Agroecology of Vegetable Crops
PSS 124
4 credits

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Lecture: TTh 10:00-11:15, L/L 102
Lab: Fri 9:35-12:40, Jeffords 101
Office Hours: Mondays 11-12, or by appointment

Course description
The course will introduce students to the agroecology of vegetable cropping systems, and current trends in organic and conventional vegetable production. Prerequisite: PSS 10, 21, 1 semester of biology, or by permission of the instructor.

Course overview
This course is designed to encourage students to think critically about the ecology of agricultural systems and evaluate how ecological factors may interact in complex ways to influence biodiversity, pest management, and yield. We will focus on answering the following questions: 1) How do species interactions differ between conventional and organic farms? 2) Why are they different? 3) How can we use ecological knowledge to improve the management of vegetable agroecosystems? Students will be guided in reading research articles and reviews, and extension publications. Within the laboratory section, students will gain hands-on experience on how to conduct laboratory and field research studies.

Course Objectives
1. To gain skills in critical thinking on how the ecology of conventional and organic agricultural systems differ.
2. To gain an appreciation of the complexity of ecological species interactions within agricultural systems
3. To gain an understanding of how ecological interactions can be exploited for sustainable agriculture

Required readings
Articles will be posted on Blackboard (http://uvm.blackboard.com)

Course Evaluation
The grading scale will proceed as follows: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F ≤ 60% of total points. I do not scale grades and extra credit is not available.

Late Policy: I highly value student effort and timeliness. Three points will be deducted for each day that an assignment is late (homework assignments and term paper).

Last day for add/drop, audit, pass/no pass changes: January 31, 2013
Last day to withdraw: April 4, 2013
Grading:

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Expectations

1. I expect students to arrive on time to class. Unexcused tardiness or absences could result in a downgrading of your final course grade.
2. I expect students to be courteous and respectful, and follow the UVM student code of conduct.
3. Students are expected to read the readings **before** class so that you can effectively participate in the class and understand the material.
4. No cell phone or laptop use in the classroom. Cell phone ringers are expected to be off, and texting is not allowed.
5. Any cheating or misconduct will result in disciplinary action.

Additional Resources and Support Services

- ALANA Student Services
- Academic Calendars
- Academic Support Services
- Bookstore, UVM
- Career Services
- Catalogues, University
- Center for Health & Wellbeing
- Counseling Services
- Honors Program
- College of Arts and Sciences (John Dewey)
- Honors Program, School of Natural Resources (Undergraduate Honors Program and Lola Aiken Scholars Program)
- International Student Advising
- Learning Cooperative
- Libraries, University
- Registrar's Office
- Residential Life
- Study Abroad
Course Readings


Assignments

1. General Homework directions (4 points each = total 48 points)
   All homework should be turned in as hard copies. The writing can be done by hand or typed.
   The following lists the general homework questions that should precede the article-specific questions.
   a) Write down all the concepts and terms that you are unfamiliar with. Look up the terms that you don’t know. Does this improve your understanding of the concept?
   b) What are the important points in the data?
   c) All other questions will be posted as homework on Blackboard.

2. Student presentations
   You will sign up at the beginning of the class to give a short (5 min.) information update on a topic.
   1. Discuss your approach to the topic with me. We will identify an outstanding question to address.
   2. Conduct short literature review. Within Web of Science, find the most relevant and most cited articles associated with the topic.
   3. Synthesize the information for the class. What are the most important points that are relevant to the focus on agroecology?
   4. Present a short, clear, and interesting talk (5 min.). Your classmates will help to evaluate your presentation.

3. Scientific Critique of the Organic Gardening literature (100 points) – Deadline April 4
   Outline – Due 3/1
   Critical thinking is a habit of mind characterized by the exploration of issues, ideas, evidence, and events before accepting or formulating an opinion or conclusion. I expect you to use your new research skills to go into the scientific literature find evidence that either supports or disagree with the statement. You can also use the approach to straddle the fence and argue both pros and cons.
   Pick a passage provided excerpts from the book Carrots love tomatoes by Louise Riotte. All of your major points should cite peer-reviewed sources. Write your response as a 6-8 page narrative, listing the following questions, and directly responding to them below.
   The critique should be written in the format of a scientific research review using the following format:
   1. Present the author’s case. What does “good” mean”? How much evidence does the author state supporting this phenomenon? Is it personal experience? Research? What kind of research? Read into what the author is saying and guess at the level of involvement that generated their conclusions.
      a. Translate the author’s writing into scientific language.
      b. generate a testable hypothesis
   2. Do you agree, disagree, or doubt the statement? Explain your position and discuss the points that seem to be supported or contraindicated by the scientific literature?
4. How generalizable do you think your assessment is? Under what kind of conditions may this be true or untrue?

5. Design a study that would specifically test the question at hand
   - Restate the hypothesis
   - Discuss your assumptions in your design
   - How would you test it?
   - Discuss any challenges or potential issues with the design.

6. References
   - Format your references according the style used by Agriculture, Ecosystems, and Environment
   - Use a minimum 8 peer-reviewed journal articles

4. Agroecological Crop Management Recommendation (100 points) – Deadline April 30

In the exercise, you will play the role of a county extension agent, to explain to a grower why a particular technique will work. The grower tends to be doubtful around new techniques, but is won over by a well-researched presentation. Choose a vegetable crop from the New York State Integrated Pest Management Program from the following web address (http://nysipm.cornell.edu/organic_guide/). Write the first part as a short mini-review for a scientific audience on the ecological basis of why a particular phenomenon should work. In the last section, summarize your arguments in change your writing style to write to the lay public.

Written (70 points)
1. Select a recommendation from a single production guide for organic production.
   - Examples (Trichoderma harzianum should reduce Rhizoctonia in carrots).
2. Do you think the method is effective? Describe how a particular method should affect crop production by reviewing the available literature. Conduct searches within Web of Science to review the efficacy of the recommendation. Cite primary literature to support your main arguments.
3. Answer the following questions:
   - Under what conditions should this technique be effective?
   - How effective is the technique?
   - What other factors strongly influence its efficacy?
3. As an extension agent, distill your review of the agroecological literature into an explanation for a lay person. This means that you should write an easily understandable explanation for how this recommendation should work.

References
   - Format your references according the style used by Agriculture, Ecosystems, and Environment
   - Use a minimum 8 peer-reviewed journal articles

Oral presentation (30 points) – last two class days
Prepare a 10 minute presentation (5 min for Q&A) as an extension agent. Your audience is a group of vegetable growers.
1. Distill your review down to the main points.
2. Answer all of the questions posed under the written assignment directions.
3. Remember that 1 slide = 1 min, so try to focus on the main points that a grower would care about.
4. Grading will follow the Student presentation rubric.
1. What are you hoping to learn in this course? What are your expectations?

2. List all of your previous courses in biology, ecology, or agriculture.

3. Do you have any topical interests that are not listed in the covered topics?

4. What aspects around the agroecology of vegetable cropping systems are you most interested in? (Plant pathology, pest management, breeding, yield, etc...)

5. Check the concepts that you are familiar with, put a ? if you have never heard of it before:
   - Cation exchange capacity
   - Monoculture
   - Nitrogen cycle
   - Organic chemistry
   - Predator-prey interactions
   - Plant defense
   - Pollen limitation
   - Source-sink relationships
   - Induced resistance
   - Describe other topics that you are familiar with here
   - Semiochemicals
   - Eutrophication