UTRGV
Center for Vector-Borne Disease

NEWSLETTER

Volume 2 Issue 1 - April 2021

A Word from the Director

Greetings from the Center for Vector-Borne Disease,

As we move into a new stage of the COVID pandemic, with increased access to vaccines and (hopefully) a declining incidence of disease, we can start to look forward to life getting closer to "normal". However, from the perspective of vector-borne diseases, "normal" means continued disease transmission. While diseases like West Nile virus, Chagas disease, and Lyme disease may have taken a back seat over the past year, they were still circulating. In fact, the Rio Grande Valley had a minor dengue epidemic with multiple locally transmitted cases in 2020. Although, 2021 has proven to have it's own challenges, we continue to remain vigilant in surveillance and control efforts to detect and manage any possible vector-borne disease outbreak. Just like SARS-COV2, there are new vector-borne diseases that may eventually make their way to our borders. Effective surveillance, as well as an understanding of the biology of the vectors and disease transmission, remain as important as ever.

In other news, our newsletter will be moving to twice a year, with the next issue being distributed in June or July.

Research

Faculty Highlight

Featuring Dr. Tamer Oraby

Dr. Tamer Oraby is an associate professor at the School of Mathematical and Statistical Sciences at UTRGV. He was promoted to that position on September 1, 2020. Dr. Oraby is working on modeling the spread of infectious diseases in humans and animals. He recently worked on modeling measles using fractional models and on modeling the effect of lockdown on controlling COVID-19. He has also recently coauthored and published a paper in the journal of *Subtropical Agriculture and Environments* that compare the abundance of adults and eggs of Aedes Mosquitos, which is a vector of Zika virus in McAllen and Reynosa. Dr. Oraby used a statistical model implemented using a Bayesian approach to estimate its parameters and perform the test of hypotheses to compare that abundance. He also participated in modeling and estimation of the association between the abundance of Rickettsial pathogens in Rhipicephalus sanguineus ticks and the Rickettsiosis outbreak in Baja, California during 2010 and 2011. Currently, he serves as a committee member, chaired by Dr. Arroyo, of a master thesis by Ms. Consuelo Aguilar in the department of biology. In the thesis, a survey is being conducted to examine the knowledge of the population across the US-Mexican border about tick-borne diseases.

[1]Arroyo, T., Aguilar, C., Vazquez, C., et al. (2020). A tale of two cities: Aedes Mosquito surveillance across the Texas-Mexico Border. Subtropical Agriculture and Environments, 71, 12-22.

Research

- Following the shut down period over the summer due to COVID, Dr. Vitek's lab has resumed operations with the CDC and DSHS funded research effort to monitor for mosquito and tick-borne diseases in South Texas, as well as testing insecticide resistance. New graduate student research projects looking at blood feeding behavior, environmental influence on insecticide resistance, and acaricide resistance and diseases in ticks have started as well.

Greeting from the Center for Vector-Borne Disease

Center Members:
Dr. Christopher Vitek, Director
Sylvia Alafa, Program Specialist
Dr. Erin Schuenzel
Dr. John Thomas, III
Dr. Teresa Feria
Dr. Scott Gunn
Dr. Rupesh Kariyat
Dr. Tamer Oraby
Dr. John Vandeberg
Dr. Beatriz Tapia
Dr. Robin Choudhury
Dr. George Yanev

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- Applied Statistics and Data Science (MS) is a statistical application revolutionizing the field of infectious diseases, including vector-borne disease, by contributing to early outbreak detection, surveillance, pathogenicity prediction, diagnostic tools, and more. In the era of big data, addressing broad-scale, fundamental questions regarding the complex dynamics of these diseases requires a combination of diverse datasets to produce an understanding of knowledge. Two particularly data-intensive approaches are (i) Big data-model integration and AI for vector-borne disease prediction and (ii) Assessment of vector-host-pathogen relationships using data mining and machine learning. A Master of Science degree in Applied Statistics and Data Science includes instruction in a broad range of statistical methods and computational tools to equip students to pursue careers as government, industrial, or academic statisticians and data scientists, or to continue to doctoral study in statistics. For more information on this program visit: https://www.utrgv.edu/graduate/for-future-students/graduate-programs/program-requirements/applied-statistics-and-data-science-ms/index.htm

- Thalia Rios, student and Senior Lab Technician in the Vitek Lab, was awarded third place in the poster competition at the 2021 American Mosquito Control Association Annual Meeting. The meeting, held virtually this year, brings together mosquito control professionals, researchers, and students from around the world. The poster competition had 250 competitors (mosquito control professionals, not students).

Publications

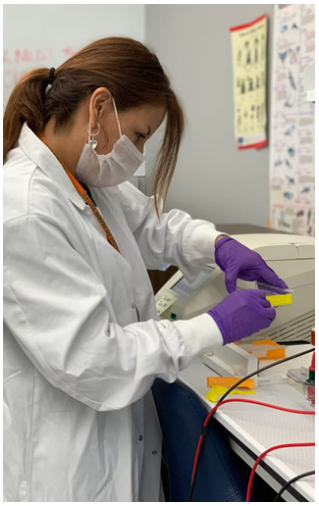
A. Vacek, J Goolsby, and R R. Kariyat. Development and testing of artificial membranes for rearing of Rhipicephalus microplus, the Southern Cattle Fever Tick. Year Month date. 2020. Subtropical Agriculture and Environments. 71:59-66.2020

G. P. Yanev,. Exponential and Hypoexponential Distributions: Some Characterizations, 2020, Mathematics., https://www.mdpi.com/922216

Education

Student Highlight

Consuelo Aguilar is a nontraditional, single mom, first-generation college graduate student majoring in Biology, concentrating her studies in vector-borne disease at UTRGV. In 2016, during her undergraduate studies, she was invited by her professor, Dr. Feria, to participate in a bilingual (English-Spanish), bi-national project to work on Aedes mosquito surveillance. Due to her great initiative and perseverance, she received a scholarship to participate in the project and was assigned to be the captain of the six undergraduate students who had to monitor 300 mosquito traps. During that time, she completed mosquito-borne surveillance training provided by the University of Texas El Paso, and Texas AgriLife Research in Weslaco. This catapulted her passion and interest for insects creating a further goal to start tracking the importance of public health, vector-borne disease, and ecology. She started her master's in biology on tick-borne diseases. She is currently participating in the project titled “Survey of fleas and tick collected from cats and dogs for evidence Rocky Mountain – Spotted Fever and Typhus Fever in the urban and rural areas of the Lower Rio Grande Valley, in Texas.” She also started molecular work with ticks in Dr. John Thomas's lab, which had to stop due to COVID-19. Additionally, she has mentored several of Dr. Feria's undergraduate students interested in learning about tick research. She has participated in conferences presenting her research experiences in bilingual posters and obtaining Honorable Mention in her service-learning "Conservation Biology." She is one of the co-authors of an article published in February 2020 in the SAE Journal and is currently working on her thesis project. Her project, a survey titled "Ticks and Their Possible Transmitted Diseases Survey," is now accessible in either English or Spanish and is being conducted in the transboundary region of Texas and Tamaulipas, Mexico. After graduation, she would like to continue researching the epidemiology field to incorporate all of her knowledge into public health and vector-borne diseases. She acknowledges all her accomplishments could not have been possible without her family’s support, advisors, professors' guidance, the teamwork with other students, and learning from her own mistakes. The Aedes mosquito surveillance project was supported by CENAPRECE via the US-Mexico Border Infectious Disease Surveillance (BIDS) Cooperative Agreement (CDC and the Mexican Ministry of Health) administered by the Fundación México-Estados Unidos para la Ciencia (FUMEC). Consuelo’s master’s research work has been possible thanks to three scholarships that she’s received. One from the Global Change Studies and two from the Fred W. and Frances H. Rusteberg Faculty Fellowship in Science and Technology Endowment position, both granted to Dr. Teresa Patricia Feria-Arroyo.



Student Updates

- Dr. Vitek is happy to welcome Melissa Rosalez to his lab. She’s an undergraduate from UTRGV, who started in Spring 2021. Neetu Khanal, a foreign student from Nepal and winner of a PGRA scholarship and stipend will also be joining the lab in the spring, pending her VISA approval. Heather Hernandez, a former graduate student from Dr. Vitek’s lab, was hired and started a new job in a parasitology lab at Walter Reed Army Institute of Research in Maryland. Jonathan Cisneros, and Clarissa DeLeon, two student in the lab, also each presented research results at a virtual ESA meeing in November.

- Recent UTRGV graduate Alejandro Vasquez will join Dr. Kariyat’s lab (https://phenotype2017.wixsite.com/kariyatlab) in Spring as a MS Student to work on vector biology. Specifically, he will work on the recently funded Contex grant (2020-2021) examining the chemical ecology of Chagas disease. Alejandro will focus on collection and analyses of volatile compounds responsible for aggregation behavior in Triatomine bugs, the vector of Chagas. This will be done in collaboration with Drs. Alejandro Coìrdoba-Aguilar, Researcher, from the Instituto de Ecologìa, Universidad Nacional Autonoma de Mexico; and Ana Erika Gutieìrrez Cabrera, Researcher, Instituto Nacional de Salud Puìblica-Consejo Nacional de Ciencia y Tecnologìa).

Outreach

Guest Speakers

October 1, 2020 - Dr. John-Paul Mutebi, **Centers for Disease Control (CDC) and Prevention Division of Vector-Borne Diseases** presented on Arbovirus Activity in the United States in 2020

October 22, 2020 - Dr. Roberto Barrera, presented on Ecology and Control of Dengue Vectors

November 12, 2020 - Saravanan Thangamani, Youtube

Upcoming Guest Speakers

March 25, 2021 - Dr. Kerry Mauck, Department of Entomology, University of California Riverside will present on Chemical Ecology of Insect-Vectored Disease

April 1, 2021 - Dr. Chelsea T. Smartt, Department of Entomology and Nematology, IFAS from the Univeristy of Florida will presented. Molecular biology and biochemistry of disease- transmitting mosquitoes, molecular entomology, gene expression and regulation, genetic basis of vector competence, insecticide resistance mechanisms

April 8, 2021 - Dr. Cynthia Lord, Dept. of Entomology and Nematology, IFAS, University of Florida, will presented on Mathematical and computer modeling to investigate questions about the ecology and epidemiology of pathogens

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