-225 Agriculture Science Center North, University of Kentucky, Lexington, KY 40546-0091

- 4:15 213 Habitat manipulations in ornamental systems: what happens to the predators and pests?  
**Paula M. Shrewsbury**, 4112 Plant Science Bld., Department of Entomology, University of Maryland, College Park, MD 20742
- 4:40 214 Can HIPPOs aid conservation biological control of arthropods?  
**David G. James**, 24106 N. Bunn Road, Washington State University, Prosser, WA 99350
- 5:05 215 Conserving natural enemies in Michigan blueberry fields using multifunctional cover crops.  
**Matthew E. O'Neal**, 202 CIPS, Michigan State University, East Lansing, MI, 48824, Erica Zontek, 1200 Academy Street, Kalamazoo College, Kalamazoo, MI, 49006, Zsofia Szendrei, Douglas A. Landis and Rufus Isaacs, 202 CIPS, Michigan State University, East Lansing, MI, 48824

**March 30, 2004**

**Tuesday Evening**

6:00 – 7:00 p.m.

Salon II

**Linnaean Games Champion v. Old Masters**

Moderator:

**W. Wyatt Hoback, Gamesmaster**  
University of Nebraska at Kearney

**ESA Student Award Ceremony**

Moderator:

**Mark A. Boetel, Chair**  
North Dakota State University

**March 30, 2004**

**Tuesday Evening**

7:00 – 9:00 p.m.

Salon IA & IB

**ESA-North Central Branch Mixer**

**March 31, 2004**

**Wednesday Morning**

**Continental Breakfast**

7:00 – 8:00 a.m.

**Wednesday Morning**

8:00 – 9:00 a.m.

Salon II

**Final ESA-NCB Business Meeting**

**Rob Wiedenmann**

ESA-NCB President

**March 31, 2004**

**Wednesday Morning**

**Symposium**

**Evaluating the Risks of Genetically Modified Plants  
to Natural Enemies: Learning from**

**Transgenic Bt Crops**

9:00 a.m. – 12:15 p.m.

Pavilion I

Organizers and Moderators:  
**Jian J. Duan**, Monsanto Company  
St. Louis, MO 63167  
**Jonathan G. Lundgren**, Center for Economic  
Entomology, Illinois Natural History Survey  
Champaign, IL 61820

- 9:00 216 Introduction.  
**Jian J. Duan**, 800 North Lindbergh, Monsanto  
Company, St. Louis, MO, 63167
- 9:05 217 Regulatory procedures and non-target organism  
risk assessment for plant-incorporated  
protectants in genetically modified crops.  
**Mike Mendelsohn** and Zigfridais Vaituzis, US  
EPA (7511C), 1200 Pennsylvania Ave, NW,  
Washington, DC 20460 and Robyn Rose,  
USDA/APHIS
- 9:30 218 Quantitative approaches to NTO risk assessment  
for GM crops.  
**Jeffrey Wolt**, Biosafety Institute for Genetically  
Modified Agricultural Products, Iowa State  
University, Ames, IA 50011
- 9:55 219 The role and design of laboratory studies in  
evaluating the effect of biotechnology-derived  
insecticidal products on natural enemies.  
**Jian J. Duan**, 800 North Lindgbergh, Monsanto  
Company, St. Louis, MO 63167
- 10:20 **BREAK**
- 10:30 220 Assessing the risk of bitrophic interactions  
between Bt crops and natural enemies: a case  
study involving pollen-feeding by *Coleomegilla  
maculate*.  
**Jonathan G. Lundgren** and Robert N.  
Wiedenmann, 607 East Peabody Drive, Center  
for Economic Entomology, Illinois Natural  
History Survey, Champaign, IL 61820

- 10:55 221 Interactions of Bt crops with parasitoids on non-target, secondary pests.  
**Julio Bernal**, Department of Entomology,  
Texas A&M University, College Station, TX  
77843
- 11:20 222 What about natural enemies in Bt-transgenic cotton fields?  
**Jorge B. Torres** and John R. Ruberson,  
Rainwater Road, University of Georgia, Tifton,  
GA 31794
- 11:45 223 Effect of YieldGard Rootworm on nontarget organisms: another perspective.  
**Gerald E. Wilde**, Mohammad Al-Deeb and  
Aqeel Ahmad, 123 West Waters Hall, Kansas  
State University, Manhattan, KS 66502

**March 31, 2004**  
**Wednesday Morning**

**Symposium**  
**Population Genetics**  
9:00 a.m. – 12:15 p.m.  
Salon II

Organizer and Moderator:  
**Brandon J. Schemerhorn**, USDA-ARS  
Purdue University, West Lafayette, IN 47905

- 9:00 224 Populations of *Anopheles funestus* chromosomal forms.  
**A. P. Michel** and O. Grushko, Center for Tropical Disease Research and Training, Department of Biology, University of Notre Dame, Notre Dame, IN 46556, W. M. Guelbeogo, N. Sagnon and C. Costantini, CNRFP, Ouagadougou, Burkina Faso, N. J. Besansky, Center for Tropical Disease Research and Training, Department of Biology, University of Notre Dame, Notre Dame, IN 46556
- 9:25 225 Revealing lineages of Hessian fly populations in the United States and worldwide.  
**Alisha J. Johnson**, Brandon J. Schemerhorn and Richard H. Shukle, 170 South University Street, WSLR 201, USDA-ARS/Purdue University, West Lafayette , IN 47905
- 9:50 226 Searching for genome regions involved in incipient speciation in the African Malaria Mosquito, *Anopheles gambiae*.  
**Aram D. Stump** and Nora J. Besansky, P.O. Box 369, University of Notre Dame, Notre Dame, IN 46656
- 10:15 227 Darwinian natural selection for orange bioluminescent color in the Jamican click beetle *Pyrophorus plagiophthalmus*.  
**Sebastian Velez** and Jeffrey L. Feder, 107 Galvin Life Sciences, University of Notre Dame, Notre Dame, IN 46556
- 10:40 **BREAK**
- 10:55 228 Examining the molecular basis of abdominal pigmentation variation in the South American *Drosophila cardini* subgroup.  
**Daniela C. De Toni**, 004 Galvin Life Science University of Notre Dame, University of Notre Dame, Notre Dame, IN 46556



- 11:20 229 Condition-dependent traits and the capture of genetic variance in male.  
**LaRoy Brandt**, 3201 West 16th, Yeater Building, State Fair Community College, Sedalia, MO 65301 and Michael Greenfield, Department of Entomology, University of Kansas, Lawrence, KS 66045
- 11:45 230 The role of host associated diapause in sympatric race formation of *rhagoletis pomonella* (diptera:tephritidae)  
**Hattie R. Dambroski** and Jeffrey L. Feder, University of Notre Dame, Notre Dame, IN 46556

**March 31, 2004**  
**Wednesday Afternoon**

**NCB Executive Committee Meeting**  
1:00 – 3:00 p.m.  
Conference Suite

## Author Index

Adamczyk, John	144
Adarkwah, Charles	066
Ahmad, Aqeel	D113, 223
Al-Deeb, Mohammad	223
Alam, M. J.	131
Alatawi, Fahad J.	D097
Alavi, Sajid	012
Aldrich, Benjamin T.	D162, D100
Aliano, Nicholas P.	D074
Allen, Andy R.	004
Alleyne, Marianne	D157
Allgeier, William J.	D079
Anderson, Daniel	D169
Anderson, Patricia L.	025
Anderson, Troy D.	013
Anderson, Wyatt G.	010
Antwi, Frank	055
Arthur, Frank	D108
Arthur, Franklin H.	D192
Atkinson, Lorilie	054
Babcock, Jon M.	D186, D190
Backus, Elaine A.	D114
Baer, Sara G.	202
Bahr, J.	151
Bailey, Wayne C.	D071, D087, D173, D194
Bao, Nonggang	132
Barile, Joe	132
Barth, Ruth J.	D160
Baute, Tracey	D173
Baxendale, Frederick P.	006, 010
Bazik, Martha	D169
Beck, Dave	D168
Beckendorf, Eric	D197
Bedick, Jon C.	D081
Beeman, Richard W.	D070
Behle, Robert W.	056
Behnken, Lisa	120
Bennett, Ashley B.	207
Bennett, Kathleen V.	D086
Berger, Tierney R.	D080
Bernal, Julio	221
Besansky, Nora J.	224, 226

Bhadriraju, Subramanyam	004, 009, 012, 018, 020, 038, 048, 128, 152, D103
Bing, James W.	D186, D190
Binning, Rachel	D183
Blankenship, Erin E.	D171
Bledsoe, Larry	D173
Boetel, Mark A.	027, D088
Bohnert, Catherine A.	D084
Boina, Dhanaraj	012
Bose, Shauna L.	D193
Bowling, Robert D.	D195
Boxler, David J.	062, 063
Boykin, Roy	145
Bradley, J. R.	144
Bradshaw, Jeffrey D.	D106, 050
Bragg, David	053
Brandt, LaRoy	229
Braness, Gary A.	132
Brannon, Sonja L.	D073
Breitenbach, Fritz	120
Brewer, Gary J.	016, 051
Brown, Susan J.	D070
Brueland, Brent	D181
Brust, Mathew L.	001
Burkness, Eric C.	D107, 015, 143
Buschman, Lawrent L.	D177, D196, 014
Butler, David W.	029
Campbell, James F.	D103, D170
Campbell, John B.	062, 063
Campbell, Laura A.	204
Campbell, Leslie R.	D111
Cannon, Colleen A.	D115
Carrillo, Mario A.	D115
Carroll, Matthew W.	024
Casey, Christine	034
Catangui, Michael A.	052, D167, D197
Cavanaugh-Grant, Deborah	D169
Cermak, Steven C.	056
Chakrabarti, Seemanti	D104
Chanbang, Yaowaluk	D108
Chapman, Michael	137
Charlton, Ralph	D090
Chen, Eric	145
Ching'oma, Godfrey P.	D103

Chomas, Andrew J.	D182
Chris, Clemens	146
Clark, Pete L.	D109
Clark, Thomas L.	148, D071, D087, D194
Cloyd, Raymond A.	031, D166
Coates, Brad S.	028, D153
Coffelt, Mark A.	136
Cooperband, Leslie	D169
Costantini, C.	224
Crowder, D W.	121
Cullen, Eileen M.	D173, D179
Dambroski, Hattie R.	230
Danielson, Stephen D.	D171
Davis, Craig A.	D082
Davis, Jeffrey A.	011
Davis, Paula	D190
Davis, Robert W.	136
De Toni, Daniela C.	228
DeGooyer, Todd A.	D188, D189
DeVries, Terry A.	D175
DiFonzo, Christina D.	D173, D182, D179
Dregseth, Robert J.	027
Duan, Jian J.	219, 216
Duenow, Jay	043
Eastburn, Darin	D169
Eastman, Catherine E.	D169
Echtenkamp, Gerald W.	D184
Edwards, Jeff M.	D186, D190
Eisley, Bruce	D173
Ellis, Marion D.	D074
Ellsbury, Mike M.	D088
Estes, Ron	141
Fay, Phil	205
Feder, Jeffrey L.	227, 230
Ferguson, Carolyn J.	021
Fields, Paul G.	066
Flannagan, Ronald D.	D159
Flaskey, Jason	D168
Flinn, Michael B.	029
Flinn, Paul W.	018, D099
Foster, John E.	D109, D112, D093
Foster, Stephen	026
Fournier, Alfred J.	019
Franzen, Lisa D.	D089, D193

French, Bryan W.	D168
French, Roy C.	D101
French, Wade W.	D088
Fuller, Billy W.	D088
Furgason, Eric S.	D078
Glogoza, Philip	D173
Goldowitz, Beth S.	202
Golick, Douglas A.	D105
Gore, Jeffrey	144
Grace, Tony	020
Gray, Michael E.	117, 141, 008, 116, D173
Grieshop, Matthew J.	D099
Grushko, O.	224
Guelbeogo, W. M.	224
Guscar, Howard L.	D185
Habibi, Javad	D155
Hall, Dianne L.	D069
Hamick, Jeffery	D081
Hamik, Jeffrey J.	003, D076
Hammack, Leslie	D168
Hammond, Ron	D173
Hanks, Lawrence M.	207, 208
Hanlin, Steve J.	D199
Hanson, Bryan	054
Hartnett, David	201
Harwood, James D.	058
Head, Graham P.	144, D088
Heimpel, George E.	209, D160, 049
Hein, Gary L.	D101, D112
Heinz, Kevin M.	D098
Hellmich, Richard L.	028, D153, 025, D077, D156
Helm, Charles G.	059
Heng-Moss, Tiffany M.	010, D089, D193
Henson, Robert	054
Herbek, James H.	D174
Hershman, Donald E.	D174
Hesler, Louis S.	D167
Hewitt, P.	041
Hibbard, Bruce E.	D187, 148
Higgins, Laura	D190
Higgins, Randall A.	014
Higley, Leon G.	D089, D079, D080, 006, D105, D083, D193
Hill, John H.	050

Hladilek, Erin E.	060
Hoback, W. Wyatt	007, D080, D082
Hoback, William W.	001
Hoback, William W.	001, 002, D163, D075, 003, D076, D180, D081
Hodgson, Erin W.	015
Holt, Kiffnie M.	D072
Hooten, Robert S.	D185, 067
Hopper, Keith R.	049
Houseman, Richard M.	133, 134, 149, 150
Hoy, Casey W.	210
Huang, Fangneng	014, 152
Hubbard, Jamee L.	212
Hunt, Thomas E.	D184, D112, D173
Huntington, Timothy E.	006
Hutchison, William D.	D107, D086, 015, 143, D115
Isaacs, Rufus	215
Isard, Scott A.	118
Isbell, Terry A.	056
Jackson, Ryan	144
James, David G.	214
Jaronski, Stefan T.	027
Jensen, Bryan	143
Jesse, Laura C.	D176, D161
Jewett, Michael R.	D182
Jia, Fengyou	D096
Joern, Anthony	205
Johnson, Alisha J.	225
Johnson, Douglas W.	D173, D174
Jonas, Jayne L.	205
Jones, Susan C.	126
Jordan, Kyle K.	126
Joy, Austin L.	D081
Kaakeh, Walid A.	D198
Kaliyan, Nalladurai	D115
Kallenbach, Robert L.	D194
Kambhampati, Sринi	D162, D100, D104, 020
Kamble, Shripat T.	D091, 136, 140
Keeney, George	126
Keith, Jarvi J.	D184
Kells, James J.	D182
Kieckhefer, Robert W.	D167
Kirkham, M. B.	D111
Knake, R.	041

Knisley, Charles B.	001
Knodel, Janet J.	054, 055
Koch, Robert L.	143, D107
Kofoid, Ken D.	D111
Konakandla, Bhanu S.	D096
Krafsur, Elliot S.	D100
Kranz, William L.	D184
Kronback, Kate T.	D077
Krumm, Jeffrey T.	D093, D112
Kula, Robert R.	021
Landis, Douglas A.	215
Lang, Brian	D181
Lang, Bruce A.	D094
Larson, Zeb	009
Lavelle, Perrine	D088
Lawrence, Janet L.	210
Lee, Jana C.	209
Lefko, Steve	D183, D191
Leonard, Roger	143, 144
Levine, Eli	118, 119
Lewis, Donald R.	D176
Lewis, Leslie C.	D077, 025
Li, Huarong	014
Lingren, Donna	042
Linit, Marc J.	D165
Lockhart, Sam	D178
Londono, Diana K.	D092
Lorenzen, Marce D.	D070
Lundgren, Jonathan G.	220, D169
Luttrell, Randy	144
Mabry, Timothy R.	118
Macedo, Tulio B.	D089, D193
Macom, Tom	132
MacRae, Ian V.	024, 065, 060
Mahroof, Rizana M.	018
Majumdar, Ayanava	027
Maliphan, Sasi	D093
Margolies, David C.	023, 032, D096, D097, D072, 037
Masiunas, John	D169
Mason, Linda J.	129
Matos, Bethzayda	D095
May, B.	041
McClurg, Sharon	D199

McGraw, Robert L.	D165
McManus, Bradley L.	D088
McSwigan, Brian	045
Meers, Theresa L.	D166
Meghji, Moez	145, 146
Meihls, Lisa N.	D071
Meinhardt, Clinton G.	D087, D194
Meinke, Lance J.	142, 204
Mendelsohn, Mike	217
Meyer, Clint K.	202
Michaud, J. P.	147
Michel, A.P.	224
Mittapalli, Omprakash	017
Mize, Terry	040
Morey, Vance	D115
Moser, Susan E.	022
Mphosi, Maboko S.	026
Mroczkiewicz, Steve	146
Mullen, Michael A.	D170, 042
Mullins, James W.	144
Mundal, Kirk D.	016
Murdock, Larry L.	D078
Nabity, Paul D.	D083
Nagaraj, Nandi J.	038, D111
Nardi, James B.	D157
Nechols, James R.	023, 030, 032, C072, D097, D099
Neuberger, Brent A.	067
Nichols, Craig N.	145
Nowatzki, Timothy M.	D191
O'Neal, Matthew E.	117, 215
Obrycki, John J.	058, D095, D161
Olson, Denise L.	054, 055
Onstad, David W.	121
Opit, George P.	032, D072, D097
Oppert, Brenda	014
Ostlie, Kenneth R.	120, D173, D179
Owens, Elizabeth D.	D191
Oyediran, Isaac O.	148
Park, Yoonseong	D096, D070
Parrella, Michael	034
Pascual, Alejandra	D190
Pearson, Gwen A.	D180
Pedersen, Palle	D181



Pereira, Eliseu J.	D094
Perry, Robert S.	D185, 151
Peters, Mel	D190
Pierce, Christopher M.	117
Pinzon, Olga P.	134, 150
Pittendrigh, Barry R.	D078
Popham, Holly J. R.	D154
Post, Susan L.	059
Potter, Daniel A.	212
Prabhakaran, Suresh K.	046, 125, 130, 135
Prasifka, Jarrad R.	D098
Pszczolkowski, Maciej A.	057
Puttler, Ben E.	D155
Qureshi, Jawwad A.	147
Rabaey, Tom L.	143
Radcliffe, Edward B.	011, 024, 060
Ragsdale, David W.	011, 015, 024, 049, 060, D173
Ramaswamy, Sonny B.	057, D103
Ramos-Rodriguez, Olgaly	D170
Ranger, Christopher M.	D114
Ratcliffe, Susan T.	008, 122
Raupp, Michael J.	035
Ray-Chandler, Andrea E.	D090
Reardon, Brendon J.	D102
Rebek, Eric J.	208
Reese, John C.	D090, D111
Resner, P.	151
Rice, Marlin E.	D106, D173, D179, 050, D181
Riedell, Walt	D197
Riggins, John J.	D081, D082
Roberts, Michal	D110
Rogers Kula, Abigail	201
Romer, James P.	D176
Rose, Robyn	217
Rottinghaus, George E.	D114
Roubos, Craig	005
Rowan, Jaclyn	152
Rowlett, Joseph H.	D172
Roy, Boykin	146
Ruberson, John R.	144, 222
Sadof, Clifford S.	036, 207, 208, D068
Sagers, Jon	145
Sagnon, N.	224
Sanderson, John P.	033

Sappington, Thomas W.	D102, D164
Sarath, Gautam	010, D092
Sass, Brian D.	003, D076, D081
Scharf, Michael E.	139
Schemerhorn, Brandon J.	225
Schone, Chad	126
Schroeder, Allen J.	027
Schroeder, Amanda R.	D085
Schroeder, Jared B.	008
Schwarz, Michael	041, 142
Schwinghammer, Margaret A.	133, 149
Scott, Jon E.	D184
Shade, Richard E.	D078
Shapiro, Charles A.	D184
Shaw, John T.	D169
Shelby, Kent S.	D154, D155
Shrewsbury, Paula M.	213
Shufran, Roxanne A.	D195
Shukle, Richard H.	225, 017
Siebert, Kendra S.	D070
Siegfried, Blair D.	D092, D156, D094, D159
Siqueira, Herbert A.	D159
Siriwetwivat, Benjawan	D101
Sites, Robert W.	D069
Sivasupramaniam, Sakunta	144
Skinner, Kerri M.	D180, D082
Skoda, Steven R.	D093, D112
Sloderbeck, Phillip E.	D177, D195, D196
Smith, Michael C.	D111
Smith, Michelle S.	135
Snethen, Daniel G.	002, D163, D075
Spencer, Joseph L.	118
Spencer, Terence A.	D156, D094
Spomer, Neil A.	D091
Srinivasan, Asoka	057
St. Amand, Paul	D111
Stamps, William T.	D165
Starke, Robert J.	D188, D189, 039
Steffey, Kevin L.	124, 141, D179
Storer, Nicholas P.	D186, D094
Stratman, Gail G.	D185, 067
Stump, Aram D.	226
Sumerford, Douglas V.	028, D077, D102, D153, D158
Suranyi, Robert A.	060

Szalanski, Allen L.	138
Szendrei, Zsofia	215
Tarver, Matt R.	D078
Taylor, David B.	127
Thill, Christian A.	011
Tockman, Gary	047
Tollefson, Jon J.	D179, 123
Tooker, John F.	200
Torres, Jorge B.	222
Trager, James C.	203
Tuinstra, Mitch R.	D111
Vagts, Todd	D181
Vaituzis, Zigfridais	217
Van Duyn, John	144
Vaughn, Ty T.	142
Velez, Sebastian	227
Vitullo, Justin M.	D068
Voeglin, David	049, 206, D173
Voth, Richard D.	144
Walther, Denise A.	029, D172
Wander, Michelle	D169
Wedberg, John L.	143
Weinzierl, Richard A.	064, 143
Wentworth, Nathan L.	141
Whiles, Matt R.	202, 029, D172
Whirlwind Horse, Loudon	D075
White, James	146
White, Johnathan G.	D069
Wiedenmann, Robert N.	059, D157, 220
Wilcke, William F.	D115
Wilde, Gerald E.	D085, D108, D110, D111, D113, D192, 223
Wilde, Rob	145, 146
Williams, Kimberly A.	032
Wilson, Gail	201
Wilson, Ted A.	D187
Winemiller, Kirk O.	D098
Winter, Rudolph E.	D114
Wise, David H.	211
Wold Burkness, Suzanne J.	D107
Wolt, Jeffrey	218
Woods, Terry L.	D165
Wright, Robert J.	D175, D179
Wu, Zhishan	D160, 049

Yeaman, Herb	044
Yeargan, Kenneth V.	D073
Yue, Bisong	D192
Zaborski, Edmond	D169
Zechmann, Benjamin J.	007
Zhi, Junrui	023
Zhu, Kun Yan	013, 014, D113
Zolnerowich, Gregory	021
Zontek, Erica	215
Zurek, Ludek	D104, 131

## Taxonomic Index

*Anacanthotermes ochraceus* D198  
*Chironomus tentans*, 013  
*Plodia interpunctella*, D115  
*Aceria tosichella*, D101  
*Achroia grisella*, 229  
Acrididae, 201  
*Anopheles gambie*, 226  
Aphelinidae, D160  
Aphelinidae, Braconidae, 049  
*Aphelinus albipodus*, D160  
Aphidae, 151  
Aphididae, D173, 015, D089, D193, D184, 147, 024, D111, 011,  
060, 067, D090, D197, D181  
*Aphis glycines*, D181  
Apidae, D074  
*Apis mellifera*, D074  
*Blattella germanica*, 132  
Blattellidae, 132  
*Blissus leucopterus leucopterus, occiduus*, 010  
Bostrichidae, D108, D103  
Braconidae, D155, 021  
*Bradysia sp. nr coprophila*, D166  
Bruchidae, D078  
*Calliphora*, D199  
Calliphoridae, D199, D093, D083  
*Callosobruchus maculatus*, D078  
Carabidae, 215  
Cecidomyiidae, 225, 017, 051  
Cerambycidae, D177, D196  
*Cerotoma trifurcata*, 050, D086  
*Ceutorhynchus assimilis*, 053  
*Chaenusa*, 021  
*Chionaspis pinifoliae*, 207  
Chironomidae, D092, 013, 029  
Chrysomelidae, 117, 124, D183, D106, D109, 054, 055, 118, 119,  
D085, 141, D086, 008, 122, 059, 142, D186, D179, D187, 148,  
D168, 050, 056, 204, D189, D195, D190, 052, 123, D191  
Cicadellidae, D194, D114  
*Cicindela hirticollis*, 001  
*Cicindela nevadica*, D079  
Cicindelidae, 001, D079  
Coccidae, 212

*Coccinella*, D167  
Coccinellidae, D107, D167, 220, D098, D088  
*Cochliomyia hominivorax*, D093  
Cochylidae, 016  
Cochylidae, Pyralidae, 026  
*Cochylis hospes*, 016  
*Coleomegilla maculata*, 220  
*Conotrachelus nenuphar*, 005  
*Contarinia schulzi*, 051  
Crambidae, D102, D164, D156, 028, D153, D158, D112, D094,  
D159, 014  
Crambidae, D077  
Cryptocercidae, D100  
*Cryptocercus darwini*, *wrighti*, D100  
Culicidae, 226  
Curculionidae, 066, 053, 005  
*Cydia pomonella*, 064  
Danaidae, 025  
*Danaus plexippus*, 025  
*Dectes texanus texanus*, D196  
*Diabrotia virgifera virgifera*, 056, 122, 223  
*Diabrotica barberi*, 148, D168  
*Diabrotica virgifera virgifera, barberi*, D186  
*Diabrotica virgifera, barberi, cristata, undecimpunctata howardi*,  
204  
*Diabrotica virgifera, barberi, virgifera zea*, D191  
*Diabrotica virgifera*, 123  
*Diabrotica*, D190  
*Diadegma insulare*, 209  
Diaspididae, 207, 208  
*Diatraea, Ostrinia, Cotesia saccharalis, grandiosella, nubilalis,*  
*flavipes*, D157  
Diptera, D166  
*Drosophila cardini* subgroup, 228  
Drosophilidae, 228  
Elateridae, 227  
*Empoasca fabae*, D114  
Eriophyidae, D101  
*Eulecanium cerasorum*, 212  
Formicidae, 203  
*Frankliniella occidentalis*, 023, D084  
*Galerucella calmariensis*, 059  
Geocoridae, D073  
*Geocoris uliginosus*, D073

*Haematobia irritans* (L.), 063  
*Harmonia axyridis*, D107  
*Harpalus erraticus*, 215  
*Helicoverpa zea*, 143, 144  
*Heliothis virescens*, 057  
*Hippodamia convergens*, D098  
Hodotermitidae, D198  
Ichneumonidae, 209, 022  
Lumbricidae, D113  
*Lumbricus terrestris*, D113  
Lygaeidae, 010  
*Mayetiola destructor*, 017  
*Megastigmus aculeatus*, D161  
*Microctonus aethipoides*, D155  
*Musca domestica*, 131, D104  
Muscidae, 062, 063, D104, 131  
*Myzus persicae*, 011, 024  
*Nicrophorus americanus*, D163  
*Nicrophorus and Thanatophilus marginatus, guttula, obscurus and lapponicus*, D075  
*Nicrophorus marginatus*, D081  
*Nicrophorus, Necrodes americanus, orbicollis, pustulatus, surinamensis*, 002  
Noctuidae, D154, 143, 144, 057  
*Ostrinia nubilalis*, 014, D094, D156  
Otitidae, 061  
*Phormia regina*, D083  
*Phyllotreta cruciferae*, 055  
Phytoseiidae, D096  
*Phytoseiulus persimilis*, D096  
*Pimpla disparis*, 022  
*Plodia interpunctella*, 020, D115  
*Popillia japonica*, D068  
Pyralidae, 021, 020, D099, D115, 229  
Pyralidae, Crambidae, Braconidae, D157  
*Pyrophorus plagiophthalmus*, 227  
*Reticulitermes flavipes*, 139, 150  
*Rhagoletis pomonella*, 230  
Rhinotermitidae, D091, 136, 139, 149, 150  
*Rhyzopertha dominica*, D103, D108  
Scarabaeidae, D068  
*Schizaphis graminum*, D111  
*Schizaphis, Rhopalosiphum, Diuraphis graminum, padi, noxia*, 147  
Silphidae, 002, D163, D075, 003, D076, D081

*Sitophilus oryzae*, 066  
*Stomoxys calcitrans* (L.), 062  
*Systema blanda*, 052  
Tenebrionidae, 012, 018, D070, 009  
Tenebrionidae, Silvanidae, Pyralidae, 128, 152  
*tentans*, D092  
Tephritidae, 230  
Termopsidae, D162  
*Tetanops myopaeformis*, 027, 061  
Tetranychidae, 034, 032, D097, D072  
*Tetranychus urticae*, D072, D097  
Thripidae, 031, 023  
Tortricidae, 064  
Torymidae, D161  
*Tribolium castaneum*, 009, D070  
*Tribolium confusum*, 012  
*Tribolium*, *Oryzaephilus*, *Plodia castaneum*, *surinamensis*,  
*interpunctella*, 152  
*Trichoplusia ni*, D154  
*Unaspis euonymi*, 208  
*Zootermopsis nevadensis*, D162,



## Keyword Index

3243M	146
<i>Bacillus thuringiensis</i>	D094
<i>Chorebidea</i>	021
<i>Chorebidella</i>	021
<i>Itopectis conquisitor</i>	022
<i>Plodia interpunctella</i>	D115
<i>Solanum tuberosum</i> L.	060
achiasmatic	D158
acoustic communication	229
action thresholds	031, 033
activity period	D075
adoption	019
adult learners	D176
Aesthetic thresholds	036
Affect of Light	002
agroforestry	D165
Alfalfa	D185
alfalfa weevil	D165
allozymes	D100
alpha tubulin	D070
alternate hosts	148
American Burying Beetle	002, D163
<i>Anopheles gambiae</i>	226
ants	203
Aphelinids	207
<i>Aphelinus albipodus</i>	D160
aphid trapping	060
aphids	D178, 151
<i>Aphis glycines</i>	D071, D090
apple	D107
apples	064, 005
aquatic insects	D172
armored scales	208
arthropod-weed interactions	D087
atrazine	D092, 013
<i>Bacillus thuringiensis</i> resistance	D153
<i>Bacillus thurnigiensis</i>	014
baculovirus	D154
bait aversion	132
Banded sunflower moth	016

bean leaf beetle	D106, D086, 050
Bean pod mottle virus	119, 050
beetles	D192
behavior	D109, D164, D079, D096, D196, D090, D170
Big-eyed bug	D073
Binding analysis	D159
binomial	015
bioassessment	D172
biodiversity	D165, D082
biological control	222, 049, D072, D161
bioluminescence	227
biorational insecticides	055
Biotechnology	219, D189
Blissus	010
Bradysia	D166
breeding structure	D162, D100
brood	D074
brood ball	D076
Bt	D109, D156, D188, D189
Bt Corn	D077, D186, 220, 014
Bt Crops	217
burying beetle	D076
Cabbage Aphid	053
Cabbage seedpod weevil	053
calico scale	212
Calliphoridae	D199
Callisto	D182
canola	054, 055
Carabidae	215
carrion	D081
carrion beetle	D075
caste differentiation	139
Cattle	062
CD	D181
chinch bug	010
Chironomus tentans	D092
Clothianidin	D195
Cochylidae	016
Cold hardiness	D115
community ecology	004
competition	022
confocal	D155

conservation	001, D167
conservation biocontrol	211
conservation biological control	208, 210, 213
control	063
Corn	141, 143
Corn Ear Worm	144
corn earworm	143
corn injury	D182
Corn Rootworm	145, D179, 123
Corn Rootworms	141
cotton	D098, 144
cover crops	027
Crop insect management	D175
crop rotation	118, 123
cropping system	008
crucifer flea beetle	054, 055
Cry34/35Ab1	D190
Cry34Ab1	D183
Cry35Ab1	D183
Cry3Bb1	D113, D088
Cryptocercus	D100
cultivars	023
Cumulative pest density	032
Cuphea	056
curculio	005
CYP4	D092
Damage threshold	032
DAS-59122-7	D190, D191
DE	066
decay	D076
Decision making	036
decision-making	035
declining populations	D167
defoliation	D086, 007
degree days	D083
degree-days	006
deterrents	D114
<i>Diabrotica</i>	118
<i>Diabrotica virgifera</i>	123
diapause	230, D073
diatomaceous earth	D108
digestive proteases	017
Diptera	D166

disease transmission	119
dispersal	D103
disturbance	202, 149
Diuraphis noxia	D089, 147
diurnal	D075
DNA marker	D111
Dose	D186
Drosophila	228
ear tags	063
early warning	065
Education	D080, D180, D105
efficacy assessment	152
elevated temperature	018
emergence	202
Endangered Species	D163
entomological knowledge	D180
entomological literature	D180
entomopathogenic nematodes	210
EPA	217
epidemiology	131
Eulecanium cerasorum	212
European corn borer	D102, D164, D077, 014
Event	145, 146
evergreen bagworm	022
evolution	228
Evolutionary genetics	229
Experimental Design	219
expressed sequence tag database	122
fecundity	209
Feed mills	009
feeding preferences	150
Fipronil	136
fire	205
Fitness	142
flea beetles	D194
flonicamid	D178, 151
Flower density	207
flowering plants	213
food processing	129
food-borne pathogen	131
foraging behavior	D198
forensic entomology	006, D083
functional herbivores	203

fungus gnats	D166
garlic mustard	059
Gene Expression	013
generalist predators	D169
genetic linkage map	D111
genetics	D096
genomics	122, 139
German cockroach	132
glandular trichomes	D114
glyphosate resistant soybean	D087
grape	D107
grassy weeds	148
grazing	205
greenhouse	201, 031, 034, 033
ground cover	215
growth	029
gut-content analysis	058
<i>Harmonia axyridis</i>	D095
heat treatment	128
heat treatments	012
<i>Helianthus annuus</i>	051
hemocyte	D157
Herbivores	214
Hessian fly	225
honey bee	D074
horn fly	063
host age preference	D160
host plant resistance	011, D090
Host selection	026
host-selection	D114
house fly	131
hydration	D084
immune system	D157
immunity	D154
impatiens	D084
importance	D097
Indian mealmoth	020, D099
insect	007
insect management	212
Insect resistance management	144, D187
insect vision	D078
insertional mutagenesis	D070
integrated pest management	031, 064, 051

Internet	D175
intraspecific variation	225
IPM	D177, 007, 019, 033
IRM	D102, D179, D188, D191
juvenile hormone	057
lady beetle	D098
lady beetles	D167
landscape	024
landscapes	035
larval movement	187
leafhoppers	D194
light	D079
<i>Lumbricus terrestris</i>	D113
<i>Lygus</i>	053
macroinvertebrate	
male pheromone	003
Mark-Recapture	D163
Master gardener	D176
mate choice	229
Mating Behavior	D168
<i>Mayetiola destructor</i>	017
Mechanisms	D159
<i>Megastigmus</i>	D161
<i>Metarhizium anisopliae</i>	027
microbial control	
microsatellite	D162, D104
microsatellites	226, 020
microvilli	D155
MIR152	146
MIR604WR	145
Mites	D110
modelling	012
molecular evolution	227
monoclonal antibodies	058
movement	118, 119, 149
mtDNA	225, D093
mulch	150
<i>Myzus lythri</i>	D095
<i>Myzus persicae</i>	011
natural enemies	213
Natural selection	227
Nocturnal Species	002
Non target	D110

non-target	025
Non-Target Risk Assessment	217
non-target species	220
Nontarget	223, D088
northern corn rootworm	148
Noviflumuron	D091
oocyte maturation	057
organic farming systems	D169
Organophosphates	013
<i>Orius insidiosus</i>	D071
<i>Ostrinia nubilalis</i>	D156
oviposition	D164, 008
palestriped flea beetle	052
parasitoid	209, 021, D157
parasitoids	210, D069, 049, D099
patency	057
PCR	D096
PCR-RFLP	D093
pest management	054, D169
pest outbreaks	065
Pest-Crop interaction	D196
pesticide efficacy	D177
pheromone trapping	D170
Photoperiod	D073
physiology	001
pigmentation	228
pitfall trap	D081
plant resistance	017, 010, D089
plant-incorporated protectant	D191
plant-insect interactions	201
pollen	023
Pollination	D199
polymorphic	D104
Poncho	142
Population dynamics	D104
population genetics	028, 020
population pattern	D198
postmortem interval	006
potato	D178
Potato Leafhopper	D185
powdered sugar	D074
prairie	204
predator	222, D080

predator release ratios	023
predator-prey interactions	058
Predators	214
presence-absence sampling	D097
Prey	D080
prey suitability	D095
product sampling	004
proteinase	014
purple looestrife	059
pyrethroid insecticide	D106
pyrethroid resistance	143
QTL	D158
Quadris	D174
quantitative trait loci (QTL)	D111
raspberry	D107
Rearing	D199
recombination frequency	D158
recommendation	D173
reduced-risk insecticide	215
regression	D171
remote sensing	024
reproductive effects	018
reproductive performance	D101
residues	152
Resistance	D156, D159
Resistance management	D186, D168, D094, 014
Resistance mechanisms	014
restoration	D172, D082
<i>Reticulitermes</i>	149, 150
<i>Rhagoletis pomonella</i>	230
<i>Rhopalosiphum padi</i>	D089, 147
<i>Rhizopertha dominica</i>	D108, D103
Riparian Buffers	D069
risk assessment	222, 219, 220, 025
rootworm	056, D109, D187
rootworm management	124
Rootworms	D190
Rosa multiflora	D161
rotation resistance	122
rough rice	D108
Roundup Ready	D110
sampling	034
sanitation	129



Scales	207
<i>Schizaphis graminum</i>	D193, 147
schools	019
Screwworm	D093
secondary production	029
seed predator	D161
Selenium	D154
Sentricon baiting system	D091
sequential sampling	015
serosal	D155
Sexual Selection	D168
Silphidae	003, D081
software	D181
soil insecticides	D182
Soil invertebrates	D082
<i>Solanum tuberosum</i>	011
sorghum	D098
South Dakota	052, D197
Soybean	D173, D106, D174, D171, D184
soybean aphid	D173, 015, D184, D160, 049, D197, D181
soybean yield	D197
soybeans	050
speciation	226, 230
spiders	211
spinosad	128
Sprayer	062
Stable Fly	062
stable isotopes	211
storage	066
stored corn	D192
Stored product pest	D078
stored products	D099, 129
stored-grain insects	152
stored-product insects	009, 128
stored-products	066, D170
subterranean termites	D198, D091, 136
sugarbeet	027
sugar-feeding	209
Sunflower	016, 052
Supercooling point	D115
tall fescue	D194
tallgrass prairie	205

temperature	029
Termidor	136
termite	139
<i>Tetanops myopaeformis</i>	027
<i>Tetranychus urticae</i>	032
thermal variation	D083
thiamethoxam	D192
thresholds	034, 035
thrips	D084
Thysanoptera	D071
tiger beetle	001
tolerance	D111
transgenic corn	D094, D085, D179
transgenic	025, D105, D188, D113, D189
transposon	D070
trap	003
trapping	004, 009
traps	005
<i>Tribolium castaneum</i>	018
<i>Tribolium confusum</i>	012
twospotted spider mite	D097
ultrasonic monitor	D078
vector ecology	060
vegetables	151
vegetation	D171
viral diseases	D101
virus	024
vision	D079
Volatiles	214
Warrior	D174, D177
website	D105
weed biological control	059
weed management	D087
western corn rootworm	117, 124, 008, 223, D195
western corn rootworm variant	124
wetland	202
wheat	D102, D103
wheat curl mite	D101
yield	D086, D185
YieldGard	D085, 142, D195, 223
Zootermopsis	D1









