HORT 52H: HORTICULTURE PRACTICES: INTEGRATED PEST MANAGEMENT

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2024
Units:	3
Hours:	2 lecture, 3 laboratory per week (60 total per quarter)
Advisory:	Completion of or concurrent enrollment in HORT 15 strongly recommended.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- Identify various plant diseases, insects, and weeds.
- Demonstrate skills in developing integrated pest management plans.

Description

Problems of and control solutions for diseases, insects, and weeds in landscapes and gardens. Ecologically based Integrated Pest Management (IPM) practices for handling plant pathogens, insect infestations, and unwanted vegetation. Emphasis on identification, life cycles, and symptoms of diseases, insects, and weeds.

Course Objectives

The student will be able to:

1. Analyze the environmental and economic conditions that have led to pest problems.
2. Review pest characteristics, such as anatomy, physiology, and identification.
3. Integrate pest management control strategies (tools and techniques).
4. Utilize monitoring, sampling methods, and protocols for decision-making.
5. Examine selection criteria and formulate an IPM/EBPM program.
6. Discuss health issues with pesticide use, including degradation, risk vs. hazards, reduction of risk, and reduction of pesticide impacts on non-target organisms.
7. Communicate with clients and educate them on the benefits and shortcomings of an IPM program.
8. Examine pest control from different cultural backgrounds.

Course Content

1. Creation of pest problems (ecological and economic foundation)
    a. Insect pest biology and identification
    b. Insect population growth and natural control factors
    c. Equilibrium level
    d. Carrying capacity, economic injury level, and economic threshold
    e. Equilibrium population density
    f. R and K strategies
2. Review pest characteristics
    a. Plant pathogen biology and identification
        i. Pathogen structures (fungi, bacteria, viruses, etc.)
        ii. Pathogen physiology: the infestation process
    b. Pathogen identification
        i. Pathogen sample collection and preparation
        ii. Diagnosis
    c. Insect biology
        i. Functional role of insects
        ii. Insect morphology and physiology
        iii. The insect pest concept
    d. Beneficial organisms (parasitic and predatory insects and nematodes)
    e. Plant morphology and biology
        i. Plant structure
        ii. Plant physiology
        iii. Physiology of plant reproduction
    f. Plant identification (sample collection and preparation)
    g. Ecology and control of plant pathogens, insects, and invasive plants
        i. How a microbe becomes a pathogen: dissemination of plant pathogens
        ii. How insects become pest problems for plants
        iii. How a plant becomes a weed
        iv. Plant health relative to disease and insect infestations
        v. Plant competition and weeds (strategies for weed survival)
        vi. Environmental factors that pre-dispose plants to disease, insect, and weed infestations
        vii. Insect monitoring techniques
        viii. Genetics and insect management
    h. Habitat modification for weed management
        i. Vegetation management techniques
        ii. Reducing propagule load
    i. Quality control of beneficial insects and nematodes
    j. Chemical, biological, and physical control of pathogens, insects, and weeds
    k. Mode of action of pesticides, insecticides, and herbicides
    l. Cultural control of plant pathogens, insects, and weeds
3. Integrated pest management control strategies
    a. Reduction or elimination of pests through environmental modification
        i. Environmental modifications (cultural practices)
        ii. Exclusions
        iii. Monitoring
    b. Biological control
        i. Biological control agents (parasitoids and predators)
        ii. Synthetic chemical pesticides
        iii. Microbial pesticides
        iv. Transgenic plants
        v. Mechanical and physical controls
    c. Chemical control

   d. Integrated Insect Pest Management (IPM)
   e. Ecologically Based Pest Management (EBPM)
4. Insect pest monitoring
   a. Sampling and recording methods
   b. Use of monitoring data and statistical concepts to make IPM decisions
   c. Use of predictive tools in IPM
   d. Pesticide resistance monitoring techniques
5. Design and implementation of IPM and EBPM programs
   a. Planning
   b. Implementing the programs
   c. Health and biological concerns
   d. Cost benefit analysis
6. Risk management in pest management programs
   a. Strategy based
   b. Input based
   c. Regulatory framework
   d. Risk vs. hazard analysis
7. Communication with clients
   a. Client expectations
   b. Production of reports and presentations to educate clients
   c. Presentation of data to clients
   d. Program evaluation and refurbishment
8. Pest control cultural issues
   a. Pest management standards in other countries
   b. Cultural differences regarding use of pesticides

Lab Content

1. Lab instruction using microscopes. Microscopic examination of:
   a. Plant diseases
   b. Plant pests
   c. Weeds having a deleterious affect on the environment or other plants
2. Field work in the collection of representative organisms. Labs focusing on:
   a. Diseases
   b. Plant pests
   c. Weeds
3. Lab demonstrations and practice of pest control mechanisms
   a. Practical application of conventional, organic, and sustainable pest control systems

Special Facilities and/or Equipment

1. Horticultural laboratory, sustainable garden, and related horticultural facilities and equipment.
2. Students provide equipment and supplies to collect and observe diseases, insects, and weeds, including work boots, leather gloves, and clothing for fieldwork.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Term project
Midterm exam
Lab reports
Final examination

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture presentations on IPM
Slide or web presentations which assist in the identification of pests and diseases
Group discussions and examinations of common weeds, diseases, and pests
Classroom discussions and demonstrations of pest control mechanisms
Guest speakers
Field trips

Representative Text(s) and Other Materials

Dreistadt, Steve. Pests of Landscape Trees and Shrubs, An Integrated Pest Management Guide. 2016.

Despite being older than five years, this is a seminal text necessary to presenting IPM.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Reading assignments include reading approximately 30-50 pages per week from assigned text. Supplemental reading is provided in hand-out form or through reference to online resources
2. Lectures address reading topics and experiences of instructor. Classroom discussion and demonstrations in support of lecture topics is provided
3. Guest speakers from industry provide supplemental lecture and demonstration
4. Writing assignments include topical white papers

Discipline(s)

Ornamental Horticulture