

# **PROGRAM**

**for the 1999 meeting of the**

*Pacific Branch*

**Entomological Society of America**

**Eugene, Oregon  
June 21-23**

**Jay F. Brunner  
President**

*Pacific Branch*  
**Entomological  
Society of America**

*President*

Jay F. Brunner  
Washington State University  
Tree Fruit Research and Extension Center  
1100 N. Western Avenue  
Wenatchee, WA 98801

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Department of Entomology  
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Riverside, CA 92521

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Department of Entomology  
University of California  
Riverside, CA 92521-0314

*Executive Committee Members at Large*

Robert A. Van Steenwyk (1999)  
Diane G. Alston (1999)  
John Stark (2000)  
Ed Bechinski (2000)  
Larry D. Godfrey (2001)  
Vincent P. Jones (2001)

*Headquarters and Meetings*

Eugene Hilton & Conference Center  
66 E. Sixth Avenue  
Eugene, OR 97401-2686  
(541) 342-2000

*Future Meetings*

2000 - Orange County, California  
2001 - Park City, Utah

## MEETING NOTES

### REGISTRATION:

Sunday, June 20	1:00 p.m. – 4:00 p.m.
Monday, June 21	7:00 a.m. – 10:00 a.m. 1:00 p.m. – 3:00 p.m.
Tuesday, June 22	8:00 a.m. – 10:00 a.m.

Everyone attending the Pacific Branch meeting or participating in the Special Events Program must register. The ESA registration desk will be located in the Eugene Hilton & Conference Center lobby near the Playwright's Hall. On-site registration is \$80.00 for members, \$20.00 for students, \$90.00 for non-members and \$25.00 for spouses and guests. Registration is complimentary for honorary members, emeritus members, and invited participants from outside the Pacific Branch or outside the profession.

**ABSTRACTS:** Abstracts are posted on the Pacific Branch ESA web site (<http://entomology.tfrec.wsu.edu/pbesa/index.htm>). Abstracts can be downloaded and printed or received as an e-mail attachment upon request to [PBESA@tfrec.wsu.edu](mailto:PBESA@tfrec.wsu.edu).

**AWARDS LUNCHEON:** The Awards Luncheon is scheduled for noon to 1:30 p.m. on Tuesday, June 22, (location to be announced). Tickets (for your choice of meat or vegetarian entrée) are \$20 each at the ESA registration table. The hotel will take a head count on Sunday so please buy your tickets early if possible. *The awards luncheon will be free for students participating in the paper or poster competitions.*

**BRANCH MIXER:** The Pacific Branch Mixer is planned for Monday evening, June 21, starting at 6:00 p.m. in the patio area off the Conference Center lobby. There is a nominal fee of \$5.00 for non-registered individuals, but only a limited number of tickets will be available at the ESA registration table and none may be purchased at the door.

**EMPLOYMENT OPPORTUNITIES:** An employment opportunities desk will be located in the Helmuth Rilling room. Hours are listed in the program. Anyone seeking employment is invited to provide a résumé, and any employer seeking to fill a position is encouraged to provide a description of the position and the name of a contact person attending the Branch meeting.

**AUDIO VISUAL:** Projectors will be provided for 35 mm (2 x 2) slides. If you intend to show slides, organize them in a standard 80-slide Kodak (or equivalent) carousel tray. Label the tray with your name, your paper number, and the scheduled time for your paper. Hand the tray to the projectionist on duty in your session meeting room at least 10 minutes before the start of the session. Reclaim the tray promptly after the

end of the session. Speakers may preview slides in the Helmuth Rilling room at the following times:

Monday, June 21	8:00 a.m. – 4:00 p.m.
Tuesday, June 22	8:00 a.m. – 4:00 p.m.

**SPEAKERS MUST PROVIDE THEIR OWN CAROUSEL SLIDE TRAYS. EXTRA SLIDE TRAYS WILL NOT BE AVAILABLE IN THE SESSION MEETING ROOMS OR THE SLIDE PREVIEW ROOMS.**

**POSTER DISPLAYS:** Poster displays will be presented in the Lillian Hellman Room in Playwright's Hall on Tuesday, June 22, from 9:00 a.m.–4:30 p.m. Display boards will be available to authors for setting up displays on Monday evening, June 21. Displays should be taken down by 5:30 p.m. on Tuesday, June 22. Poster boards are 4' x 8'. Boards are covered with the smooth part of velcro so displays can be attached using the "hook" part of velcro on the back of the display. **Push pins will not work.**

**SPECIAL EVENTS:** The special events information desk will be located near the ESA registration table in the Conference Center lobby and will be open from 1:00–4:00 p.m. on Sunday, June 20, and from 8:00 a.m.–12:00 noon on Monday, June 21.

**SUSTAINING ASSOCIATES:** The following companies are the Pacific Branch Sustaining Associates for 1999. They are listed by one of three levels of membership. Funds generated are used entirely in connection with the annual meeting of the Branch. Please take time to thank these companies for their generous support.

#### Platinum (\$1,000)

Trécé Incorporated

#### Gold (\$500)

Abbott Laboratories

E. I. DuPont de Nemours and Company

Gowan Company LLC

Meiji Techno America

Scenturion

Zeneca Ag Products

#### Silver (\$250)

3M Company

Elf Atochem North America, Inc.

Engelhard Corporation

Pacific Biocontrol

Uniroyal Chemical Company, Inc.

**INFORMATION:** Notices, meeting schedule changes and general information will be posted throughout the meeting on a bulletin board located near the ESA registration table. Personal messages may also be posted. More urgent messages can be left with the front desk at the Eugene Hilton & Conference Center at (541) 342-2000. Information on points of interest, dining and entertainment will also be available at the Special Events desk.

**EXECUTIVE COMMITTEE:** The Executive Committee of the Pacific Branch will meet Sunday evening, June 20, from 7:30–9:30 p.m. in Studio A.

**MEETING SCHEDULE:** Session moderators are responsible for keeping speakers on schedule. If a presentation is completed early, or canceled, the moderator must ensure that the next presentation begins at the scheduled time. Sessions must not get ahead or fall behind schedule. Be sure to check the information desk for last-minute schedule changes.

**AWARDS:** The C.W. Woodworth Award and the John Henry Comstock Award will be presented during the opening session on Monday morning, June 21. All other awards will be presented during the awards luncheon on Tuesday, June 22.

#### **HOUSING AND TRANSPORTATION:**

**Room allocation at the Hilton for the Pacific Branch meeting is full. Alternate lodging is available at the DoubleTree Hotel (541-726-8181).**

Headquarters for the meeting will be the Eugene Hilton & Conference Center located at 66 E. Sixth Avenue in Eugene, Oregon. Their telephone number is (541) 342-2000. Complimentary shuttle service is available from the Eugene Hotel and Conference Center to the Eugene airport. Guests can request the Hilton shuttle by dialing “7” at the baggage claim courtesy phones. Complimentary underground parking for 300 vehicles is available on a first-come, first-served basis. Public parking is available on 7th Avenue for approximately \$5.00 per day if the adjacent parking lot is full. The Hilton does not validate parking passes for nearby garages, nor does it reimburse guests for charges incurred when a vehicle is parked illegally in the underground garage. Bus service is conveniently accessed outside the Hilton and can transport guests to nearby shopping venues, Valley River Center and the Lane County Fairgrounds.

The hotel has two restaurants, a fitness facility, pool and whirlpool open from 6:00 a.m. to 12:00 midnight. Each guest room is equipped with a coffee maker, hair dryer, iron and full-sized ironing board, two telephones, dataport, voice mail and separate work desk. In addition, all guest rooms feature a mini balcony with child-proof locks.

Biking and jogging trails are located just minutes from the hotel and wind through nearby Alton Baker Park and along the Willamette River.

**WEATHER:** The Eugene area should be warm and pleasant in June, with daytime highs in the mid-high 70s and lows in the mid 60s. Be prepared for occasional showers.

**Please remember to bring this program with you. Participants will be charged for additional copies.**

**CHARLES W. WOODWORTH**  
**The Man We Honor**

In the establishment of the C.W. Woodworth Award for Outstanding Achievement in Entomology, it is appropriate to briefly review his biography and some of his significant achievements.

Charles William Woodworth was appointed in 1891 as assistant professor of entomology at the University of California, Berkeley. In 1904, C.W. Woodworth attained the rank of associate professor, was raised to full professor in 1913, and retired as emeritus in 1930. Professor Woodworth headed the Division of Entomology at the University of California until 1920. Dr. Woodworth's appointment at UC Berkeley was timely in that it was coincident with the rise of entomology as a discipline at the state and federal levels. He is credited with paving the way for the advancement of entomology both in the College of Agriculture and in the Agricultural Experiment Station.

Professor Woodworth brought to entomology an advanced viewpoint and appreciation of economic considerations, new teaching techniques, novel systematic approaches and, in general, a scientific stature well above its amateurish beginnings.

Professor Woodworth stressed cooperation and encouraged teamwork between those associated with him at the university and with those engaged in agriculture. He was not only interested in the development and use of insecticides but he was also a keen observer and an ecologist of note. He emphasized an understanding of the life histories and habits of insects. Dr. Woodworth recognized that insecticidal treatments were often applied to no avail, a concept well ahead of his time.

Professor Woodworth made many practical contributions on the biology and control of grasshoppers, Argentine ant, grape phylloxera and grape leafhoppers.

C.W. Woodworth was keenly interested in education. He organized the University of California Entomological Society in 1895 and was a fellow in the American Association for the Advancement of Science, an honorary member of the Entomological Society of America, a member of the Cambridge Entomological Club and its president in 1891.

C.W. Woodworth is credited with having had a profound influence on entomological instruction; the addition of new and advanced courses in entomology; the bringing into the university of outstanding scientists; the improvement of teaching facilities and experiment stations; and, in general, bringing into maturity the place of entomology as a most highly respected field of science in the university.

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**Dr. Wyatt W. Cone**  
**C.W. Woodworth Award Winner**



**Specialty Crop Entomology in the Pacific Northwest**

The C.W. Woodworth Award annually recognizes a person in the Pacific Branch of the ESA who has made outstanding contributions to entomology during the past decade. The 1999 C.W. Woodworth Award goes to Dr. Wyatt W. Cone.

Dr. Cone received his A.B. degree in zoology-botany at San Diego State College in 1956 and his Ph.D. in entomology-plant ecology from Washington State University in 1962. He has been a faculty member of the Department of Entomology at Washington State University since 1961 and has served as Acting Superintendent of the Irrigated Agriculture Research and Extension Center (now WSU Prosser) in Prosser, Washington, various times since 1977. During his career he has had responsibility for developing pest management programs on hops, grapes, red currants and asparagus in Washington State. He has supported more graduate research assistants than any other member of the Department of Entomology faculty at WSU.

Together with Ph.D. and M.S. student research associates David Penman, Alan Crooker and Robert Sites, Dr. Cone pioneered work on biological and non-pesticidal control of two-spotted spider mite (mating and chemical communication) and hop aphid. Farnesol, a male mite arrestant-attractant was first identified by Dr. Cone. The compound has since been synthetically produced and marketed as Stirrup-M for mite management on strawberries and dry bean in the western U.S. He established the value and potential supplementary use of predaceous mites and coccinellids (with research associate C. Campbell) for controlling hop pests and demonstrated the use of oils that were compatible with natural enemies as alternatives to aphidicides. He discovered that female grape mealybug produced an attractant for male mealybug (with Liz Shaw, M.S. student) and established crop protection against grape mealybug and cutworm through section 18 labels. He developed the first information on grape leafhopper feeding and plant-antifeedant reactions (with Jeff Wells, M.S. student, and Kirk Olsen, Ph.D. student). He pioneered development of effective crop protection measures to control stem borer and girdlers in currants. He has explored the use of entomophagous nematodes

for long-term biological control of black vine weevil in grapes (with Ludger Wennemann, Ph.D. student) and aphidophagous parasitoid control of asparagus aphid (with Tedd Wildman, M.S. student). In 1990 he received the prestigious Walter Clore award for his work on grapes. A new species of parasitic wasp attacking hop aphid was named after him in recognition of his work on hops. He has authored or co-authored several book chapters and a multitude of research papers and extension bulletins. His research has been supported by more than two million dollars in research grants. He played a major role in obtaining many minor use registrations for pest management on wine and juice grapes, asparagus, hops and red currants.

Dr. Cone was instrumental in securing funds, designing and establishing the new Hop Research Laboratory at WSU Prosser. He also played a key part in securing funds, designing and establishing the Food and Environmental Quality Laboratory (FEQL) at WSU Tri-Cities.

As an instructor, Dr. Cone developed and offered the first acarology course at WSU and the first agricultural entomology course offered at WSU Tri-Cities and extended to WSU Pullman via WHETS. He has lectured or been involved in countless seminars and workshops for community colleges, commodity groups, Master Gardeners, other agencies and universities such as Cornell, San Diego State, Ohio State and North Carolina State, and national and international forums such as England, Germany, Hungary and India.

Dr. Cone has been very active in serving on committees and boards of directors for Washington State University, his community, service clubs and church. Since 1998, Dr. Cone has received the International Order of the Hop Award, a most prestigious international award recognizing his contributions to the hop industry on a world basis. He has also been recognized and honored with research awards by the Washington Hop Growers, the Washington State Grape Society, the Washington Association of Wine Grape Growers and the Washington Red Currant Growers Association.

Dr. Cone has been a member of and has served on ESA committees for more than 35 years. Most notable is his service as member of the ESA Governing Board from 1984–86 and President of the Pacific Branch in 1992–93.

His research has been one of successful discovery, a blend of basic and applied work, a cornerstone for integrated pest management and crop and environmental protection. In summary, Dr. Wyatt W. Cone is a solid researcher, scientist, educator, entomologist and servant of the Entomological Society of America. His achievements more than merit the special recognition of the C.W. Woodworth Award.

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### César Rodríguez-Saona Comstock Award Winner



The John Henry Comstock Award recognizes an outstanding graduate student in entomology in the geographic region served by the Pacific Branch. The 1999 Comstock Award goes to Mr. César Rodríguez-Saona.

Mr. César Rodríguez-Saona completed his Bachelor of Science degree in biology from the Universidad Nacional Agraria, Lima, Peru. In 1994, he obtained his Master's degree in entomology from Oregon State University. For the past five years he has worked for his Ph.D. degree in entomology, which he completed in May of 1999 at the University of California, Riverside. His general interest is the study of plant chemicals and their effects on phytophagous insects and their natural enemies. His interest in entomology began in Peru in 1987 during early studies he conducted on a then recently introduced whitefly, *Bemisia tabaci*, and its natural enemies.

#### **Avocado Idioblast Oil Cells: Defensive Role Against Herbivory and Chemistry of Insecticidal Components**

The role that idioblast oil cells play in plant defense against herbivory and the chemistry of oil cells is poorly known, in spite of their widespread occurrence in many plant families. Idioblast oil cells are specialized cells that differ from other cells of the same tissue in form, structure and content, indicating a possible involvement of oil cells in the isolation and storage of toxic plant metabolites. Previous research demonstrated that the oil content from the avocado oil cells differs from other oils present in adjacent cells of the same tissue. Our initial experiments showed that the extracted idioblast oil was toxic to, and deterred feeding by, the non-adapted generalist herbivore beet armyworm *Spodoptera exigua* (Hübner). Therefore, the hypothesis that oil cells provide defense against herbivorous insects was examined.

The toxicities of the intact oil cells and the extracted oil were compared among three herbivores: *S. exigua*, the omnivorous looper *Sabulodes aegrotata* (Guenée), and the soybean looper *Pseudoplusia includens* (Walker). The latter two species feed on avocados. Bioassays were conducted using naturally occurring concentrations of idioblast oil cells (2% w/w). *S. exigua* larvae fed diet containing oil cells had higher mortality, reduced growth and prolonged developmental times compared to

controls. Choice tests showed that *S. exigua* avoided diet containing oil cells, whereas the adapted herbivores did not. Subsequent experiments to separate pre- and post-ingestive effects of the oil cells and the extracted oil showed that post-ingestive adaptation was the apparent mechanism allowing adapted herbivores to feed on avocados. Thus, reduced performance of the non-adapted *S. exigua* suggests that idioblast cells play a role in plant anti-herbivore defense.

The active compounds present in the avocado idioblast oil were identified. Persin, (12Z, 15Z)-1-acetoxy-2-hydroxy-4-oxo-heneicosa-12,15-diene, was present in one of eight fractions collected using low pressure liquid chromatography. Following further fractionation of a second active fraction, five compounds, 2-(pentadecyl)furan, 2-(heptadecyl)furan, 2-(1*E*-pentadecenyl)furan, 2-(8Z,11Z-heptadecadienyl)furan (referred to as avocadofurans), and the triglyceride triolein, were identified. Avocadofurans had low to moderate toxicity. Of them, 2-(pentadecyl)furan and 2-(heptadecyl)furan had the greatest effects against *S. exigua* larvae. Because of their unusual chemistry, oil cells may serve as a source for new plant-derived compounds with insecticidal activity.

Eugene Hilton & Conference Center  
Program At-A-Glance

	<b>Morning</b>	<b>Afternoon</b>	<b>Evening</b>
<b>Sunday June 20</b>		Registration (1:00–4:00) <i>Conference Center lobby near Playwright’s Hall</i> Special Events Information Desk (1:00–4:00) <i>Conference Center lobby</i>	<b>Executive Committee Meeting</b> (7:30–9:30) Studio A
<b>Monday June 21</b>	Registration (7:00–10:00) <i>Conference Center lobby near Playwright’s Hall</i> Audio-Visual Preview (8:00–12:00) <i>Helmuth Rilling Room</i> Employment Desk (8:00–12:00) <i>Helmuth Rilling Room</i> Special Events Information Desk (8:00–12:00) <i>Conference Center lobby</i> <b>Opening Session</b> (8:30–11:45) <i>Wilder &amp; Hansberry Rooms</i>	Registration (1:00–3:00) <i>Conference Center lobby</i> Audio-Visual Preview (1:00–4:00) <i>Helmuth Rilling</i> Employment Desk (1:00–5:00) <i>Helmuth Rilling</i> <b>Session A:</b> Graduate Student Symposium <i>Thornton Wilder Room</i> (1:00–3:55) <b>Session B:</b> Symposium on Exotic Species Introductions into the Western United States <i>Lorraine Hansberry Room</i> (1:00–4:40)	Pacific Branch of ESA <b>Mixer</b> 6:00–9:00 p.m. in the patio area off the Conference Center lobby
<b>Tuesday June 22</b>	Registration (8:00–10:00) <i>Conference Center lobby</i> Audio-Visual Preview (8:00–12:00) <i>Helmuth Rilling Room</i> Employment Opportunities (8:00–12:00) <i>Helmuth Rilling Room</i> <b>Session A:</b> MS and PhD student paper competition (8:30–11:34) <i>Thornton Wilder Room</i> <b>Session B:</b> Submitted papers: (8:30–11:22) <i>Lorraine Hansberry Room</i> <b>Session C:</b> Submitted papers: (8:30–11:34) <i>Edna Ferber Room</i> <b>Session D:</b> All poster displays: (9:00–12:00) <i>Lillian Hellman Room</i>	Audio-Visual Preview (1:00–4:00) <i>Helmuth Rilling Room</i> <b>Awards Luncheon:</b> (12:00–1:30) <i>Location to be announced</i> <b>Session A:</b> Symposium on Teaching with Insects (1:30–4:50) <i>Thornton Wilder Room</i> <b>Session B:</b> Symposium on IPM in Small Fruit Crops: Pest, Present and Future (1:30–4:50) <i>Edna Ferber Room</i> <b>Session C:</b> Symposium on Insect Behavior: Understanding Management, Monitoring and Control (2:00–4:45) <i>Lorraine Hansberry Room</i> <b>Session D:</b> Poster displays (cont.) (1:30–4:30) <i>Lillian Hellman Room</i>	<b>8:00–10:00 Linnaean Games</b> <i>Vistas I</i>
<b>Wednesday June 23</b>	<b>Annual Business Meeting</b> (9:00- 11:30) <i>Thornton Wilder Room</i>		



## PROGRAM

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### Sunday Afternoon, June 20

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- 1:00–4:00 p.m. **Registration**  
*Conference Center lobby near  
Playwright's Hall*
- 1:00–4:00 p.m. **Special Events Information**  
*Conference Center lobby at ESA  
registration table*
- 7:30–9:30 p.m. **Executive Committee  
Meeting**  
*Studio A*

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### Monday Morning, June 21

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- 7:00–10:00 a.m. **Registration**  
and  
1:00–3:00 p.m. *Conference Center lobby near  
Playwright's Hall*
- 8:00 a.m.–  
12:00 noon **Special Events Information**  
*Conference Center lobby at ESA  
registration table*
- 8:00 a.m.–  
5:00 p.m. **Audio Visual Preview**  
*Helmuth Rilling Room*
- 8:00 a.m.–  
5:00 p.m. **Employment Opportunities**  
*Helmuth Rilling Room*

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- 8:30–  
11:45 a.m. **Opening Session and  
Business Meeting**

*Wilder & Hansberry Rooms*

- 8:30 **Opening Remarks**  
*Jay F. Brunner, President  
Pacific Branch, Entomological  
Society of America*
- 8:50 **Report From the National  
Organization**  
Chris Oseta, President  
*Entomological Society of America*

- 9:10 **Presentation of C.W.  
Woodworth Award and Address**  
*Jay F. Brunner, President  
Pacific Branch, Entomological  
Society of America*

**Wyatt W. Cone**, Entomologist Emeritus  
Department of Entomology  
Washington State University  
WSU-Prosser (Irrigated Agriculture  
Research and Extension Center),  
Prosser, WA 99350

Specialty Crop Entomology in the  
Pacific Northwest

- 9:45 **BREAK**

- 10:00 **Presentation of John Henry  
Comstock Award and Address**  
*Jay F. Brunner, President  
Pacific Branch, Entomological  
Society of America*

**César Rodríguez-Saona**, Graduate  
Student, Department of Entomology  
University of California at Riverside  
Riverside, CA 92521

Avocado Idioblast Oil Cells: Defensive  
Role Against Herbivory and Chemistry  
of Insecticidal Components

- 10:35 **Preliminary Business Session**  
*Jay F. Brunner, President  
Pacific Branch, Entomological  
Society of America*

- 11:15 **Report from the National Office**  
Kaye Meckley, Director of Services  
*Entomological Society of America*

- 11:45 **ADJOURN**

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Monday Afternoon, June 21

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1:00–3:55 p.m.

**Session A**  
**GRADUATE STUDENT SYMPOSIUM**

**Thornton Wilder Room**

Organized by the Graduate Student Committee

**Jennifer Carder, Chairperson**  
Department of Entomology  
University of Hawaii at Manoa  
Honolulu, HI 96822

- 1:00 Introduction/Moderator:  
**Jennifer Carder**
- 1:10 1. Understanding the Biology of  
*Otiorynchus sulcatus* as a Prelude to the  
Development of an IPM Strategy  
**TunyaLee A. Morisawa** and Michael P.  
Parrella, Department of Entomology,  
University of California, Davis, CA 95616
- 1:35 2. Predatory Role of *Neoseiulus fallacis*  
(Garman) in Red Raspberry Fields: Spatial  
Dynamics in an Acarine Predator-Prey  
System  
**Malika Bounfour**, Department of  
Entomology, Washington State  
University, Vancouver Research and  
Extension Unit, Vancouver, WA 98665
- 2:00 3. Challenges to Developing a Mass Rearing  
Program for *Anagyrus ananatis* Gahan  
(Hymenoptera: Encyrtidae)  
**Raju R. Pandey** and Marshall W. Johnson,  
Department of Entomology, University of  
Hawaii at Manoa, Honolulu, HI 96822

2:25 **BREAK**

Moderator:  
**John Rumph**  
Department of Entomology  
Washington State University  
Pullman, WA 99164-6382

2:40 4. Geographic Variation in Mating Behavior  
in Sepsid Dung Flies (Diptera: Sepsidae).

**Katja-Sabine Schulz**, Department of  
Entomology, University of Arizona,  
Tucson, AZ 85721

3:05 5. Vector Capacity of the Biting Midge  
*Culicoides variipennis sonorensis* with  
Regard to Transmission of Bluetongue  
Virus

**A. C. Gerry**, B. A. Mullens, J. O. Mecham  
and N. J. Machlachlan, Department of  
Entomology, University of California,  
Riverside, CA 92507

3:30 6. Impacts of Edge Effects on Arthropod  
Diversity and Trophic Structure in Old-  
growth Douglas Fir Forests in Western  
Oregon

**Timothy T. Work** and Timothy D.  
Schowalter, Department of Entomology,  
Oregon State University, Corvallis, OR  
97331

3:55 **ADJOURN**

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1:00–4:40 p.m.

**Session B: SYMPOSIUM**  
**Exotic Species Introductions into**  
**the Western United States**

**Lorraine Hansberry Room**

**Organizer/Moderator:**  
**Kathleen J. R. Johnson**

Oregon Department of Agriculture  
635 Capitol Street NE  
Salem, OR 97310-0110

1:00 Introduction

1:05 7. Red Imported Fire Ant in California:  
Status and Plan of Attack

**Robert V. Dowell**, California  
Department of Food and Agriculture,  
1220 N Street, Sacramento, CA 95814

1:30 8. 1998 Detection and Delimiting  
Surveys for Exotic Pest Lepidoptera  
in Western Washington

**Eric LaGasa**, Washington State  
Department of Agriculture, Olympia,  
WA 98504-2560

1:55 9. Invasive Fruit Fly Activity in  
California

**Ted Batkin**, Citrus Research Board,  
325 W. Oak, Visalia, CA 93291

2:20 10. Exotic White Flies in the Western  
U.S.—Past, Present and Future

Thomas S. Bellows, Jr. and **David H.**  
**Headrick**, Crop Science Department,  
California Polytechnic Institute, San  
Luis Obispo, CA 93407

2:45 **BREAK**

3:00 11. New Exotic Threat to North American  
Urban Landscapes: an Asian  
Longhorned Beetle, *Anoplophora*  
*glabripennis*

**Richard Hoebeke**, Department of  
Entomology, Cornell University,  
Ithaca, NY 14853

3:25 12. Monitoring High-Risk Sites for  
Exotic Wood-Boring Beetles and  
Wood Wasps in Oregon

**Alan D. Mudge**, James R. LaBonte and  
Kathleen J. R. Johnson, Oregon  
Department of Agriculture, Plant  
Division, Salem, OR 97301-2532

3:50 13. What Pathways for Introducing Exotic  
Pests Are Still Open?

**Kathleen J. R. Johnson**, Oregon  
Department of Agriculture,  
635 Capitol Street NE,  
Salem, OR 97310-0110

4:15 14. The Incursion of Exotic Arthropod  
Species into Hawaii: (and Why We  
Need More...)

**Russell H. Messing**, Department of  
Entomology, University of Hawaii,  
Kapaa, HI 96746

4:40 **QUESTIONS AND ADJOURN**

**Monday Evening, June 21**  
**6:00 p.m. – 9:00 p.m.**

**Pacific Branch Mixer**  
*Patio area off the*  
*Conference Center lobby*

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**Tuesday Morning, June 22**

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- 8:00–10:00 a.m.     **Registration**  
*Conference Center lobby near  
Playwright's Hall*
- 8:00 a.m.–  
4:00 p.m.           **Audio Visual Preview**  
*Helmuth Rilling Room*
- 8:00 a.m.–  
12:00 noon         **Employment Opportunities**  
*Helmuth Rilling Room*

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- 8:30–11:34 a.m.
- Session A**  
**M.S. and Ph.D.**  
**Student Paper Competition**

**Thornton Wilder Room**

**Moderator:**  
**Brian Bret**  
Dow AgroSciences  
Western Crop Business  
3835 North Freeway Boulevard  
Sacramento, CA 95834-1955

**M.S. Papers**

- 8:30     15. Arthropod Effects on Stand Establishment  
of Sugarbeets in California
- Kelly J. Brewer** and Larry D. Godfrey,  
Department of Entomology, University of  
California, Davis, CA 95616
- 8:42     16. Developing a Stink Bug Monitoring  
Program Acceptable to Processing Tomato  
Pest Control Advisers
- Eileen M. Cullen**, Frank G. Zalom, Mary  
Louise Flint and Eric E. Zilbert, Department  
of Entomology, University of California,  
Davis, CA 95616
- 8:54     17. Potential Impact of Acorn Feeding Larvae  
on Two Southern California Oaks
- Connell E. Dunning**, Richard A. Redak and  
Timothy D. Paine, Department of  
Entomology, University of California,  
Riverside, CA 93521

- 9:06     18. Difficulties of Developing an IGR Bioassay  
for Pear Psylla

**Greg T. Hannig** and John E. Dunley,  
Department of Entomology, Washington  
State University, Tree Fruit Research and  
Extension Center, Wenatchee, WA 98801

- 9:18     19. Structural Differences Between Parapatric  
Sagebrush-bunchgrass and Cheatgrass  
Communities

**C. N. Looney** and R. S. Zack, Department of  
Entomology, Washington State University,  
Pullman, WA 99164-6382

- 9:30     20. Host Suitability of *Thrips palmi* (Karny)  
(Thysanoptera: Thripidae) on Selected  
*Ficus* Species

**Cheryle A. O'Donnell** and Michael P.  
Parrella, Department of Entomology,  
University of California, Davis, CA 95616

- 9:42     21. Regional Analysis of Spider Mites and  
Predacious Mites on Grape in Western  
Oregon

**D. A. Prischmann** and Brian A. Croft,  
Department of Entomology, Oregon State  
University, Corvallis, OR 97331

- 9:54     **BREAK**

- 10:10    22. The Contributions of Frank Benton to Bee  
Importations in the 1880's

**Jamie Strange**, Department of Entomology,  
Washington State University, Pullman, WA  
99164-6382

- 10:22    23. Behavioral Response of *Hippodamia  
convergens* (Convergent Ladybird Beetle)  
to Insectary Plants

**Ken Wise** and Edward John Bechinski,  
Department of Plant, Soil and  
Entomological Sciences, University of  
Idaho, Moscow, ID 83844

- 10:34 24. The Development of a Marker to Determine the Foraging Range of Argentine Ant Populations

**Stephanie Young** and Michael K. Rust,  
Department of Entomology, University of  
California, Riverside, CA 92521-0314

### Ph.D. Papers

- 10:46 25. Induced Response of Red Raspberry Plants to Spider Mite Feeding (Acari: Tetranychidae)

**M. Bounfour** and L. K. Tanigoshi,  
Department of Entomology, Washington  
State University, Vancouver Research and  
Extension Unit, Vancouver, WA 98665

- 10:58 26. Spatial Distribution of Formosan Subterranean Termite Foraging in a Laboratory Arena

**Cory E. Campora** and J. Kenneth Grace,  
Department of Entomology, University of  
Hawaii at Manoa, Honolulu, HI 96822

- 11:10 27. Potential Impacts on Control: Toxicity of Phloxine B to *Ceratitis capitata* and its Parasitoid, *Fopius arisanus*

**Jennifer B. Carder** and Marshall W.  
Johnson, Department of Entomology,  
University of Hawaii at Manoa, Honolulu,  
HI 96822

- 11:22 28. Unintended Tritrophic Consequences of Crop Domestication: the Case of Sunflowers

**Yolanda H. Chen** and Stephen C. Welter,  
Division of Insect Biology, University of  
California, Berkeley, CA 94720-3112

11:34 **ADJOURN**

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8:30–11:22 a.m.

### Session B Submitted Papers

**Lorraine Hansberry Room**

**Moderator:**

**Barat Bisabri**  
Dow AgroSciences  
109 Canon Drive  
Orinda, CA 94563

- 8:30 29. Sampling and Control of Grape Mealybug in Table Grapes

**Walt Bentley**, Peggy Schrader and Lee  
Martin, University of California,  
Kearney Agricultural Center, Parlier,  
CA 93648

- 8:42 30. Use of Success™ Naturalyte Insect Control as an IPM Tool in Tree Nuts

**Barat Bisabri**, Reed Kirkland, Tim  
Ksander, Steve Dietz and Mike Lees,  
Dow AgroSciences, Orinda, CA 94563

- 8:54 31. Control of Foliar Feeding Pests with *Beauveria bassiana* and Reduced Rates of Bt or Imidachloprid

**Benjamin Rogers**, Mark Hoard and  
Jim Britton, Mycotech Corporation,  
Salt Lake City, UT 84101

- 9:06 32. Effect of Oil-based Programs on Apple Pests and Predators in Central Washington

**D. Fernandez**, E. Beers, J. Dunley,  
J. Brunner and M. Doerr, Washington  
State University, Tree Fruit Research  
and Extension Center, Wenatchee, WA  
98801

- 9:18 33. Development of Attract and Kill (A&K) Product for Control of Codling Moth and Obliquebanded and Pandemis Leafroller

**T. Curkovic**, J. F. Brunner and  
P. Landolt, Department of  
Entomology, Washington State  
University, Pullman, WA 99164

- 9:30 34. Overwintering Life History of the Cotton Aphid, *Aphis gossypii*, in the San Joaquin Valley
- Larry Godfrey**, Peter Goodell, Kevin Keillor and Cecilia Garcia, Department of Entomology, University of California, Davis, CA 95616
- 10:58 40. Leafminer Control on Legume Vegetables and Cucurbits with Success™ in California and Arizona
- J. M. Richardson**, K. Umeda, C. A. Frate, S. C. Mueller, B. L. Bret and G. D. Thompson, Dow AgroSciences, Hesperia, CA 92345
- 9:42 35. Control of Mites and Aphids with the Natural Product Cinnamic Aldehyde
- Benjamin Rogers**, Robert D. Kearns, Jim Britton and Brook C. Murphy, Mycotech Corporation, Salt Lake City, UT 84101
- 11:10 41. Optimum Timing for Leafminer Control in Apple with Success™
- E. H. Beers** and B. L. Bret, Department of Entomology, Washington State University, Tree Fruit Research and Extension Center, Wenatchee, WA 98801
- 9:54 **BREAK**
- 10:10 36. A Survey of the Termites of the Hawaiian Islands: Oahu, Maui, Molokai and Midway Islands
- R. Joseph Woodrow** and J. Kenneth Grace, Department of Entomology, University of Hawaii at Manoa, Honolulu, HI 96822
- 11:22 **ADJOURN**
- 10:22 37. The Impact of Black Pepper and Chamomile Extracts on the European Corn Borer
- Janet Y. Kirolos**, Akila M. El-Shafei, Zahia R. Moustafa and Amal E. Abou Zeid, Department of Field Crop Pests Research, Plant Protection Research Institute, Giza, Egypt
- 10:34 38. Resistance to the Silverleaf Whitefly, *Bemisia argentifolii*, Transmitted Cotton Leaf Crumple Disease in Upland Cotton
- E. T. Natwick**, C. G. Cook, R. L. Gilbertson and Young-Su Seo, University of California Cooperative Extension, Holtville, CA 92250
- 10:46 39. Using Imidacloprid to Control California Red Scale and Citricola Scale in Citrus
- Christopher A. Reagan** and Elizabeth E. Grafton-Cardwell, Department of Entomology, University of California, Lindcove Research and Extension Center, Exeter, CA 93221

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8:30–11:34 a.m.

**Session C**  
**Submitted Papers**

*Edna Ferber Room*

**Moderator:**

**David E. Bragg**  
Washington State University  
Cooperative Extension  
Pomeroy, WA 99347-0190

- 8:30 42. Biorational Management of Blackheaded Fireworm, *Rhopobota naevana* (Lepidoptera: Tortricidae) in Cranberry
- Steven R. Booth**, Kim Patten and Lynell K. Tanigoshi, Washington State University Research and Extension Unit, Long Beach, WA 98631
- 8:42 43. Antagonism Between Herbicide and Insecticide in Spring Canola
- D. E. Bragg**, J. W. Burns and J. Yenish, Washington State University, Cooperative Extension, Pomeroy, WA 99347-0190
- 8:54 44. Increasing the Efficacy of Neem for Control of Aphids
- John D. Stark**, Department of Entomology, Washington State University, Puyallup Research and Extension Center, Puyallup, WA 98371
- 9:06 45. The Pheromone Microsprayer for Fruit Pest Mating Disruption: Where Next?
- Rufus Isaacs**, Larry J. Gut, Peter McGhee and James R. Miller, Department of Entomology and Center for Integrated Plant Systems, Michigan State University, East Lansing, MI 48824
- 9:18 46. Bizarre Cytogenetics in the Social Mexican Butterfly *Eucheira socialis* (Pieridae)
- Dessie L. A. Underwood**, Department of Biology, California State University, Long Beach, CA 90840
- 9:30 47. Phantom® Termiticide-Insecticide
- S. Burkart**, C. Klein, D. Colbert and T. Alby, American Cyanamid Company, Princeton, NJ 08543
- 9:42 48. Jerking Behavior Among Phytoseiid Mite Species (Acari: Phytoseiidae)
- S. Blackwood**, B. A. Croft and P. Schausberger, Department of Entomology, Oregon State University, Corvallis, OR 97331
- 9:54 **BREAK**
- 10:10 49. Efficacy of Lacewing Larvae in Controlling Russian Wheat Aphids on Susceptible and Resistant Wheat
- Frank J. Messina** and Suzann M. Sorenson, Department of Biology, Utah State University, Logan, UT 84322-5305
- 10:22 50. Biology of *Neurocolpus longirostris* Knight (Hemiptera: Miridae) in Central California
- Richard E. Rice** and Richard A. Jones, Department of Entomology, University of California at Davis, Kearney Agricultural Center, Parlier, CA 93648
- 10:34 51. Reproductive and Survivorship Attributes of *Anaphes iole*, an Egg Parasitoid of *Lygus hesperus*
- S. Udayagiri** and S. C. Welter, Division of Insect Biology, University of California, Berkeley, CA 94720
- 10:46 52. Walnut Pest Management Alliance
- Carolyn Pickel** and Walt Bentley, UC IPM, Sutter/Yuba Cooperative Extension, Yuba City, CA 95991
- 10:58 53. Threshold Activity Levels of Structural Termiticides
- Donald A. Reiersen**, M. K. Rust and J. Hampton-Beesley, Department of Entomology, University of California, Riverside, CA 92521

11:10 54. Argentine Ant Control Around Urban Structures  
**Michael K. Rust**, Donald A. Reiersen and Jody Hampton Beesley, Department of Entomology, University of California, Riverside, CA 92521

11:22 55. Response of Omnivorous Leafroller and Onion Thrips to Low Temperature Storage  
**Victoria Y. Yokoyama** and Gina T. Miller, USDA, ARS, Horticultural Crops Research Laboratory, Fresno, CA 93727

11:34 **ADJOURN**

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9:00 a.m.–4:30 p.m.

**Session D  
STUDENT POSTER COMPETITION**

**Students Should be Present From 9:30 to 11:00 a.m. for Judging**

**Lillian Hellman Room**

**M.S. Poster Display Competition:**

D1. Oviposition Behavior and Establishment of Hessian Fly on Resistant and Susceptible Spring Wheats

**Daniel E. Cervantes**, Nilsa A. Bosque-Pérez, Sanford D. Eigenbrode and Edward J. Souza, Department of Plant, Soil and Entomological Sciences, University of Idaho, Moscow, ID 83844-2399

D2. Response of Wood-boring Beetles (Coleoptera: Buprestidae, Cerambycidae) to Prescribed Burning in Southwestern Oregon

**M. V. Duane**, D. W. Ross and C. Niwa, Department of Forest Science, Oregon State University, Corvallis, OR 97331

D3. Phenology and Host Plants of *Lacanobia subjuncta* (Lepidoptera: Noctuidae) in Tree Fruits of the Pacific Northwest

**Mark Hitchcox**, Richard Zack, Peter Landolt and Jay Brunner, Department of Entomology, Washington State University, Pullman, WA 99164-6382

D4. The Basic Biology of Black Vine Weevil, *Otiorynchus sulcatus*, in California Commercial Nurseries

**TunyaLee A. Morisawa** and Michael P. Parrella, Department of Entomology, University of California, Davis, CA 95616

D5. Western Larch (*Larix occidentalis*) Resistance to Douglas-fir Beetle (*Dendroctonus pseudotsugae*) Attack Success

**Tiffany A. Neal** and Darrell W. Ross, Department of Forest Science, Oregon State University, Corvallis, OR 97331

D6. Evaluation of *Chrysoperla rufilabris* as a Component of *Scirtothrips perseae* IPM in Avocados

**Cressida S. Silvers**, E. E. Grafton-Cardwell and J. G. Morse, Department of Entomology, University of California, Riverside, CA 92521

**Ph.D. Poster Display Competition:**

D7. Searching and Oviposition Behavior of *Anagrus nigriventris* (Hymenoptera: Mymaridae)

**Ali K. Al-Wahaibi** and Gregory P. Walker, Department of Entomology, University of California, Riverside, CA 92521

D8. Testing the Carbon/Nutrient Balance Hypothesis under Elevated Atmospheric CO<sub>2</sub>

**Carlos E. Coviella** and John T. Trumble, Department of Entomology, University of California, Riverside, CA 92521



## OTHER SUBMITTED POSTER DISPLAYS

*Lillian Hellman Room*

- D9. *Alyma*, a New Chilean Taxon (Coleoptera: Elateridae)  
**Elizabeth T. Arias**, R. M. Bohart Museum of Entomology, University of California, Davis, CA 95616
- D10. Control of Root Weevils in Container-grown Azalea with Entomopathogenic Nematodes  
**Ralph E. Berry** and Tae-Hwan Kim, Department of Entomology, Oregon State University, Corvallis, OR 97331
- D11. Alternative Treatment Efficacy for Two Quarantine Pests on Lychee in Hawaii  
**Peter A. Follett**, USDA-ARS Pacific Basin Agricultural Research Center, Hilo, HI 96720
- D12. Development of *Cirrospilus* N.sp. (Hymenoptera: Eulophidae) on Citrus Peelminer, *Marmara* sp. (Lepidoptera: Gracillariidae)  
**Marta Guillen**, John Heraty and Alberto Urbaneja, Department of Entomology, University of California, Riverside, CA 92521
- D13. Cuticular Hydrocarbons of *Pteromalus cerealellae* (Hymenoptera: Pteromalidae)  
**Ralph W. Howard**, USDA-ARS, US Grain Marketing Production Research Center, Manhattan, KS 66502
- D14. Dispersal Patterns of the Whitefly Parasitoid, *Eretmocerus emiratus*, from Central Point Releases  
**Glen Jackson**, James Hagler and Juli Gould, USDA-ARS Western Cotton Research Lab, Phoenix, AZ 85040
- D15. The Role of Delayed Mating on Demography of *Cryptophlebia illepada*: a Possible Mechanism for Mating Disruption  
**Vincent P. Jones**, Maria Aihara-Sasaki and Gwen Ochikubo, Department of Entomology, University of Hawaii, Honolulu, HI 96822
- D16. Effects of Temperature on Development of Entomopathogenic Nematodes  
**Tae-Hwan Kim**, Ralph E. Berry and Peter W. Gothro, Department of Entomology, Oregon State University, Corvallis, OR 97331
- D17. Testing Biodiversity Implications of Old-forest Stand Remnants Surrounded by Clearcuts  
**Bruce G. Marcot** and Andrew Moldenke, USDA Forest Service, Pacific Northwest Research Station, Portland, OR 97208-3890
- D18. Aphids of Guam, Saipan, and Tinian and Associated Parasitoids  
**R. H. Miller**, K. S. Pike, P. Stary and A. Moore, College of Agriculture and Life Sciences, University of Guam, Mangilao, GU 96923
- D19. Drip Application of 1,3-Dichloropropene for Grape Phylloxera Management  
**James P. Mueller**, Dow AgroSciences, Brentwood, CA 94513
- D20. Control of Wild Mediterranean Fruit Flies Using Bait Sprays of Spinosad and the Phototoxic Dye Phloxine B  
**Steven L. Peck** and Grant T. McQuate, USDA-ARS, Hilo, HI 96720
- D21. Avocado Thrips Field Biology, Fruit Damage, and Tentative Economic Threshold  
**Phil A. Phillips**, Ben A. Faber, John L. Rodgers and Wee L. Yee, Cooperative Extension, University of California, Ventura, CA 93003
- D22. A Pheromone System for Monitoring Activity of Pea Leaf Weevil and Alfalfa Weevil  
**Mark A. Quinn** and David F. Bezdicek, Department of Crop and Soil Sciences, Washington State University, Pullman, WA 99164-6240
- D23. The Need for Understanding Mechanisms of Resistance: the Example of Celery  
**J. T. Trumble**, M. M. Diawara and C. F. Quiros, Department of Entomology, University of California, Riverside, CA 92521

D 24. Arthropods Depicted on Military Insignia

**Richard S. Zack** and Christophor N. Looney,  
Department of Entomology, Washington State  
University, Pullman, WA 99164-6382

12:00 noon – 1:30 p.m.  
**AWARDS LUNCHEON**  
*Location to be Announced*

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**Tuesday Afternoon, June 22**

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1:30–4:50 p.m.

**Session A: SYMPOSIUM**  
**Teaching with Insects**

*Thornton Wilder Room*

**Organizer/Moderator:**

**Dr. Lynn Royce**

Department of Entomology  
Oregon State University

North Willamette Research & Extension Center  
Aurora, OR 97002

- 1:30 Introduction
- 1:40 56. “A Bug a Week”—a Module for Discovering Insects
- Laurel D. Hansen** and Melissa Gaver,  
Biology Department, Spokane Falls  
Community College, Spokane, WA 99224
- 2:05 57. Outreach Programs Teaching About Tropical Rain Forests and Protection of Biodiversity Using Live Insects
- Mary M. McCoy**, Biology Department,  
Washburn University, Topeka, KS 66621
- 2:30 58. The Young and the Restless: Maggots Without a Cause!
- Amy J. Dreves**, Oregon State University  
Master Gardener Program, Corvallis, OR  
97331-7304
- 2:55 59. How Insects Stimulate School Age Children in Writing
- Margaret J. Anderson**, 3325 NW 60th  
Street, Corvallis, OR 97330
- 3:20 **BREAK**

- 3:35 60. The Pavilion of Wings—a Turn-key Butterfly Exhibit  
**Arthur V. Evans**, Natural History Museum of Los Angeles County, Los Angeles, CA 9000
- 4:00 61. Insects as Human Food  
**Florence Dunkel**, Department of Entomology, Montana State University, Bozeman, MT 59717-3020
- 4:25 62. Involving Volunteers in Entomological Research and Education  
**Sharon J. Collman**, Department of Entomology, Washington State University, and Center for Urban Horticulture, University of Washington, Seattle, WA 98195-4115
- 4:50 **QUESTIONS AND ADJOURN**
- 2:05 64. Progress Towards Managing Weevils in Small Fruits  
**Glenn C. Fisher** and Joseph T. DeFrancesco, Department of Entomology, Oregon State University, Corvallis, OR 97321
- 2:30 65. Assessing the Impact of Carabid Ground Beetles on Pests in Red Raspberry: How Many Active Beetles are There per Acre?  
**David A. Raworth** and Man-Young Choi, AAFC, PARC, Agassiz, British Columbia, Canada V0M 1A0
- 2:55 **BREAK**
- 3:10 66. Potential of Some Fall Planted Cover Crops for Weed Suppression and Beneficial Insect Habitat  
**Diane Kaufman**, G. Koskela and L. Royce, Oregon State University, North Willamette Research & Extension Center, Aurora, OR 97002

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1:30–4:50 p.m.

**Session B: SYMPOSIUM  
IPM in Small Fruit Crops:  
Past, Present and Future**

**Edna Ferber Room**

**Organizers/Moderators:**

**Dr. Robin Rosetta**

Department of Entomology  
University of California  
Davis, CA 95616  
and

**Dr. Lynell Tanigoshi**

Department of Entomology  
Washington State University  
Vancouver, WA 98665

- 1:30 Introduction
- 1:40 63. Lygus Bug Control on California Strawberries  
**Doug Walsh**, Frank Zalom, Nick Toscano, Bill Brindley and Carolyn Pickel, Department of Entomology, Washington State University, Irrigated Agriculture Research and Extension Center, Prosser, WA 99350
- 3:35 67. Cool Climate Grape Integrated Pest Management  
**Wyatt W. Cone**, Entomologist Emeritus, Department of Entomology, Washington State University, Irrigated Agriculture Research and Extension Center, Prosser, WA 99350
- 4:00 68. Toxicity of Selected Pesticides to *Neosieulus fallacis* in the Laboratory and in Field Observations  
**Diane Kaufman**, G. Koskela, M. Morris and B. Croft, Oregon State University, North Willamette Research & Extension Center, Aurora, OR 97002
- 4:25 69. Contrasting IPM Systems in California Wine Grapes and Strawberries  
**Frank G. Zalom**, Department of Entomology, University of California, Davis, CA 95616
- 4:50 **QUESTIONS AND ADJOURN**

2:00-4:45 p.m.

**Session C: SYMPOSIUM  
Insect Behavior: Understanding  
Management, Monitoring and Control**

**Lorraine Hansberry Room**

**Organizer/Moderator:**

**Jay F. Brunner**

Department of Entomology  
Washington State University  
Tree Fruit Research and Extension Center  
Wenatchee, WA 98801

2:00 Introduction

2:10 70. Insights to Mechanisms of Mating  
Disruption Using Field Wind Tunnels

**Ring T. Cardé**, Department of Entomology,  
University of California, Riverside, CA  
92521

2:40 71. Disrupting Pheromone Communications  
Among Leafrollers: Flights from Wind  
Tunnel to Field and Back

**Gary J. R. Judd** and M. L. Evenden, Pacific  
Agri-Food Research Centre and Agri-Food  
Canada, Summerland, British Columbia,  
Canada V0H 1Z0

3:10 72. Development and Uses of Feeding Attractants  
for Tree Fruit Insects

**Peter J. Landolt**, USDA-ARS, Wapato, WA  
98951

3:55 73. Reproductive Behavior of True Bugs Affects  
Responses to Pheromone Traps

**Jocelyn C. Millar**, Heather McBrien, Richard  
E. Rice and J. Steven McElfresh, Department  
of Entomology, University of California,  
Riverside, CA 92521

**SPECIAL PRESENTATION**

4:15 74. Improving Sprayer Technology: Timing,  
Targeting and Towers

**Gary R. Van Ee**, Biosystems Engineers,  
Michigan State University, East Lansing,  
MI 48824

4:45 **QUESTIONS AND ADJOURN**

8:00 - 10:00 p.m.

**LINNEAN GAMES**

*Vistas I*

Teams to be announced

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Wednesday Morning, June 23

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9:00–11:30 a.m.

**ANNUAL BUSINESS MEETING**

*Thornton Wilder Room*

**Convener:**

**Jay F. Brunner**

President, Pacific Branch  
Entomological Society of America

11:30      **ADJOURN**

**Pacific Branch  
Entomological Society of America  
Committee Membership and Other  
Appointments**

**1999**

**Abstracts**

Jay Brunner  
Jerry Tangren, Internet Version

**Archives**

Bruce F. Eldridge

**Arrangements**

Rick Hilton  
Phil VanBuskirk  
Ross Penhallegon

**Auditing**

Tom Unruh

**Awards Canvassing**

John J. Brown, Chairperson  
Carrol Calkins

**Employment Opportunities**

**Nominations**

Richard E. Rice, Chairperson  
Steve Clement  
Charlie Summers

**Program**

John Stark, Chairperson  
Lynn Royce  
Lynell Tanigoshi  
Kathleen Johnson  
Robin Rosetta  
Jay Brunner  
Jerry Tangren, Internet Version

**Registration**

Mike Doerr  
Chris Nobbs  
Linda Evers

**Resolutions**

Larry Godfrey  
 Barat Bisabri  
 David Bragg

**Site Selection**

Steve Welter, Chairperson  
 Brian Bret  
 John Dunley

**Local Arrangements**

Rick Hilton  
 Phil VanBuskirk  
 Ross Penhallegon

**Student Paper Competition**

Richard Zack

**Sustaining Associates**

Jay Brunner, Chairperson  
 Michael P. Parrella

**Index of Numbered Entries  
 (Senior Author Only)**

Senior Author	Paper		Page
	No.	Type	
Al-Wahaibi, A.	D7	DSC-PHD	15
Anderson, M.	59	SYM	17
Arias, E.	D9	Poster	16
Batkin, T.	9	SYM	10
Beers, E.	41	Paper	13
Berry, R.	D10	Poster	16
Bentley, W.	29	Paper	12
Bisabri, B.	30	Paper	12
Blackwood, S.	48	Paper	14
Booth, S.	42	Paper	14
Bounfour, M.	2	SYM	9
Bounfour, M.	25	SC-PHD	12
Bragg, D.	43	Paper	14
Brewer, K.	15	SC-MS	11
Burkart, S.	47	Paper	14
Campora, C.	26	SC-PHD	12
Cardé, R.	70	SYM	19
Carder, J.	27	SC-PHD	12
Cervantes, D.	D1	DSC-MS	15
Chen, Y.	28	SC-PHD	12
Collman, S.	62	SYM	18
Cone, W.	67	SYM	18
Coviella, C.	D8	DSC-PHD	16
Cullen, E.	16	SC-MS	11
Curkovic, T.	33	Paper	12
Dowell, R.	7	SYM	10
Dreves, A.	58	SYM	17
Duane, M.	D2	DSC-MS	15
Dunkel, F.	61	SYM	18
Dunning, C.	17	SC-MS	11
Evans, A.	60	SYM	18
Fernandez, D.	32	Paper	12
Fisher, G.	64	SYM	18
Follett, P.	D11	Poster	16
Gerry, A.	5	SYM	9
Godfrey, L.	34	Paper	13
Guillen, M.	D12	Poster	16
Hannig, G.	18	SC-MS	11
Hansen, L.	56	SYM	17
Headrick, D.	10	SYM	10

Senior Author	Paper No.	Type	Page
Hitchcox, M.	D3	DSC-MS	15
Hoebeke, R.	11	SYM	10
Howard, R.	D13	Poster	16
Isaacs, R.	45	Paper	14
Jackson, G.	D14	Poster	16
Johnson, K.	13	SYM	10
Jones, V.	D15	Poster	16
Judd, G.	71	SYM	19
Kaufman, D.	66	SYM	18
Kaufman, D.	68	SYM	18
Kim, T.	D16	Poster	16
Kirollos, J.	37	Paper	13
Landolt, P.	72	SYM	19
LaGasa, E.	8	SYM	10
Looney, C.	19	SC-MS	11
Marcot, B.	D17	Poster	16
McCoy, M.	57	SYM	17
Messina, F.	49	Paper	14
Messing, R.	14	SYM	10
Millar, J.	73	SYM	19
Miller, R.	D18	Poster	16
Morisawa, T.	1	SYM	9
Morisawa, T.	D4	DSC-MS	15
Mudge, A.	12	SYM	10
Mueller, J.	D19	Poster	16
Natwick, E.	38	Paper	13
Neal, T.	D5	DSC-MS	15
O'Donnell, C.	20	SC-MS	11
Pandey, R.	3	SYM	9
Peck, S.	D20	Poster	16
Phillips, P.	D21	Poster	16
Pickel, C.	52	Paper	14
Prischmann, D.	21	SC-MS	11
Quinn, M.	D22	Poster	17
Raworth, D.	65	SYM	18
Reagan, C.	39	Paper	13
Reiersen, D.	53	Paper	15
Rice, R.	50	Paper	14
Richardson, J.	40	Paper	13
Rogers, B.	31	Paper	12
Rogers, B.	35	Paper	13
Rust, M.	54	Paper	15

Senior Author	Paper No.	Type	Page
Schulz, K.	4	SYM	9
Silvers, C.	D6	DSC-MS	15
Stark, J.	44	Paper	14
Strange, J.	22	SC-MS	11
Trumble, J.	D23	Poster	17
Udayagiri, S.	51	Paper	14
Underwood, D.	46	Paper	14
Van Ee, G.	74	SYM	19
Walsh, D.	63	SYM	18
Wise, K.	23	SC-MS	11
Woodrow, R.	36	Paper	13
Work, T.	6	SYM	9
Yokoyama, V.	55	Paper	15
Young, S.	24	SC-MS	12
Zack, R.	D24	Poster	17
Zalom, F.	69	SYM	18

**Key to Presentation Types:**

Paper	Submitted 10 minute Paper
SC-MS	Student Comp. Paper (M.S.)
SC-PHD	Student Comp. Paper (Ph.D.)
Poster	Submitted Poster Display
DSC-MS	Student Comp. Poster Display (M.S.)
DSC-PHD	Student Comp. Poster Display (Ph.D.)
SYM	Symposium Presentation

**Notes**