

Kelsey Ann Schall

Entomology Department
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EDUCATION

- 2009-2013 **University of California, Santa Barbara, CA**
Bachelor of Arts, Biology
3.8 GPA; College of Creative Studies Biology Major
- 2013-present **University of California, Riverside, CA**
3.925 GPA; Ph.D. Candidate for Entomology Major

RESEARCH EXPERIENCE

- April 2012- June 2013 **Undergraduate Researcher - Parasitology Lab, UCSB**
Director: Armand Kuris, Ph.D.
Insect biodiversity survey of Carpinteria salt marsh:
Independent survey of insect biodiversity at Carpinteria Salt Marsh Reserve (CA). Collection techniques included sweep netting, pitfall and light trapping, and sifting soil samples through Berlese funnels. Hundreds of insects were collected, curated, and identified to family, genus, and/or species level.
Other Projects:
1. Assisted trapping and collection of California horn snails (*Cerithidea californica*) at the Carpinteria Salt Marsh Reserve. Subsequently extracted, identified, and recorded parasite species and overall parasite load a laboratory setting.
2. Performed octopus dissections and parasite extraction and identification. Other responsibilities included care of experimental animals and tank maintenance.
- June 2013-present **Graduate Researcher - Biological Control Lab, UCR**
Director: Mark Hoddle, Ph.D.
Completed Projects:
1. Two-year replicated experiment in SoCal citrus groves to examine impact of Argentine ant (*Linepithema humile*; AA) control via Tanglefoot and low-toxicity, insecticide-laced liquid baits on biological control of Asian citrus psyllid (*Diaphorina citri*; ACP). Both generalist predator activity and parasitism by the host-specific larval ectoparasitoid *Tamarixia radiata* were significantly higher when AAs were controlled. Additionally, behavioral observations revealed a high rate of antagonistic, biocontrol-disrupting interactions between *T. radiata* and AAs and less oviposition by the parasitoid on ant-allowed branches in comparison with ant-excluded branches.
2. A 9-month field study in a SoCal citrus grove to assess the effectiveness of a low-toxicity AA baiting protocol. Within 3 days, AA activity declined by 70-90%, near complete control was achieved

for the duration of treatment, and AA activity did not completely recover for several months following baiting cessation.

3. Laboratory experiment examining key life history traits of ACP and Punjab, Pakistan sourced *T. raidata* across 8 constant and naturally fluctuating temperature regimes ranging from 10-38°C. Results revealed significant differences in parasitism, mortality, developmental rate (using Lactin and Briere models), longevity, and survivorship across different regimes and temperatures.

PRESENTATIONS

1. **Schall, K.A.** and M. Hoddle. Invasional meltdown: Are Argentine Ants Facilitating the Invasion of Asian Citrus Psyllid (*Diaphorina citri*) (Hemiptera: Liviidae) in Southern California? Entomological Society of America Pacific Branch, Marriott University Park, AZ. 7 April 2014 (poster).
2. **Schall, K.A.** and M. Hoddle. Invasional meltdown: Are Argentine Ants Facilitating the Invasion of Asian Citrus Psyllid in SoCal? California Association of Pest Control Advisers, Santa Paula Community Center, Santa Paula, CA. 10 Sept 2014.
3. **Schall, K.A.** and M. Hoddle. Invasional meltdown: Are Argentine Ants Facilitating the Invasion of Asian Citrus Psyllid in SoCal? California Association of Pest Control Advisers – University of California Riverside, South Coast Winery, Temecula, CA. 17 Sept 2014.
4. **Schall, K.A.** and M. Hoddle. Invasional meltdown: Are Argentine Ants Facilitating the Invasion of Asian Citrus Psyllid (*Diaphorina citri*) (Hemiptera: Liviidae) in Southern California? Entomological Society of America National Meeting, Oregon Convention Center, Portland, OR. 17 Nov 2014.
5. **Schall, K.A.** and M. Hoddle. Invasional meltdown: Are Argentine Ants Facilitating the Invasion of Asian Citrus Psyllid (*Diaphorina citri*) (Hemiptera: Liviidae) in Southern California? University of California Riverside Entomology Student Seminar Day, University of California Riverside Genomics Conference Room, Riverside CA. 25 Sept 2014.
6. **Schall, K.A.** and M. Hoddle. Argentine Ants and ACP Mutualism: Determining Action Thresholds and Ant Control Strategies. Citrus Research Board Joint Agency Biocontrol Task Force, Jerry Dimitman Laboratory 1201 Research Park Drive, Riverside, CA. 4 Dec 2014.
7. **Schall, K.A.** and M. Hoddle. Argentine Ants and ACP Mutualism: Determining Action Thresholds and Ant Control Strategies. San Bernardino Asian Citrus Psyllid Task Force, National Orange Show Events Center, San Bernardino, CA. 9 April 2015.
8. **Schall, K.A.** and M. Hoddle. Argentine Ants and ACP Mutualism: Determining Action Thresholds and Ant Control Strategies. Citrus Research Board Joint Agency Biocontrol Task Force, California Department of Food and Agriculture Biocontrol Facility Rubidoux Conference Room Building F, Riverside, CA. 21 April 2015.
9. **Schall, K.A.** and M. Hoddle. Argentine ant control: Implications for Asian citrus psyllid management. California Rare Fruit Growers Inland Empire Chapter, Jurupa Mountains Discovery Center, Riverside CA. 7 May 2015.
10. Hoddle, M.S., E. Kistner, and **K. Schall**. Asian Citrus Psyllid Biocontrol in California: Updates. Citrus Research UCANR Citrus Growers Seminar Series, Santa Paula Community Center, Santa Paula, CA. 26 June 2015.
11. Hoddle, M.S., E. Kistner, and **K. Schall**. Asian Citrus Psyllid Biocontrol in California: Updates. Citrus Research UCANR Citrus Growers Seminar Series, UCR Palm Desert Center, Palm Desert, CA, 30 June 2015.
12. Hoddle, M.S., E. Kistner, and **K. Schall**. Asian Citrus Psyllid Biocontrol in California: Updates. Citrus Research UCANR Citrus Growers Seminar Series, Exeter Veterans Memorial Building, Exeter, CA, 1 July 2015.
13. **Schall, K.A.** and M. Hoddle. Argentine Ant Control: Implications for Asian Citrus Psyllid Management. Pesticide Applicators Professional Association, Marina Village Conference Center, San Diego, CA. 8 July 2015.
14. **Schall, K.A.**, J. Lara, and M. Hoddle. Biological Control in Action. Master Gardeners of Riverside Chapter, Western Municipal Water District, Moreno Valley, CA. 9 July 2015.
15. **Schall, K.A.** and M. Hoddle. An Overview of Argentine Ants in Southern California. Pesticide Applicators Professional Association, National Orange Show Events Center, San Bernardino, CA. 27 August 2015.
16. **Schall, K.A.** and M. Hoddle. An Overview of Argentine Ants in Southern California. California Association of Pest Control Advisers, Santa Paula Community Center, 530 West Main St. Santa Paula, CA. 9 Sept 2015.
17. **Schall, K.A.** and M. Hoddle. Argentine Ant Control: Implications for Asian Citrus Psyllid Management. California Asian Citrus Psyllid and Huanglongbing Research and Extension Summit, University of California Davis ARC Ballroom A, Davis, CA. 10 Sept 2015.
18. **Schall, K.A.** and M. Hoddle. Lessons from a HHS Graduate: College, Entomology, & Beyond. Heritage High School, Brentwood, CA. 11 Sept 2015.
19. **Schall, K.A.**, M. Kececi, and M. Hoddle. Comparing the Effects of Fluctuating and Constant Temperature Regimes on the Life History of the Asian Citrus Psyllid and its Parasitoid, *Tamarixia radiata*. University of California Riverside Entomology Student Seminar Day, University of California Riverside Genomics Conference Room, Riverside, CA. 17 Sept 2015.

20. **Schall, K.A.**, M. Kecci, and M. Hoddle. Comparing the Effects of Fluctuating and Constant Temperature Regimes on the Life History of the Asian Citrus Psyllid and its Parasitoid, *Tamarixia radiata*. Citrus Research Board Joint Agency Biocontrol Task Force, California Department of Food and Agriculture Biocontrol Facility Rubidoux Conference Room Building F, Riverside, CA. 24 Sept 2015.
21. **Schall, K.A.** and M. Hoddle. An Overview of Argentine Ants in Southern California. California Association of Pest Control Advisers, Victor Valley College – Performing Arts Center, 18422 Bear Valley Road Victorville, CA. 5 Nov 2015.
22. **Schall, K.A.**, M. Kecci, and M. Hoddle. Comparing the effects of fluctuating and constant temperature regimes on the life history of the Asian citrus psyllid and its parasitoid, *Tamarixia radiata*. Entomological Society of America National Conference, Minneapolis Convention Center, Minneapolis, MN. 16 Nov 2015.
23. **Schall, K.A.** and M. Hoddle. An Overview of Argentine Ants in Southern California. Pesticide Applicators Professional Association, Fantasy Springs Resort, Indio, CA. 2 Dec 2015.
24. **Schall, K.A.**, J-W. Tay, L. Greenberg, and M. Hoddle. Fire Ant Baiting Technology in Almonds: Today and Beyond. UC Cooperative University of California Almond Integrated Pest Management Meeting, Kearney Agricultural Research and Extension Center, Parlier, CA. 7 Jan 2016.
25. Hoddle, M.S., **K. Schall**, J-W. Tay, D-H Choe, and A. Mulchandani. What is the Potential Future of Ant Control in Citrus Without Chlorpyrifos? IPM Conference: "What is the Future of Chlorpyrifos in Citrus IPM?", Tulare County UCCE Office, Tulare, CA. 12 January 2016.
26. **Schall, K.A.** and M. Hoddle. An Integrated Approach Towards Asian Citrus Psyllid Management: Ant Baiting and Biological Control. Entomological Society of America Pacific Branch, Pacific Beach Hotel, Honolulu, HI. 4 April 2016.
27. **Schall, K.A.** and M. Hoddle. Ant Baiting for Improved Biocontrol. Rare Fruit Growers of California Los Angeles Chapter, Los Angeles Arboretum – Palm Room, Arcadia, CA. 4 June 2016.
28. **Schall, K.A.** and M. Hoddle. Ant Baiting for Improved Biocontrol. California Association of Pest Control Advisers, Santa Paula Community Center, Santa Paula, CA. 9 June 2016.
29. **Schall, K.A.** and M. Hoddle. Effects Argentine Ants Have on Biocontrol Agents. Pesticide Applicators Professional Association, Riverside Convention Center, Riverside, CA. 17 Aug 2016.
30. **Schall, K.A.** and M. Hoddle. An Integrated Approach Towards Asian Citrus Psyllid Management: Ant Baiting and Biological Control. University of California Riverside Entomology Student Seminar Day, University of California Riverside Genomics Conference Room, Riverside, CA. 14 Sept 2016.
31. **Schall, K.A.** and M. Hoddle. Argentine Ant Management for Biological Control of the Asian Citrus Psyllid and Other Citrus Pests. International Congress of Entomology XXV, Orange County Convention Center, Orlando, FL. 29 Sept 2016.
32. **Schall, K.A.** and M. Hoddle. Assessing the Impact of Invasive Ant Management on Asian citrus psyllid biological control. California Asian Citrus Psyllid and Huanglongbing Research and Extension Summit, University of California Riverside Highlander Union Building, Riverside, CA. 4 Oct 2016.
33. **Schall, K.A.** and M. Hoddle. Assessing the Impact of Argentine Ant Management on Asian citrus psyllid biological control in Southern California. Annual Citrus Day for Industry, University of California Riverside Agricultural Operations, Riverside, CA. 2 Feb 2017.
34. **Schall, K.A.** and M. Hoddle. Assessing the Impact of Invasive Ant Management on Asian Citrus Psyllid Biological Control. Organic Citrus Growers Annual ACP Meeting, Pala Mesa Golf Resort. Fallbrook, CA. 22 Feb 2017. Organic Citrus Growers Annual ACP Meeting, Pala Mesa Golf Resort. Fallbrook, CA. 22 Feb 2017.
35. **Schall, K.A.** and M. Hoddle. An Argentine Ant Baiting System for Improved Biocontrol of Honeydew-Producing Hemipteran Pests in Southern California Commercial Citrus. Entomological Society of America Pacific Branch, DoubleTree Hotel, Portland, OR. 3 Apr 2017.

PUBLICATIONS

- Schall, K.A. and M. S. Hoddle. 2017. Disrupting the Ultimate Invasive Pest Partnership. *Citrograph* 8: 38–43.
- Schall, K.A. and M. S. Hoddle. 2017. The Pest Partnerships that Threaten Citrus. *Citrus Industry* 98: 28-31.
- Milosavljevic, I., K. A. Schall, and M. S. Hoddle, 2017. Classical Biological Control of Asian Citrus Psyllid, *Diaphorina citri* (Hemiptera: Liviidae), in California. *Applied Biological Control Research*. Accessed 1 Apr 2017, http://biocontrol.ucr.edu/asian_citrus_psyllid.html
- Milosavljevic, I., K. A. Schall, and M. S. Hoddle, 2017 (in-review). Protecting California Citrus from Huanglongbing: A Review of the Classical Biological Control Program Targeting Asian Citrus Psyllid. *California Agriculture*.

MEDIA FEATURES

Muckenfuss, Mark. Why Researchers Say Killing Ants May be Key to Saving California's Citrus

Industry. The Press Enterprise. Accessed 5 Oct 2016, <https://shar.es/1Eyylp>. Accessed 17 Oct 2016.

HONORS, AWARDS, AND CERTIFICATIONS

2009	Regents Scholarship, UCSB
2013	Chancellor's Fellowship, UCR
2013	GradEdge Summer Program, UCR
2015	Herbert Kraft Endowed Scholarship, UCR
2015	2 nd Place Presentation, Entomology Student Seminar Day Competition, UCR
2015	1 st Place Presidents Prize, 10-Minute Paper Presentation Competition, Entomological Society of America (ESA) National Conference, Minneapolis, MN
2016	Travel Grant Entomological Society of America Pacific Branch Conference, Honolulu, HI
2016	2 nd Place Prize, 10-Minute Paper Presentation Competition, Entomological Society of America Pacific Branch Conference, Honolulu, HI
2016	Graduate Research Mentorship Fellowship, UCR
2016	Harry Scott Smith Biological Control Award, UCR
2016	Ernest Propes Endowed Graduate Fellowship, UCR
2017	Charles W. Coggins Jr. Endowed Scholarship, UCR

PROFESSIONAL SERVICE

EGSA Outreach Coordinator 2014-2015	Served as Outreach Coordinator for the University of California, Riverside's (UCR) Entomology Graduate Student Association (EGSA). Volunteered over 200 hours; responsibilities included event organization and communication, transportation, set-up, clean-up, outreach insect colony care, and interactive presentation of research and insects to children, teens, and adults.
EGSA Fundraising Committee Chair 2015-present	Served as Fundraising Committee Chair and as member of treasury and merchandise committees in EGSA. Planned and executed EGSA's largest fundraising and educational events: the UCR Entomology Craft Fair and the 2 nd and 3 rd Annual Riverside Insect Fair. The latter was a collaborative event with the

Riverside Metropolitan Museum which had upwards of 100 educational insect-related booths and vendors and netted an estimated 10,000+ visitors. Primary responsibilities include event planning (supply purchase and preparation, vendor organization, permit/documentation acquisition and management, handling of finances, collaborator communications, etc.), advertising (sponsor and crowd-sourced funding), and event execution (set-up, clean-up, and coordination). Re-elected to serve as chair a second year in a row.

Seminar Moderator
Sept 2016

Moderated seminar session “Contributed Papers: Biological Control and Insect Pathology: Unique Studies II” at International Congress of Entomology XXV, Orlando, FL.

Teaching Assistant and
Guest Lecturer
Sept 2016-Dec 2016

Teaching assistant for 150 students enrolled in Entomology 10, A Natural History of Insects, at UCR. Responsibilities include material preparation, teaching sections and lectures, proctoring exams, and grading.

RELEVANT COURSEWORK

UCSB:

BIOL CS 101: Field Research I
 BIOL CS 101: Field Research II
 EEMB 131: Principles of Evolution
 EEMB 120: Intro to Ecology
 EEMB 168: Conservation Ecology
 EEMB 40: Ecology of Disease- Infectious
 EEMB 136: Principles of Paleontology
 EEMB 143: Ecological Physiology
 EEMB 159: Tropical Ecology
 EEMB 50: Ecology of Disease- Non-Infectious
 EEMB 116: Invertebrate Zoology
 BIOL CS 101: Evolutionary Medicine
 EEMB 111: Parasitology
 BIOL CS 105: Research Presentation

UCR:

ENTM 100: General Entomology
 ENTM 201: Insect Core: Molecular Genetics and Physiology
 ENTM 202: Insect Core: Morphology and Systematics
 ENTM 203: Insect Core: Ecology and Integrated Pest Management
 ENTM 242: Development of Hypotheses, Research Design, & Grant Writing
 ENTM 258: Seminar in Insect Pest Management
 ENTM 250: Seminar in Entomology
 ENTM 272: Ant Communication and Behavior Seminar
 STAT 100B: Intro to Statistics
 STAT 110: Biostatistical Methods in Life Science
 STAT 231A: Graduate Biostatistics
 ENTM 254: Seminar in Biological Control