



Entomology

NEWSLETTER

2022

News from the LSU Department of Entomology

FROM THE DEPARTMENT HEAD

Alumni, supporters, and friends of LSU Entomology,

I am pleased to present this newsletter, which contains an overview of the activities and accomplishments of faculty, staff, and students of the LSU Department of Entomology in 2021. As you will see from the articles in the newsletter, LSU Entomology continued to provide innovative solutions to the insect-related problems faced by Louisiana and the world despite the challenges presented by the ongoing pandemic. As we reflect on these accomplishments, we are grateful for the opportunity to serve the citizens of Louisiana, and we look forward to another successful year in 2022.



The publications, grants, honors, and awards of our faculty, staff, and students in 2021 attest to the productivity and excellence of our programs. Our M.S. and Ph.D. programs, which serve a total of about 40 students, remain strong. The results of a university-mandated review of our graduate programs in 2021 were very good, with only a few minor suggestions made for improving the two programs. We also developed an undergraduate Plant Health Management curriculum in 2021 at the behest of the former vice president and dean of agriculture, Bill Richardson, and in cooperation with the Department of Plant Pathology and Crop Physiology. The letter of intent for this B.S. degree program was approved by the LSU Board of Regents last year, and we look

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This section demonstrates the process of imaging an entire specimen through imaging the ultrastructures responsible for color.

‘Nature does have this profound beauty’:

Art and science intersect in LSU lab exhibit

*By Domenic Purdy
LSU Reveille*

An exhibit at the Louisiana Art and Science Museum that features research from assistant professor of entomology Nathan Lord seeks to bridge the gap between the worlds of art and science.

The exhibit, “Iridescence,” expands on the work of Lord and his students in LSU’s Entomology Department studying the emerald ash borer, whose unique green color has given them the nickname of jewel beetle. Jewel beetles are

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colored by the exhibit's titular iridescence, a rainbowlike optical illusion caused by the refraction of light waves.

"The color changes as the receiver of the light changes angles," Lord said. "That's what makes these structures so brilliant. You see it in bird feathers, shells, precious stones like opal, in soup bubbles and oil slicks. There's tons of examples of iridescence in nature."

"Iridescence is unique from most color found in nature, originating primarily from a phenomenon known as structural color," Able Chow, a Ph.D. candidate working in Lord's lab said.

An example of artificial structural color would be the surface of a CD, Chow described.

"The color doesn't come from the chemical property of the object [like pigmentary colors] but its physical properties," Chow said. "An iridescent object has a very specific pattern that is small enough that it interacts with different wavelengths of light. It's synonymous with iridescence."

For its yearlong run at LASM starting July 2021, Lord's exhibit seeks to showcase both the natural phenomenon and the artistic applications of iridescence.

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forward to launching the curriculum in late 2022 or early 2023. We also look forward to welcoming a new extension entomologist, Dr. Aaron Ashbrook, in May of 2022. Aaron's areas of responsibilities will include extension and teaching related to insect pests in urban and peri-urban areas. Aaron replaces, in effect, Dr. Dennis Ring, whom we lost to cancer in 2020. We are also currently conducting a search for a forest entomologist and anticipate having someone in this position by the fall semester.

We appreciate the interest and support of our alumni and friends, and we welcome opportunities to visit with you

by email or phone or, even better, in person. Suggestions for improving our programs are always welcome. One mechanism for delivering your suggestions is through the annual Stakeholder Summit, which is organized by the LSU College of Agriculture and is scheduled for Saturday, March 19. You can contact me for details on the summit. Finally, if you would like to donate to support any of our programs, details for doing so can be found in this newsletter.

Again, the Department of Entomology sincerely appreciates your support of our efforts.



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The exhibition, featured in LASM's second floor gallery and Soulcon gallery, consists of artistic representations of iridescence from local, national, and international artists showcased alongside the lab's work cataloging Jewel Beetles and other iridescent beetles, with both magnified photographs and real insects from their field work.

Beyond Lord's lab, the exhibition features items other parts of LSU's campus that artistically incorporate iridescent colors.

"It includes a custom built, period specific, Victorian dress from faculty members at the Department of Textiles, Apparel and Merchandising adorned with jewel beetle wings," Lord said. "It also includes a very special LSU football helmet that has been loaned by the athletics department, which is a special, purple iridescent version that was used only once in 2018."

The artists included in the exhibit utilize a range of mediums, including photography, sculpture and painting, all tied together by a showcase of "iridescence in some form or fashion," Lord said.

Pieces like Jennifer Robison's amalgamation of a photograph and 97 iridescent butterflies and Christopher Marley's collages of iridescent insects make "the visitors stop and appreciate the life, beauty and contributions of these specimens," LASM curator Lexi Adams said.

"It really just stops people in their tracks wondering 'Are the butterflies real? Are they alive? How did the artist do this?' There's just so many talking points," Adams said. "What really makes art special to me is when our visitors latch on to it and connect to it."

This expansion outside of Lord's work in his lab into the realm of art is what attracted Adams to the exhibition as early as 2019.

"It was a perfect fit for LASM because he was proposing an exhibition that dealt with the scientific principles of iridescence through an artistic lens," Adams said. "At LASM, those are our favorite subjects, finding the art in science."

One of the artists showcased, England's Franziska Schenk, utilized a scientific approach to create iridescent paintings.

"Her work is scientifically developed. She spent years experimenting and working with a team of scientists to create truly iridescent paint that changes color and disappears and reappears depending on the light," Adams said. "The color changes as you move around the work, creating this interactive, iridescent painting that's one of a kind."

Through her time in Lord's lab and working on the exhibit, master's student Sierra Weir wanted to raise awareness for this convergence of the arts and sciences that the exhibit is attempting to cultivate, specifically in the way people learn.

"We haven't really talked about the scientific aspects of art or how beautiful science can be," Weir said. "Utilizing the science that we are doing and its natural beauty, we can raise awareness for science through a different form of education that's engaging and really gets people involved beyond the aesthetics."

The exhibit has also allowed both museum visitors and the contributors to look at the world through a new lens, divorced from the pigmented world, Chow said.

"It raises a lot of questions about how these colors are produced and why they're there and who they're for. Us as humans are unintended receivers," Chow said. "The very first time a lot of these people see this, they encounter this curiosity of 'I want to know more about this.' For a lot of people, this is the first time they are able to ask these questions and look further in."

Lord said wanted to emphasize the beauty found within the intersection of art and science with the exhibit, despite starting off studying a "less desirable organism" like beetles.

"What is not lost on, that is often lost on many people that are not in science, is that nature does have this profound beauty," Lord said.

This article originally appeared in the Nov. 22, 2021 issue of the LSU Reveille and was reprinted with special permission.

Meet Aaron R. Ashbrook, assistant professor of urban and peri-urban entomology

I am a new assistant professor of urban and peri-urban extension entomology. I received my Bachelor of Science in biology at Grand Valley State University. I then pursued my Master of Science at Purdue University, where I focused on insecticide resistance detection and management in bed bugs and German cockroaches. I also obtained my Ph.D. from Purdue, where I

investigated bed bug thermal tolerance, their physiological response to heat stress, and how their behavior changes after high temperature exposure to optimize heat as a tool for their control indoors. For my postdoctoral work, I studied at North Carolina State University, where I examined the susceptibility of German cockroaches and bed bugs with fungal pathogens that are specific to insects. My research

focuses on identifying and exploiting weak links in the biology of urban and peri-urban pests (e.g., bed bugs, cockroaches, and other arthropods around the home) to improve integrated pest management strategies while also mitigating insecticide resistance. We look forward to communicating our findings as well as those from other researchers to help people that are negatively affected by pest insects.



Aaron R. Ashbrook

HELP US TO ENSURE EXCELLENCE IN ENTOMOLOGY

While the department receives some monetary support for its core research, extension, and teaching programs, private financial support is vital for enhancing our existing programs, providing additional financial support for our students, and beginning new initiatives. Please consider contributing to help support our programs.

You may help to support the Entomology Department by donating to one of the funds below:

- #100162 — Entomology Development Fund
- #100166 — Entomology Research Support Fund
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- #104124 — D. Michael Chambers Endowed Scholarship
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- #104131 — Louisiana State Arthropod Museum Fund
- #104132 — 4-H Entomology Awards Account Fund
- #104133 — Entomology and Alternate Uses
- #104134 — Integrated Pest Management Research Fund
- #104135 — Arthropod Pest Management Program Support Fund
- #105260 — Louisiana Mosquito Control Association Endowed Scholarship

Donations can be made by accessing the LSU Foundation site at www.lsufoundation.org/give or by sending a personal check made out to the LSU Foundation with a letter stating which fund you would like to donate to. Address the letter to:

Entomology Department
404 Life Sciences Building
LSU Campus
Baton Rouge, LA 70810
225-578-1628

For more information contact:
Michael J. Stout
Professor and Department Head
mstout@agcenter.lsu.edu

Wilson receives 2021 ESA Early Career Professional Extension Award

The Entomology Society of America Early Career Professional Extension Award is given to a student in transition or an early professional who excels in entomological extension.

Dr. Blake E. Wilson is an assistant professor and extension specialist with the LSU AgCenter. He leads a field crops entomology research and extension program focused on integrated pest management of rice and sugarcane insects. He received his B.S. (biology), M.S. (entomology/experimental statistics), and Ph.D. (entomology) from LSU before joining the faculty in 2017.

His extension activities aim to promote sustainable integrated pest management (IPM) strategies that maximize grower profitability. These include pheromone-based scouting methods and targeted insecticide applications. He has developed cultivar-specific management guides based on pest susceptibility and yield loss relationships. He also works to monitor invasive species expansion and raise awareness about the arrival of new insect threats. He works closely with producers and crop consultants to conduct on-farm trials demonstrating new pest management strategies.

His research focuses on host plant resistance, yield loss relationships, and sampling strategies of key insect pests. He also studies invasive species ecology and biological control.

Wilson has been active in ESA throughout his career. He participated frequently in the Entomology Games and Student Debate as a graduate student and now serves



as the faculty advisor for LSU's teams. He is a previous recipient of the Kirby Hays M.S. Student Award and the John H. Comstock Ph.D. Student Award from the Southeastern Branch of ESA. He currently resides in Baton Rouge with his wife and two daughters.

AgCenter Bug Biz series revived

By Chris Carlton

The LSU AgCenter's online Bug Biz series was initiated about 20 years ago by Dr. Dale Pollet and the late Dr. Dennis Ring. They are short, concise articles about insects and related arthropods that convey technical information to the citizens of Louisiana about species of concern. Since its inception, the series has evolved during the intervening years as online presentation formats improved and images became more widely available under Creative Commons copyrights. The series was recently renewed thanks in large part to Dr. Reagan's pest management grants. The breadth of coverage was expanded to include virtually any nonmarine arthropod occurring in Louisiana, with special attention to pests and species of interest or concern to the public. Beginning in fall 2019, a graduate level ENTM 7008 special topics course was offered to provide a formal avenue for students to contribute to the series and receive one hour of class credit with yours truly serving as instructor

and ad hoc editor. Many recent Bug Biz articles were prepared by students enrolled in the 7008 course. Class discussions also dealt with broad aspects of publication, such as formatting guidelines, copyright issues and appropriate narrative style for the general public.

Authorship of Bug Biz articles is not limited to students involved in the course, and anyone with a desire to contribute to the entomological knowledge of Louisiana's arthropod fauna is invited to participate. New articles can be prepared or older articles updated and enhanced. With the nonmarine arthropod diversity of the state estimated at around 20,000 species, there is no shortage of material from which to choose.

Currently, 103 articles in the series are posted online, the majority produced during the past three years. An additional 30 are in various stages of production. Anyone interested in preparing a Bug Biz article can contact me for guidance on formatting and publication workflow.

INDEX FOR ENTOMOLOGY-RELATED TOPICS ON THE LSU AGCENTER WEBSITE

As of Jan. 15, 2022:

Links are embedded for published material. Items labeled as “submitted” and/or “pending” are not yet published but are in process. Periodically updated indices will include those links. Articles for specific kinds of insects and other arthropods are indexed by taxonomic orders or higher taxa, then alphabetically by scientific names (i.e., genus and species or higher taxonomic levels, as treated in articles). Common names follow the scientific names. Note that multiple common names may be applied to the same organism. To avoid confusion, scientific names are prioritized.

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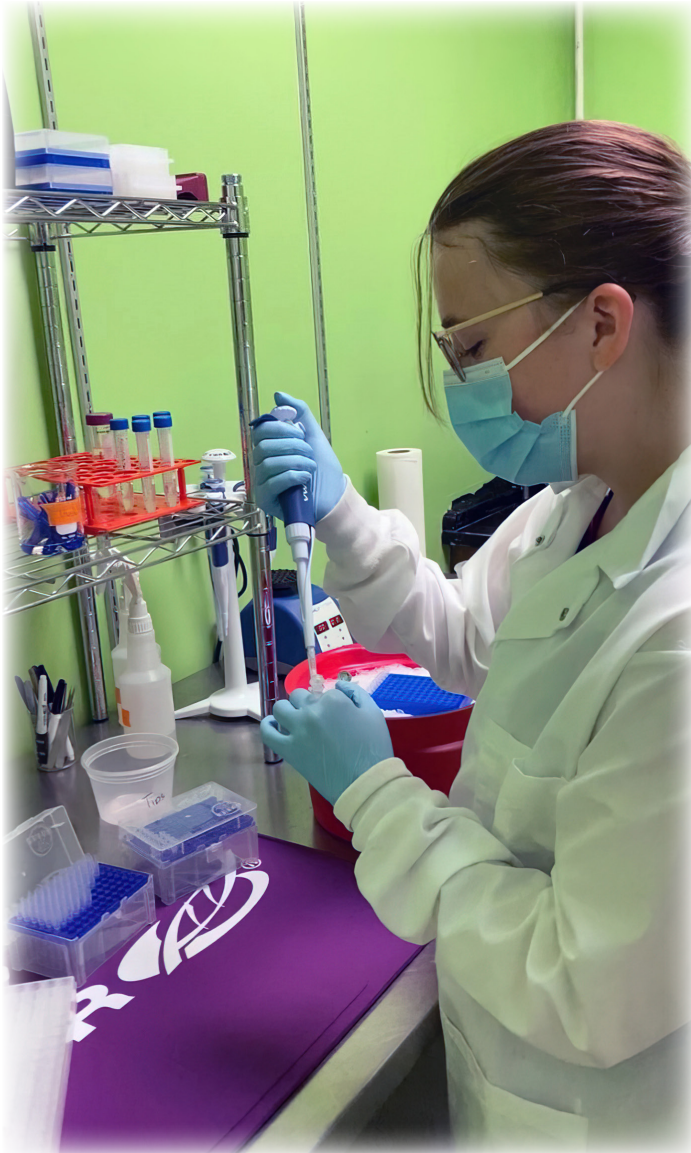
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Keyla Pruett setting up a PCR reaction.

KEYLA PRUETT, TRANSIENT WORKER

As an undergraduate student worker and researcher, Pruett contributed to our understanding of the Roseau cane scale (*Nipponaclerda biwakoensis*) parasitoid complex in Louisiana. Additionally, Pruett developed species-specific PCR primers to facilitate easy molecular identification of RCS parasitoids. Pruett is responsible for training undergraduate and graduate students on molecular techniques, such as DNA extractions, PCR, and gel electrophoresis. Due to her expertise on these techniques, Pruett built a small molecular laboratory space for the Diaz lab. Her final project focuses on whole genome sequencing of two biotypes of air potato beetle (*Lilioceris cheni*).



Matthew Berry collects Roseau cane at the Mississippi River Delta.

MATHEW BERRY, RESEARCH ASSOCIATE

As a research associate on the Roseau cane project, Berry's primary research interests are in long-term health surveys of the lower Mississippi River Delta (MRD) and use of remote sensing and mapping. The health surveys are conducted quarterly, and we sample 28 sites in the MRD. We measure plant height, percent green, stem densities, water depths, and scale densities. These measurements allow us to better understand the dynamics across vast areas of the MRD and how the Roseau cane scale and the die-off might be related. Berry is also responsible for managing all drones/UAVs for the Diaz lab remote sensing projects. This includes flying the drones for imaging as well as post-processing using RGB and multispectral cameras to create photomosaics, reflectance maps, and NDVI heat maps. In addition, Berry also assists Tanner Sparks with the GIS mapping for the range expansion study of the Roseau cane scale. In collaboration with Josh Snook, Berry is responsible for developing a boating training program for the Roseau cane project and management of the boats of the Diaz lab.

ROSEAU CANE DREAM TEAM



Josh Snook evaluates planting techniques of Roseau cane at the Mississippi River Delta.

JOSH SNOOK, RESEARCH ASSOCIATE

Snook studies the effect of rhizome size on the ability of Roseau cane to tolerate the invasive Roseau cane scale (*Nipponaclerda biwakoensis*). This research is being used to identify plant traits that will give Roseau cane the best chance to grow and restore die-back regions at

the lower Mississippi River Delta (MRD). To understand how soil conditions affect the establishment of Roseau cane, Snook is characterizing the soil (clay, sand, silt) of potential restoration sites at the MRD, and different planting techniques using stems. With Mathew Berry, Snook provides hands-on boat training that gives researchers the skills to safely operate boats to access their remote field sites.



TANNER SPARKS, PH.D. STUDENT

Tanner Sparks is a PhD. student in the Diaz lab. His research focuses on the biology of Roseau cane scale (*Nipponaclerda biwakoensis*) and the encyrtid wasp species that parasitize it. Sparks' hypothesis is that these wasps can be used as biocontrol agents to reduce invasive scale populations below damaging levels. His experiments have looked at the effects natural enemies have on *Nipponaclerda* populations in the native and adventive ranges. Tanner also conducts field surveys to identify the invasive range for the scale and determined that *Nipponaclerda* has spread further along the Gulf Coast since its initial detection in 2016.

At left, Tanner Sparks counts scales at the lower Mississippi River Delta. The boat driver is Earl Armstrong, a long-term resident of Plaquemines Parish and one the first people who reported the die-back of the Roseau cane.



Setia studies ironwood tree decline in Guam

Garima Setia, a master's student of Dr. Claudia Husseneder, spent a month at the University of Guam conducting fieldwork to determine the potential role of termites as pathogen vectors of ironwood tree decline (IWTD). Ironwood (*Casuarina equisetifolia*) is widely distributed across Southeast Asia, Australia and the Pacific Islands and is important in agroforestry. Ironwood trees in Guam have been decimated by IWTD, a multifactorial disease associated with wood-rot fungi (*Ganoderma*), bacterial pathogens (*Ralstonia* and *Klebsiella*), and termites (*Nasutitermes*, *Microcerotermes* and *Coptotermes* species) attacking the trees.

Garima used 16S rRNA gene next-generation sequencing of bacteria to search for pathogens carried by termites feeding on ironwood trees. The pathogen load in termites was low regardless of the disease severity of the tree. Therefore, Garima conducted bioassays in Guam to determine whether plant pathogens have a low survival rate in termites and/or termites avoid consuming diseased wood with pathogens. The project is funded by a Western Sustainable Agriculture Research and Education grant to Drs. Schlub (University of Guam), Arif (University of Hawaii) and Husseneder (LSU AgCenter).

Rickettsial influence on host membrane physiology in arthropod vectors

National Institute of Health, NIAID

PI: Daniel Swale

Co-I: Kevin Macaluso (University of South Alabama)

Co-I: Albert Mulenga (Texas A&M)

Tick-borne rickettsial diseases (TBRDs) are ubiquitously present throughout the world, and case fatality rates in disease clusters can range up to 100% despite the availability of effective treatment. Thus, there is a need to increase the “toolbox” for TBRD control by supplementing existing strategies with promising novel approaches that focus on interrupting the *Rickettsia* transmission cycle in the tick vector.

Our recent studies demonstrated that the nonpathogenic *Candidatus Rickettsia andeanae* is secreted in tick saliva during feeding but at a lower level when compared to pathogenic *Rickettsia parkeri*, raising questions regarding the underlying mechanisms that mediate rickettsial pathogenicity. The likelihood that rickettsiae manipulate the arthropod host to enhance horizontal transmission has been recognized, yet the specific interactions between *Rickettsia* and ticks remain unknown. Unfortunately, significant knowledge gaps exist regarding the basic transmission biology of tick-borne *Rickettsia* and the specific interactions between *Rickettsia* and tick physiology that enable transmission, which represents a significant barrier to the field and has limited the development of novel approaches to control TBRDs.

Thus, the premise of this proposal is that pathogenic *Rickettsia*, but not nonpathogenic strains of *Rickettsia*, alter regulation of tick-derived proteins to enhance salivary gland physiology and increase the secretory activity of the gland, which facilitates increased horizontal transmission. Salivary gland function is dependent on strict regulation of acini membrane physiology and thus, we hypothesize that *Rickettsia* alter mechanisms for ionic homeostasis to facilitate horizontal transmission. Correspondingly, we hypothesize that inhibition of ion flux will negate the rickettsial-mediated enhancement of salivary gland activity to prevent tick bloodmeal feeding and horizontal transmission of *Rickettsia*.

In Specific Aim 1, we will employ a multidisciplinary approach to measure the influence pathogenic *Rickettsia* has to secretory activity and membrane physiology (e.g., membrane potential) of an *R. parkeri* infected tick salivary gland compared to nonpathogenic *Rickettsia* infected ticks. These data will delineate the mechanism by which *Rickettsia* influences tick salivary gland physiology to drive pathogenicity. In Specific Aim 2, we will test if dysregulation of K⁺ homeostasis across salivary gland epithelia will inhibit salivary gland function of rickettsial ticks to alter blood feeding biology and reduce *R. parkeri* virulence in vertebrate disease models. Combined, the experiments outlined in this proposal will define unique aspects of rickettsial influence on tick physiology that enhance pathogenicity of *Rickettsia*, which will assist in resolving the epidemiology of SFG *Rickettsia* and reveal intervention points to reduce the health burden of TBRDs.

Investigating The Impacts Of Covert Virus Infection To Visual Pathways And Responses In The Honey Bee

USDA-NIFA, AFRI

PI: Daniel Swale

Co-I: Nathan Lord (LSU)

Co-I: Mike Simone-Finstrom (USDA-ARS)

High concentrations of honey bee viruses are known to collapse colonies, yet the influence of “covert” infections to colony health and function remains understudied. Our group has aimed to identify novel intervention points that can mitigate negative impacts of virus infections and our work has identified a family of potassium ion channels, termed KATP channels, that mediate survival of honey bees during virus infection. This suggests KATP channels represent a putative therapeutic target for mitigation of virus induced damages. Interestingly, our preliminary data

indicate “covert” Deformed Wing virus (DWV) infections infect bee eye tissue, impair bee vision, and alter foraging behavior. This raises the intriguing possibility altered foraging behavior is resultant of an impaired visual sensory system and modulation of KATP channels may mitigate virus-induced changes to visually guided behavior. Therefore, the goal of this seed proposal is to define the relationship between virus infection, visual sensory system function, and foraging behavior of honey bees. We will employ molecular, physiological, and ecological approaches to test if DWV infection alters: foraging choices and homing ability at the colony level, sensitivity to light and color spectrums, and transcriptional regulation of key visual genes. Data generated from this study will establish the framework needed to initiate a large-scale study that aims to define and mitigate the antagonistic effects of covert virus infections to honey bee behavior and health.

2021 ENTOMOLOGY AWARD WINNERS

Graduate Students

Roussel Scholarship Graduate Student Award in Entomology

- Steven Richardson — Master's
- Paula Castillo — Ph.D.

Boethel Scholarship Graduate Student Award in Entomology

- Flinn O'Hara — Master's
- Colin Bonser — Ph.D.

LSU College of Agriculture Undergraduate Research Grant

- Kieu Ngo

LSU Discover Undergraduate Research Project Grant

- Nathan Le

L.D. Newson Graduate Student Award in Entomology

- Leo Salgado — Master's
- Zhilin Li — Ph.D.

Ray and Dorothy Young Endowed Assistantship in Crop Integrated Pest Management

- Ethan Doherty

Louisiana Agricultural Consultants Association Scholarship

- Tyler Musgrove — Master's (see article)

American Mosquito Control Association (AMCA) Student Competition, Gerald Hollandsworth prize for outstanding presentation

- **McNamara, T.** Non-target Risks of Common Ultra-low Volume Adulticides to Red Swamp Crawfish (*Procambarus clarkii*) Production.

Louisiana Mosquito Control Association (LMCA) Student Competition winner for outstanding presentation

- **McNamara, T.** The Effects of Environmental pH on the Toxicity of *Bacillus thuringiensis* subspecies *israelensis* to *Culex quinquefasciatus*.

American Chemical Society, Division of Agrochemicals. "Pesticides, Pollinators, and Crop Protection." Virtual Format. Education Award, 2021 Fall National Meeting. Atlanta, Georgia.

- **Christopher J. Fellows**, Troy D. Anderson, and Daniel R. Swale. The synergistic effects of agrochemical exposure phosphorothioate insecticides in the Western honey bee, *Apis mellifera*.

- **Sarah E. McComic**, Troy D. Anderson, Leslie C. Rault, and Daniel R. Swale. 2021. Post-translational histone modifications alter permethrin susceptibility in *Drosophila melanogaster*.
- **Flinn M. O'Hara**, Jeffrey A. Davis, Daniel R. Swale. 2021. *Toxicity and Changes to Feeding Behaviour of Aphis gossypii After Exposure to Commercial Insecticides*.

Third place presentation, American Chemical Society Agrochemical Division

- **Flinn M. O'Hara**, Jeffrey A. Davis, Daniel R. Swale. 2021. *Toxicity and Changes to Feeding Behaviour of Aphis gossypii After Exposure to Commercial Insecticides*. American Chemical Society, Division of Agrochemicals. "Pesticides, Pollinators and Crop Protection". Third place poster award. 2021 Fall National Meeting. Atlanta, Georgia.

11th Annual LSU Entomology Department Graduate Student Symposium, Baton Rouge. Oct. 22, 2021

Roussel Family Entomology Symposium Award

- **Tyler Musgrove** — Third place M.S. Student Paper Competition (10-Minute Oral Presentations: Masters 2): The effects of neonicotinoid seed treatments on three cornered alfalfa hopper, *Spissistilus festinus* (Say), in Louisiana soybean, *Glycine max* (L) Merr.
- **Flinn O'Hara** — Second place 10-Minute Proposals (Masters 1) Testing the effect of commercialized aphicides on the feeding behavior of the cotton aphid, *Aphis gossypii*. Flinn M. O'Hara, Zhijun Liu, Jeffrey A. Davis, Daniel R. Swale.
- **Joseph McCarthy** — First place 10-Minute Proposals (Masters 1) Effect of soldier proportion on tunneling behavior of Formosan subterranean termite *Coptotermes formosanus* (Blattodea: Rhinotermitidae). Joseph McCarthy, Qian Sun, Arjun Khadka.
- **Sierra Weir** — Second place 3-Minute Proposals Color Compounds in Buprestidae: The identification and evolutionary significance of aposematic pigments in Stigmoderini. Sierra Weir, Nathan Lord.
- **Able Chow** — First place 3-Minute Proposals Color and Species Delamination in Jewel Beetles: From Subjective Perception to Objective Definition. Able Chow, Nathan Lord.
- **Scott Lee** — Third place Ph.D. Student Paper Competition (10-Minute Oral Presentations: Ph.D.): Composition and temporal abundance of resident arthropod predators in Louisiana soybean. 11th Annual LSU Entomology Department Graduate Student Symposium, Baton Rouge. Oct. 22, 2021.

2021 ENTOMOLOGY AWARD WINNERS



Left to right: Luke Laborde, Rodrigo Diaz, and Allen Rutherford.



Luke Laborde, left, and Daniel Swale.

- **Sarah McComic** — Second place Ph.D. student paper competition (10-minute oral presentations: Ph.D.) Reduced neuronal sensitivity and susceptibility of the fall armyworm, *Spodoptera frugiperda*, to pyrethroids in the absence of known knockdown mutations. Sarah E. McComic, Leslie C. Rault, Troy D. Anderson, Daniel R. Swale.
- **Paula Castillo** — First place 10-Minute Proposals (Ph.D.) Molecular characterization and gene expression analysis of the odorant receptor coreceptor (orco) in the Formosan subterranean termite, *Coptotermes formosanus*. Paula Castillo, Qian Sun.
- **Ilgoo Kang** — Second place Poster Session Taxonomic revision of *Bohayella Belokobylskij*, 1987 in the New World with description of a new species from Ecuador. Ilgoo Kang, Rodrigo Diaz.
- **Manoj Pandey** — First place Poster Session: Arboreal arthropods in response to repeated canopy opening in a tropical rain forest. Manoj Pandey, Timothy D. Schowalter
- **Colin Bonser** — First place Poster Session (Infographics): Life history of *Chrysodeixis includens* (Lepidoptera: Noctuidae) on zein nanoparticles.
- **Alex Leede** — Second place M.S. Student Paper Competition (10-Min Oral Presentations: Masters 2): Aphid herbivory on industrial hemp, *Cannabis sativa* L.: What we know so far.
- **Seiji Yokota** — First place 10-Minute Proposals (Masters 2) Dietary Phytochemicals Support Hypopharyngeal Gland Development in Worker Honeybees (*Apis mellifera*). Seiji Yokota, Arathi Seshadri, Elina L. Nino.

First place, Ph.D. Student Poster Competition: ESA Virtual Southeastern Branch Meeting 2021

- **Kang I**, Sharkey M.J., Diaz R. A new species of *Cardiochiles* (Hymenoptera: Braconidae: Cardiochilinae) from Montserrat: a potential biological control agent against the melonworm, *Diaphania hyalinata* (L.).

Entomological Society of America Graduate Student Awards 2021, Denver, Colorado

Lillian and Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry, or Molecular Biology

- Zhilin Li (see article).

Student Poster Award

- Stored rice resistance to *Rhyzopertha Dominica* among varieties. **Ethan Doherty**, Dr. Qian Sun, Blake Wilson.
- Insecticidal Seed Treatments in Louisiana Rice. **Megan M. Mulcahy**, James M. Villegas, and Blake E. Wilson.

First place, Oral competition: Korean Young Entomologist

- **Kang I**. Functions of unique structures of Cardiochiline braconids.

Student Competition for the President's Prize First Place — Grad P-IE: Biocontrol — General 1

- **Korey Pham**, Dr. Rodrigo Diaz, Dr. Charlie Wahl, and Dr. Chris Mudge. 2021. Optimizing the establishment and impact of *Cyrtobagous salviniae* through the manipulation of release points.

2021 ENTOMOLOGY AWARD WINNERS

Second place M.S. Student Paper Competition

- **Musgrove, T.** 2021. (P-IE: IPM – Field Crops 2): The effects of neonicotinoid seed treatments on three cornered alfalfa hopper, *Spissistilus festinus* (Say), in Louisiana soybean, *Glycine max* (L) Merr.

2021 Faculty Awards

2021 American Mosquito Control Association (AMCA) Presidential Citation

- Kristen Healy

Sedberry Award for Outstanding Graduate Teacher Recognizes outstanding graduate teaching.

- Rodrigo Diaz

The G & H Seed Company Inc. Research Excellence Award Recognizes a scientist who has made during the past five years the most significant contributions to the research programs of the Louisiana Agricultural Experiment Station.

- Daniel Swale

2021 Tipton Team Research Award of the LSU AgCenter Recognizes significant contributions to Louisiana agriculture by a team of at least three scientists who have been participants in exceptional collaborative research efforts.

- Claudia Husseneder

2021 Early Career Professional, National Extension Excellence Award, Entomological Society of America

- Blake Wilson (see article)



Luke Laborde, far left, and the 2021 Tipton Team Research Award Winner. Claudia Husseneder is pictured third from the left.

2021 ENTOMOLOGY GRADUATES

Patrick Rayle, M.S. — Spring 2021

[A Comparison of Intertidal Metazoan Biodiversity Between Previously Oiled Sheared and Intact Marsh Margins and Between Multiple Salinity Zones in the Coastal Marshes of Louisiana](#)

Leonardo Salgado, M.S. — Summer 2021

[Characterization of Resistance to Two Crambid Stem Borers Among Louisiana Sugarcane Cultivars](#)

Shucong Lin, M.S. — Fall 2021

[Resistance Allele Frequencies to Cry1Ab and Vip3Aa20, and Performance of Cry1A.105/Cry2Ab2 susceptible and Single/Dual-Gene Resistant Corn Earworm on Non-Bt and Low Concentrations of Bt Diet](#)

Julian Lucero, M.S. — Fall 2021

[Regional Expansion and Evaluation of Potential Chemical Control for Invasive Apple Snails \(*Pomacea maculata*\) in Southwest Louisiana](#)



James Villegas and Megan Mulcahy at commencement day in winter 2021.



Left to right: James Villegas, Julian Lucero, Megan Mulcahy, and Blake Wilson.

Carlos Wiggins, M.S. — Fall 2021

[Revealing the native status of *Conyza bonariensis*: Specialization of insect herbivores associated with *Conyza* and *Erigeron* spp. \(Asteraceae\) in Louisiana, Texas, and Mississippi](#)

Megan Marie Mulcahy, Ph.D. — Fall 2021

[Improving the Deployment of Insecticidal Seed Treatments in Louisiana Rice in Accordance with Integrated Pest Management](#)

James Michael Villegas, Ph.D. — Fall 2021

[Investigating Plant Tolerance for the Management of Insect Pests in Rice](#)



Left to right: Ethan Doherty, Julian Lucero, Megan Mulcahy, Blake Wilson, and James Villegas.



Left to right: James Villegas, Megan Mulcahy, and Julian Lucero at Rice Field Day.

2021 LACA Scholarship Recipient funded by Ray and Dorothy Young

Masters Scholarship

Tyler Musgrove

Tyler Musgrove is currently enrolled at Louisiana State University, pursuing a Master of Science degree in the Entomology Department, where he currently has a 3.911 GPA in his graduate studies. Tyler earned his Bachelor of Science degree from Louisiana Tech University in agricultural business with a minor in plant science. For the past five years, he has worked with Rusty Elston as a field scout in his consulting business, identifying pest problems in soybean, corn, rice, and sorghum. His current research focus is evaluating the effect of neonicotinoid seed treatments on the early season colonization and establishment of *Spissistilus festinus* (Say), three-cornered alfalfa hopper, in *Glycine max* L. and looking at economic threshold verification of *Spissistilus festinus* (Say) in *Glycine max* L.

“Currently, there are discrepancies in the literature regarding how economically important this pest truly is. Although annual reports suggest this pest is responsible for millions in economic loss, recent studies suggest that TCAH



may not be as impactful as previously thought. If this were true, integrated pest management strategies regarding TCAH may be unnecessary. No previous research has ever evaluated the effects of insecticide seed treatments (ISTs) on the early season colonization and establishment of TCAH in soybean. With the increased usage of ISTs in soybean production, new research must be done to elucidate the effects of ISTs in controlling the TCAH. Therefore, the objective of my research is twofold: to determine if the current use of ISTs in soybean impact early season colonization and to determine whether the current state recommended threshold for TCAH needs refinement.”

Tyler’s thesis research was in large part his idea after having worked with Elston. He noted many inconsistencies regarding hopper thresholds and the best control measures for them. His research work will play a key role in evaluating effectiveness of current and future control methods for TCAH in soybean. His work will produce valuable insights that will allow growers and consultants to improve their response to TCAH in their soybean fields. He hopes that his experience conducting research and investigating scientific issues involving Louisiana agriculture will complement his future goal of becoming an agricultural consultant. Tyler is a hard-working, well-rounded, and driven individual who is very deserving of a Master of Science scholarship from the LACA.

Lillian and Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry, or Molecular Biology

Zhilin Li

Louisiana State University

The purpose of this ESA award is to encourage graduate students working with insects or other arthropods in the broad areas of physiology, biochemistry, and molecular biology to affiliate with ESA's Integrative Physiological and Molecular Insect Systems Section and to attend the ESA Annual Meeting.

Zhilin Li received his bachelor's degree in agronomy from Northwest A&F University in 2014, where he had training in entomology and plant pathology. He joined the Insect Physiology Lab at the Department of Entomology at Louisiana State University to pursue his Master of Science in 2016. His thesis was to characterize the role of potassium



conductance pathways (primarily inward rectifier potassium channels) on tick salivary gland function and blood feeding. He continued with his Ph.D. program under the mentorship of Dr. Daniel Swale after he earned his M.S. in 2018. His dissertation project was to investigate the underpinning (primarily ion homeostasis) that contributes to vector competence in mosquitoes and ticks. His degree and side projects have generated eight peer-reviewed publications, with three first-authored research articles. During the five years of his degree programs, he has won more than \$7,000 in cash prizes from travel awards, presentation competitions, and awards for student academic performance.

Li is active in participating in scientific conferences and ESA activities. He has given eight presentations for either ESA or ACS annual meetings since 2016. He took part in ESA student debates in 2019 as a member of the LSU team and served as the LSU representative in the ESA Southeastern Branch Student Affairs Committee (2019-2020).

FACULTY ACTIVITIES

Jeff Davis

Invited Presentations, Posters, and Infographics

- Arey, N., and J. A. Davis. Integrated pest management research in industrial hemp production in Louisiana. 2021 Virtual Hemp Field Day, Baton Rouge. Sept. 23, 2021.
- Arey, N., and J. A. Davis. Life table analysis of known noctuid pests of hemp, *Cannabis sativa* (L.). 11th Annual LSU Entomology Department Graduate Student Symposium, Baton Rouge. Oct. 22, 2021.
- Arey, N., and J. A. Davis. Life table analysis of known noctuid pests of hemp, *Cannabis sativa* (L.). 2021 Annual Meeting of the Entomological Society of America Annual Meeting, Denver. Nov. 1, 2021.
- Bonser, C. A. R., C. E. Astete, C. M. Sabliov, and J. A. Davis. Life history of *Chrysodeixis includens* (Lepidoptera: Noctuidae) on zein nanoparticles. 11th Annual LSU Entomology Department Graduate Student Symposium, Baton Rouge. Oct. 22, 2021. (Infographic)
- Bonser, C. A. R., C. E. Astete, C. M. Sabliov, and J. A. Davis. Developmental effects of biopolymeric nanoparticles on *Chrysodeixis includens* (Walker). 2021 Annual Meeting of the Entomological Society of America, Denver. Nov. 1, 2021.
- Davis, J. A. Host plant resistance in sweet potato. 2021 Virtual Sweet Potato Field Day, Baton Rouge. Sept. 28, 2021.
- Fleming, D. E., J. A. Davis, F. Musser, F. R. Musser, S. V. Paula-Moraes, R. C. Stephenson, T. Galvan, and C. A. Wheeler. Trapping soybean looper, *Chrysodeixis includens* (Lepidoptera: Noctuidae), in the southeastern USA and implications for pheromone-based research and management. 2021 Annual Meeting of the Entomological Society of America, Denver. Nov. 2, 2021.
- Lee, S. T., and J. A. Davis. Composition and temporal abundance of resident arthropod predators in Louisiana soybean. 2021 Annual Meeting of the Entomological Society of America, Denver. Nov. 1, 2021.
- Lee, S. T., and J. A. Davis. Composition and temporal abundance of resident arthropod predators in Louisiana soybean. 11th Annual LSU Entomology Department Graduate Student Symposium, Baton Rouge. Oct. 22, 2021.
- Leede, A., and J. A. Davis. Aphid herbivory on industrial hemp, *Cannabis sativa* L.: What we know so far. 11th Annual LSU Entomology Department Graduate Student Symposium, Baton Rouge. Oct. 22, 2021.
- Musgrove, T., and J. A. Davis. The effects of neonicotinoid seed treatments on three cornered alfalfa hopper, *Spissistilus festinus* (Say), in Louisiana soybean, *Glycine max* (L) Merr. 11th Annual LSU Entomology Department Graduate Student Symposium, Baton Rouge. Oct. 22, 2021
- Musgrove, T., and J.A. Davis. The effects of neonicotinoid seed treatments on three cornered alfalfa hopper, *Spissistilus festinus* (Say), in Louisiana soybean, *Glycine max* (L) Merr. 2021 Annual Meeting of the Entomological Society of America, Denver. Nov. 1, 2021.
- O'Hara, F. M., D. R. Swale, and J. A. Davis. Testing the effect of commercialized aphicides on the feeding behavior of the cotton aphid, *Aphis gossypii*. 2021 Annual Meeting of the Entomological Society of America, Denver. Nov. 1, 2021.
- O'Hara, F. M. J. A. Davis, and D. R. Swale. Toxicity and changes to feeding behaviour of *Aphis gossypii* after exposure to commercial insecticides. 2021 Fall Meeting of the American Chemical Society, Virtual Conference. Aug. 22-26, 2021.
- Sarkar, N., M. J. Murray, M. J. Stout, and J. A. Davis. Influence of host plant resistance on development and supercooling point of sweet potato weevil, *Cylas formicarius elegantulus* (Summers). 2021 Annual Meeting of the Entomological Society of America, Oct. 31-Nov. 3, Denver. (poster).
- Sarkar, N., S. Navarro, C. Keyser, E. Armstrong, E., and J. A. Davis. Fear no weevil: biological control of sweet potato weevil with entomopathogenic fungi. 2021 Annual Meeting of the Entomological Society of America, Oct. 31-Nov. 3, Denver.

Grants and Contracts

- SSARE Graduate Student Grant. "Evaluating the impacts of conservation stewardship plantings on arthropod communities in Louisiana agroecosystems." 2021-2023. Lee, S. T., and J. A. Davis. \$16,000.
- Louisiana Soybean and Grain Research and Promotion Board. "IPM for Louisiana soybean insect pests." 2021-2022. J. A. Davis. \$75,000.
- Louisiana Soybean and Grain Research and Promotion Board. "Fungicide Seed Treatment with Lignin Nanoparticles." 2021-2022. C. M. Sabliov (Lead PI), C. E. Astete, P. P. Price, V. Doyle, and J. A. Davis. \$25,000.

FACULTY ACTIVITIES

- Provivi. "Soybean pest complex pheromone blend trapping trial." 2021. J. A. Davis. \$15,000.
- Bayer CropScience. "Bayer SIP4 Open Field Efficacy Trial." 2021. J. A. Davis. \$46,801.
- Vestaron. "Field efficacy trial." 2021. J. A. Davis. \$8,500.

Publications

- Fleming, D. E., J. A. Davis, F. R. Musser, S. V. Paula-Moraes, R. C. Stephenson, C. A. Wheeler, E. Ringpis, T. S. Crum, J. K. Tran. 2021. Trapping soybean looper (Lepidoptera: Noctuidae) in the southeastern USA and implications for pheromone-based research and management. *Florida Entomol.* 104: 186-194.
- Salinas, F., C. E. Astete, J. H. Waldvogel, S. Navarro, J. C. White, W. Elmer, C. Tamez, J. A. Davis, and C. M. Sabliov. 2021. Effects of engineered lignin-graft-PLGA and zein-based nanoparticles on soybean health. *NanolImpact*, 23, 100329.
- Britt, K. E., T. P. Kuhar, W. Cranshaw, C. T. McCullough, S. V. Taylor, B. R. Arends, H. Burrack, M. Pulkoski, D. Owens, T. A. Tolosa, S. Zebelo, K. A. Kesheimer, O. S. Ajayi, M. Samuel-Foo, J. A. Davis, N. Arey, H. Doughty, J. Jones, M. Bolt, B. J. Fritz, J. F. Grant, J. Cosner, and M. Schreiner. 2021. Pest management needs and limitations for corn earworm (Lepidoptera: Noctuidae), an emergent key pest of hemp in the United States. *J. Integr. Pest Manag.* 12, 34.
- Huseth, A. S., R. L. Koch, D. D. Reisig, J. A. Davis, S. V. Paula-Moraes, and E. W. Hodgson. 2021. Current distribution and population persistence of five lepidopteran pests in U.S. soybean. *J. Integr. Pest Manag.* 11, <https://doi.org/10.1093/jipm/pmab004>
- Hodgson, E. W., R. L. Koch, J. A. Davis, D. Reisig, S. V. Paula-Moraes. 2021. Identification and biology of common caterpillars in U.S. soybean. *J. Integr. Pest Manag.* 12. <https://doi.org/10.1093/jipm/pmab006>
- Lanka, S. K., B. D. Elder, J. A. Davis, and M. J. Stout. 2021. Jasmonic acid-induced resistance to fall armyworm in soybeans: Variation among genotypes and tradeoffs with constitutive resistance. *Basic Appl. Ecol.* 56: 97-109.
- Dryburgh, J., and J. A. Davis. 2021. Effect of soybean variety and systemic induction on herbivore feeding guilds. *Arthropod-Plant Interactions.* 15: 171–181.
- Souza, M. F., and J. A. Davis. 2021. Characterizing host plant resistance to *Melanaphis sacchari* (Hemiptera: Aphididae) in selected sorghum plant introductions. *J. Econ. Entomol.* 114: 959–969.

- Yang, Y., F. P. F. Reay-Jones, T. E. Reagan, J. M. Beuzelin, B. E. Wilson, J. A. Davis, and J. Wang. 2021. Sugarcane aphid (Hemiptera: Aphididae) on sorghum. I. Population characteristics and dispersion patterns in relation to different sample unit sizes. *Environ. Entomol.* 50: 489-503.
- Musser, F. R., A. L. Catchot, Jr., S. P. Conley, J. A. Davis, C. DiFonzo, S. H. Graham, J. Greene, R. L. Koch, D. Owens, D. D. Reisig, P. Roberts, T. Royer, N. J. Seiter, S. D. Stewart, S. Taylor, B. Thrash, K. Tilmon, R. T. Villanueva, and M. O. Way. 2021. 2020 Soybean insect losses in the United States. *MidSouth Entomol.* 13: 1-25.

Rodrigo Diaz

Grants and Contracts

- Optimizing the establishment and impact of the salvinia weevil through the manipulation of release points. Barataria National Estuary Program. \$18,600. Award to support research by Korey Pham.
- Implementation and monitoring of biological control of giant salvinia (*Salvinia molesta*) in Puerto Rico. \$5,000. USDA-APHIS.
- Improving the cold tolerance of the salvinia weevil. \$45,000. U.S. Army Corps, ERDC.
- Biological control of aquatic weeds. \$90,000. Louisiana Department of Wildlife and Fisheries.
- CWPPRA Coastwide Salvinia Weevil Propagation Facility and Monitoring Program. \$106,077.
- Integrating the effects of environmental stressors, above and belowground interactions and plant genetics to understand Roseau cane die-off and restoration. \$1,611,263. USDA-APHIS. Diaz section: \$310,000.
- Roseau Cane Die-off: Soil Chemistry, Above and Belowground Interactions and Long-Term Monitoring. \$1,608,000. USDA-APHIS. Diaz section: \$233,000.

Visiting Scientists/Students

- Flaminia Mariani, visiting student, Università Degli Studi Roma Tre, fall 2021.

Graduated Students

- Carlos Wiggins, M.S. Fall 2021.

Publications

- Adult cold tolerance and potential North American distribution of *Mylocherus undecimpustulatus undatus* (Coleoptera: Curculionidae). Neal, A., Diaz, R., Qureshi, J. and Cave R. D. 2021. *Biological*

FACULTY ACTIVITIES

Invasions. In Press: <https://link.springer.com/article/10.1007/s10530-021-02601-9>.

- Climate Mismatch Between Introduced Biological Control Agents and Their Invasive Host Plants: Improving Biological Control of Tropical Weeds in Temperate Regions. Harms, N., Knight, I., Pratt, P., Diaz, R. 2021. *Insects*. In Press: <https://www.mdpi.com/2075-4450/12/6/549>.
- Nutrients enhance the negative impact of an invasive floating plant on water quality and a submerged macrophyte. Wahl, C.F., Diaz, R., and Kaller, M. 2021. *Journal of Aquatic Plant Management*. In Press.
- Invasive floating fern limits aerial colonization and alters community structure of aquatic insects. Wahl, C.F., Diaz, R., and Kaller, M. *Wetlands*. In Press: <https://link.springer.com/article/10.1007/s13157-021-01457-y>.
- Invasion of floating fern alters freshwater macroinvertebrate community structure with implications for bottom-up processes. Wahl, C.F., Kaller, M., and Diaz R. 2021. *Hydrobiologia*. In Press: <https://link.springer.com/article/10.1007/s10750-021-04571-4>.
- First report of dasheen mosaic virus infecting taro (*Colocasia esculenta*) in Louisiana. Escalante, C., Galo, D., Diaz, R. and Valverde, R. 2021. *Plant Disease*. In Press: <https://doi.org/10.1094/PDIS-04-21-0854-PDN>.

Lane Foil

Publications

- Becker, M. E., Park, J.-S., Gentry, G., Husseneder, C. and Foil, L. D. 2021. Comparison of trap methods for use in surveys for potential *Culicoides* vectors of orbiviruses. *Parasites and Vectors*. 14, 564. <https://doi.org/10.1186/s13071-021-05059-9>. Impact Factor 3.17.

Graduated Students

- Patrick Rayle (co-advised with Dr. Husseneder), M.S. spring 2021.

Kristen Healy

Committees

- LMCA Board of Directors.
- LMCA Newsletter Committee.

Grants and Contracts

- American Mosquito control Association's Research Fund (competitive grant awarded to two projects annually in the U.S.). "Evaluating the Impacts of Mosquito Control on Bumble Bees", \$31,944, Thomas

O'Shea Wheller, Daniel McNamara, and Kristen Healy.

- Field repellent study trial.

Publications

- A Comparison of Hay and Fish Emulsion-Infused Water as Oviposition Attractants for the CDC Gravid Trap. TD McNamara, K Healy. *Journal of Medical Entomology* 2021. <http://pubmed.ncbi.nlm.nih.gov/34927>.
- Host Genotype and Tissue Type Determine DWV Infection Intensity. H Penn, M Simone-Finstrom, S Lang, J Chen, K Healy. *Front. Insect Sci*. 1: 756690. doi: 10.3389/finsc 2021.
- An Efficient Alternative to the CDC Gravid Trap for Southern House Mosquito (Diptera: Culicidae) Surveillance. TD McNamara, TA O'Shea-Wheller, N DeLisi, E Dugas, KA Caillouet. *Journal of Medical Entomology*. 58 (3), 1322-1330 2 2021.

Fangneng Huang

Grants and Contracts

- Investigation of the confounded effects of heterogeneous genetic background among corn earworm genotypes on the measurement of fitness costs and dominance levels of the Cry1A.105/Cry2Ab2 resistance. \$97,869, Bayer CropScience, Fangneng Huang and Ying Niu.
- Evaluation of the performance of Cry1A.105/Cry2Ab2-susceptible heterozygous- and -resistant genotypes of *Helicoverpa zea* on non-Bt and Bt corn and cotton containing pyramided Bt genes. \$68,562, Bayer CropScience, Fangneng Huang (PI), Co-PIs: Sebe Brown, Tyler Towels, and Ying Niu.
- Susceptibility of Bt-resistant fall armyworm, corn earworm, and sugarcane borer to Syngenta's novel insecticidal proteins. \$37,728, Syngenta.
- Mechanisms, genes, and frequency of resistance to Vip3Aa proteins as plant incorporated protectants in GE corn and cotton. USDA-NIFA, \$498,580, Juan Luis Jurat-Fuentes (PI), co-PIs David Kerns, Fei Yang, and Fangneng Huang (\$42,000).
- Baseline susceptibility and resistance monitoring of Louisiana corn earworm populations to Vip3A, a novel insecticidal protein in Bt crops. \$10,000. Louisiana Soybean and Grain Research and Promotion Board.

FACULTY ACTIVITIES

Graduated Students

- Shucong Lin, M.S. fall, 2021.

Publications

- Dimase, M., S. Brown, G.P. Head, P.A. Price, W. Walker, W. Yu, and F. Huang. 2021. Performance of Bt-susceptible and -heterozygous dual-gene resistant genotypes of *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) in seed blends of non-Bt and pyramided Bt maize. *Ins. Sci.* 28, 1147–1158.
- Guo, J., I. Oyediran, M.E. Rice, S. Brown, M. Dimase, S. Lin, W. Walker, W. Yu, Y. Niu, and F. Huang. 2021. Seed blends of pyramided Cry/Vip maize reduce *Helicoverpa zea* populations from refuge ears. *J. Pest Sci.* 94: 959–968.
- Huang, F. 2021. Resistance of the fall armyworm, *Spodoptera frugiperda* (J. E. Smith), to transgenic *Bacillus thuringiensis* Cry1F corn in the Americas: lessons and implications for Bt corn IRM in China. *Ins. Sci.* 28: 574–589.
- Huang, F. 2021. Dominance and fitness costs of insect resistance to genetically modified *Bacillus thuringiensis* crops. *GM Crops and Food: Biotechnology in Agriculture and the Food Chain*. 12(1):192-211. doi: 10.1080/21645698.2020.1852065.
- Niu, Y., I. Oyediran, W. Yu, S. Lin, M. Dimase, S. Brown, F.P.F. Reay-Jones, D. Cook, D. Reisig, B. Thrash, X. Ni, S.V. Paula-Moraes, Y. Zhang, J.S. Chen, Z. Wen and F. Huang. 2021. Populations of *Helicoverpa zea* (Boddie) in the southeastern United States are commonly resistant to Cry1Ab, but still susceptible to Vip3Aa20 expressed in MIR 162 corn. *Toxins* 2021, 13, 63. <https://doi.org/10.3390/toxins13010063>.
- Gilreath, R.T. D.L. Kerns, F. Huang, and F. Yang. 2021. No positive cross-resistance to Cry1 and Cry2 proteins favors pyramiding strategy for management of Vip3Aa resistance in *Spodoptera frugiperda*. *Pest Manag. Sci.* 77: 1963–1970.
- Schlum, K.A., Lamour, K., de Bortoli, C.P., Banerjee, R., Emrich, S.J., Meagher, R., Pereira, E., Murua, M.G., Sword, G.A., Tessnow, A.E., Dillon, D.V., Ramirez, A.M.L., Akutse, K.S., Schmidt-Jeffris, R., Huang, F., Reisig, D., and Jurat-Fuentes, J.L. 2021. Whole genome comparisons reveal panmixia among fall armyworms (*Spodoptera frugiperda*) from diverse locations. *BMC Genomics*. 22:179. <https://doi.org/10.1186/s12864-021-07492-7>.

Claudia Husseneder

Other Presentations:

- Interview about experience with Lyme disease for NPMA Tick Awareness Week (by Ed Freytag): [Claudia Husseneder Lyme disease Interview 4-29-2021 Edit](#).
- FindingGenius podcast (3/5/2021). Finding Genius Website: <https://bit.ly/317GozX>.
- Jurgita Dominauskaitė and Aivaras Kaziukonis. The Most Beautiful Bugs (175 Pics). Bored Panda <https://www.boredpanda.com/interesting-bugs/>.

Grants and Contracts

- Wilson, B., Husseneder, C., Stout, M., Diaz, R. 2022-2026. Population genetics and adaptive change during gradual and rapid range expansion of an invasive insect herbivore. USDA-NIFA.

Graduated Students

- Patrick Rayle (co-advised with Dr. Foil), M.S. spring 2021

Publications

- Blumenfeld, A.J., Eyer, P-A., Husseneder, C., [...], Edward L. Vargo, E.L. 2021. Bridgehead effect and multiple introductions shape the global invasion history of *Coptotermes formosanus*. *Communications Biology*. 4: 196. doi: 10.1038/s42003-021-01725-x. Impact Factor: 6.27.
- Obanda, D. N. Keenan, M. J. [...] and Husseneder, C. 2021. Gut microbiota composition and predicted microbial metabolic pathways of obesity prone and obesity resistant outbred Sprague-Dawley CD rats may account for differences in their phenotype. *Frontiers of Nutrition*. <https://doi.org/10.3389/fnut.2021.746515>. Impact Factor 6.58.
- Becker, M. E., Park, J.-S., Gentry, G., Husseneder, C. and Foil, L. D. 2021. Comparison of trap methods for use in surveys for potential *Culicoides* vectors of orbiviruses. *Parasites and Vectors*. 14, 564. <https://doi.org/10.1186/s13071-021-05059-9>. Impact Factor 3.17.

Nathan Lord

Invited Presentations

- 2021. "Circular polarization in Chrysin: understanding design rules for novel visual signals and their applications." United States Air Force Research Lab - Doolittle Institute: Nature inspired and Biotechnology University Day. Oct. 14.

FACULTY ACTIVITIES



Dr. Nathan Lord and iridescent insects.

- 2021. "Structural colors in jewel beetles: analytical methods, tools, and future directions." Symposium titled "Evolution of Structural Coloration in Animals." The 2nd Asia Evo Conference (virtual, hosted by Tokyo Metropolitan University), Aug. 16–19.
- 2021. "Structural colors: mechanisms and analyses in the jewel beetles." Natural Systems Sensing Lab, Air Force Research Laboratory, Elgin Air Force Base, Florida. March 4 (virtual).
- 2021. "Animal coloration - untangling signal complexity and utility in the colorful and visual jewel beetles." Department of Biology, University of Texas at Arlington. Feb. 11 (virtual).
- 2021. "Color and vision in Buprestidae: Blind to blue but with genetic work-arounds." International Union of Forest Research Organizations (IUFRO) Working Party Seminar Series: Behavioral and chemical ecology of bark and woodboring insects, Visual Ecology of Forest Beetles seminar. Feb. 04 (virtual).

Other Presentations

- 2021–2022. Creative director of Iridescence, a featured exhibition at the Louisiana Art and

Science Museum, Baton Rouge. This exhibition features the scientific works of Dr. Nathan Lord and his graduate students, invited works from renowned artists, and a juried competition ([link](#)). This was supported by the Department of Entomology and the LSU AgCenter.

Grants and Contracts

- Daniel Swale (PI), Nathan Lord (Co-PI) and others were awarded a NIFA AFRI Pollinator Health: Research and Application grant from the USDA. Total award amount: \$272,717. Title: Investigating the impacts of covert virus infection to visual pathways and responses in the honeybee.

Publications

- 2021. K.D. Feller, C.R. Sharkey, A. McDuffee-Altekruse, H.D. Bracken-Grissom, N.P. Lord, M.L. Porter, and L.E. Schweikert. Surf and Turf Vision: Patterns and predictors of visual acuity in compound eye evolution. *Arthropod Structure and Development*. <https://doi.org/10.1016/j.asd.2020.101002>.

Gene Reagan

Graduated Students

- Megan Mulcahy, Ph.D., December 2021 (co-advised with Dr. Blake Wilson).

Committees

- Editorial board of the Agronomy Journal.
- Member of the USDA-ARS Research Project Review Board.

Grants and Contracts

Integrated Pest Management Extension Implementation for Louisiana T. Reagan (PI) and B. Padgett (co-I), Forest Huval, and Megan Mulcahy.

Publications

- Mulcahy, M.M., B.E. Wilson, M.J. Stout, and T.E. Reagan. 2021. Spatial distribution of the rice water weevil (Coleoptera: Curculionidae) in Louisiana rice fields. *Environ. Entomol.* 51: [nvab120](#).
- Yang, Y., Reay-Jones, F.P., Reagan, T.E., Beuzelin, J.M., Wilson, B.E., Davis, J.A., and Wang, J., 2021. Sugarcane Aphid (Hemiptera: Aphididae) on Sorghum. I. Population Characteristics and Dispersion Patterns in Relation to Different Sample Unit Sizes. *Environ. Entomol.* 50: 489-503.
- Mulcahy, M.M., Wilson, B.E., Reagan, T.E. 2021. Spatial distribution of lepidopteran stem borers in Louisiana rice fields. *Environmental Entomology*. DOI: 10.1093/ee/nvab138.

FACULTY ACTIVITIES

Michael Stout

Invited Presentations

- *Entomological Society of America*, North Central Branch (20-minute talk, virtual). Title: Mycorrhizae influence plant resistance and tolerance in rice, *Oryza sativa*. June 26, 2021.
- *Fifth Partnership in Biocontrol and Biostimulants Congress, Global Engage* (30-minute talk, virtual). Title: Practical considerations for the use of “plant strengtheners” in agriculture. March 4, 2021.
- *University of Massachusetts, Stockbridge School of Agriculture* (1-hour invited departmental seminar, virtual). Title: Exploiting plant phenotypic plasticity for pest management. April 26, 2021
- *Purdue University, Department of Entomology*, (1-hour invited departmental seminar, virtual). Title: Exploiting plant phenotypic plasticity for pest management. March 31, 2021

Grants and Contracts

- Perennial Agriculture Project, The Land Institute, 07/01/21–12/31/21. Super-ratooning (perennial) rice project. M. Stout and J. Ham, co-PIs, \$25,601.
- USDA AFRI, Foundational and Applied Sciences, 2022–2026. Population genetics and adaptive change in gradual and rapid range expansion of an invasive insect herbivore. B.E. Wilson lead-PI, (Husseneder, Diaz, Stout and Beuzelin Co-PIs) \$612,852.
- *Idaho Forest Group*, 11/15/2021 – 11/14/2022, Effects of Bioactive Extracts on Plant Growth and Resistance to Biotic Stresses. \$180,390 (M. Stout, PI).

Visiting Scientists/Students

- Dr. Alexander Gaffke, post-doctoral scientist (May 2021–November 2021).
- Ms. Danna Judith Vera Martinez, visiting student, Zamarano University, Summer/Fall 2021.

New Collaborations (University, Industry, Other)

- Idaho Forest Group – Industry.
- The Land Institute (Perennial Agriculture program) – NGO.

Graduated students

- James Villegas, Ph.D. (co-advised with Dr. Blake Wilson; graduate fall 2021).

Publications

- Souza, B. H. S., E. Costa, Z. Ribeiro, B. Perlatti, M. Cruz, M. Forim, A. Boiça Jr., and M.J. Stout. 2021. Soybean leaf age and plant stage influence

expression of resistance to velvet bean caterpillar and fall armyworm. *Chemoecology*. 31: 377-390. <https://doi.org/10.1007/s00049-021-00360-6>.

- Bhavanam, S. and M. J. Stout. 2021. Assessment of Silicon- and Mycorrhizae- Mediated Constitutive and Induced Systemic Resistance in Rice, *Oryza sativa* L., against the Fall Armyworm, *Spodoptera frugiperda* Smith. *Plants* 2021. 10(10) 2126; <https://doi.org/10.3390/plants10102126>.
- Villegas, J.M., B.E. Wilson, and M.J. Stout. 2021. Integration of host plant resistance and cultural tactics for management of root- and stem-feeding insect pests of rice. *Frontiers in Agronom.* 3: 754673, doi: 10.3389/fagro.2021.754673.
- Bhavanam, S. and M.J. Stout. 2021 Seed treatment with jasmonic acid and methyl jasmonate induces resistance to insects but reduces plant growth and yield in rice, *Oryza sativa*. *Frontiers in Plant Science*. 12: 691768 doi: 10.3389/fpls.2021.691768.
- Bhavanam, S., B. Wilson, B. Blackman, and M.J. Stout. 2021. Biology and management of the rice stink bug (Hemiptera: Pentatomidae) in rice, *Oryza sativa*. *Journal of Integrated Pest Management*. 12 (1): 20.
- Lanka, S.K., Davis, J.A., Elder, B., and M.J. Stout. 2021. Jasmonic acid-induced resistance to fall armyworm in soybeans: variation among genotypes and tradeoffs with constitutive resistance. *Basic and Applied Ecology*. 56: 97-109.
- Bernaola, L., Butterfield, T.S., T.H. Tai, and M.J. Stout. 2021. Epicuticular wax rice mutants show reduced resistance to the rice water weevil and fall armyworm. *Environmental Entomology*. doi: 10.1093/ee/nvab038.
- Wilson, B.E., J.M. Villegas, M.J. Stout, and K.J. Landry. 2021. Relative yield loss from stem borers (Lepidoptera: Crambidae) and rice water weevil (Coleoptera: Curculionidae) in rice. *Journal of Economic Entomology*. doi: 10.1093/jee/toab046.
- Villegas, J.A., Wilson, B.E., and Stout, M.J. 2021. Assessment of Tolerance and Resistance of Inbred Rice Cultivars to Combined Infestations of Rice Water Weevil (Coleoptera: Curculionidae) and Stem-borers (Lepidoptera: Crambidae). *Entomologia Experimentalis et Applicata*. doi: 10.1111/eea.13054.
- Wilson, B.E., J.M. Villegas, M.O. Way, R.A. Pearson, and M.J. Stout. 2021. Cyantraniliprole: A new insecticidal seed treatment for U.S. rice Crop

FACULTY ACTIVITIES

Protection. *Crop Protection*. 140: 105410 <https://www.sciencedirect.com/science/article/pii/S0261219420303434?via%3Dihub>.

- Villegas, J.A., Wilson, B.E., Way, M.O., Gore, J., and Stout, M.J. 2021. Tolerance to Rice Water Weevil, *Lissorhoptus oryzophilus* Kuschel (Coleoptera: Curculionidae), Infestations among Hybrid and Inbred Rice Cultivars in the Southern U.S. *Crop Protection*. 139: 105368.

Qian Sun

Grants and Contracts

- Louisiana Board of Regents, Research Competitiveness Subprogram, “Molecular mechanisms of exploratory foraging behavior in the Formosan subterranean termite,” June 2021-June 2024, funded for \$137,704. PI: Qian Sun.
- Louisiana Department of Agriculture and Forestry, Structural Pest Research (contract), July 2021-June 2022, funded for \$50,000. PI: Qian Sun.

Publications

- Ngo K, Castillo P, Laine RA, and Sun Q. 2021. Effects of menadione on the survival, feeding, and tunneling activities of the Formosan subterranean termite. *Insects*. 12(12), 1109.
- Castillo P, Le N, and Sun Q. 2021. Comparative antennal morphometry and sensilla organization in the reproductive and non-reproductive castes of the Formosan subterranean termite. *Insects*. 12(7): 576.

Daniel Swale

Grants and Contracts

- USDA-NIFA, Agriculture and Food Research Initiative. 2021. *Investigating the impacts of covert virus infection to visual pathways and responses in the honey bee*. Daniel R. Swale (PI), Nathan Lord (co-I), Troy D. Anderson (co-I), Michael Simone Finstrom (co-I). \$299,689 / 2 years.
- National Institute of Health, NIAID, R01. 2021. *Rickettsial influence on host membrane physiology in arthropod vectors*. Daniel R Swale (PI), Kevin Macaluso (coPI), Albert Mulenga (co-PI). \$1,907,879 / 4 years.
- MGK. 2021. Efficacy testing of pyrethrum formulations against biting flies. Daniel R Swale (PI). \$35,000 / 1 year.
- Calibr the Scripps Research Institute. 2021. Insecticide activity of novel isoxazoline analogs to



Dr. Daniel Swale and Redfish



Dr. Daniel Swale with graduate students Rui Chen and Zhilin Li from the Swale Lab and their Redfish catches.



Dr. Daniel Swale and Dr. Nathan Lord and snowy grouper.

FACULTY ACTIVITIES

arthropod vectors of human pathogens. Daniel R. Swale (PI). \$135,000 / 1 year.

- Mr. Christopher Fellows and Daniel R Swale. 2021. Louisiana Beekeepers Association, Competitive Grant. "Effects of Deformed Wing Virus Infection on Honey Bee Vision and Color Preferences." \$5,000 / 1 year.

Publications

- Sarah E. McComic*, Leslie C. Rault, Troy D. Anderson, Daniel R Swale. 2021. Toxicological analysis of stilbenes against the fall armyworm, *Spodoptera frugiperda*. *Pesticide Biochemistry and Physiology*. 171: 104965.
- Sarah E. McComic*, Kumudini Meepagala, Daniel R Swale. 2021. Characterization of toxicological and neurophysiological effects of natural product based chromenes to Fall Armyworm, *Spodoptera frugiperda*. *Journal of Economic Entomology*. 114(6): 2485-2492.
- Alexander Soohoo-Hui*, Zhilin Li*, L. Paulina Maldonado-Ruiz, Ganyu Zhang*, Daniel R Swale. 2021. Neurochemical regulation of *Aedes aegypti* salivary gland function. *Journal of Insect Physiology*. 129: 104193.

Blake Wilson

Grants and Contracts

- USDA AFRI, Foundational and Applied Sciences, 2022–2026. Population genetics and adaptive change in gradual and rapid range expansion of an invasive insect herbivore. B.E. Wilson lead-PI, (Husseneder, Diaz, Stout and Beuzelin Co-PIs) \$612,852 (funded).

Collaborative project aiming to elucidate population genetic changes during an ongoing invasion of an economically important crop pest, the Mexican rice borer. Research activities will study population genetics on a large-scale comparing populations from Mexico, Texas, Louisiana, and Florida as well as small scale trends at the expansion front in central Louisiana. Additional activities will determine larval cold tolerance and predict future habitable range of the species in the United States.

Graduated students

- Leonardo Salgado, M.S., August 2021.
- Julian Lucero, M.S., December 2021.
- Megan Mulcahy, Ph.D., December 2021 (co-advised with Dr. Gene Reagan).
- James Villegas, Ph.D., December 2021 (co-advised with Dr. Michael Stout).

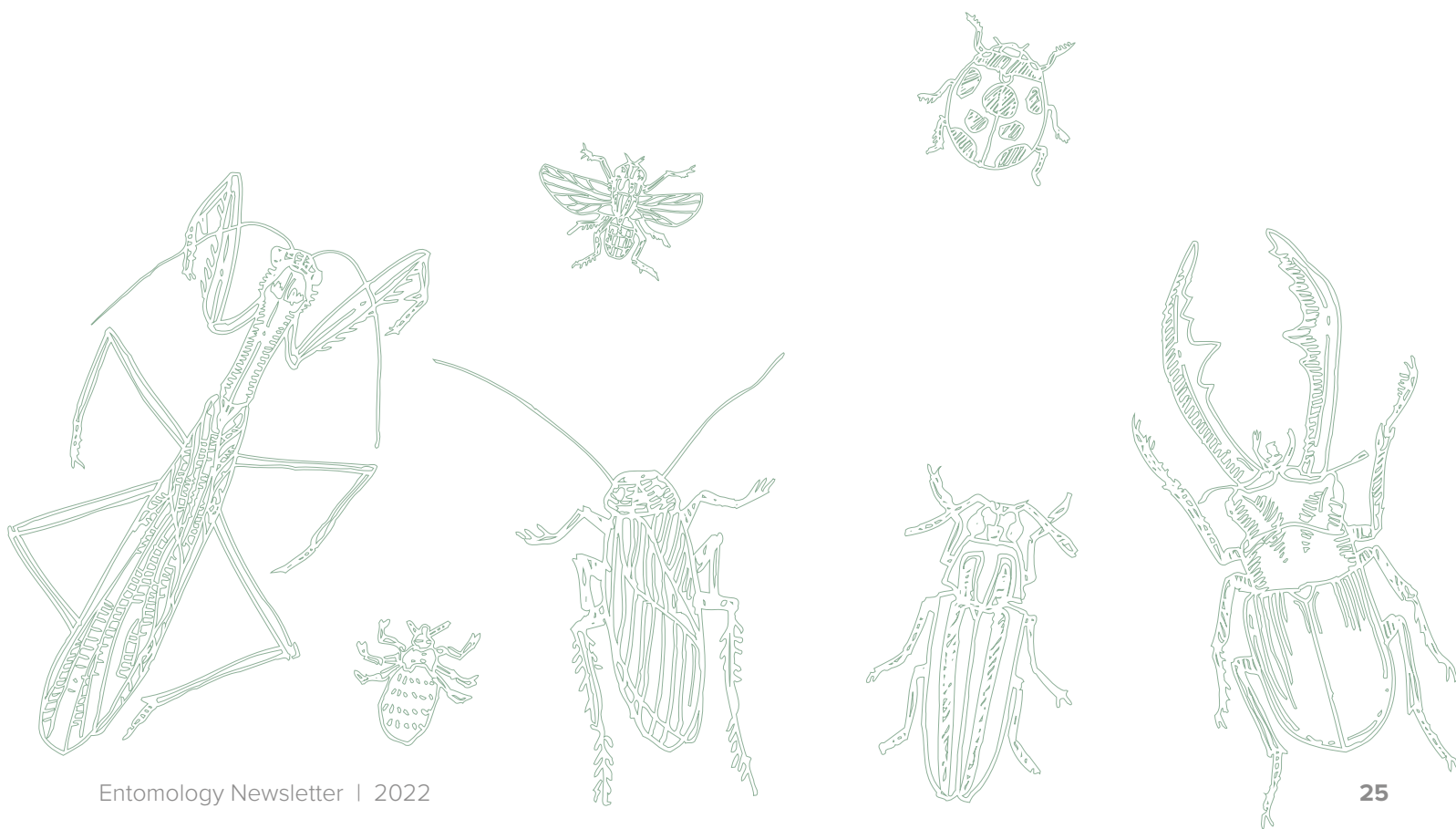
Publications

- *Mulcahy, M.M., B.E. Wilson, and T.E. Reagan. 2022. Spatial distribution of stem borers in Louisiana rice fields. *Environ. Entomol.* 52: [nvab138](#).
- *Mulcahy, M.M., B.E. Wilson, M.J. Stout, and T.E. Reagan. 2021. Spatial distribution of the rice water weevil (Coleoptera: Curculionidae) in Louisiana rice fields. *Environ. Entomol.* 51: [nvab120](#).
- Wilson, B.E., L.D. Salgado, and J.M. Villegas. 2022. Optimizing chemical controls of *Diatraea saccharalis* in sugarcane. *Crop Prot.* 152: [105843](#).
- *Salgado, L., B.E. Wilson, and J.M. Villegas. 2021. Resistance to the sugarcane borer (Lepidoptera: Crambidae) among Louisiana sugarcane cultivars. *Environ. Entomol.* 51: [nvab118](#).
- *Villegas, J.M., B.E. Wilson, and M.J. Stout. 2021. Integration of cultural controls and plant tolerance for control of a complex of rice pests. *Front. Agron.* 3: [754673](#).
- Todd, J.R., A.L. Hale, Y.-B. Pan, T.L. Tew, W.H. White, E.O. Dufrene, M.J. Duet, D.L. Verdun, D.J. Spaunhorst, C.D. Dalley, M.P. Grisham, B.E. Wilson, K.A. Gravois, and W.R. Jackson. 2021. Registration 'Ho 05-961' sugarcane. *J. Plant Reg.* (accepted, in press).
- *Villegas, J.M., B.E. Wilson, and M.O. Way. 2021. Management of stemborers (Lepidoptera: Crambidae) using foliar-applied chlorantraniliprole in rice. *Fla. Entomol.* 104(4): [274–281](#).
- Pontif, M., C. Kimbeng, K. Bischoff, K. Gravois, C. LaBoard, G. Hawkins, D. Sexton, J. Hoy, N. Baisakh, B.E. Wilson, A. Orgeron, J. Todd, and H. Waguespack. 2021. Registration of 'L 11-183' sugarcane. *J. Plant Reg.* 10.1002/pl22.20136.
- Orgeron, A.J., M.W. Cater, K.A. Gravois, B.E. Wilson, M.A. Deliberto, and M.E. Salassi. 2021. Sugarcane production school established for the Louisiana sugar industry. *J. Nat. Assoc. County Ag. Agents* 14: [JID-1198](#).
- Wilson, B.E., J.M. Villegas, M.J. Stout, and K.J. Landry. 2021. Relative yield loss from rice stem borers (Lepidoptera: Crambidae) and the rice water weevil (Coleoptera: Curculionidae). *J. Econ. Entomol.* 114: [1159–1165](#).
- Bahvanam, S., B.E. Wilson, B. Blackman, and M.J. Stout. 2021. Biology and management of the rice stink bug, *Oebalus pugnax*. *J. Integ. Pest Manag.* 12: [pmab014](#).



FACULTY ACTIVITIES

- *Villegas, J.M., B.E. Wilson, and M.J. Stout. 2021. Assessment of tolerance and resistance of inbred rice cultivars to combined infestations of rice water weevil (Coleoptera: Curculionidae) and stemborers (Lepidoptera: Crambidae). [*Entomologia Experimentalis et Applicata* 169: eea.13054](#). *Selected as Editor's Choice.
- Wilson, B.E., W.H. White, R.T. Richard, and R.M. Johnson. 2021. Evaluation of sugarcane borer, *Diatraea saccharalis*, resistance among commercial and experimental cultivars in the Louisiana sugarcane cultivar development program. [*Internat. Sugar J.* 123: 256–261](#).
- Yang, Y., F.P.F. Reay-Jones, L.T. Wilson, T.E. Reagan, J.M. Beuzelin, B.E. Wilson, J.A. Davis, and J. Wang. 2021. Sugarcane aphid (*Melanaphis sacchari*) population characteristics and distribution patterns in relation to sample unit size. [*Environ. Entomol.* 50: 489–503](#).
- Wilson, B.E. 2021. Successful integrated pest management minimizes impact of *Diatraea saccharalis* (Lepidoptera: Crambidae) on the Louisiana sugarcane industry. [*J. Econ. Entomol.* 114: 468–471](#).
- Wilson, B.E., J.M. Villegas, M.O. Way, R.A. Pearson, and M.J. Stout. 2021. Cyantraniliprole: A new insecticidal seed treatment for U.S. rice. [*Crop Prot.* 140: 105410](#).
- *Villegas, J.M., B.E. Wilson, M.O. Way, J. Gore, and M.J. Stout. 2021. Tolerance to root injury by rice water weevil among hybrid and conventional rice cultivars. [*Crop Prot.* 139: 105368](#).





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