

ENTOMOL 597A: Insect-Plant Interactions (Special Topics) 3 credits, Fall 2005

Instructor: Dr. Lynn Adler, lsadler@ent.umass.edu, 5-1060, 204C Fernald Hall

Time schedule: TBA; with community service

Prerequisites: Introductory ecology and introductory statistics or experimental design suggested

Office hours: TBA

Website: <https://webct.oit.umass.edu>

Course Description: This course will cover the ecology and evolution of insect-plant interactions in basic and applied contexts. The interactions between insects and plants are of fundamental importance to the structure and function of natural ecosystems, the management of invasive species, and decisions regarding the use of biological control agents and genetically-modified crops. We will use these interactions as models to empirically explore the concepts and general principles covered in population and community ecology courses. Using formal lectures, interactive discussions, and readings from the primary literature, this course will examine all major classes of insect-plant interactions and their consequences at multiple hierarchical levels.

Readings: We will read 1-2 papers per class, mostly from the primary literature. These readings will be posted 2 weeks before class on the course website. If an electronic version is not available, readings will be handed out at least one week in advance.

Grading scheme: Grade will be based on:

- three written take-home exams (15% each)
- one written paper on a topic selected by the student with instructor's permission (15%)
- a 'teaching' presentation and leading discussion on one of the course topics (20%)
- 12 hours of CSL including journal entries (10%)
- writing discussion questions for lectures (5%)
- class participation (5%)

Grading details

General. Take home exams and the paper are due in class. Submit both a hard copy and an electronic version (can be emailed or handed in on disk).

Presentations. Students will each lead one lecture/discussion. Three choices from the syllabus (Oct 4 and later) are due on Sept 15. Students are required to meet with me to discuss their presentation at least 2 lectures before it is planned; presentations should be based on 10 citations and be structured as a 'teaching' lecture of ~25 minutes. I will provide written feedback.

Papers. Papers can be written on the same topic as the presentation. A one-paragraph description of the topic is due in class by Nov 27. Final papers should be 7 - 10 double-spaced pages of text and include at least 10 citations (not counted in page limits). Papers should (1) review the current literature on the selected topic and (2) identify a novel question in this topic, explain why it is an important question to address, and provide a brief (less than two pages) description of how to address it.

CSL component. This is a Community Service Learning (CSL) class. The goal is for students to gain hands-on learning experience through providing service to their community. In this case, we ask each student to volunteer 12 hours at the Hampshire Farm Center. Service should be completed by November 1.

The first week of volunteer service will be divided into two guided groups from 1-4 pm on Weds Sept 14 and Friday Sept 16. We will provide van transportation; meet at 12:40 in the Lot 62 parking lot.

We will meet Nancy Hanson, who will be your regular contact person for volunteer work, and Brian Schultz, who is on the Hampshire College faculty and conducts research at the farm. We will assist in data collection for an experiment controlling leafhopper damage on 3 potato varieties. This will count as your first 3 hours of service.

Following the first week, students can volunteer individually. Bus transportation is available (see handout). Volunteer time slots are Monday 1-4 pm, Tues 7-10 am, Thurs 1-4 pm, or Friday 7-10 am. *Ask Nancy to sign your journal at each visit to verify your service times.*

Students should keep a brief journal documenting at least 5 plant-insect interactions observed at the farm. These can include a variety of types of herbivory (to leaves, stems, fruits, roots, etc.), predation, parasitism, pollination, or other mutualisms (such as ants tending aphids). Bring tupperware or film containers to collect insect samples based on your observations. If you freeze these, they can be brought to class and pinned for a group discussion.

Directions to the Farm: From downtown Amherst, head S on 116 (S. Pleasant). Pass the businesses of South Amherst. Pass the Hampshire Farm Center sign and the admissions office and turn right at the main Hampshire College sign. Turn right at the stop sign. Park in the 2nd lot on the right (Greenwich Lot). You do not need a parking pass. Take the path at the right corner of the lot to the path intersection, which is the meeting point. Alternatively, you can turn right from 116S into the parking lot at the Hampshire Farm Center and walk down the path to the meeting point.

Class participation and discussion questions. Three discussion questions based on the reading are due in every class from Oct 4 through Dec 13. Class participation will be based on attendance and willingness to discuss material.

Course Outline

Lecture	Topic	Due dates
Sept 8	Introduction to Insect-Plant Interactions	
Sept 13	Review of Natural Selection, Species Interactions	
	Mostly Herbivory	
Sept 15	Herbivores as Selective Agents	
Sept 20	Mechanisms and Theories of Plant Resistance	Discussion choices due
Sept 22	Induced Resistance and Costs of Resistance	Note: Lynn out, Dr. Toby Kiers teaches
Sept 27	Plant Defenses as Selective Agents and Herbivore Offense	Paper topics due
Sept 29	Evolution of Herbivore Diet Breadth	
Oct 4	Herbivore Population Growth	Discussion questions due every lecture starting today
Oct 6	Theories of Coevolution- Herbivory	1 st Exam handed out
Oct 11	Multitrophic Interactions and Trophic Cascades	
Oct 13	Omnivory	1 st Exam due
Oct 18	Community-Level Processes - Herbivory	
	Mostly mutualisms	
Oct 20	Pollination I – Plant Perspective	
Oct 25	Pollination II – Pollinator Perspective	
Oct 27	Floral Antagonists and Cheating “Mutualists”	
Nov 1	Seed Dispersal and Plant Population Genetic Structure	CSL service done; journals due
Nov 3	Seed Predation and CSL discussion	Bring insects
Nov 8	Theories of Coevolution - Mutualism and Conditionality	2 nd Exam handed out Note: Lynn out, Dr. Nina Theis teaches
Nov 10	Community-Level Processes - Pollination	
Nov 15	Ant-Plant Interactions	2 nd Exam due
	Applications: Agriculture and Conservation	
Nov 17	Biological Control in Agriculture I	
Nov 22	Biological Control in Agriculture II	
Nov 24	No class; Thanksgiving	
Nov 29	Pollination in Agricultural Systems	
Dec 1	GM Plants and Herbivory	
Dec 6	GM Plants and Pollination	
Dec 8	Species Invasions	Paper due; 3 rd Exam handed out
Dec 13	Endangered plants, herbivory and pollination	Papers returned
Dec 15		3 rd Exam due
Dec 23		Grades available by email