Organic Food Crop Production
Tentative Syllabus
Department of Tropical Plant and Soil Science
University of Hawaii

Instructor: Dr. Ted Radovich
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Prerequisites: None


Course Description and Objectives:
This lecture/laboratory is intended to provide a science-based overview of the ecological processes that are relied on in organic agricultural systems. Emphasis will be placed on management strategies for vegetable production. The general objectives of this course include:

1. Develop in students an understanding of certified organic agricultural systems, including the challenges associated with making them sustainable, and how they differ from other systems designed to improve agricultural sustainability.

2. Engage students in hands-on learning of strategies designed to maximize the efficacy of biological cycles within the farm and garden in order to optimize the economic, environmental and social sustainability of the food production system.

3. Facilitate the development of independent research, thought, and problem solving processes with regard to organic vegetable production.

Course Format (2 credit):

Each lab period will generally be initiated by a brief introductory lecture. The remaining period will be devoted to the students acquiring hands-on experience in organic vegetable production and experimentation, field trips to better acquaint the students with commercial aspects of organic vegetable production, and discussion of student garden projects.

Student reports and presentations:
Each student will be responsible write a 5-10 page review of a topic of the student’s choosing, subject to the instructor’s approval.

The written portion of the report should follow the format below, unless otherwise cleared with the instructor:

Introduction- Clearly introduces the subject, its importance and what the student plans to assert.
Results and Discussion- Summarize the information available and discuss what it means to the student.
Conclusion- Clearly states the student’s conclusion and its implications.
References- Consistently follows a conventional format and contains all the references cited in the paper and only those. They should be accurate and allow others to locate the reference. Students should cite at least 5 references and references should not be exclusively websites.

The student will also be responsible for a short (~5 min) oral presentation of their report to the class.

Grading:
Grading is based on a combination of quizzes (20%), a final exam (20%), lab journal and field trip reports (40%), a report and presentation (10%) and participation (10%). Garden plots will be allocated to lab groups at the Magoon Greenhouse Facility.

- **A**: \( \geq 90\% \)
- **B**: \( \geq 80\% \) and \(< 90\% \)
- **C**: \( \geq 70\% \) and \(< 80\% \)
- **D**: \( \geq 60\% \) and \(< 70\% \)
- **F**: \( \leq 60\% \)

All students are expected to attend all labs. More than three absences will result in loss of all class participation points (10% of course grade).

**TPSS 220 Course Content and Tentative Schedule**

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<th>Meeting</th>
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| 1       | **Lec.** Introduction to General Organic Principles  
**Lab:** Experimental design and research plot establishment; |
| 2       | **Lec.** The agroecosystem: plant-environment interactions  
**Lab:** Effect of microclimate on plant growth; Students will utilize growth chambers and quantitative measures (germination rate, biomass production etc.) to observe the independent and interactive effects of biotic and abiotic growth factors on plant development. |
| 3       | Field evaluation: Students will observe whole system approaches to farm management on a certified organic farm. Student reports of the visit will evaluate the influence of farm location, crop type, market demands and other factors on day-to-day farm operations and long term planning. |
| 4       | **Lec.** Soil health and fertility I  
**Lab:** Rhizobia and mycorhizae; Students will learn basic soil microbiology theory and application and conduct a series of bioassays to quantify the benefits of mutualism. Legumes will be inoculated with rhizobia and plant response will be quantified via nodule counts, biomass production etc. |
| 5       | **Lec.** Soil health and fertility II  
**Lab:** Organic fertilizer evaluation; Students will use calibration mathematics to calculate fertilizer application rates on the small (m²) and large (hectare) scale. Crop response to various organic fertilizers will be quantified. |
| 6       | **Lec.** Pest control  
**Lab:** Organic pesticides; Students will observe the links between plant metabolites and insecticidal activity by deriving botanical extracts and comparing their efficacy against insect pests with comparable commercial products. Students will also use calibration mathematics to calculate pesticide application rates on the small (m²) and large (hectare) scale. |
| 7       | **Lecture:** Weed control  
**Lab:** Mulch systems; students will utilize time domain reflectometry, infra-red thermometry and other technology to quantify the influence of various organic and synthetic mulch materials on important components of the agroecosystem, including soil temperature and moisture content, light interception, and weed seed germination. |
**Field evaluation:** Students will visit an operating organic operation to evaluate integrated pest management strategies. Students will discuss strengths and weaknesses of observed programs.

**Lec.:** Harvest, Marketing  
**Lab:** Local food market analysis; Students will survey local retail produce sites (farmer markets, small groceries, supermarkets) to determine what is available, where it comes from, how it is grown and what it costs. This information will be used to construct a picture of the local food market and how market forces may influence agricultural practices.

**Lec.:** Vegetables and melons  
**Lab:** Data collection and analysis for fertilizer trial (Class meeting #5)

**Lec.:** Economic viability  
**Lab:** Cost of production; Students will learn to establish a minimum commodity selling price by calculating cost of organic production for selected commodities. Students will learn to identify variable costs, fixed costs, and relate cost of production to local market analysis (class meeting #9).

**Lec.:** Herbs and medicinals  
**Lab:** Data collection and analysis for mulch trial (Class meeting #7)

**Lec.:** Fruits  
**Field evaluation:** Students will observe whole system approaches to fruit tree management on a certified orchard. Student reports of the visit will evaluate the strengths and weaknesses of farm management approaches.

**Lec.:** Grains  
**Lab:** Irrigation technology and techniques

**Individual student presentations**

**FINAL EXAM**