EntNem

May - June 2023 Newsletter

UF/IFAS Entomology and
Nematology Department

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Letter from the Chair

Dear Friends in Entomology & Nematology,

As I write this note, I have just reached the 6-week milestone in the chair seat. I am extremely excited and humbled to serve the department in this role and look forward to working with everyone in the UF Entomology and Nematology community to keep it strong and vibrant. I want to thank everyone for making my arrival a warm and smooth transition from Kansas to Florida.

I set several goals for my first three months on the job, including (1) individually meeting with all the Gainesville faculty and staff, (2) getting to know all the other IFAS department chairs, and (3) complete a 360-degree view of the department's budget and finances. I'm making good progress on all these fronts, and optimistic I'll complete all three on schedule. This fall, my getting-to-know-you efforts will shift to the REC faculty and center directors. I hope to be able to start making visits to REC locations as soon as September. Getting to know our various stakeholder groups will be a high priority as well.

Almost immediately after my arrival, I had the pleasure of attending the IFAS Research Awards Ceremony and watch as a number of our student, faculty and staff colleagues were recognized for all kinds of accomplishments--so many that they are too numerous to describe in this note, but celebrated elsewhere in this newsletter. I also am pleased to report that all five faculty that completed the tenure and promotion process were successful, so please join me in congratulating freshly minted Associate Professors Thomas Chouvenc, Zane Grabau, Xavier Martini, Silvana Paula-Moraes, and Full Extension Professor Faith Oi.

If you see me around, whether you are passing by Gainesville or just strolling by my office, don't hesitate to stop by and chat. I hope everyone has a wonderful summer. Go UFBugs and Worms!

Dr. Andrew Short
Professor and Department Chair

Please welcome our Newest members!

Allyson Fleischer

Academic Advisor I

Ally Fleischer is the Academic Advisor I. She completed dual degrees with CALS (Family, Youth, and Community Sciences) and CLAS (Criminology) in Spring 2022. After graduation, She spent a year right down I-75 at the University of South Florida as a program specialist. Ally is thrilled to return to the Swamp as an Academic Advisor I for Entomology and Nematology Department. She is a Gator through and through – when not in the office, you will find her decked out in Orange and Blue at various UF sporting events. If you've ever wanted to go to a sporting event but aren't sure where to start, find her – she'll show you the ropes!

Natalie Parkell

Extension Program Coordinator

Natalie Parkell is the Extension Program Coordinator for the Honey Bee Research & Extension Lab. Her responsibilities include event planning, science communication, extension outreach, and other administrative projects. Natalie has served UF/IFAS Extension as a county 4-H agent, a regional food systems specialist with the Family Nutrition Program, and a program assistant at NFREC-Suwannee Valley. She hopes to bring honey bee education to youth and adults all over the world.

Insect ID LAB

A lot of flies breed in decaying organic matter and many of them are labeled as “filth flies”. However, many of the flies that breed in such material wouldn’t be encountered by people and aren’t a danger for spreading bacteria to our food. For example, this is a type of soldier fly called *Cyphomyia marginata*. The larva was feeding on damaged tissue in a Spanish bayonet plant, *Yucca aloifolia*, in south Florida. Agave weevils were the primary cause of damage to the plants, but the rotting tissue became food for soldier fly larvae and other insects.

Adam Wong, gave an invited seminar for the NIH-RISE Program at the University of Puerto Rico in Río Piedras. The NIH-RISE initiative has transitioned from the Research Education (R25) to better align with the programs' purpose and goals. Now the RISE Program is divided into three programs: U-RISE (T34) for research-oriented undergraduates pursuing higher degrees, Bridges to the Doctorate Student Training Program (T32) for masters' level trainees, and G-RISE (T32) for Ph.D. students at research-active institutions.

Jawwad Qureshi was selected as UF Research Foundation Professor. He also received 2022 Large Grant Leadership Award for his USDA-NIFA-OREI grant on the "Systems approach to organic management of the Asian citrus psyllid."

Strategic Nematology Retreat

The UF Entomology and Nematology Department has been committed to teaching, research, and extension in nematology for more than 70 years. Its excellence in this field has drawn students and researchers from all over the globe, solidifying its reputation as one of the leading nematology programs in the world. Seven nematologists at the Entomology and Nematology Department including **Larry Duncan**, **Billy Crow**, **Johan Desaeger**, **Abolfazl Hajihassani**, **Zane Grabau**, **Dorota Porazinska**, and **Peter DiGennaro** recently had their strategic planning retreat on June 1 and 2 in St. Petersburg Beach, FL, hosted by **Johan Desaeger**. The timing of this retreat was opportune, coinciding with the arrival of Andrew Short as department chair. This retreat gave participants an opportunity to make strategic plans and prospects in research and extension in nematology for the next five years (2023-2028) and to revise the nematology teaching curriculum.

Written by A. Hajihassani.

North American Colleges and Teachers of Agriculture

awards are in and we excited to share the great news!

We are thrilled to celebrate the remarkable achievement of **Jen Weeks**, who has been honored with the prestigious NACTA Educator Awards. This well-deserved recognition acknowledges Jen's exemplary dedication to education and her exceptional contributions to the field. As an outstanding educator, she has made a significant impact on students' experiences and has set a high standard for excellence in teaching. Congratulations Jen, on this well-earned accolade that showcases your passion and commitment to fostering knowledge and inspiring the next generation of learners!

NACTA has awarded **Anthony Auletta** the prestigious Global Engagement Early Career Award. This esteemed recognition highlights Anthony's exceptional contributions and commitment to promoting global engagement in the field of agriculture. His dedication to fostering international collaborations and advancing agricultural practices on a global scale is truly commendable. Congratulations, Anthony, on this well-deserved achievement!

16th Annual FLORIDA AGRICULTURAL EXPERIMENT STATION RESEARCH AWARDS Ceremony

For the 16th Annual Florida Agricultural Experiment Station Research Awards Ceremony, we are thrilled to celebrate multiple exciting wins!

Richard Jones Outstanding New Faculty Research Awards:

Dorota Porazinksa

UF Research Foundation Distinguished Professors

Jawwad Qureshi

High Impact Research Publications:

De-Fun Mou & Bryony Bonning

Diversity Difference Maker Awards:

Oscar Liburd

Culture of Nomination Award:

Bryony Bonning

Best Dissertation, Natural Resources:

Kristina Sloyer
& Chair Nathan Burkett-Cadena

AAAS Fellows:

Lukasz Stelinski & Nan-Yao Su

Large Grant Leadership Awards:

Peter DiGennaro, Adam Wong, Barry Alto, Virni Mattson & Janice Shott

Student News

Aswaj (Ash) Punnath, a PhD student in the Lucky lab, received the Entomological Society of America's SysEB Student research travel award and the UF Graduate Student Council travel award. These awards will support his travel to Papua New Guinea this August to attend the premier international ant course. The Ant Course 2023 (run by the California Academy of Science, USA) aims to cultivate the next generation of ant scientists. The course offers an intensive training program in both field and laboratory research.

Clebson S. Tavares and his advisor Dr. Bonning participated in the 2023 Doctoral Recognition Ceremony. Clebson earned his Ph.D. in Entomology working with the "Midgut surface proteome of *Diaphorina citri* and toxicity of gut-targeting insecticidal proteins for use in citrus greening management". He is the most recent Post Doc to join Bonning Lab to work on the molecular interactions between psyllids and the citrus greening pathogen, *Candidatus Liberibacter asiaticus*.

Photos by Morgana Miranda

The Nan Yao and Jill Su scholarship honors excellence in entomology and nematology studies, awarding $1,000 to an M.S. student and $1,500 to a PhD student annually. We are delighted to announce Jasleen Kaur (Phil Hahn Lab) as this year's distinguished scholarship recipient, embodying the true essence of scientific passion and achievement in her field.

Congratulations, *Jasleen!*

Madison Gits was awarded a 2022-23 Pest Management Foundation Student Scholarship by the Foundation's Board of Trustees based on her academic record, accomplishments, and dedication to her education and to the advancement of the pest management industry. Madison Gits is from La Porte, Indiana. She received her bachelor's degrees in Animal Behavior and Biology from Indiana University and her Master's degree in Entomology from Purdue University. She is currently an Entomology PhD student at the University of Florida co-advised by **Michael Scharf** and **Faith Oi**. She is interested in studying insecticide resistance in German cockroaches and how to transfer knowledge to stakeholders.

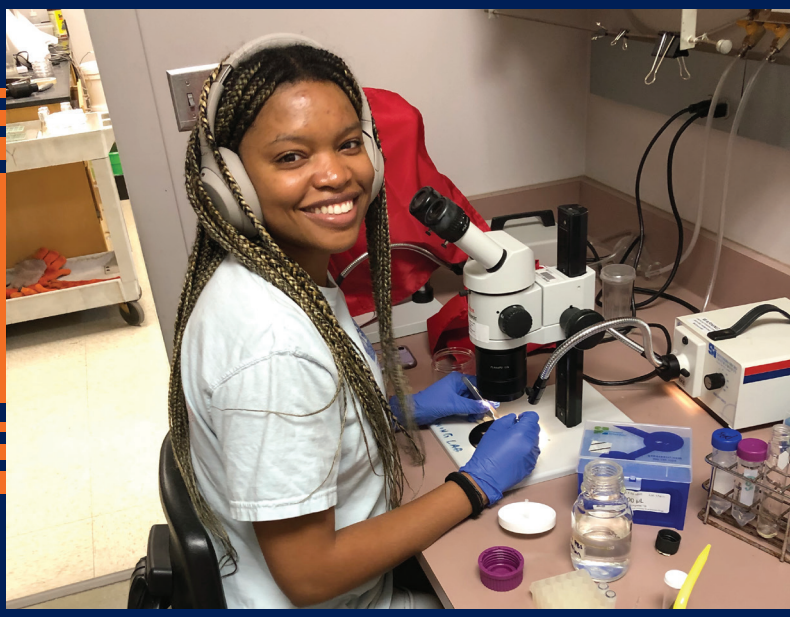
Bravo!

Iris Stryzewski (**Martini lab**) has accepted a position as a senior scientist at Disney World. She will conduct research within the IPM lab and update the Living with the Land attraction in Epcot.

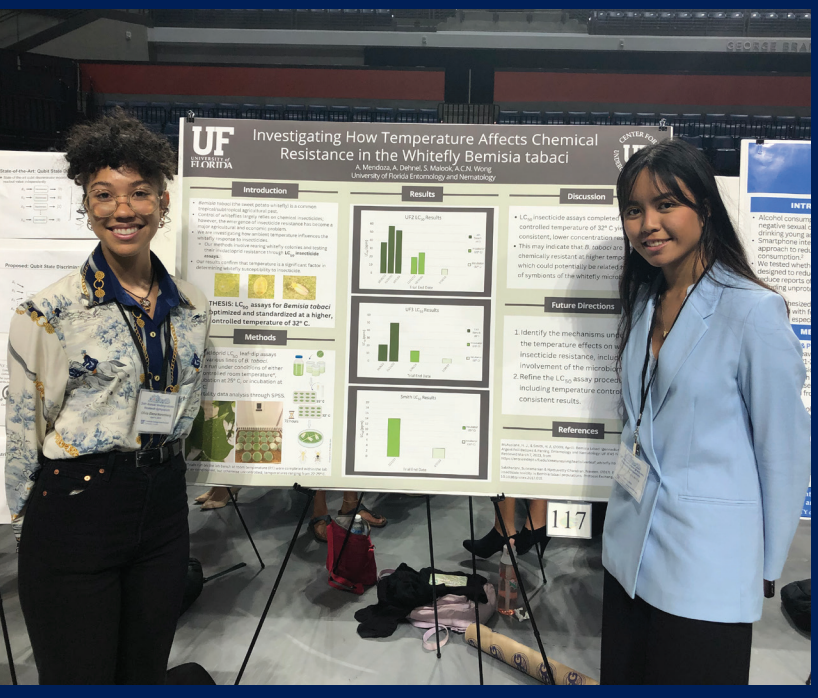
Way to go!

Jessica Griesheimer (Martini Lab) received a $1,000 travel grant to present her research on the chemical ecology of the air potato beetle at the annual American Chemical Society meeting in San Fransico.

Congratulations, *Jessica!*



Chenia Coulanges, an undergraduate intern in the Wong lab, received the NIH Intramural Research Training Award (IRTA) and will be conducting genomics research this summer in an NIH (Neil Hanchard's) lab.



Alessa Mendoza and Olivia Norenberg, the two NSF REU students supported by the CAMTech program in the Wong lab, presented their work at the Undergraduate Research Symposium.

CURE

Course-Based Undergraduate Research Experiences

We are excited to announce the publication of our new paper in a special issue of the open-access journal Genes (Genome-Wide Identifications: Recent Trends in Genomic Studies)! This paper is especially exciting, as it emerged from research conducted by undergraduate students in our Insect Research CURE course (ENY 2890) during Fall 2021! The full citation is below:

Bogale M, Mishra S, Stacey K, Rooney L, Barreto P*, Bishop G*, Bossert K*, Bremer K*, Bustamante D*, Chan L*, Chau Q*, Cordo J*, Diaz A*, Hacker J*, Hadaegh L*, Hibshman T*, Lastra K*, Lee F*, Mattia A*, Nguyen B*, Overton G*, Reis V*, Rhodes D*, Roeder E*, Rush M*, Salichs O*, Seslija M*, Stylianou N*, Vemugunta V*, Yun M*, Auletta A, Leppla N, DiGennaro P. (2023). First Description of the Nuclear and Mitochondrial Genomes and Associated Host Preference of Trichopoda pennipes, a Parasitoid of Nezara viridula. Genes **14(6):1172**.

* Denotes undergraduate researchers from the CURE Of the 26 student co-authors, 8 are current or recently graduated Entomology & Nematology majors: Gina (Max) Bishop, Julian Cordo, Kimberly Lastra, Victoria Reis, Daniel Rhodes, Emily Roeder, Matteo Seslija, Nick Stylianou. This research project was a collaboration between the DiGennaro and Leppla labs, and focused on using genomic data to investigate the possibility that the economically important parasitoid fly *Trichopoda pennipes* may actually be a complex of host-specific cryptic species. Drs. Peter DiGennaro and **Norm Leppla** were the principal investigators who oversaw the project and helped mentor the student researchers. Mesfin Bogale (former postdoc, DiGennaro lab) and Shova Mishra (current postdoc, DiGennaro lab) took lead on doing the follow-up analyses after the CURE and writing the paper. Kendall Stacey (former MS student, Leppla lab) and Lillie Rooney (current MS student, Leppla lab) also contributed substantially to the research. Dr. Anthony Auletta was coordinator of the CURE who helped adapt the project to an undergraduate course and served as an additional mentor for the student researchers. Congratulations to all of the authors on this terrific achievement!

What is a CURE, you might ask? Course-based undergraduate research experiences (or CUREs) are immersive, hands-on courses that engage students in impactful, authentic research. CURE students spend the semester working in collaborative teams on a novel research project, generating publishable data and thus providing new knowledge to the field of entomology. Dr. Anthony Auletta leads our Insect Research CURE (ENY 2890) every spring and fall semester, in partnership with a rotating team of research collaborators in the Entomology & Nematology Department. Each semester CURE can accommodate up to 32 undergraduate researchers; we have mentored 116 students in research through the CURE since 2020! Many of these students go on to pursue other research opportunities after the course ends, including graduate school. This year, several CURE students will also present their research at the Entomological Society of America national meeting! If you're interested in getting involved with the CURE program, please reach out to Dr. Auletta for more information about how you can adapt your lab's research to a CURE course!

EDUCATION & OUTREACH:

On June 12th and 13th, the **UF/IFAS Honey Bee Research and Extension Laboratory** hosted extension agents, staff, and volunteers from nine Florida counties for a "Practical Beekeeping" in-service training seminar. With the goal of improving the health of honey bees around the state using a "Train-the-Trainer" model, **Jamie Ellis** offered attendees an overview of the apiculture industry with a detailed look at a "Year in the Life" of a honey bee colony. Jennifer Hagen, Family and Consumer Sciences Agent from Lee County, helped distinguish the legal maze of business options for honey producers. Several HBREL staff brought the class up close to *Varroa* monitoring and other information about honey bee pests and diseases. The highlight of the course was the interaction between the agents who spoke about their extension programming around the state, highlighting the diversity and unique challenges they all faced improving the outcomes of Florida apiculturists.

Colorful Dancing Spiders

The Taylor Lab collaborated with the Florida Museum of Natural History on an exhibit that showcases the colorful jumping spiders that they study. The exhibit, called Colorful Dancing Spiders, features large-scale photographs by collaborating photographer Colin Hutton and display cases and videos that illustrate the experiments being done in the lab. The exhibit is located in the museum's West Gallery where it is free for museum visitors. Click here to be directed to the museum's webpage for the dancing-spiders.

In May and June, our Outreach Coordinator, Vashti Tatman, engaged in a series of exciting and educational projects with schools and libraries. As part of the end-of-year celebrations, a kindergarten class chose insects as their project theme, and we brought our fascinating insect zoo right to their school. The interactive sessions provided valuable insights into the benefits of insects, and the students even had the opportunity to create maggot art using non-toxic paint. In June, we continued our efforts with multiple library presentations and summer camp experiences, providing safe and enjoyable learning environments for students throughout the summer. These endeavors have been successful in promoting the significance of bugs and fostering curiosity among young minds.

2023 Invasive Ant Boot Camp

Invasive Ant Boot Camp took place this year on May 10-12 here in Steinmetz Hall. The course was led by Andrea Lucky and instructors included Jason Williams, Lyle Buss, Thomas Chouvenc, and Faith Oi, as well as colleagues from other universities. One of the three on-campus tours was led by Anthony Auletta, at NATL. Course topics included lab and field ID of invasive ants, as well as management and regulation of globally important ant species. Next year's course will take place in early May and registration opens in September - contact Dr. Lucky if you are interested in attending. Photo caption: Invasive Ant Boot Camp 2022 participants (in photo): Back row from L: Mariangie Ramos, Matt Buffington, Ben Meier, Aswaj Punnath, Jason Williams, Lyle Buss, Scotty Yang, Elijah Talamas Front row from L: Skyla Sheehy, Charly Hartle, Erin O'Reily, Jenny Gavilanez-Sloane, Emily Poole, Chloe Liu, James Trager, Andrea Lucky, Athena Conde, Roxie White. Not Pictured: Thomas Chouvenc, Miles Maxcer.

Photo by Randy Fernandez

The 22nd Annual Advanced Mosquito Identification and Certification Course was held March 13-24, 2023 at the **Florida Medical Entomology Laboratory** in Vero Beach, FL. Instructors, Dr. Nathan Burkett-Cadena and Dr. Derrick Mathias (both of UF FMEL), were assisted by Mr. Jason Stuck of Pinellas County Mosquito Control. Students from diverse organizations participated in the course, including Barbados Ministry of Health, CDC Dengue Branch (Puerto Rico), the CDC (Fort Collins), US Navy, UF, New Mexico Department of Health, and Texas Department of State Health Services.

Advanced Mosquito Identification & Certification Workshop
Florida Medical Entomology Laboratory - University of Florida / IFAS
MARCH 2023

FMEL Professors Teach Arbovirus Workshop in Black Sea Region!

Professors at the Florida Medical Entomology Laboratory (FMEL) Barry Alto, Nathan Burkett-Cadena, and Lindsay Campbell, and lab technician Yasmin Tavares traveled in late May to Tbilisi, Georgia to teach a ten-day arbovirus surveillance workshop to collaborators from Georgia, Turkey, and Ukraine as part of a DTRA - funded project focused on arbovirus surveillance in the Black Sea region.

The workshop was held at the National Center for Disease Control (NCDC) in Georgia and included participants across a range of disciplines including entomologists, parasitologists, molecular biologists, and public health from each country. This was a very exciting opportunity to further strengthen the connections between all collaborators, students, and countries involved in the project.

Dr. Nathan Burkett-Cadena lead a portion of the workshop focused on the Gravid Aedes Trap (GAT) for vector mosquito sampling, and identifying mosquitoes of Georgia, Turkey and Ukraine using morphological keys.

Dr. Lindsay Campbell lead a GIS and species distribution modeling portion of the workshop where participants gained basic GIS skills and learned how to run species distribution models using *Ae. albopictus* as an example.

For the last part of the workshop, Dr. Barry Alto spent time in the field with the international collaborators and learned how to run species distribution models to practice mosquito sampling techniques chosen for this project. In addition, project fieldwork designs were finalized.

Mosquitoes were not the only fun part of the trip!

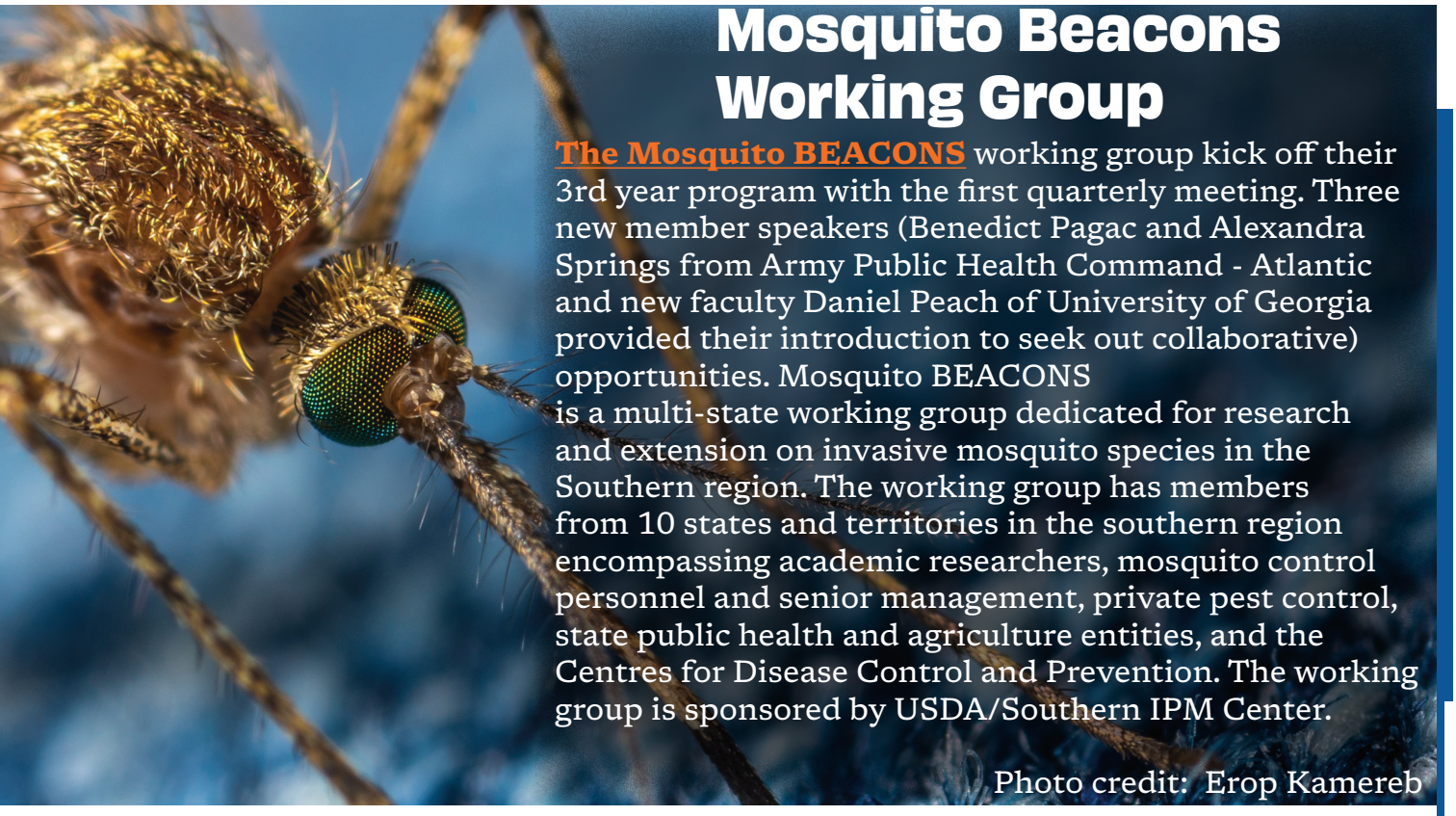
The FMEL group, along with the international collaborators, had a great time at the banquet and got to see beautiful mountains in Tbilisi together. All in all, it is exciting to see so many experts from many nationalities coming together to discuss the current lack of information on arbovirus surveillance in the Black Sea region and finding ways to bridge this gap. Everyone is looking forward to the next five years working together on this project!

2023 Caribbean Bee College

Caribbean Bee College was held in Freeport, Bahamas on June 22 and 23, 2023. 25 participants were in attendance each day, where they learned about beginner beekeeping topics, equipment, pests and diseases, and African-derived honey bees. The University of Florida held this training in collaboration with the local Bahamian beekeepers association, Bees Beyond Borders, and other expert beekeepers in Florida and Grenada. Attendees were enthusiastic and encouraged to continue their beekeeping education. Part 2 is already in the works, and will focus on learning how to create value-added honey bee products, such as soaps, lip balms, candles, etc. to help with beekeeping entrepreneurship.

The 2nd Agricultural Acarology Workshop

The 2nd Agricultural Acarology Workshop was held at TREC on May 8-12. Graduate students from UF and other institutions, state and government agents, consultants, and industry professionals attended the workshop. This is a 5-day hands-on workshop aiming to introduce participants to acarology and teach them how to work with mites. More information about the workshop can be found **here**. This extension initiative is organized by **Alexandra Revynthi** and **Daniel Carrillo** every summer. Invited speakers: Sam Bolton (FDACS-DPI), Ron Ochoa (USDA-ARS), Orlando Combita (Ohio State University), Enrico De Lillo (University of Bari Aldo Moro) and Theodoros Stathakis (Agricultural University of Athens).



Mosquito Beacons Working Group

The Mosquito BEACONS working group kick off their 3rd year program with the first quarterly meeting. Three new member speakers (Benedict Pagac and Alexandra Springs from Army Public Health Command - Atlantic and new faculty Daniel Peach of University of Georgia provided their introduction to seek out collaborative) opportunities. Mosquito BEACONS is a multi-state working group dedicated for research and extension on invasive mosquito species in the Southern region. The working group has members from 10 states and territories in the southern region encompassing academic researchers, mosquito control personnel and senior management, private pest control, state public health and agriculture entities, and the Centres for Disease Control and Prevention. The working group is sponsored by USDA/Southern IPM Center.

Photo credit: Erop Kamereb

Remembering Dr. John Howard Frank

Professor J. Howard Frank was an indomitable Entomologist! He was determined to become a major force in biological control and insect systematics, and he succeeded admirably. He was well-known for his research and ultimate success in biological control of pest *Neoscapteriscus spp*. mole crickets, primarily using the nematode, *Steinernema scapterisci*, and the wasp, *Larra bicolor*. Howard was dedicated to saving several of Florida's native bromeliads from an invasive bromeliad-eating weevil, *Metamasius callizona*, first unsuccessfully using biological control, and secondly by promoting the study and use of a Belize bromeliad population that is resistant to the weevil. His life-long passion was staphylinid beetle taxonomy. He also was a passionate and very popular teacher, revered by students who took his classes in Biological Control and Tropical Entomology, for which he taught himself rudimentary Spanish. While a Professor of Entomology in the Entomology and Nematology Department at the University of Florida in 1985-2012, he graduated ten Ph.D. and seven M.S. students and remained an active member of the emeritus faculty. He also was well-known as an expert editor of scientific literature and for his exceedingly high standards of English. He was an environmentalist and dedicated member of the Center for Systematic Entomology (CSE) and Gainesville Bromeliad Society, along with several professional entomological societies. Howard's awards included Lifetime Membership in the CSE and Pioneer Lecturer for the Florida Entomological Society. His curriculum vitae is **here**.

Dr. Frank was born in Stockton-on-Tees, England in 1942 and, in 1948, moved with his parents, George and Hilbre Frank, to Newcastle upon Tyne. In 1960, he entered King's College of Durham University in Newcastle upon Tyne as an undergraduate to study Zoology. His advisor, Edmund Burt, was an insect physiologist. At one Saturday morning lab meeting, Howard was introduced to Edmund's predecessor, George Varley, who was then professor and head of the Hope Department of Entomology at Oxford University. After graduating from Durham University in 1963, Howard was invited to attend Oxford University as a graduate

student. At Oxford, George Varley began a long-term ecological study of the winter moth, *Operophtera brumata*. Howard worked on all the parasitoids and predators of the moth at Wytham Woods, near Oxford. He used radioactive C-14 and serological methods to identify predators that had eaten winter moth pupae. He graduated in 1966, having showed that a staphylinid beetle and a couple of carabid beetles were the most important predators regulating winter moth populations.

Howard was immediately offered a postdoctoral fellowship at the University of Alberta in Edmonton, Canada. September 1966 saw him sailing from Scotland to Montreal, buying a used car, and driving the 2,224 miles to Edmonton. He really liked the people there, especially students Don Whitehead, Andy Nimmo, and Terry Erwin, and professors Doug Craig, George Ball, and head of department, Brian Hocking. Howard had never taken a course in insect taxonomy, but there he learned the subject by association and discussion. His research involved using the techniques he had learned in England to evaluate beetles as predators of the redbacked cutworn, *Euxoa ochrogaster*, a major pest of cereals. The methods worked, and he was able to show that some carabids were important cutworm predators. His faculty sponsor, Ron Gooding, researched insecticides that were least harmful to the beetles.

Howard needed a permanent job and found one in Jamaica with the help of Fred Bennett, whom he met in Edmonton the previous year. So, Howard and his wife, Audrey, drove from Edmonton through 3,016 miles of blizzards in Montana and Wyoming to Miami and placed their car on a ship headed for Kingston. The Sugar Research Department of the Sugar Manufacturers' Association of Jamaica Ltd. was his employer for the next 3 years. He worked on the major sugarcane pests: sugarcane borer, *Diatraea saccharalis*; West Indian canefly, *Saccharosydne saccharivora*; yellow sugarcane aphid, *Sipha flava*; and lesser cornstalk borer, *Elasmopalpus lignosellus*. A primary goal was to model the life cycle of the canefly and its parasitoids to support biological control instead of using insecticides. As the only entomologist for the entire industry, Howard was responsible for both research and Extension. He was able, however, to meet other entomologists at the University of the West Indies in Kingston plus Tom Farr, an American entomologist at the Institute of Jamaica. They especially enjoyed discussing Jamaican insect natural history. Also, Bob Woodruff from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry (FDACS, DPI) stayed at Howard's house, along with University of Florida graduate students, Ed Farnworth and Pete Drummond. For recreation, Howard joined the Jamaica Caving Club and spent many exciting weekends exploring caves and collecting staphylinids.

Howard was not ready to leave Jamaica but was offered a position at the Entomological Research Center of the Florida Department of Health in Vero Beach. Audrey and his three small daughters flew to New Jersey to stay with her sister while he began researching the ecology of mosquitoes. Howard enjoyed working with the staff at the Center that included John Edman, John Linley and George O'Meara, and later Phil Lounibos, Jorge Rey and Earl McCoy. Howard admired and respected Maurice Provost, the Center Director, who encouraged him to continue working on staphylinids. However, his primary research was on egg disappearance of *Aedes taeniorhynchus* during winter and summer; the container-inhabiting mosquito, *Aedes aegypti*; *Culex quinquefasciatus*; and mosquitoes in leaf axils of native *Tillandsia utriculata* bromeliads. Undeservedly, he came under fire from the infamous Director of the Lee County Mosquito Control District, T. Wayne Miller, because Miller saw no use in ecology and used insecticides recklessly to control mosquitoes. Howard also studied mosquitoes in leaf axils of the ornamental non-native bromeliad species, *Billbergia pyramidalis*. He determined that there was an average of 107 adult mosquitoes in every plant, and all belonged to the genus *Wyeomyia*, day-biting

mosquitoes that do not vector human diseases. *Wyeomyia spp*. are relatively small and require less food to develop from egg to adult than do *Aedes aegypti* or *Culex quinquefasciatus*, so die under normal competition with *Wyeomyia*. Twenty-eight years later, Zika virus occurred in Miami and all bromeliads in its botanical garden were destroyed because of the erroneous belief that these bromeliads harbored the disease-vectoring mosquitoes.

Eventually, the Entomological Research Center was re-named the Florida Medical Entomology Laboratory and transferred to the University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS). Howard, now a member of the UF/IFAS faculty, was encouraged by Professor Will Whitcomb to succeed him in the Entomology and Nematology Department. Before retiring, Will Whitcomb introduced him to the Gainesville faculty as a "dirty-hands ecologist", an expression Howard liked after a while. Howard was hired and Professor Tom Walker immediately involved him in research on biological control of invasive mole crickets. Ultimately, four natural enemies of the pest mole crickets were imported from South America: the crabronid wasp, *Larra bicolor*; *Ormia depleta*, a tachinid fly; a carabid bombardier beetle, *Pheropsophus aequinoctialis*; and *Steinernema scapterisci*, an entomopathogenic nematode. He distributed the wasp and fly widely in Florida and, along with Professor Norm Leppla and Lucy Skelley, established the nematode throughout most of the state. The predatory beetle could not be released because it fed on the eggs of *Neocurtilla hexadactyla*, a native mole cricket. However, the other three biological control agents brought about a 95% reduction in pest mole crickets.

In 1991, Howard heard about an invasive weevil attacking native bromeliads in Florida and involved Mike Thomas, a beetle expert at FDACS, DPI. They drove to the Broward County Parks Headquarters and discovered windrows of dead *Tillandsia utriculata*. After reporting this occurrence in the Journal of the Bromeliad Society, Nat Deleon, a leading bromeliad advocate and member of the Florida Council of Bromeliad Societies (FCBS), asked Howard to start a biological control project to protect Florida's native bromeliads. The FCBS provided early financial support for weevil and bromeliad research and continued to do so for many years. The weevil had been identified by beetle specialist and Howard's friend, Charles O'Brien, as *Metamasius callizona*, native to southern Mexico, Belize and Guatemala. Howard began mapping the weevil's progression in Florida, which eventually spread to 23 counties. He obtained USDA Agricultural Research Service foreign exploration funding and with Mike flew to Merida, Mexico in the Yucatan and drove over 600 miles to a nursery in Fortín de las Flores that had exported weevil-infested bromeliads to Florida. They collected bromeliads infested by *Metamasius callizona* and transported them to Gainesville where all of the weevils died in quarantine without producing a parasitoid. Subsequently, Howard contacted Ron Cave at Escuela Agricola Panamericana at Zamorano in Honduras and asked him to collect local bromeliads infested by the weevil. Ron recovered some tachinids from the weevils and along with Monty Wood, a retired Canadian tachinid expert, described the flies as *Lixadmontia franki*, in honor of Howard. Howard and Teresa Cooper struggled to rear flies from weevils collected at several locations and were able to release 7,000 flies at 10 natural areas in Florida but the parasitoid never established.

Howard was asked to develop a graduate course in biological control in the Entomology and Nematology Department in 1989 and taught it every other year for 30 years. Reece Sailer taught the subject previously. In 1995, Howard was on sabbatical at the Instituto de Ecología in Xalapa, Mexico to gain the ability to lecture in Spanish. Subsequently, Dr. Pepe Clavijo of the Departamento de Zoología Agrícola, Universidad Central de Venezuela in Maracay suggested to the chairman of the UF/IFAS Entomology and Nematology Department that Howard should begin a course in

Tropical Entomology, including a field trip to Venezuela. Howard consequently began teaching this second course every two years for both undergraduates and graduates in 1997. The course continued until 2011, when Venezuela became unsafe for the students. Howard began his active retirement the next year, being characterized at his career celebration as Florida's David Attenborough! He passed away on January 21, 2023. Howard is survived by Audrey and their three daughters, Christine, Jocelyn, and Susan. He is also survived by his sister Leslie Crossley and Luton England. The family will hold a private Celebration of Life at a later date.

Dr. Norman C. Leppla
Dr. Teresa Marie Yawn

Publications

Su, N.Y., A. Mullins, and T. Chouvenc. 2023. Elimination of structural and tree infestations of the Asian subterranean termite, *Coptotermes gestroi* (Wasmann) (Blattodea: Rhinotermitidae) with noviflumuron baits in above-ground stations. Journal of Economic Entomology **10.1093/jee/toad077**

Iredale, M.E., P.H.O. Viadanna, K. Subramaniam, E. Tardif, B.C. Bonning, and J.D. Ellis. 2023. Report of amoebic disease in a colony of Western honey bees (*Apis mellifera*). Veterinary Pathology **10.1177/03009858231179956**

Ghoveisi, H., D.M. Kadyampakeni, J. Qureshi, and L. Diepenbrock. 2023. Water Use Efficiency in Young Citrus Trees on Metalized UV Reflective Mulch Compared to Bare Ground. Water DI **10.3390/w15112098**

Adeleye, V.O., D.R. Seal, O.E. Liburd, X. Martini, and G. Meru. 2023. Integrated approach using insecticides in combination with reflective plastic mulch for the management of pepper weevil, *Anthonomus eugenii* (Coleoptera: Curculionidae). Environmental Entomology DI **10.1093/ee/nvad033**

Gitonga, D., P.R. Singh, and A. Hajihassani. 2023. Detection of guava root-knot nematode, *Meloidogyne enterolobii* infecting *Psidium guajava* orchards in Homestead, Florida. Australasian Plant Disease Notes DI 10.1007/s13314-023-00506-1

Bui, H.X., S. Agehara, W.N. Wang, and J.A. Desaeger. 2023. Effects of Planting Date, Cultivar and Vernalization Using Gibberellic Acid on the Severity of Root-Knot Nematode Damage to Globe Artichoke in Subtropical Sandy Soil. Journal of Nematology DI **10.2478/jofnem-2023-0012**

Guralnick, R.P., L.P. Campbell, and M.W. Belitz. 2023. Weather anomalies more important than climate means in driving insect phenology. Communications Biology DI **10.1038/s42003-023-04873-4**

Lee, S.B., and N.Y. Su. 2023. Foraging proportion of the Formosan subterranean termite workers and soldiers in relation to soil type. Frontiers in Ecology and Evolution DI **10.3389/fevo.2023.1091395**

Zhao, D.S., A. Ali, C. Zuck, L. Uy, J.G.M. Morris, and A.C.N. Wong. 2023. *Vibrio cholerae* Invasion Dynamics of the Chironomid Host Are Strongly Influenced by Aquatic Cell Density and Can Vary by Strain. Microbiology Spectrum DI **10.1128/spectrum.02652-22**

Lopez, M., and O.E. Liburd. 2023. Effects of intercropping marigold, cowpea and an insecticidal soap on whiteflies and aphids in organic squash. Journal of Applied Entomology DI **10.1111/jen.13141**

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