UTRGV
Center for Vector-Borne Disease

NEWSLETTER

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A Word from the Director

Greetings from the Center for Vector-Borne Disease,

The past six months have been, putting it mildly, unexpected. As we have seen the COVID-19 pandemic spread, we have all had to adjust our research, teaching, and related activities to a new normal. Classes have moved online, research has slowed to maintain social distancing in the lab, and outreach efforts have become more virtual than in person. The Center for Vector-Borne Diseases has adjusted some of their activities as well. We had two guest speakers give virtual presentations at UTRGV in the spring semester, shifting topics in both cases from vector-borne diseases to COVID-19. One of these was Dr. Susan McLellan, a speaker from UTMB who hosted a Q&A with students about COVID-19, and the second was Dr. Rebecca Christofferson, a researcher from LSU who hosted a talk about how she shifted her vector-related surveillance efforts to COVID-19 testing.

Along those same lines, faculty from the Center for Vector-Borne Disease also helped out by utilizing their expertise in diagnostics to help establish the UT Health RGV Diagnostic Laboratory. This effort was spearheaded by Dr. John Thomas, assisted by Drs. Erin Schuenzel and Chris Vitek. Laboratory personnel, students, testing equipment, and expertise were utilized to quickly develop a diagnostic facility to test samples that were collected by UT Health RGV in their drive-through clinics. This effort was so successful that Dr. Thomas has moved to become the full-time director of the new UT Health RGV facility.

As we move to the fall semester, uncertainty continues. We all remain vigilant and flexible as we continue to weather the storm of COVID-19. Education efforts remain online, speaker series remain virtual, but the personnel and researchers from the Center for Vector-Borne Disease will continue their efforts in research, education, and community outreach to further our understanding and control efforts of diseases that impact South Texas.

Research

Research Highlight

Featuring Dr. Teresa Feria Arroyo:

Dr. Teresa Feria Arroyo's research interests focus on Geographical Information Systems (GIS) and Species Distribution Modeling (SDM) methods that are applied to live organism distributions, both the present and the future (under climate change). She includes the development of predictive risk assessment models for the spread of Vector-Borne diseases and reservoirs based on GIS and SDM techniques. She has been developing studies on fine-scale assessments of Chagas diseases in Mexico and Texas. Her multi-institutional collaborative research on this topic has generated publications in high-quality Q1 journals such as Plos Tropical Neglected Diseases, Journal of Medical Entomology, and Journal of Parasitology, among others. Both her undergraduate and graduate students involved in Chagas research projects in her lab have participated as co-authors in scientific publications and presented their research findings in local, regional, state, and national scientific conferences. The students she mentors have joined the workforce or continued with their graduate studies in these areas. "Our study includes field and lab work, molecular techniques, GIS and SDM modeling, as well as citizen science", says Dr. Arroyo. So far, her findings are being used by other researchers interested in the study of Chagas disease in the Rio Grande Valley.

As a Mexican national, she understands the need to work against Chagas and other Neglected Tropical Diseases (NTD), particularly in the Lower Rio Grande Valley (LRGV), which has a large Hispanic population that has disproportionately poor access to adequate health care and housing. So, she plans to continue working on opportunities to help prevent the control of mortal diseases.

Greeting from the Center for Vector-Borne Disease

News Update

UT Health RGV Clinical Lab working on COVID-19 screenings, testing

UTRGV graduate students assisting in coronavirus tests

UTRGV students, scientists face potential 'avalanche' of COVID-19 tests

UTRGV Center for Vector-Borne Disease shifts work to COVID-19 screenings, testing

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. Hannah Penn
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Grants

Dr. Kariyat was awarded a grant to study Chagas disease in Mexico and Latin America caused by the parasite Trypanosoma cruzi, and vectored by Triatomine bugs. The disease is of utmost importance since there is no known cure, and especially in Mexico, little has been done to control the vector and more importantly, the chemical ecology underlying the disease is not well understood. An interesting feature of the vector is its aggregation behavior – an area planned to critically explore and examine via studying the chemical compounds linked to this behavior. To accomplish this, the plan is to collect, analyze, and test the effect of compounds (individual compounds and their blend) on the insect's aggregation behavior when they attract conspecifics to communal refuges. This project will not only provide key information to set up a possible Chagasic bug control program but may also reveal how parasites may change the behavior of hosts in insect vectors of medical importance. The project is funded by Contex UT-Mexico collaborative program, and will have three investigators from three institutions; Drs. Rupesh Kariyat (Assistant Professor of Biology; UTRGV; Dr. Alejandro Coìrdoba-Aguilar, Researcher, Instituto de Ecologìa, Universidad Nacional Autoìnoma de Meìxico; and Dr. Ana Erika Gutieìrrez Cabrera, Researcher, Instituto Nacional de Salud Puìblica-Consejo Nacional de Ciencia y Tecnologìa).

- Unifying Texan and Mexican efforts towards controlling Chagas disease by deducing parasite-vector dynamics, Contex UT-Mexico collaborative, Rupesh Kariyat (PI). This is to study the Chagas disease, a common illness in Mexico and Latin America caused by the parasite *Trypanosoma cruzi*, and vectored by Triatomine bugs.

Dr. Vitek was able to successfully renew his three cooperative agreements with the USDA studying control efforts of the Asian Citrus Psyllid. These agreements allow for continued collaboration between Dr. Vitek and Dr. Dan Flores from the USDA, which began in 2013. While the state funded project examining insectide resistance in mosquitoes was put on hold due to COVID, we are hopeful that the project will be renewed for continued funding in August.

- Biological Control of the Asian Citrus Psyllid, USDA, Chris Vitek (PI). This award is to evaluate the efficacy and use of biological control agents to control the Asian Citrus psyllid in the Lower Rio Grande Valley of Texas.
- Binational Partnership for the Biological Control of ACP, USDA, Chris Vitek (PI). This award is to reduce the risk of movement of HLB-infected Asian Citrus psyllids into Texas by providing biological control agents for release in Mexico.
- Assessing the Impact of Entomopathogens, USDA, Chris Vitek (PI). This awards will assess the viability of using entomopathogens as a viable tool for integrated biological control of the Asian Citrus psyllid in the Lower Rio Grande Valley.

Publications

Martínez-Peinado N, Cortes-Serra N, Losada-Galvan I, Alonso-Vega C, Urbina JA, Rodríguez A, VandeBerg JL, Pinazo MJ, Gascon J, Alonso-Padilla J. Emerging agents for the treatment of Chagas disease: what is in the preclinical and clinical development pipeline? Expert Opin Investig Drugs. 2020 Jul 7. doi: 10.1080/13543784.2020.1793955. Online ahead of print.

David, SN, Goolsby, JA, Thomas, D, Badillo, I, Kariyat, R, Vitek, C, and Sekula, D. 2020. Review of Major Crop and Animal Arthropod Pests of South Texas. Subtropical Agriculture and Environments. Issue 71, pages 36-48

Teresa Patricia Feria-Arroyo[1], Consuelo Aguilar[1], Cuauhtémoc Quintero Vazquez[2], Rene Santos-Luna[3*], Susana Roman-Perez [3], Tamer Oraby[4], Gustavo Sanchez Tejeda[5], Fabian Correa Morales[5], Víctor M. Salazar Bueyes[5], Pascual Camacho Guevara[2], Juan Francisco Castañón Barrón[2], and Jesus F. Gonzalez Roldan[5]. 2020. A tale of two cities: Aedes Mosquito surveillance across the Texas Mexico Border. Subtropical Agriculture and Environments. Issue 71, pages 12-22

Education

Student Highlight

Jasleen Kaur (MS Biology, Kariyat lab) thesis project under the mentoring of Dr. Rupesh Kariyat, has previously established that inoculating the sorghum seeds with arbuscular mycorrhizal fungi (AMF) can not only boost the plant growth traits, but also improve its defense traits, and ability to selectively attract beneficial insects and repel herbivores under field conditions (Kaur et al., 2020). In addition, Jasleen used an electrophysiological technique called electrical penetration graph (EPG) to examine how surface defenses and underlying chemical defenses in Sorghum, possibly enhanced by AMF affect probing and feeding of SCA, key components to understanding SCA development, and vector dynamics in this system. Her experiments using behavioral, feeding, and population assays show promising results for using AMF against SCA. Both population growth and feeding behavior of SCA on AMF inoculated plants were found to be significantly impacted when compared to control plants. The funding for this project was through Transforming the World Strategic Plan Award to Dr. Rupesh Kariyat from UTRGV. Jasleen graduated this summer and is currently a Ph.D. student at the University of Florida Entomology Department.

Student Updates

- The Vitek lab is happy to welcome three new graduate students starting in the fall – Spencer Hill, Bianca Guerra, and Neetu Khanal. Neetu Khanal is the recipient of one of the UTRGV Presidential Graduate Research Awards. At the same time, we say goodbye to Jeremy Marshall and Rachel Malampy, who both successfully defended their thesis over the summer and will be leaving to take on new challenges.

- Consuelo Aguilar, a master student in Dr. Feria's lab, will be surveying the knowledge that people have about ticks and tick borne diseases in the transboundary region of Mexico-USA. Her main goal is to be able to raise awareness with the local communities on how to prevent/control diseases transmitted by ticks. The IRB has been approved. The survey will be online. Please contact her at consuelo.aguilar01@utrgv.edu if you would like to share the survey with people in your communities. That will be a great help for her.

- Also, the Empowering Future Agricultural Scientist program that addresses issues with vector borne diseases in animals and plants is accepting applications. Research examples include the cattle fever tick, citrus greening, fruit fly, and more. Please share the information with undergraduate students that may be interested. The online application can be found here: https://www.utrgv.edu/efas/application/index.htm or contact Dr. Feria for more information about the program: teresa.feriaarroyo@utrgv.edu

Outreach

Guest Speakers

April 1, 2020 - Dr. Christopher Vitek, Associate Professor of Biology, UTRGV presented on "Mosquito Biology, Identification, and Surveillance". Youtube

April 3, 2020 - Dr. Susan McLellan, UTMB, Questions and Answers on Corona Virus

April 20, 2020 - Dr. Rebecca C. Christofferson, Assistant Professor, Pathobiological Sciences, LSU School of Veterinary Medicine. presented on "The Global Pandemic response and preparedness- How we weren't prepared" Youtube

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