

PLS 15: Pest Management Lab Lab Handout (Weeks 2 – 8)

Overview

Students will be organized into “lab groups” of 5 or fewer members. During lab on Week 3, each lab group will be assigned a crop and an associated “*Main Pest*” and one or more “*Other Pests*.” The members of the group will monitor the crop and pests for six weeks and learn about various aspects of the crop/pest ecosystem through their field activities and the literature. There are several individual and group responsibilities and assignments within the seven week project. While there is class (lab) time allocated for field and group activities, additional individual and group time, outside of normal lab periods, will need to be spent on this project.

Field activities will focus mostly on crop and pest observations and monitoring, including collecting associated data. Recording observations and data in a lab notebook is a critical part of this work. Each student must have a 3-ring binder lab notebook which will hold their notes and associated materials. In addition to field activities, there are activities related to understanding more about various aspects of the *Main Pest* and its management and learning how to find information about these topics. In this regard, each student in the group will focus on a different “Pest Management Topic” (PMT) that is relevant to some aspect of the *Main Pest* and its management. The student will gather information from designated types of sources (including practical science-based publications and the scientific research literature) that are related to their PMT and use it to help understand the pest and its management and to complete specific assignments.

Pest Management Topics (PMTs)

Introduction:

Each group will be given one PMT for each member of the group. The group members will decide who will take on each PMT (the results of these decisions will be turned in during lab on Week 4). To complete their individual PMT assignments, each student will gather information from specific types of sources - both practical, applied literature and scientific research literature - that is related to their PMT. (Each student needs to identify two appropriate scientific research information sources and turn in a specific assignment regarding these sources during lab on Week 6). They will use all of the information they gather to help understand the *Main Pest* and its management and complete specific assignments. These assignments culminate during lab on Week 8 when each student will turn in a written assignment and make oral presentations to their lab sections on their PMTs. The assignments are described more fully in the *Weekly Schedule of Activities and Assignments* section (below).

Information Sources:

Students will utilize two distinct, but related *types* of information sources:

1. Practical science-based information sources that have been developed for farmers, pest control advisors and related professionals to provide practical, applied information useful in managing pests. These sources include UC IPM publications and UC IPM web resources [<http://ipm.ucdavis.edu/>] and similar sources from other agricultural universities, government agencies and other organizations. This information will be valuable in designing and carrying out

field observations and monitoring as well as in completing the PMT assignments. The instructors will provide guidance regarding these sources.

2. The scientific literature, including primary research sources that are found in refereed scientific journals, research reports, etc. This literature helps provide the scientific basis for the more practical information (e.g., described in #1, above). The main audience for this literature is the scientific community. Most students need some assistance learning how to access and navigate this literature. Staff from Shields Library will make a presentation during class on April 16 to assist with this. You are encouraged to bring a laptop computer to class on April 16 to get the most out of this activity.

To complete the PMT assignment, each student is required to develop at least two sources from the scientific literature:

1st source: An original research paper from a peer-reviewed scientific journal.

2nd source: One of the following: a. an additional original research paper from a peer-reviewed scientific journal; b. a review article of primary literature sources from a scientific publication; c. a research report from a university, government agency, private research entity, etc. that is not found in a peer-reviewed scientific journal, or similar sources (sometimes referred to as “gray literature”).

Weekly Schedule of Activities and Assignments

Week 2

{In Class} Introduction to IPM practices lecture (~ 20 min. - in lab classroom)

Brief introduction to basics of IPM, including methods of monitoring and record keeping.

{In Class} Individual Assignment: Initial Crop/Pest/Ecosystem Observations (~ 35 min - field)

After a brief field introduction to the facilities and assignment, each group will be assigned their crop. Group members will make individual observations of the crop, pests and surrounding ecosystem. Students can help each other in this process, but each student needs to make individual observations and fill out the “Assignment: Initial Crop/Pest/Ecosystem Observations” sheet. This sheet will be turned in to the TA by the end of today’s lab.

{In Class} Crop, Main Pest, Other Pests; Individuals Monitor and Record (~ 50 min. - field)

Each group will be assigned the *Main Pest* and *Other Pest(s)* for their crop. Some information about the pests and suggested protocols (methods) of observation, monitoring, note taking and record keeping will be provided in a “*Pest Description and Recommended Monitoring Protocol*” handout to each student in the group. Students will also be given “*Pest Monitoring Data Sheets*” to use in recording their observations.

These recommended protocols should be used by each student during Weeks 2 and 3, and possibly for the rest of the quarter. The instructors will provide assistance in learning how to use these protocols, if needed. (During Week 3, the group should meet to discuss the possibility of modifying or changing any of these protocols. See Week 3, below, for more information.)

NOTE: We will use the terms “monitor” and “record” as shorthand for a variety of different methods used in observing and keeping track of crops, pests, their development, and other parts of an agroecosystem in this exercise.

- 1) **Insert** into your notebook: The handout that identifies your crop, Main Pest, Other Pest(s) and the suggested monitoring and recording protocols.
- 2) **Monitor and record** the appropriate information about your *Main Pest* and *Other Pest(s)*, according to the suggested protocols, using the data sheets provided.

Week 3

Note: Bring laptop computers to LECTURE on Thursday April 16 for presentation by Shields Library staff.

{Outside Class} Individual Field Work (conducted **BEFORE** the group work):

- 1) **Monitor and record** date and information about your *Main Pest* and *Other Pest(s)*, according to the recommended methods, as well as other indicated information, using one of the *Pest Monitoring Data Sheets*.
- 2) **Record** on the back of the *Pest Monitoring Data Sheets* how you think the monitoring is working. Specifically, **answer**: do you think you need to make any adjustments to your monitoring and/or recording methods?

{Outside Class} Group Work (conducted **AFTER** the Individual work, above):

- 1) **Discuss** how the monitoring and recording are going and whether people think adjustments should be made. **Discuss and get agreement** from course instructors before making final decision if you want to change your monitoring and/or recording methods.
- 2) **Discuss and decide** which students will do which PMT assignments.
- 3) **Prepare**, based upon the outcomes of 1) and 2) above, the group assignment (see “Group Assignment due” under Week 4) to turn in to the TA at the beginning of the Week 4 lab period.

{Outside Class} Individual Field Work (conducted right **AFTER** the group work, above):

- 1) Each student should **record** the results of this meeting (i.e., decisions on monitoring and recording protocols and decisions on PMT assignments) in his/her lab notebook.

Week 4

Individual Assignment due (at start of lab period):

- 1) **Show** your lab notebook to the TA for review.

Group Assignment due (at start of lab period):

- 1) **Turn in** a short written report from the group with the following information:
 - a) Identity of the crop, *Main Pest* and *Other Pests* and monitoring and recording methods. If you are using the recommended method without modifications, simply indicate that. If you are making modifications to the recommended monitoring protocols, indicate what those

modifications are. If you are modifying your recording protocols, provide a copy of the modified “Pest Monitoring Data Sheet” you will be using.

- b) Identity of the PMT that each group member will work on.

{In &/or Outside Class} Individual Field Work:

- 1) **Monitor** and **record** data and information about your *Main Pest* and *Other Pest(s)* and other aspects of the crop/pest agroecosystem using the appropriate monitoring and recording protocols.

Week 5

{Outside Class} Individual Field Work:

- 1) **Monitor** and **record** data and information about your *Main Pest* and *Other Pest(s)* and other aspects of the crop/pest agroecosystem using the appropriate monitoring and recording protocols.
- 2) **Record** in your lab notebook your thoughts on how you think the field portion is going. (e.g., are you having difficulties monitoring the *Main Pest* and/or *Other Pests*? Do you think you it would be good to make any adjustments to your monitoring protocol? Does your data seem to make sense? If not, do you have any ideas about why not?)

{Outside Class} Group Work:

- 1) **Discuss** the group’s assessment of the status of the *Main Pest* and **prepare** written answers (about ½ to 1 page) to the questions posed in the **Group Assignment due** on Week 6.

Week 6

Individual Assignments due (at start of lab period):

- 1) **Turn in** the full citation and a photocopy of the 1st page of the document for each of the 2 literature sources for your PMT.

Group Assignment due (at start of lab period):

- 1) **Turn in** written answers (about ½ to 1 page) to the following questions, based upon your monitoring and research so far:
 - Does there seem to be a pattern to what the pest populations are doing (e.g., increasing or decreasing)?
 - Does the group think the *Main Pest* is (or likely will be) a problem in this situation?
 - Why or why not?
 - What actions does the group think could be taken to manage this pest at this time?

{In Class} Group Work:

- 1) **Compare** and **discuss** the data (weekly averages) that the individual students have collected in Weeks 2 – 6. Are there patterns in the pest population numbers? Do the different students see the same pattern? **Discuss** what you are finding with the instructor and/or TA and start to **develop** a plan for presenting your data to the rest of your lab section on Week 8. This may involve simple tables or graphs.

{In &/or Outside Class} Individual Field Work:

- 1) **Monitor** and **record** data and information about your *Main Pest* and *Other Pest(s)* and other aspects of the crop/pest agroecosystem using the appropriate monitoring and recording protocols.

Week 7

{In &/or Outside Class} Individual Work:

- 1) **Monitor** and **record** (for the last time) data and information about your *Main Pest* and *Other Pest(s)* and other aspects of the crop/pest agroecosystem using the appropriate monitoring and recording protocols. .
- 2) **Finalize** your Individual PMT written assignments and oral presentation. See Week 8 below for specific requirements.
- 3) **Prepare** the Pest Management section of your field notebook to turn in during lab on Week 8. This involves more than the weekly Pest Monitoring Data Sheets. See Week 8, below, for specific requirements.

{In &/or Outside Class} Group Work:

- 1) **Prepare** a ~ 2 – 3 page “*Group Written Overview of Main Pest and PMTs*” that includes highlights from each individual PMT, the group’s assessment of the *Main Pest* in this situation, and the group’s recommended integrated plan for sustainably managing the *Main Pest*. See Week 8, below, for specific requirements.
- 2) **Coordinate** efforts for the group’s presentations in Week 8.

Week 8

Individual Assignments due (at start of lab period):

- 1) **Turn in** your Individual Written PMT Assignment

Each student turns in 2 pages text on their PMT, plus citations on 3rd page, that includes:

- A Summary (~ 1 pg) of the most useful practical information you found on your PMT.
- A Summary (~ 1 pg) of the information from the scientific literature you found.
- Citations for all sources (see provided style guide for help).

- 2) **Turn in** the Pest Management Section of your individual Lab Notebook

Each student turns in their Lab Notebook,

This should include:

- The “Assignment: Initial Crop/Pest/Ecosystem Observations” from Week 2
- All pest monitoring data sheets. Make sure all of your data sheets are present and in order.
- A summary (~ 1 page) of your individual (not group) observations regarding the *Main Pest* and *Other Pests*. This summary should include:
 - A. a tabular or graphical depiction of your data from Weeks 2 through 7;
 - B. a brief interpretation of this data;
 - C. an assessment of the monitoring process during the quarter (e.g. was your pest difficult to observe? Did the pest’s presence and damage increase or decrease over time? How did that affect your observations?)

Group Assignment due (distribute during your group's presentations):

NOTE: Make multiple copies: one copy for student in the lab section, plus one to turn in.

- 1) **Turn in** Group Written Overview of Main Pest and PMTs (~ 2 - 3 pages) that includes:
 - 1 – 2 paragraphs or graphics from each student that highlights the most important practical information from their PMT
 - the group's assessment whether the *Main Pest* is (or likely will be) a problem in this situation – and – Why or Why not?
 - the group's recommended integrated plan for sustainably managing the Main Pest (regardless of whether it is a problem in this situation or not).

In Class Individual and Group Presentations

(Organized by group and delivered to the whole lab section)

Presentations will be organized by group. Each group will be given approximately 30 - 35 minutes total for their presentations (5 minutes per individual PMT presentation, followed by 5 minutes for the group overview presentation). Each group will use the following format.

A. Individual Presentations

Each student delivers an oral presentation in the field (which is accompanied by graphical or text information is the group handout) to the whole lab section focusing on the practical information related to his/her PMT. Prepared presentations should be about 4 minutes with 1 minute for questions (total time = 5 min/student).

B. Group Presentation

The group spokesperson delivers an oral presentation in the field (which is accompanied by graphical or text information is the group handout) of the group's assessment whether the *Main Pest* is (or likely will be) a problem in this situation and the group's recommended integrated plan for sustainably managing the *Main Pest*.