

Advanced Mosquito Identification

ENY – 6591C

3 Credits

Instructor: Dr. Roxanne Connelly
Florida Medical Entomology Laboratory (FMEL) Research & Education Center
200 9th Street SE
Vero Beach, FL 32962
Tel. 772-778-7200 x. 172
email: crr@ufl.edu
Office: Room 112, FMEL

Office Hours: By appointment, Skype or email

Course Description: This 2-week course will provide intensive, hands-on training on the identification of adult and larval mosquitoes.

The course is co-taught as a senior-level undergraduate and a first year graduate level course. Graduate students are required to demonstrate advanced study beyond what is expected of the undergraduates through more rigorous test questions, additional readings in non-revolving and rotating reading assignments, participation in discussion sessions, and one species essay.

Course Objectives: Students will demonstrate their understanding of mosquito morphology terminology and their ability to recognize morphological features on adult and larval mosquito species that occur in North America through identification exercises. The training will enable students to complete a comprehensive practical laboratory and written examination at the conclusion of the course. Students will learn to develop an extension document, suitable for mosquito stakeholder groups and the importance of writing to a lay audience.

Course Goals:

1. Train students to use mosquito taxonomic keys to identify adult female and larval mosquitoes.
2. Train students to recognize morphological features used to identify adult female and larval mosquitoes that occur in North America.
3. By the end of the course, students will have identified and recognize the 12 mosquito genera and a minimum of 50 species that occur in North America, north of Mexico.

Required Textbook: Identification and Geographic Distribution of the Mosquitoes of North America, North of Mexico. 2005. Richard F. Darsie and Ronald A. Ward. University Press of Florida. Gainesville, FL.

Course Location: The course will be offered at the Florida Medical Entomology Laboratory in Vero Beach, FL.

Prerequisites: ENY 3005 or ENY 4161. Students must have basic knowledge of mosquito morphology; experience and familiarity with binocular and compound microscopes and the use of taxonomic identification keys.

Grading:

There is one written test and one lab test at the end of the two-week course. The written test will be closed-book and include questions on mosquito morphology, larval habitats, and mosquito taxonomy as well as from guest lectures. The lab test will be open-book and will include 5 adult and 5 larval mosquito specimens that must be identified to species in the allotted time frame; partial credit is given as long as the work is shown in detail.

Lecture attendance is mandatory and one point is awarded for each lecture attended (5% of final grade).

Additional readings are required above what is expected of undergraduate students. All articles will be provided in a PDF through email to each student at the beginning of the semester. Assigned readings will be discussed on Wednesday evenings of each of the two weeks on on-site instruction; participation in the discussion is mandatory and will be graded. Knowledge of the assigned readings will be assessed on the written test. Readings will include current research articles (to be assigned each year) related to mosquito taxonomy and systematics, as well as three review articles in the same subject area (listed below).

Students will be required to write one essay on a species selected by the instructor; the essay will follow the format of the Entomology and Nematology Departments Featured Creatures documents (<http://entnemdept.ufl.edu/creatures/>). Instructions for completing this assignment and the rubric for grading will be provided in class. The final draft of the essay is due April 30.

Non-revolving reading assignments:

Harbach RE. 2007. The Culicidae (Diptera): a review of taxonomy, classification and phylogeny. *Zootaxa*. 1668:591-638.

Reinert JF. 2000. New classification for the composite genus *Aedes* (Diptera: Culicidae: Aedini), elevation of subgenus *Ochlerotatus* to generic rank, reclassification of the other subgenera, and notes on certain subgenera and species. *Journal of the American Mosquito Control Association*. 16(3):175-188.

Rozeboom LE. 1962. Taxonomy concerning mosquito populations. *The Journal of Parasitology*. 48(5):664-670.

Examples of rotating/current reading assignments:

Blosser EM, Lounibos LP. 2012. Florida's Frog-biting Mosquitoes. *WingBeats*. Spring 2012; 23(1):5-12.

Nielsen LT. 2012. The mosquitoes and Chaoborids of Glacier and Yellowstone National Parks with new records and *Ochlerotatus nevadensis*, a new state record for Montana. *Journal of the American Mosquito Control Association*. 23(1):6-8.

Letter grades correspond to the numerical score as follows:

90% - 100% A
87% - 89.99% B+
80% - 86.99% B
77% - 79.99% C+
70% - 76.99% C
67% - 69.99% D
0 - 66.99% E

There will be no D+ and no minus (-) grades awarded.

	POINTS	PERCENT OF FINAL GRADE
LAB TEST	100	20%
LECTURE TEST	100	65%
LECTURE ATTENDANCE	12	5%

DISCUSSION PARTICIPATION	20	5%
SPECIES ESSAY	50	5%
TOTAL	282	100%

Grades and Grade Points

For additional information on current UF grading policies, see:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Class Attendance: Class attendance for lectures is mandatory. There is a large proportion of class time spent at the microscope working through the steps of identification; the amount of time spent in the lab at the microscope is up to the student. The instructors may recommend that students spend more time in lab based on a continuing evaluation of progress during the two weeks.

Tests and Make-up tests: The tests are given on the last day of class. The written test begins at 8:00 a.m. and ends promptly at 9:00 a.m. The lab practical begins at 9:00 a.m. and ends promptly at 12:00 p.m. No make-up tests will be provided except in the occurrence of a University-approved absence, family or medical emergency or court imposed legal obligations where the student must leave Vero Beach. In the event of such an emergency, arrangements will be made accordingly.

Class Demeanor: Students are expected to arrive on time for lectures, to refrain from using cell phones and text messaging during lectures; during lab time when students are studying specimens under the microscope, students are expected to take cell phone calls outside of the lab and to keep discussions to a level such as not to bother others.

Course Schedule:

Meeting Date	Organization (time)	Topic
March 04	LECTURE: 2 hours	Use of taxonomic keys; Errata for textbook; Use and set-up of compound and dissecting microscopes; Overview of mosquito genera and adult morphology
	LAB: 2 hours	Lab: Study of <i>Psorophora ciliata</i> Pre- and post- spiracular setae
	LAB: 4 hours	Lab: Identify adult female mosquitoes to genus
March 05	LECTURE: 2 hours	Overview of mosquito larvae morphology
	LAB: 3 hours	Lab: Identify larval mosquitoes to genus; How to make slide mounts of mosquito larvae; Techniques for collecting mosquito larvae
	LAB: 3 hours	Lab: Identify unknown mosquito adults and larvae to genus
March 06	LECTURE: 2 hours	Introduction to identification of <i>Aedes</i> adults
	LAB: 6 hours	Lab: Review <i>Aedes spp.</i> adult mosquitoes
March 07	LECTURE: 2 hours	Introduction to identification of <i>Aedes spp.</i> larvae
	LAB: 6 hours	Lab: Review of <i>Aedes spp.</i> larvae, identify unknown <i>Aedes spp.</i>
March 08	LECTURE: 1 hour	Introduction to <i>Anopheles</i> adults
	LAB: 1 hour	Lab: Review of <i>Anopheles</i> adults
	LAB: 1 hour	Lab: Tour of the Indian River Mosquito Control District; overview of identification activities at the district
	LECTURE: 1 hour	Mosquito-borne diseases in the Southeastern United States
	LAB: 3 hours	Lab: Identification on unknown <i>Anopheles</i> adults
March 11	LECTURE: 1 hour	Introduction to identification of <i>Anopheles</i> larvae
	LAB: 3 hours	Lab/Field: Mosquito collections at wastewater wetlands
	LAB: 4 hours	Lab: Identification of known and unknown <i>Anopheles</i> larvae
March 12	LECTURE: 1 hour	Introduction to identification of <i>Culex spp.</i> adults
	LAB: 3 hours	Lab: Identification of known and unknown <i>Culex spp.</i> adults
	LECTURE: 1 hour	Introduction to identification of <i>Culex</i> larvae
	LAB: 3 hours	Lab: Identification of known and unknown <i>Culex spp.</i> larvae
March 13	LECTURE: 1 hour	Guest lecture – varied topics: Modeling of mosquito-borne disease; IPM in mosquito control
	LECTURE: 1 hour	Introduction to minor genera adult mosquitoes
	LAB: 3 hour	Lab: Identification of known and unknown adults of minor genera
	LECTURE: 1 hour	Introduction to minor genera larval mosquitoes
	LAB: 3 hours	Lab: Identification of known and unknown larvae of minor genera
March 14	LAB: 4 hours	Lab: Parity dissections, midgut dissections, salivary gland dissections
	LAB: 4 hours	Lab: Review of all specimens, species, life stages
March 15	8:00 AM - Noon	Lecture Test and Laboratory Practical

Academic Honesty, Software Use, Campus Helping Resources, Services for Students with Disabilities

Academic Honesty

In 1995 the UF student body enacted an [honor code](#) and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: **"On my honor, I have neither given nor received unauthorized aid in doing this assignment."**

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office.

(Source: 2011-2012 Undergraduate Catalog)

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

Software Use:

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library

Training Programs

Community Provider Database

- *Career Resource Center*, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Plagiarism

Plagiarism is unethical, unacceptable in science, and prohibited by the UF Student Honor Code (<http://www.dso.ufl.edu/sccr/honorcodes/honorcode.php>). The consequences for plagiarism while at the University of Florida range from receiving a grade of zero for the plagiarized assignment or a failing grade for the course, to, for repeated offenses, expulsion from the university. Plagiarism after graduate training calls into question one's scientific integrity and can lead to banning of publication in journals and the loss of jobs/careers.

In some countries, it is an acceptable practice to write in a manner that faculty members at the University of Florida consider to be plagiarism. Students studying in our university and with plans to publish their research in the English language need to know what plagiarism is and how to avoid it.

Students who plagiarize will be caught and consequences will be applied.

For further information and examples of plagiarism, consult Guide to Plagiarism at http://www.uflib.ufl.edu/msl/services/tutorials/plagiarism/student_intro.html