

Insect Toxicology Laboratory, Spring 2008
ENY 6651
Instructor - M.E. Scharf
Assistant - Sam Nguyen

Lab Course Philosophy:

The goals of the toxicology laboratory section are three-fold. The first goal is to give students practical training in techniques commonly employed by insect toxicologists. By no means will a single course make a student into an expert with a technique. It is my main goal, therefore, to provide the student exposure to a variety of techniques so that in their future careers, they will be able to identify appropriate techniques and gather the necessary expertise to solve problems and answer questions. The second goal of the laboratory is the demonstration of important principles of insect toxicology. The third goal is to improve student technical writing skills through preparation of regular laboratory reports.

Lab Organization:

This laboratory consists of a series of laboratory exercises. Each exercise will require a report to be written in turned at the beginning of the following lab. Most exercises can be completed in a single 3-hr laboratory period. However, a few of the techniques and concepts do not fit into a single 3-hr period. These laboratories will require that time be spent on an arranged basis. We will strive to keep the exercises within the allotted period. **THIS WILL REQUIRE STUDENT COOPERATION AND PATIENCE. PLEASE PAY ATTENTION AND KEEP CONVERSATION TO A MINIMUM WHILE IN THE LABORATORY. THIS IS IMPORTANT FROM BOTH A SAFETY AND A LEARNING PERSPECTIVE!**

Each laboratory will have a handout that is available on the course CD. Handouts will contain a brief introduction to the laboratory, the experimental procedures and references, and in some cases, a series of questions to be answered. Students will complete the experiments as directed. Each lab except the first lab on safety will require a report.

The entire laboratory grade is derived from reports for each of the 10 labs. The reports are to follow a typical journal article format, except that the abstract, most of the introduction, and materials & methods will be excluded. **An outline to assist with report writing is provided on the next two pages of this handout.** This outline also doubles as a general outline of steps to follow in the preparation of scientific journal articles.

Report Writing Guide, as well as a Guide to Writing Journal Articles

ENY 6651

M.E. Scharf

The major sections of a scientific report:

ABSTRACT
 INTRODUCTION
 MATERIALS AND METHODS
 RESULTS
 DISCUSSION
 REFERENCES
 TABLES AND FIGURES

The steps in the process:

- (1) Summarize and analyze the data, and prepare tables or figures. Try to get a good feel for what your data is saying before you undertake the writing in earnest.
- (2) Formulate 1-2 simple declarative statements for each experiment. You may or may not use these later. These statements are extremely helpful in organizing your thoughts, if nothing else.
- (3) Write the last paragraph of the introduction and state the experimental objectives. Begin the paragraph with the statement “The broad goal of this experiment was to.....”. In the next sentence, provide a broad overview (list) of approaches taken. In the next sentence, state each specific objective. Close the paragraph with a simple statement that reflects your single major conclusion from the work. There is no “wrong” conclusion here, as long as it is carefully thought-out and supported by the data.
- (4) Write the results section into which you insert references to the tables, figures, graphs etc. The results section is just as the name implies: a description of the results that is as concise as you can make it. Brevity is the key.
- (5) If you were preparing a formal journal article, you should write the materials and methods section at this stage. This section includes all the information necessary to show how you obtained the results included in *Results*. **For the purposes of this course, we will not do this since the materials and methods are already provided with each lab.**
- (6) Write the discussion section next, checking carefully that it includes all the major conclusions developed under (2) above, and that each and every statement is appropriate to the strength of evidence presented under *Results*. Usually, in a formal journal article, the discussion should relate the results and conclusions of your work to those of earlier investigators whose papers should be listed under *references*. For

the laboratory reports, students should focus mostly on interpretations of their findings and if they do or do-not satisfy initial hypotheses. Also, although no additional library research will be required, students are also encouraged to relate their findings to any literature referenced in the lab handout, as well as any information or references provided in the lecture portion of the course.

- (7) Normally, if one were writing a formal journal article this is when the initial portion of the introduction would be written. For the purposes of the lab reports, **we will not do this**. The introduction, under normal circumstances, should provide appropriate background information for the reader, and an explanation of why you undertook to discover the things you actually did discover. The style and breadth of this part of the introduction is often dictated by the specific journal that you plan to submit your work to. **For laboratory reports, simply begin the introduction with the final intro paragraph as described above in (3).**
- (8) Formulate the abstract. The abstract should provide the reader a broad but concise overview of your findings and why they are important **IN 250 WORDS OR LESS**. Avoid concise data summaries and try to focus on general trends, major conclusions, and broad importance.
- (9) Write a concise title (60 characters or less) that captures the theme of your work. This is often the first thing an author tries to do, but it is much easier if you can avoid the temptation and write the title last. For the purposes of this course, please include the lab number in your title.
- (10) Provide answers to any questions, as well as provide any data figures or tables at the end of the report.

LABORATORY OUTLINE - ENY 6651 (Tuesdays; 12:50 - 3:50)

Weekly lab reports will be due at the beginning of Tuesday lab periods, or if there is no lab for a given week (), reports will be due to the instructor by 5PM of the day indicated.*

#	Date	Topic
1.	Tues-Jan 08:	Lab intro and lab safety (no report required).
2.	Tues-Jan 15:	General laboratory procedures (weighing, pipetting, pH and buffers).
3.	Tues-Jan 22:	Neurophysiology: insecticide effects on the central nervous system.
4.	Tues Jan 29:	Neurophysiology: temperature effects on nervous system function.
5.	Tues-Feb 05:	NO LAB (exam week) *
6.	Tues-Feb 12:	Insecticide dilutions and molarity calculations, dosage range finding, probit analysis.
7.	Tues-Feb 19:	Bioassays: LD50 determination using probit analysis.
8.	Tues-Feb 26:	NO LAB (pre-exam review session) *
9.	Tues-Mar 04:	Bioassays: LC50 determination, probit analysis and resistance ratios
 <i>March 10-14 Spring Break - No class</i>		
10.	Tues-Mar 18:	Chemistry: Physical properties of insecticides and their metabolites
11.	Tues-Mar 25:	Enzyme biochemistry: protein isolation and total protein determination.
12.	Tues-Apr 01:	NO LAB (pre-exam review session) *
13.	Tues-Apr 08:	Enzyme biochemistry: Esterases (phase I metabolism).
14.	Tues-Apr 15:	Enzyme biochemistry: Glutathione-S-transferases (phase II metabolism).
15.	Tues-Apr 22:	OPEN

* Reports from previous week's lab due to instructor by 5PM.