

Sarah Elizabeth Johnson

Current Address: Lincoln, NE Email: sarah2017@huskers.unl.edu

EDUCATION/TRAINING

Winthrop University, Rock Hill, SC

Bachelor of Science in Biology, grad. May 2010

Research Assistant, Spring 2010

University of Georgia, Athens, GA

Graduate School:

Masters of Science in Entomology, grad. August 2013

Teaching Assistantship, Fall 2011, 2012, Spring 2013

Research Assistantship, Spring and Summer 2012

Work: Research Technician III, Soybean Genetic

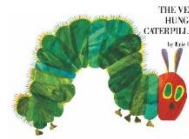
Transformation lab, Fall 2013 – Summer 2017

University of Nebraska, Lincoln, NE

Graduate School:

Complex Biosystems Phd, Specializing in Integrative Plant Sciences

First year (rotations): Dr. George Graeff, Dr. David Hyten, and Dr. James Schnable



PROFESSIONAL SKILLS

Laboratory:

Soybean and medicago embryogenesis & regeneration

Soybean transformation with biolistics

Media preparation

DNA and RNA extraction

cDNA synthesis

DNA and RNA quantification-Hoeste Dye, Take3,

Qubit, Quantiflour

gPCR, RT-PCR

Microscopy

Hemocytometer technique

Micropipetting techniques

Serial dilutions

Invader assay

BAP staining for hydrogen peroxide in leaf

GUSPlus staining

Bacillus thuringiensis Strip Test

Standard dose mortality assay

Acid Fuschin staining for insect salivary deposits

Microplitis demolitor Bracovirus isolation

Audographica californica multinucleated polyhedrovirus (AcMNPV) isolation

Insect Rearing

Autoclave

Computer:

Electronic Penetration Graphing techniques

Microsoft Word, Excel, Powerpoint

SAS 9.3, RStudio, Learning Python

Other:

Propagating soybean, medicago, tobacco, *Arabidopsis*

Lab supply ordering and budget management

Organization, scientific writing, problem solving, supervisory, and decision-making skills

Insect taxonomy

AWARDS/ HONORS

Certificate of Achievement- Emerging Leaders Program, Winthrop U., 2006

Dean's List, Winthrop U., Spring 2007, Fall 2008, and Spring 2010

Leadership Enhancement & Academic Development Wall of Fame, Winthrop U., Spring 2008 and Fall 2008

Induction to National Residence Hall Honorary, Winthrop U., Spring 2009

Biology Scholar, Winthrop U., Fall 2009 and Spring 2010

Research published in Winthrop University's "2010 Book of Abstracts"

1st Place in Houk Prize Research Poster Competition, Winthrop U., Spring 2010

1st Place in the Undergraduate Paper Presentation at the SC/GA Entomological meeting, Fall 2010

Won the Plant-Insect Ecosystem Section's Undergraduate Award for Excellence in Entomology to present/compete at the Entomological Meeting of America in San Diego, CA., December 2010

Job promotion from grant based pay to hard money through the department of Crop and Soil Sciences at UGA, 2014

Awarded a 3-4% merit raise, 2014, 2015, 2016

RESEARCH

Winthrop University Undergraduate Project

Leptoglossus phyllopus (Hemiptera: Coreidae) is a local leaffooted bug that is considered a minor economic problem, but research on its feeding behavior could be useful in understanding congeneric species that pose a greater economic threat.

The objective of this research was to examine probing behavior of juvenile and adult bugs using Electrical Penetration Graph (EPG) techniques. Feeding was monitored using a AC-DC 4-channel EPG monitor (Bennett Electronics, Columbia, Missouri) connected to an analog to digital board and Windaq-Lite® software (Dataq Instruments, Akron, OH). Up to two insects were run simultaneously, and were monitored for 9 hours. Recognizable voltage spikes (waveforms) indicated

stylet insertion into the green bean. Frequency and duration of feeding, duration of each probe (i.e., a single feed), time until first probe, and length of pathway of each probe were compared. Feeding behaviors of third, fourth, and fifth instar nymphs and adults on green beans were analyzed (ANOVA, Kruskal-Wallis test) along with a separate statistical comparison of juveniles vs. adults (t test). Sample size was 10 insects per developmental stage. Significant differences appear between juveniles vs. adults for probe frequency and length of pathway, indicating that adults eat more frequently and locate the feeding site faster than nymphs. Knowledge of the most damaging stages can aid in timing of control. Further study will allow comparisons between coreids and other Heteroptera and correlations of waveforms with ingestion and salivation behaviors.

University of Georgia Master's Project

The parasitoid wasp *Microplitis demolitor* carries the polydnavirus *Microplitis demolitor Baculovirus* (MdBV) to parasitize the larval stages of the moth *Chrysodeixis includens*. Prior studies established that MdBV infection globally suppresses host immunity, which raised the question of whether parasitized hosts are more vulnerable to infection by other pathogens. I assessed whether parasitism mediated altered host growth and development by measuring body weight, head capsule width, frass weight, and locomotor activity. I then tested host susceptibility and risk of infection with *Bacillus thuringiensis* (*Bt*) and *Autographa californica* multicapsid nucleopolyhedrovirus (AcMNPV). Results indicated that parasitism suppressed host feeding behavior, which caused stunted host growth and development. Parasitized and non-parasitized hosts were equally as susceptible to AcMNPV and *Bt* when each pathogen was injected into the hemocoel. In contrast, when parasitized 3rd instars fed naturally on AcMNPV spread diet they exhibited significantly lower levels of mortality compared to non-parasitized hosts. *Bt* spread diet exhibited no significant mortality difference between parasitized and non-parasitized nymphs.

University of Georgia Research Staff Projects

The Parrott lab research focus evolves around crop genetic engineering and is most notable for the development of protocols for somatic embryogenesis and genetic transformation of soybean, switchgrass, alfalfa, rice and maize. My first project was to transform soybean with genes known to increase host-induced gene silencing to attack the fungus-like oomycete. I worked hard to quickly learn soybean somatic embryogenesis and regeneration among the other duties that go along with tissue culture, such as media making and superb sterile technique. I was hired early November, 2013 and was ready to complete my first bombardment December, 2013. I produced 52 lines with 10 different genes for just that project. Not only did I transform soybean, but I also confirmed the transgenic gene via PCR. Upon my superior's retirement announcement in 2014, I applied for the hard money position and became in charge of many more projects, point person for soybean transformation, greenhouse, lab safety training, and ordering/budget management. Projects included: methylation pattern changes with different age transgenic and non-transgenic tissue; nematode resistance; transgenic risk assessment; gene silencing for function validation; promoter testing; insect resistance with *Bacillus thuringiensis* (*Bt*); increasing carotenoid in seed. Although I did not create the plasmids, I transformed, regenerated, confirmed, performed tests to attain homozygous plants, completed bioassays, worked with collaborators by attending meetings, produced reports as often as every 2 weeks and shipped seed with the APHIS permits I attained.

CO-AUTHOR PUBLICATIONS

Kandoth, P.K., Liu, S.M., Prenger, E. Ludwig, A., Lakhssassi, N., Heinz, R. Zhou, Z., Howland, A., Gunther, J., Eidson, S., Dhroso, A., LaFayette, P., Tucker, D., Johnson, S., Anderson, J., Alaswad, A., Cianzio, S.R., Parrott, W.A., Korkin, D., Meksem, K., and Mitchum, M.G. 2017. Systematic mutagenesis of serine hydroxymethyltransferase reveals an essential role in nematode resistance. *Plant Physiol.* 175(3):1370-1380.

PRESENTATIONS

Paper presentation at the Winthrop University Biology Department Seminar, Fall 2009

Paper presentation in the master's competition at the South Eastern Branch of the Entomological Society of America (ESA) meeting in Atlanta, GA Spring 2010

Paper presentation at the Winthrop University Biology Department Seminar, Spring 2010

Paper presentation in the undergraduate competition at the SC/GA Entomological meeting, Fall 2010

Poster presentation for the Houk prize in the Biology Department at Winthrop University, Spring 2010

Paper presentation in the undergraduate competition at the ESA meeting in San Diego, CA. Fall 2010

Paper presentation in student competition at the ESA Meeting in Knoxville, TN November 2012

Paper presentation in student competition during Lund Week at UGA, March 2013

Guest speaker for UGA's Ento 2010 Insects and the Environment course at UGA, Spring 2013

Nematode Resistance in Soybean project update at the United Soybean Board meeting, St. Louis, MO, Summer 2015

Combined lab meeting retreat presentation on Soybean Transformation with the Gene Gun, Summer 2016

Transformation update presentations in lab meetings at UGA, Fall 2015-Summer 2017

PROFESSIONAL MEMBERSHIPS

National Residence Hall Honorary at Winthrop University

Emerging Leaders at Winthrop University

Entomological Society of America, 2010-2014

Southeastern Branch of the Entomological Society of America, 2010-2014

H.O. Lund Entomology Club at University of Georgia:

Vice President: Fall 2011, Spring 2012

President: Summer and Fall 2012 and Spring 2013

- Clerical duties such as club registration and conduct monthly meetings
- Student Liaison to the Entomology Seminar Committee
- Organized Entomology Department's Beginning of the Year Party, Brady Seminar, Halloween Bake Sale, Ento Department's Holiday Party, and the Ento Department's End of the Semester Party.
- Organized Lund Week:
 - During Lund Week we honor the founder and benefactor of our club. We invite a speaker to be a Lund Seminar Speaker and host many events during the week to celebrate our interests in the world of insects. I was the primary contact with the guest speaker and created the master schedule. I helped organize the luncheon and dinner reception. I was also instrumental in writing the guest speaker's bio, created a few pages of the events program, and competed in the oral presentation competition.
- Judge in the GA Science and Engineering Fair for our Excellence in Entomology Award
- Organized and created space on campus now known as the Lund Room

SCIENCE AND MATH COURSES TAKEN

Winthrop University

BIOL 203 & 204 - Introductory Biology

BIOL 205 - General Botany

BIOL 206 - General Zoology

BIOL 304 - Human Anatomy

BIOL 306 - Human Physiology

BIOL 310 - Microbiology

BIOL 404 - Animal-Plant Interactions

BIOL 471, 472 - Undergraduate Research Biology

BIOL 480H- Integration of Biological Principles

BIOL 491, 492 - Departmental Seminar

BIOL 515 - Vertebrate Natural History

BIOL 527- Population Biology

ENVS 101 - Environmental Science

CHEM 105,106,107,108 - General Chemistry I & II

PHYS 201, 202- General Physics I & II

PHED 361- First Aid and Cardiopulmonary Respiratory

CTQR 150 - Quantitative Methods in Critical Thinking

MATH 101 - Algebra and Pre-calculus

MATH 105 - Calculus Managerial, Life Science

University of Georgia

ECOL 6500- Evolution Ecology

ENTO 7000- Master's Research

ENTO 7300-Master's Thesis

ENTO 8000- Entomology Seminar

ENTO 8010- Insect Taxonomy

ENTO 8050- Physiology, Systematics and Evolution

ENTO 8070-Research Discussion

ENTO 8250- Insect Physiology

ENTO 8570- Molecular Entomology

FANR 6750- Experimental Methods in Natural

Resources Research (Experimental Design)

CRSS 8871- Genome Analyses (Spring 2016)

HORT 6430- Plant Physiology (Fall 2016)

University of Nebraska

AGRO835- Agroecology

LIFE891- Life Sci Res I: Big Questions

LIFE891- Complex Biosystems Seminar

LIFE891- Biotech Core Research Facilities

AGRO896- Independent Study (Dr. George Graeff, Dr.

David Hyten, and James Schnable)

STATS801-Statistical Methods in Research

STATS802- Design and Analysis in Research

REFERENCES

Dr. David Hyten, Haskins Professor in Plant Genetics and Associate Professor in department of Agronomy and Horticulture at the University of Nebraska-Lincoln 402.472.3255 david.hyten@unl.edu

Dr. Mike Strand, National Academy of Science Member (2017), Regent Professor and Principal Investigator in the Entomology department at University of Georgia 706.583.8237 mrstrand@uga.edu

Dr. Wayne Parrott, Professor and Principal Investigator in the Center for Applied Genetic Technologies department at University of Georgia 706-542-0928 wparrott@uga.edu