

Tips for Doing Well in Entomology 301

Because considerable new information is presented in Entomology 301, most students find it a challenging course. Several areas of difficulty encountered by previous students are identified below with tips for meeting the challenges that each area presents. By implementing these tips, you should not only do better in 301, but you should have a smoother ride and more rewarding experience in this course.

STUDY SKILLS

Take good notes in lecture and lab. Although the visuals from my lectures are available on the web site, these are supplemented by considerable material that is essential for you to know, and that is not on the slides. The same is true for lab presentations. To do well in Ento 301, you must attend both lecture and lab, and you must take careful notes. One way to do this is to print out copies of the lecture slides, with lots of white space around the figures, and bring them to lab. Or you may prefer to take your notes on regular paper and keep them with copies of the lecture slides.

Dedicate a 3-ring binder to Entomology 301. During the semester, you will be receiving and downloading all sorts of printed material, such as handouts with diagnostic characters for insect orders and suborders. A good way to organize this material is to keep it all together with your lecture and lab notes in a 3-ring binder. That way, it will all be in one place when you study for exams.

NEW TERMINOLOGY

Develop a system for learning new words. Entomology is infamous for its voluminous terminology. You will encounter many new words in 301 – including scientific names for insect taxa and terms from morphology and biology. There is no way around the chore of learning this new terminology, and you must learn to spell terms and names correctly. Face it head on and develop a system for learning the new words. Try making lists of terms or use flash cards. Form a study group and quiz each other. Try the read/say/write method. Read the word silently, then say the word out loud, then hand write the word, then think about its meaning. This technique involves more of your senses in the learning of a new word. It reinforces pronunciation and spelling and should increase your chances of remembering the new word and its meaning later.

Use the handouts as a checklist of the “scientific” names of insect taxa that you will be required to know for 301. Use it to learn the classification of hexapods. Scan ahead in the list to familiarize yourself with names to be presented in future lectures/labs. Look back in the list to review names from earlier lectures/labs. Add common names to your list so that you learn to associate the common name with the scientific name.

INSECT BIOLOGY

Develop a system for associating taxon names and biologies. Try using flash cards, or form a study group and quiz each other.

Train yourself to associate organisms with their microhabitats in the field. When collecting in the field, train yourself to associate the families that you collect with the microhabitat that you are collecting them from. Then try to generalize from this knowledge to answer questions like: “In what microhabitat would I be most likely to collect family x?” and “In microhabitat x what families am I likely to collect?” This will reinforce and augment the biological information presented in lecture.

Functional morphology gives clues to biology. Learn to relate morphological features of insects to their biologies and microhabitat requirements. For example, insects that possess raptorial forelegs almost always have predaceous lifestyles, and insects that lack eyes are usually animals that live in dark, cryptic or hidden microhabitats such as soil, rotten logs or ant nests.

IDENTIFYING INSECTS

Learn to use the keys in the textbook. Identification keys are your friends – get to know them. They summarize and present in a convenient format the diagnostic features that you need to know to make accurate identifications. There is a reason that most biologists use dichotomous keys (like the ones in your text) to identify organisms. In the end, they are by far the most efficient and most reliable method! The ability to key specimens to family is one of the most important skills you will learn in Entomology 301, and one that you will use for the rest of your career! Learning to use the keys is just like learning to play a musical instrument - practice, practice practice! Do not be reluctant to annotate your text with your own notes about terms, characters, etc.

Organize families in each order into groups based on a few key characters. For example, organize beetle families based on the type of antenna and tarsal formula. This will help you rapidly narrow down the possibilities for sight identifications. Repeated use of keys will help also help you remember important sight identification characters.

As a study method, **try reading through the text of the keys.** As you read, picture in your mind each of the characters mentioned in the couplets. This will help reinforce identification-related morphology.

Key out several different species of each family. This will help familiarize you with the variability within each family in body form and identification-related morphological traits. In lab, deliberately try to find specimens that appear to be unlike the others in a family and key them out. This will show you what the reliable characters are to identify each family.

Learn spot characters to facilitate sight identifications. “Spot characters” are features that are characteristic of all or most members of a particular family or other taxon. The best spot

characters are present in all individuals of a taxon and are easily visible. Such characters are relatively rare, but we'll tell you about them when we can. The proper use of spot characters is to use them to quickly narrow the range of possible identifications, then use other characters to confirm the final identification. Don't rely solely on spot characters – exceptional taxa exist to break almost every spot character rule.

INSECT COLLECTING

Start collecting as early in the semester as possible. Usually, general collecting for insect begins to pick up in our area around spring break or shortly afterwards. However, there are a number of things you can get started on early: aquatic insects, litter samples with the Berlese funnels, insects under bark, in logs and under rocks or boards, etc. Also, even though sweeping and beating may not seem very productive, it is often surprising how many insects Malaise traps will catch, even in winter or early spring months. Remember, Malaise traps and other passive devices are out there collecting for you during those nice warm days in winter or early spring, when you may be stuck in class or at work!

Don't ignore the small stuff! The vast majority of insects are less than 5 mm. long. – including much of the diversity of insects at the family level that you will be studying in 301. You cannot successfully complete your collection if you ignore this component of the insect fauna. Prepare a small batch of points (see the Insect Collection Guide for how) and carry them in your Lab Kit. Learn how to point mount small specimens early in the semester, and experiment with this technique. This will help counter the common tendency to ignore small specimens because of an unfamiliarity with how to handle and work with them.

Collect in different microhabitats. Cultivate microhabitat thinking. On each collecting trip, collect extensively in only one or a few different microhabitats. Target different microhabitats on different trips. This strategy is much better than always doing the same thing – like always using your net to collect in grassy fields – and is usually better than trying to sample many microhabitats superficially on the same trip. Try collecting at night around bright lights, especially those that face relatively natural areas.

Utilize the different collecting tools provided in your Lab Kit. Sweep net, aquatic net, beating sheet, utility bar, trowel or hand hoe, etc. Read in your text about other collecting methods, e.g., Malaise traps, pit fall traps, etc. Using multiple collecting methods will result in a more diverse catch and help you reach your goal more quickly.

Attend the field trips. You could collect the specimens required for your insect collection without attending the class field trips, but why would you want to? The field trips are specifically designed to give you access to the diversity of microhabitats that you will need to collect in to successfully build your collection. Enjoy the camaraderie of your friends while collecting. Plan ahead for your collecting time. See new places in the Brazos Valley and beyond. For most entomologists, field work is the most enjoyable part of our profession. Find out why! If you have conflicts, contact the instructor or the TA for information on places to collect on your own, with friends, or for arranging at least one trip that fits your schedule.

Keep a collecting notebook. A perennial problem is how to keep your specimens associated with the information about who, when and where they were collected. The best solution is to keep a small notebook for the original collecting data and to key each notebook entry to a temporary coded label kept with the specimens. Don't rely on someone else to gather and maintain your collecting data. We will supply collecting notebooks in your Field Kits. Use them! These become a permanent record of your fieldwork. The habit of keeping accurate field notes is one that will serve you well in your career. **Always, always, always have collecting data, or some unique link to collecting data, associated with every batch of insect specimens that you collect, and do this immediately, when you collect them.** If we see you working on specimens that are not associated with collection data, *we will* give you a hard time!

MAKING THE INSECT COLLECTION

Read the Insect Collection Guide! In this guide we anticipate and answer many of the most commonly asked questions regarding your insect collection – please read it! If your question is not answered in the Insect Collection Guide, ask the instructor or TA for information or clarification.

Follow the Insect Collection Guide. Closely follow the instructions given in the guide when mounting and labeling specimens for your insect collection. Additional information on specialized techniques, like spreading wings properly, will be presented in the lab.

Work on your collection during lab. Set aside a portion of each lab to work on your collection. Mount, identify and label your collection specimens throughout the semester during lab periods, while the TA is available to help you. Make it a habit. By doing your identifications throughout the semester you will know what you have in your collection. This will allow you to target the microhabitats that contain the families that you still need for future collecting trips. You will also need less time at the end of the semester to complete your collection – time you could probably use for other things like studying for finals or going to the Chicken. Curating your material right after you collect it is especially important. This will save you time in the long run over the alternative of collecting bags full of specimens that you will have to sort through and mount later, and that may dry-out or rot in your apartment or dorm.

Find the extra credit families. Its always exciting to find something uncommon and it will earn you extra points on your collection. In fact, some of the extra credit families are quite common, but we happen to need more, high quality specimens in the Teaching Collection.

Make the Insect Collection work to your advantage. It is quite possible to assemble a collection that is worth more than 110 points! Make up for that low lab quiz or lecture exam by turning in extra stuff in your collection.