

DANIEL R. SCHMEHL

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124 Kuhns Lane
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EDUCATION

PhD The Pennsylvania State University, Entomology Expected May 2012

Dissertation: “Understanding the impact of environmental stressors on honey bee pheromone-mediated queen-worker interactions and worker physiology”

Committee: James Tumlinson (chair), James Frazier (co-chair), Christina Grozinger, Christopher Mullin, and Tracy Lankilde

Research Interests:

- Impacts of pesticides on queen pheromone chemistry and queen-mediated worker interactions
- Honey bee physiology and behavior in response to nutritional and pesticide stress
 - Stress-induced changes in genetic phenotype
 - Sublethal impacts of individual and combinations of pesticides on larval development and adult learning and behavior
- Differences in pesticide sensitivity between African honey bees (*Apis mellifera scutellata*) and European honey bees (*A.m. ligustica*)

BS Messiah College, Biology May 2007

Senior Research Project: “Seasonal fluctuations of the Fall, Winter, and Spring photosynthetic rates of two species of dimorphic ferns”

Research Advisor: David Foster

RESEARCH EXPERIENCE (IN ADDITION TO DISSERTATION, AND/OR COLLABORATIONS)

Research Internships

The Pennsylvania State University, Landisville, PA Summer 2007
Southeast Research and Extension Center

- Supervisor: Steve Bogash, Horticultural Cooperative Extension Educator
- Monitored and recorded fungicide trials for tomatoes and cut annuals

International Research Experience

Nairobi, Kenya- Research Collaboration with the International Centre for Insect Physiology and Ecology January 2009

- Investigated the learning capabilities of African honey bees in response to pesticide exposure

- Measured changes in sucrose sensitivity between African and European honey bees at different ages.

Domestic Research Collaborations

Ramesh Sagili- Oregon State University March 2011-Present

- Investigating the role of single-source pollen (almond) and multi-source pollen (wildflower) on queen-worker pheromone-mediated interactions and on worker behavior and physiology

Peter Teal, USDA-ARS, Gainesville March 2011-Present

- Investigating the levels of Juvenile Hormone III and Methyl Farnesoate (JH III precursor) in pesticide and nutrition-stressed honey bee workers

TEACHING AND MENTORING EXPERIENCE

Messiah College, Department of Chemistry, Grantham, PA

Teaching Assistant, Organic Chemistry I Aug 2005 to Dec 2005

- Aided students in laboratory procedure and evaluated students' performance

Penn State University, Department of Entomology, University Park, PA

Teaching Assistant Apprentice, Intro. to Entomology Jan 2008 to Mar 2008

- Introduced Ag. majors to insect natural history and trained them to identify insect orders in PA
- Assisted TAs and faculty in facilitation of lab and review sessions

Teaching Assistant, Apiculture Aug 2008 to Dec 2008

- Taught several lectures, field labs, and review sections
- Assisted in creating syllabus, designing curriculum, course grading

Teaching Assistant, Insect Pests of Ornamentals Mar 2009 to May 2009

- Taught all lectures and labs
- Assisted in creating syllabus, updating curriculum, course grading

Teaching Assistant, Insect Natural History (2 years) May 2009, May 2010

- Assisted students with collection methods, curation, and identification of insects
- Designed, implemented, and graded lab practical

High School Research Mentoring July 2008

Pennsylvania Governor's School for the Agricultural Sciences

- Mentored two high school students in research and honey bee biology
 - Designed two experiments involving behavioral bioassays

- Taught several honey bee lectures and taught students how to keep a lab notebook
- Reviewed data from projects and assisted in their research presentations

Undergraduate Research Mentoring

Oct 2009 to May 2010

Independent Research Project- Charles Cascio

- Mentored Charles Cascio in honey bee research
 - Examined the sublethal effects of combinations of pesticides on honey bee behavior
 - Guided and supervised Charles in numerous laboratory techniques (including Proboscis Extension Reflex) and in the scientific method

PUBLICATIONS

Journal Publications

M. T. Frazier, E. Muli, T. Conklin, **D. Schmehl**, B. Torto, J. Frazier, J. Tumlinson, J. D. Evans, S. Rania (2010) A scientific note on varroa mites found in East Africa; Threat or Opportunity? *Apidologie* 41: 463-465.

Anderson, R.D., Bachmann, A.C., Bentley, T.G., Irwin, B.A., and **Schmehl, D.R.** (2010) Genetically modified insect disease vectors should be incorporated into vector-borne disease control programs because they decrease disease transmission and spread to humans and livestock with fewer environmental risks than conventional control methods, con position. *American Entomologist* 56: 108-109.

Schmehl, D.R. and Foster, D. K. (2007) Fall, winter, and spring photosynthetic rates for the evergreen dimorphic fern, *Dryopteris marginalis* (Abstract). *Journal of the Pennsylvania Academy of Science* 80: 124-125.

Journal Papers Accepted

Ciarlo, T.J., C.A. Mullin, J.L. Frazier, and **D.R. Schmehl**. Learning Impairment in Honey Bees Caused by Agricultural Spray Adjuvants (PLoS One, accepted April 2012 with revisions)

Journal Papers in Preparation

Zhu, W., **D. Schmehl**, C. Mullin, and J. Frazier. Honey bee larvae are highly susceptible to environmental levels of pesticides. (in preparation for Environmental Toxicology and Chemistry)

Press Releases

Schmehl, D.R. and Conklin, T.C. African Honeybees: Establishing a CCE-icipe collaboration in Kenya. *Published in PSU Center for Chemical Ecology Newsletter (July 2009) and PSU Friends of the Frost Newsletter (October 2009).*

Schmehl, D.R. “Is that a Pollinator in your Patch?” *Published in 2010 Mid-Atlantic Fruit and Vegetable Convention Proceedings (February 2010).*

RECENT AWARDS AND RESEARCH GRANTS

Awards

Harold F. Martin Graduate Assistant Outstanding Teaching Award 2011

- University award given to a graduate assistant demonstrating outstanding teaching skills and abilities

Entomological Foundation’s 2010 National Science Project Competition 2010

- Awarded for one of the top insect science project ideas for grades K-12
 - “Does floral color or size influence pollinator visitation”

Vartkes Miroyan Memorial Award 2009

- Departmental award given to a graduate student who has achieved exemplary academic excellence and leadership qualities

Entomological Society of America Student and Early Professional Award 2009

- Awarded for active participation in ESA national meeting in Reno, NV

William Yendol Memorial Research Award 2008, 2009, 2010

- Travel award given to supplement expenses to attend workshops and national conferences

Research Grants

North American Pollinator Protection Campaign (NAPPC) research grant (\$10,000) April 2009

- “Sub-lethal effects of pesticide combinations on honey bee (*Apis mellifera* L.) larval development and adult associative learning”

PRESENTATIONS AND INVITED LECTURES

Invited Presentations

“The effect of pesticides on honey bees: acute and chronic toxicity” Nov. 8, 2008

- Pennsylvania State Beekeepers Association Annual Meeting, Lewisburg, PA

“Chemical residues, declining honey bee populations, and CCD” Jan. 8, 2009

- Delaware Ag. Week, Harrington, DE
- “The effect of oral-fed pesticide combinations on *in vitro* larval development” Aug. 2011
- National Honey Bee Awareness Day- Penn State Apiary, State College, PA
- “CCD: have we found a solution for the honey bee decline?” Sept. 14, 2009
- The North Museum, Lancaster, PA
- “Sub-lethal effects of pesticide combinations on honey bee larval development and adult associative learning” Oct. 22, 2009
- North American Pollinator Protection Campaign Annual Conference
 - U.S. Environmental Protection Agency, Washington DC
- “Is that a pollinator in my patch?” Feb. 4, 2010
- 2010 Mid-Atlantic Fruit and Vegetable Convention, Hershey, PA
- “Pesticides and honey bees: what we know thus far” Jan. 8, 2009
- 2010 Western PA Beekeepers Seminar- Cranberry, PA
 - Presented seminar and led a breakout session titled “the role of pesticides on honey bee health

Oral Presentations

- “Sub-lethal effects of pesticide combinations on honey bee larval development?” Oct. 23, 2009
- Cornell-Penn State Chemical Ecology Joint Symposium, Ithaca, NY
- “Sub-lethal effects of pesticide combinations on *Apis mellifera*?” Dec. 13, 2009
- 2009 ESA National Meeting, Indianapolis, IN
- “Impacts of pesticides on honey bee development?” Mar. 7, 2010
- 2010 ESA-Eastern Branch Meeting, Annapolis, MD
- “Are we underestimating the impacts of pesticides on honey bees? Measuring and predicting honey bee larval survival after chronic pesticide exposure” Nov. 13, 2010
- 2010 Pennsylvania Beekeeper’s Meeting, Lewisburg, PA
 - Co-authored, presented by Wanyi Zhu
- “Are we underestimating the impacts of pesticides on honey bees? Measuring and predicting honey bee larval survival after chronic pesticide exposure” Jan. 7, 2011
- 2011 North American Beekeeping Conference and Tradeshow, Galveston, TX
 - Co-authored, presented by Wanyi Zhu
- “Are we underestimating the impacts of pesticides on honey bees?” Mar. 20, 2011
- 2011 ESA-Eastern Branch Meeting, Harrisburg, PA

- Co-authored, presented by Wanyi Zhu

Poster Presentations

“Determining the changes of queen honey bee pheromone composition when exposed to the commonly encountered in-hive miticides coumaphos and tau-fluvalinate?” Dec. 13, 2010

- 2010 ESA Annual Meeting, San Diego, CA

Invited Class Guest Lectures,

“Honey bee anatomy,” Apiculture, September 2009.

“Honey bee visual, olfactory, and gustatory associative learning,” Field Ecology, September 2008, 2009.

“Introduction to Entomology,” Master Gardener Training, September 2009, 2010.

PROFESSIONAL WORKSHOPS

Native Bee Identification Workshop Feb. 2008

- Participant, USGS Patuxent Wildlife Center

Ultramicrotomy Workshop Nov. 2008

- Participant, Penn State Microscopy Center for Research

International Center for Chemical Ecology- Chemical Analysis Day June 2010

- Co-organizer, Penn State University

Competitive Grants Workshop Feb. 2011

- Participant, Penn State University- College of Ag. Sciences

Schreyer Institute Course for College Teaching Feb.-Apr. 2011

- Participant, Penn State University

ORGANIZED SYMPOSIA

Fragmented Glimpses into the Paleoentomological Past (Co-organized with Akito Kawahara)

- ESA-EB Student Affairs Committee Symposium, March 2009

Pollinator Health and Biodiversity: Unlocking the Key to Society’s Future

- ESA-EB Student Affairs Committee Symposium, March 2010

DEPARTMENTAL AND PROFESSIONAL LEADERSHIP

Public Outreach Committee- Penn State Entomology	2008-2009
Acceptance and Recruitment Committee- Penn State Entomology	2008-2010
Entomology Graduate Student Association Secretary- Penn State	2008-2009
Entomological Society of America- EB Student Affairs Committee co-Chair	2008-2009
Friends of the Frost Entomological Museum Vice-President- Penn State	2008-2009
Student-to-Student Departmental Mentorship Program	Aug. 2009
Entomological Society of America EB Student Affairs Committee Chair	2009-2010
Entomology Graduate Student Association President	2009-2010
Friends of the Frost Entomological Museum President- Penn State	2009-2010
Instruction Committee- Penn State Entomology	2010-present
Entomology Graduate Student Association Student Representative	2010-2011
Friends of the Frost Entomological Museum Past-President- Penn State	2010-2011
Awards Committee- Penn State Entomology	2011-present

COMMUNITY VOLUNTEERING AND OUTREACH

14 th Annual Penn State Great Insect Fair	Sept. 2007
Exploration Days- Penn State	Apr. 2008
Critter Care- Penn State Dept. of Entomology	2008-present
Schlow Children's Library Insect Outreach- State College, PA	June 2008
St. Mary's Children's Library Insect Outreach, St. Mary's, PA	June 2008
Children's Bug Camp Staff- Penn State Dept. of Entomology	June 2008
Fourth Fest Insect Outreach- State College, PA	July 2008
15 th Annual Penn State Great Insect Fair	Oct. 2008
Exploration Days- Penn State	April 2009
Children's Bug Camp Leader- Penn State Entomology	June-July 2009
Master Gardener Bee Identification Training- Penn State University	Aug. 2009
16 th Annual Penn State Great Insect Fair	Oct. 2009
Ferguson Elementary Tours of Penn State Honey Bee Apiary	Nov. 2009
Frost Entomological Museum Tour for Homeschoolers	Apr. 2010
Children's <i>Advanced</i> Bug Camp Staff- Penn State Entomology	June-July 2010
17 th Annual Penn State Great Insect Fair	Oct. 2010
Frost Entomological Museum Tour for Huntington High School	Feb. 2011
"The Chemical Ecology Experience" for Home School Chemistry	Mar. 2011
Frost Entomological Museum Tour for Centre Christian Academy	Apr. 2011
18 th Annual Penn State Great Insect Fair	Sept. 2011

PROFESSIONAL VOLUNTEERING AND OUTREACH

79 th Annual ESA- Eastern Branch Entomology Meeting- Registration	Mar. 2008
80 th Annual ESA- Eastern Branch Entomology Meeting- Registration	Mar. 2009
ESA National Meeting Videographer	Dec. 2009
81 st Annual ESA- Eastern Branch Entomology Meeting- Registration	Mar. 2010
ESA National Meeting Directional Assistant	Dec. 2010
82 nd Annual ESA- Eastern Branch Entomology Meeting- Assistant	Mar. 2011

SPECIALIZED SKILLS

- Gas Chromatography (GC)-FID, -MS
- Honey bee proboscis extension reflex (PER)
- Honey bee *in vitro* larval development
- Quantitative Real-Time Polymerase Chain Reaction (qRT-PCR)

OTHER

Hiking, cycling, ultimate Frisbee, tennis/racquetball, snowboarding, geocaching, fishing

REFERENCES

Available upon Request