ENTO/VIBS 489/689
Field and Lab Techniques in Vector-borne Disease Ecology

Spring 2015; 3 credit hours
Lecture/Lab:
Mon and Wed
8-10:50am; HPCT 210

Field trips: Various times and locations

Overview

Vector-borne diseases (VBDs) represent one of the fastest growing threats to human and animal population health. Patterns of climate change, global travel, urbanization, and species invasions suggest that VBDs will continue to challenge populations in both developed and developing countries. The One Health initiative calls for a synergy of efforts to protect human, animal, and ecosystem health, utilizing approaches from veterinary and human medicine, environmental science, and other disciplines. Because vectors and the pathogens they transmit often bridge humans, wildlife, and domestic animals, a One Health approach provides a useful framework for their research and management. In this course, we aim to equip future medical practitioners, public health officials, entomologists, disease ecologists, and biomedical researchers with a methodological understanding of how VBDs are studied in the field and laboratory. The emphasis will be hands-on activities to explore the ecology of disease systems, and we will utilize a One Health framework to guide lectures, field labs, and research projects. Students will apply course concepts to design, conduct, and present small group research projects.

Learning Outcomes- ENTO/VIBS 489

- Demonstrate field and lab techniques used to study vector-borne disease.
- Identify vectors of disease.
- Relate the relevance of vector-borne diseases to the One Health initiative.
- Design a course project from 'start to finish', including data collection in the field and lab and dissemination of results to an audience.

Additional Learning Outcomes- ENTO/VIBS 689

- Evaluate published studies in a research area.
- Produce a manuscript based on original research that is suitable for peer-review and publication in a scientific journal.

Co-Instructors

Gabriel L. Hamer MS PhD
Clinical Assistant Professor
hamerlab.tamu.edu/index.html
Dept. Entomology
Email: ghamer@tamu.edu
Office: 319 Heep Center
Phone: (979) 862-4067

Sarah A. Hamer MS PhD DVM
Assistant Professor
vetmed.tamu.edu/faculty/hamer-lab
Dept. Veterinary Integrative Biosciences
Email: shamer@cvm.tamu.edu
Office: 276 Vet Med Research Bldg.
Phone: (979) 847-5693

Enrollment

Due to enrollment capacity of 15, enrollment is exclusively though an application process. Instructors will select enrollees based on:

1. Ratio of undergrad/graduate students to facilitate projects
2. Diversity of majors to provide complementary expertise and allow a focus on One Health
3. Career aspirations
4. Flexibility to participate in activities outside lecture/lab

Materials

Required Text: None
Readings: Available electronically through eCampus website
Notebooks: Two notebooks are required (one for field, one for lab)

Disease Detective Course Project

Students will select one of three pre-determined research topics and engage in hypothesis generation and study design, field-based sample collection, lab-based molecular diagnostics, and data analysis throughout the semester. Projects will be conducted in small groups with a graduate student leader. Teams will prepare an oral presentation to deliver at the end of the semester. Additionally, graduate students will prepare a manuscript including literature review. In some cases, these manuscripts could be submitted for publication, pending contributions of students beyond the expectations of the semester-long course.

Field Research Experiences

A series of field-based experiences are planned to expose students to vector and host populations in their natural environments. Because these experiences will include hands-on processing of vertebrate species (wild birds, rodents, etc), all students will be required to complete animal use trainings as required by the TAMU Institutional Animal Use and Care Committee (IACUC). Due to activity patterns of vectors and hosts, and travel to various field sites, not all such experiences can be attained within the restraints of regularly-scheduled class periods. Accordingly, some experiences will require meeting at night, early morning, or during weekends. Prior to any off-campus activity, students will be required to complete travel authorization forms with emergency contact information, and instructors will attain approval of department heads. Additionally, students will register with the Biosafety and Occupational Health Program and complete Blood-borne Pathogen Training.

Photo Policy

We want you to enjoy the hands-on field and lab work we will conduct this semester, and we invite you to take photographs of your experiences to share with others. While all the work we do will uphold to strict protocols and humane treatment of animals, some photos taken out of context may be confusing to those not involved with our class. Therefore, you must obtain oral or written consent from instructors before distributing or posting to social media any photos taken of class activities.

Laboratory Research Experiences

Analysis of field-collected biological specimens in vector-borne disease ecology research often occurs within the laboratory. Students will gain proficiency with common research techniques and laboratory equipment used to study vectors and pathogens. Because the biological samples with which we will work pose health risks, all students will be required to complete Biosafety Level 2 training.

Career Opportunity Guest Lectures

Guest lectures are planned to feature different professionals who focus in vector-borne diseases. Invited speakers may include medical entomologists or zoonosis control veterinarians from the state health department, military entomologists, academic researchers with expertise in particular disease systems, or others. Each guest speaker will show the real-world application of the concepts learned in class, and asked to share their educational background and career path.

Evaluation: A=90–100; B=80–89; C=70–79; D=60–69; F=<60

ENTO/VIBS 489: A total of 200 points are available
ENTO/VIBS 689: A total of 300 points are available

- **Attendance and participation in class discussions (25 pts), quizzes (50 pts); maintenance of field/lab notebooks (25 pts)**
- **Disease Detective course project (100 pts)**
- **Manuscript preparation (graduate students only) (100 pts)**

Attendance

Both the university and instructors view class attendance as an individual student responsibility. Your grade will be based in part by attendance and participation. Make-up experiences/assignments for class activities that occur outside the scheduled meeting times will be available within reason. Absences will be excused as per TAMU Student Rule #7 (http://student-rules.tamu.edu/rule07).

ADA Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statue that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

Academic Integrity Statement

The Texas A&M University Honor Code, based on the long-standing affirmation that "An Aggie does not lie, cheat, or steal or tolerate those who do" is fundamental to the value of the A&M learning experience and requires that Aggies will not involve themselves in any form of academic dishonesty. According to the Office of the Aggie Honor System, academic dishonesty consists of cheating, fabrication, falsification, multiple submission, plagiarism, and multiplicity. Clarification of each of actions may be found at the Aggie Honor System website at http://www.tamu.edu/aggiehonor. This list, however, is not exclusive of any other acts that may reasonably be termed academic dishonesty. The penalty for a violation of academic dishonesty in this class shall be an "F" in the course and filing of an Honor Code Violation Report with the Office of the Aggie Honor System. Less severe penalties may be imposed if the circumstances warrant

SCHEDULE IS SUBJECT TO CHANGE

Week	Date	Lecture/Lab Topics	Outside of classroom activities

1	Wed Jan 21	• Introductions
		• Course overview
		• Presentation of group project topics
		• Compliance
		  • BSL2 training video
		  • Animal Use training web class
		  • Emergency info collected for online form
			BSL2 training:
			Username: biosafety
			Password: fSsz8FKZ
			Video:
			http://mediamatrix.tamu.edu/streams/521371/BL2_with_title
			Animal Use training:
			'Working with the IACUC' course in CITI website; see eCampus for registration details

2	Mon Jan 26	• Biosafety and Occupational Health compliance
		  o Complete BOHP initial screening questionnaire
		  o Blood-borne pathogen training course provided by Sherri Koepnick
		  o Optional form for Hepatitis B vaccination.	

2	Wed Jan 28	• Vector sampling methods	
3	Mon Feb 2	**Field Trip** to Lick Creek Park for avian mist-netting, banding, and blood collection; tick drag sampling	Meet at Lick Creek Park instead of coming to class. Time/car pool to be determined.
3	Wed Feb 4	• **Guest Lecture:** Dr. Edward Wozniak, Regional Public Health Veterinarian, Texas Department of State Health Services. • Vertebrate host sampling • Submit Disease Detective project preference	
4	Mon Feb 9	Identification of major arthropod vectors; microscopy; mounting; dissection	Week of Feb 9- Nighttime grackle trapping off roosts, 8pm start. Date/car pool to be determined.
4	Wed Feb 11	**Field Trip** to Biodiversity Research and Teaching Collections (BRTC) for mammal trapping, blood and tissue collections	Tuesday, Feb 10, evening- set mammal traps at BRTC. Wed, Feb 11- Meet at BRTC instead of coming to class. Time/car pool to be determined.
5	Mon Feb 16	Vector-borne diagnostics: molecular, virology, parasitology and serological diagnostics	
5	Wed Feb 18	• **Quiz 1** • Blood meal Analysis	
6	Mon Feb 23	**Field Trip** to Sam Houston National Forest for tick collections	Sunday, Feb 22 – Mon, Feb 23. Camp at Stubblefield Recreation Area, Sam Houston NF, Huntsville, TX
6	Wed Feb 25	NO CLASS	
7	Mon Mar 2	• Epidemiology • Statistics for population-level analyses	
7	Wed Mar 4	• Spatial Epidemiology • **Guest lecture/lab**: Vence Salvato, Harris County Public Health & Environmental Services: Geographic Information Systems	

8	Mon Mar 9	Flex time; topic to be determined	
8	Wed Mar 11	**Guest Lecture:** 9:45-10:50: Dr. David Florin, State Medical Entomologist, Texas Department of State Health Services	
9	*Mar 16-20*	*SPRING BREAK*	
10	Mon Mar 23	• Epidemiological modeling • Vectorial capacity	
10	Wed Mar 25	**Guest Lecture**: Dr. Walt Cook, Wildlife Veterinarian and Clinical Associate Professor in Veterinary Pathobiology, TAMU. Topic: Perspectives from a former state wildlife veterinarian on vector-borne diseases including blue tongue virus	
11	Mon Mar 30	• **Quiz 2** • Chemical immobilization of wildlife	
APRIL SCHEDULE IS TO BE DETERMINED. WILL INCLUDE FLEX TIME FOR DISEASE DETECTIVES PROJECTS, including field and laboratory work and manuscript preparation.			
Guest lectures to be scheduled: • LTC Anthony Schuster PhD, Command Entomologist, US Army Medical Command at Fort Sam Houston, TX. • Dr. Nick Komar, Biologist, Arbovirus Disease Branch, CDC-NCEZID Division of Vector-borne Disease, Ft. Collins, CO **Local field activities to be scheduled during class time:** • Radio-telemetry of insects			**Field trips to be scheduled**: • Overnight trip to The Nature Conservancy's Clive Runnells Family Mad Island Marsh Preserve in Matagorda County, TX for assessment of exotic ticks arriving on spring migratory birds. • Mosquito trapping at local sites using different trap types • Field and Lab work associated with Disease Detective Projects
11	Wed Apr 1		
12	Mon Apr 6		
12	Wed Apr 8		
13	Mon Apr 13		
13	Wed Apr 15		
14	Mon Apr 20		
14	Wed Apr 22		
15	Mon Apr 27	**Quiz 3**	
15	Wed Apr 29	Course Evaluations; Presentation of Disease Detective Research Projects	
16	May 4-8	Prep/Reading Days- No class meeting	

******There will be NO FINAL EXAM during finals week for ENTO/VIBS 489/689*****