


WELCOME TO ENY 3005/5006L

PRINCIPLES OF ENTOMOLOGY LAB

Web Course Fall 2009

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Overview

This class provides the laboratory activities for the ENY 3005/5006 web course. In this lab, you will learn the anatomy of an insect, how to identify an insect to order, how to collect and curate insects, and you will learn a bit about how insects fit into our lives.

There are a series of lab activities for you to complete during the semester. Some of the assignments are interactive virtual labs, some are hands-on labs that you must report on, and some are just for you to read through for the information. The first few labs will give you a foundation that will help you learn to identify insects so you can begin working on your collection. You will notice that there are two lab reports. These two experiments will take time to set up and will take a while to collect the data, so be sure to read them ahead of time. (You will hear this from me again.) Besides the insect collection and lab reports, there will be a lab exam at the end of the semester and several worksheets along the way.

All of the lab material can be found in ELearning at <http://lss.at.ufl.edu>. **Assignments should be posted to the assignment link in ELearning.** Please follow the "Complete by" date on this syllabus. You will see that the ELearning date is set for the end of the semester. That is a safety because the system will not accept late assignments. Again, please refer to the course outline for assignment due dates. If you have questions about assignments, please e-mail the TA and copy the instructor.

Collection information

There is an insect collection due at the end of the semester. Since this is a web class, there are students across the US and even in other countries. Take into account the weather conditions in your area and plan to collect on warm, sunny days. Please don't wait until the last minute to collect. Curation takes some time, so you want to leave the last few weeks before the collection is due to work on labeling and pinning. Collections will not be returned to you unless you have made prior arrangements with your instructor. If your collection needs to be mailed back to you, you must provide a pre-paid shipping label with your collection. We cannot send you a bill for shipping costs, so please pre-pay and include a self-addressed label if you would like your collection returned. UF will no longer ship collections back through campus mail, so we must hand deliver the collections to the post office. Please remember to include the postage with your collection so we don't have to make multiple trips to return collections. Insect collections are generally light, unless they have glass tops, so avoid overpaying for shipping. The typical cost should be between \$10 and \$15 to ship priority mail. You may also ship by UPS or FedEx to the address above. While we are speaking of shipping, it is important to secure your specimens so they don't get damaged. This can be done by placing the vials in a separate container from the pinned specimens and putting a piece of cardboard over the pinned specimens so they don't shake loose during delivery. Keep in mind that in order to grade the collection, we need to get to the specimens. Try to avoid collection boxes (purchased or homemade – more information and photos below) that have nails or metal clips that would be difficult for us to open. Please also judiciously use tape and packing materials so we can easily open the packages.

Course Outline

Lab	Points	Activity	Complete by:
Order Collection Equipment Read Collection and Curation Lab	-----	Get started on your collection. (These are the warm months.)	August 28
Labs 1 & 2 - (2 review files, no worksheet) Insect External and Internal Morphology	-----	Interactive self quizzes (un-graded)	September 4
Lab 3 -Using a Key Insect Orders	15	Worksheet	September 11
Lab 4 - Insect Behavior –Vision* or Acoustic Communication (if available) *This lab is weather dependent	50	Lab Report	October 2
Lab 5 – Pest Management	50 15	Lab Report and Worksheet (submit two items)	October 16
Lab 6 – Soil Arthropods	15	Worksheet	October 30
Lab 7 – Social Insects	15	Watch video of field trip and complete worksheet	November 6
Lab 8 – Forensic Entomology	20	Evidence Reports	November 13
Final Exam (Lab)	50	Exam	November 20
Collection Due Insect Collection and CurationLab	100	Turn in properly curated collection (*Drop-off will be from 9:30-11:00 and from 1:00-5:00 on the 23rd.)	Postmarked or delivered* by Monday, November 23

EVALUATION

Type	Points	FINAL GRADING	
		Scale: Percentage	
Collection	100	100-93	A
Lab 3 Worksheet	15	90-92	A-
Lab 4 Report	50	87-89	B+
Lab 5 Report	50	83-86	B
Lab 5 Worksheet	15	80-82	B-
Lab 6 Worksheet	15	77-79	C+
Lab 7 Worksheet	15	73-76	C
Lab 8 Data	20	70-72	C-
Lab Exam	50	67-69	D+
Total Points	330	63-66	D
		60-62	D-
		0-59	E

***Please address lab questions to the TA and copy the instructor.
The TA will post lab grades to ELearning.**

Text and Supply information

There is no required textbook for the lab course.



An optional book that will be helpful for this lab is the Photographic Atlas of Entomology and Guide to Insect Identification by J. L. Castner. This book is about \$35 and has nice photographs that will help you in identification of your collection specimens.

Collecting Kit

Each student is *required* to make an insect collection that will be mailed to the instructors for grading. You may purchase a kit of collecting supplies or follow the collection and curation lab instructions on how to make a net and kill jar. Either way, you will need to submit a properly curated and well organized insect collection. Here are three purchasing options for collecting kits. **Feel free to shop around on your own.** Just be sure to make your purchase within the first week of class so you can begin collecting. Also, please follow lab instructions for identification (Order names), labeling, and pinning position. Do not depend solely on the guide that is included with the kit.

The source many entomologists use for their collecting supplies is <http://www.bioquip.com>. The Student Insect Collecting Kit #1138 is \$39.95 and has a net, jar, pinning block, pins, spreading board, box, etc. This is a nice kit, but has a small box for the collection. You may need an additional box to house your collection, especially if you collect large dragonflies or butterflies. If you use the one included box, it easily ships in a USPS Priority Mail box for about \$6.



Entomology collecting kit # EL201 is available from <http://educationalscience.com/merchant.ihtml?pid=3129&step=4&merchantid=4&repid=0&passwordstatus=passed>. The kit is approximately \$39.00 + \$7.00 shipping and taxes according to your geographical area. The kit includes all of your basic collecting equipment (net, jar, pinning block, pins, foam spreading board, and cardboard collection box). It takes about three business days for the kit to arrive, so please order it before you get to the collection and curation lab. The cardboard box included with this kit is large enough for your collection, but does not have tight fitting lid. This box can be wrapped in paper to mail and the USPS mailing cost for this box is about \$7.



If you prefer a wooden and glass box, you can order the Entomology Starting Kit from Canada. This is a higher quality box, but it is smaller than the one from Educational Science. This kit can be viewed at http://www.quebecinsectes.com/pages/pages_english/macrodontia_english.html. You would want #300 Entomology Starting Kit. The cost is listed in Canadian dollars, but is around \$38. Note that a net and pins would need to be ordered in addition to the collection kit. The net is #100 (~\$15) and the pins (100 size 2) are # 135 (~\$7.00). This site has quality collecting gear, but you cannot place online orders, you must call.



Other Lab Purchases – Lab Report Supplies

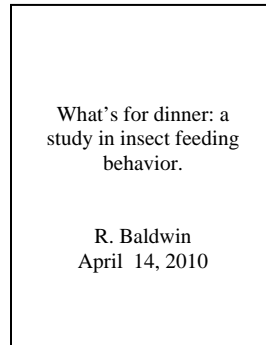
The Vision and Pest Management labs require you to purchase items (i.e. 3 types of light bulbs, fly paper, live insects, household cleaner, cups with lids, paper towels), so be sure and make a list of needed items for both labs. It is very important to watch the weather and make sure that you have proper conditions when running the experiments. Also, these two experimental labs will take some time to set up and perform. It is important to read them ahead of time so you have time to properly set up the experiment. There are some supplies (above) you will need to purchase, so keep that in mind. You may need an extra couple of days to work out some details, so don't wait until the last minute. You have been allotted two weeks for these labs. You will need that long to complete the experiment, find your references, and write the report. Reports should be uploaded to ELearning. There is an example format below.

Exam

The comprehensive lab exam will consist of fill in the blank, matching, short answer, and identification. The exam will be e-mailed out, but should be uploaded to ELearning for grading. The exam will be worth 50 points. If you are unable to take the exam on the posted date, please contact your instructor to make other arrangements. Late exams will be penalized 5 points per day.

Reports

There are two lab reports that must be completed. They should be posted to ELearning by the due date to avoid a late penalty (5 points per day). Please contact the TA/instructor if you cannot meet the deadline. Each report should be typed using Arial or Times New Roman font with 12-point type. The report should be double-spaced and pages should be numbered, except page 1. Be sure to perform spell check on your report and proofread it for any errors. The title page should contain your name, the title of the lab, and the date of the lab. If you post the report as an attachment, please begin the file name with your last name (i.e. Baldwin_vision_report).



Each report should contain the following sections: abstract, introduction, materials and methods, results (graphs), discussion and references.

Abstract	<p>This is a brief (1 paragraph) overview of the entire paper.</p> <p>Basically the abstract consists of 1-3 introductory sentences, a sentence stating your objective, 1-2 sentences discussing your materials and methods, 1-2 sentences stating results, and 1-2 conclusion sentences. Although this is one of the first sections in your lab report, it is easiest to write this section last, after all of the other sections have been completed.</p> <p>Feel free to pick up a science journal at a nearby library or online source and see how this is written.</p>
Introduction	<p>Give some background information about the lab activity. What was the lab set up to teach and why?</p> <p>This section should provide a good rationale for why your study was important and introduce what you plan to do. This portion of the paper is where you provide relevant background information on the subject. The introduction includes everything a person needs to know in order to understand the experiments. You will want to find references for this section. Visit http://www.uflib.ufl.edu/distance/ for e-resources.</p>
Materials and Methods	<p>A detailed description of the equipment and procedures used to conduct this lab.</p> <p>I should be able to replicate your experiment from the information you give me here. This is not a shopping list of what you used. It must be written in complete sentences (paragraph format) and not in first person.</p> <p>Example: INCORRECT- I poured one tablespoon of dishwashing liquid into the handheld spray bottle. CORRECT - One tablespoon of dishwashing liquid was added to a hand held sprayer.</p> <p>You have completed the experiment at this point, so should report in past tense.</p>

Results	<p>A detailed report of what you discovered as a result of this lab.</p> <p>Here, you describe <i>what</i> happened, <u>not</u> <i>how</i> or <i>why</i> (don't interpret the information). You do not explain what the results mean, just what they are. Any graphs or tables should be included here. Failure to include the appropriate table and graphs will result in a poor grade on this section. Each chart, table, graph, etc. requires a title and a caption that explains it. If you have, for example, two tables separated by a graph, you have Table 1, then Figure 1, then Table 2.</p>
Discussion	<p>Here is where you explain the results. Why did the results turn out this way? Are there any special circumstances that affected the experiment? Did you have to modify anything? Do you have any missing data? What did you learn from this experiment? These types of questions should be answered in the discussion section.</p> <p>This section is not merely a brief repeat of the Results section. Here, you explain how and why (or why not) the results you obtained actually occurred and how this related to your hypothesis. This is the section where you <i>must</i> think critically and analyze, providing explanations for what you observed and measured. Failure to do it thoroughly will result in a poor grade on the lab report.</p>
References	<p>Include an alphabetical list of your references.</p> <p>In this section, provide the complete literature citation (author(s), date, title, journal, volume, pages) for all works you cited within the paper. Here, you are to provide a MINIMUM of five (5) references that pertain to the subject of your lab report. These can be books or journal articles. For this report, they can NOT be newspaper articles, popular press magazines or web URL's. I suggest looking at the reference section of a scientific paper for some guidelines. <i>Just as a reminder, in the text portion (introduction or discussion) of the report, you would place your reference in parentheses like this (Amrine and Noel 2006). If more than two authors are in the citation, then (Baldwin et. al 2008).</i></p> <p><u>Example of a reference in the reference section:</u> Amrine, JW, and R. Noel. 2006. Formic acid fumigator for controlling varroa mites in honey bee hives. Int. J. Acarol. 32(2):115-24.</p>

Important Collection Note:

Read the "Collection and Curation" information. This explains the materials you will need for the required insect collection as well as the different collecting and curating techniques. Labs 1 and 2 contain very important information that will help you with your collection, so please make sure that you these get done on time so you can correctly identify and curate your insects. Although the first two labs are preparing you with information about insects, you do not have to wait to begin collecting. If you do collect insects before getting your insect collecting kit, please put them in Ziploc baggies or some type of container with the dates and place of collection then store them in your freezer until you are ready to pin them. Your collection will be ongoing throughout the semester. There are no scheduled weeks for collection trips, so you are expected to collect when you can. If you have any problems or need suggestions, please contact the TA or instructor.

IMPORTANT: Only soft-bodied insects are curated in alcohol, but you are not required to use alcohol vials. For this class, you may pin or point all specimens. The shipping of alcohol is becoming more and more restricted, so you may want to pin all of you specimens. If you choose to use alcohol vials, please be sure they include an order and locality label, and do not leak. (Bead containers and pill bottles will not work well for insect vials.)

The collection should be submitted in a box of some type. Collections submitted outside of a box (i.e on posterboard, corkboard, or Styrofoam) will not be accepted. Insects that are poorly curated will not be graded, and each collection should be presented in a professional manner. This collection is worth 100 points and will take some time to complete. If you submit insects that are pinned, but are still alive, you will receive a 10 point deduction in your grade. Collections postmarked after the due date will not be accepted.

Each specimen must be pinned or spread properly (all legs) and must be in good condition. **All specimens should be identified to Order** and should be properly labeled. (See the link in ELearning for the MS word label template). An index of your collection must accompany your collection. An example will be posted in the collection and curation lab. Be sure to neatly arrange the insects under the order label (photo examples below). Remember, only adult insects will be accepted and duplicates will only be counted once.

Collection Index Example:

<p>Rebecca Baldwin ENY 3005 Fall 2010</p> <p>Total adult insects: 64 Total insect orders: 20 Total non-insect arthropods: 3</p>	<p>Number of Specimens by order</p> <ol style="list-style-type: none"> 1. Thysanura – 1 (vial #1) 2. Ephemeroptera – 1 3. Odonata – 2 4. Isoptera – 1 (vial #2) 5. Blattodea – 5 6. Mantodea - 2 7. Phasmatodea -1 8. Orthoptera – 7 9. Dermaptera -1 10. Psocoptera – 1 (vial #3) 11. Phthiraptera – 1 (vial #4) 12. Hemiptera - 9 (vials #5 & 6) 13. Neuroptera -2 14. Megaloptera - 1 15. Coleoptera -11 16. Diptera - 5 17. Siphonaptera – 1 (vial #7) 18. Trichoptera - 1 19. Lepidoptera - 3 20. Hymenoptera -8 21. Non-insect arthropods - 3
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Insect collection in Educational Science box



Collection – be careful of vials in box – they can destroy specimens



Insect collection in Cornell drawer – lid open



Insect collection in Bioquip box



Bioquip box modified with risers to increase space – top and bottom of box used.



How to package collection -cardboard on top of pins, index included

At a minimum your collection should contain:

ENY 3005
50 adult insects of different species (No immatures – check for those wing buds)
14 representative orders
2 Lepidopterans properly spread – All leps must be spread.
5 insects mounted on points
3 non-insect arthropods identified to order *these do not count towards your adult insects
Collection index
ENY 5006
65 adult insects of different species
16 representative orders
4 Lepidopterans properly spread - – All leps must be spread.
10 insects mounted on points
5 non-insect arthropods identified to order *these do not count towards your adult insects
Collection index

Collections should be mailed or delivered to your instructor or TA (address above). Please contact your instructor or student coordinator for details. If you are mailing your collection, please follow the instructions in the curation lab.

Collection Packaging Reminders

Insects can become damaged in shipping, so please take care when preparing them for shipment. Remember that you may no longer be able to ship alcohol, so may need to pin all specimens. If you have large specimens, please secure them with pins on the sides so they do not spin. Also, please put a piece of cardboard or poster board over your collection so the pins do not bounce loose during shipment (pins will become imbedded in foam, so you should avoid a foam top). All pins should be pushed down in the foam until they reach the bottom of the box. Keep in mind that we have to open and grade the collections, so please do not completely tape around the inner or outer the box lid. Test your box by gently rotating it vertically and side to side. If any insects move, be sure to secure them. Also, do not ship vials in the same box as the pinned insects. Vials can destroy your collection if they come loose in transit. You may place the index to the top of the piece of cardboard you add to the top of the pins in the collection box.



Enjoy the semester and good luck on your collection!