

2019 METAZOAN PARASITOLOGY LABORATORY

(ADVANCED INVERTEBRATE ZOOLOGY - BIOL 459/559)

Instructor: Dr. Rick Hochberg
Availability: By appointment
Office Location: Olsen Hall 413A
Office Phone: (978) 934-2885
E-Mail Address: rick_hochberg@uml.edu

Course title – credits: Metazoan Parasitology Lab – BIOL459/559 - 1 credit

Meeting day, time and location: M in Olsen 411

A web link to all available class materials:

<http://www.hochbergbiodiversitylab.com/parasitology.html>

Required Materials:

1. Camera or cell phone

2. Single subject notebook (no other course materials in it)

3. Pencils/pens, colored pencils

Laboratory materials (dissection tools, etc) will be provided for you

Course Description

The purpose of the laboratory is to provide you an opportunity to identify and work with a variety of parasites discussed in lecture. We will work with preserved specimens, slide material, necropsies, and live specimens. Some methods are directly applicable to veterinary medicine.

Learning Outcomes

Upon completion of this laboratory, all students should

- 1) Be able to identify the major parasite groups based on adult and egg morphology;
- 2) Be able to describe the anatomies and lifecycles of select species;
- 3) Be able to identify the anatomy and function of host organ systems;
- 4) Be familiar with some basic methods in parasitology

PARTICIPATION

Participation is mandatory and lab sessions cannot be made up. Lab exams will not be given as makeups. There are no formal points given for participation because you are supposed to attend each and every lab. However, if you miss a lab, you will have 100 pts deducted from your final grade. Students that arrive late will have 25 pts deducted for each late arrival.

LABORATORY SCHEDULE

Date	TOPIC	PUB
01/28	Course Mechanics; Use of microscopes; blood histology, epithelium structure	
02/04	<i>Fasciola hepatica</i> anatomy Lifecycle stages Ocular fascioliasis – eye anatomy	Dalimi & Jabarvand 2005
02/11	<i>Schistosoma</i> : Adults, egg identification Liver dissections, liver histology and pathology	NA
2/18	Holiday: President's Day	NA
02/19	Monday Schedule: Fecal Floatation Experiment & Egg identification (<i>Taenia</i> , <i>D. caninum</i> , <i>F. hepatica</i> , <i>A. lumbricoides</i> , <i>N. americanus</i> , <i>H. nana</i>); Know names of diseases caused by each species	NA
02/25	Tapeworm anatomy (<i>Taenia</i> , <i>Echinococcus</i>) Cysticeroid-beetle dissections Brain dissections	Gong et al. 2012
03/04	Lab Exam 1	NA
03/18	Acanthocephala anatomy Diptera life cycles: Setup Mosquito and Fly Cultures	NA
03/25	Mosquito lifecycle: Anatomy and Taxonomic Identification	NA
04/01	Insect ectoparasites: Fly larvae and/or pupae; adult anatomy	Blakely et al. 2018
04/08	Tick Anatomy and Taxonomic Identification	NA
04/19	General nematode anatomy; hookworm slides; Dioctophymiasis; Kidney dissections	Chauhan et al. 2016
04/22	Heartworms blood slides; blood cell identification; heart anatomy	NA
04/29	Lab Exam 2	NA

POINT DISTRIBUTIONS

Lab Exam 1	500 pts
Lab Exam 2	500 pts
Notebook	500 pts
TOTAL	1500 pts

LAB EXAM: What will the exams cover?

In general, you are only responsible for information we cover in lab. While there is overlap between lecture and lab, you will only be asked about lab-based material unless otherwise stated. In some cases, we will cover parasites/infections in lab that *are not covered* in lecture. In both cases, you are responsible for knowing the lifecycle of the parasites. In some cases, this information will be spoken about in lab or provided on a handout, while in other cases, you will be asked to check the CDC website and/or read a short publication. It is worthwhile taking notes on this information for your notebook.

Important: If you have already taken the lecture in a previous semester, you may need to play catch-up in the lab. I will undoubtedly reference current lecture material, and some of this material may differ from what you learned previously, e.g., topics change, new data is added, etc. Be prepared.

How are the lab exams conducted?

Both lab exams are conducted in a Powerpoint-style fashion. I will project images on the screen based on slides/organs/parasites you have seen in class. I will then ask questions about the images you see on the screen. The types of questions I will ask are presented below.

Generic Lab Exam Questions:

1. What species is this? Based on an image of the whole animal or even its eggs; I will likely provide other information as well (e.g., where parasite is found, where eggs are found, other information as needed)
2. If the parasite has larval stages, be able to identify them (and where they are found, e.g., free-living in the water or on land, in an intermediate host, etc.)
3. Know the major taxonomic categories (Phylum, Class, Order, Species) if we covered them – in some cases, we cover only minimal material.
4. Where is the parasite found in the body – specifically, which organ system(s)?
5. What disease or diseases does it cause in humans or other animals (if we covered them)?
6. What are the symptoms and underlying pathologies of an infection with a particular parasite? Only those we speak of in lab and/or based on a publication.
7. Can you identify the organs of different parasites and their functions? (e.g., uterus, suckers, pharynx, teeth, mouthparts, etc.)
8. Can you identify the host organs and their tissue/cells, and know something about their function (if we covered them)?
9. What is the intermediate host (or other hosts) of this parasite?
10. How do you diagnose an infection with this parasite?
11. In some cases, I might show you an x-ray, ct scan, etc. that shows the parasite and/or pathology. You do not need to know the technology (x-ray, etc) but you should know what it is showing; I will provide clues.
12. How do you treat an infection with this parasite? Surgery, medication (be specific)

NOTEBOOK

You will be keeping a detailed notebook of all of your observations while in the laboratory. The notebook is meant to be a source of information for your laboratory exam, and so should be legible, well organized, and with detailed accounts (illustrations, photographs, text) of the parasites and dissections we perform. As we move through the semester, you will be given assignments that can be inserted into the notebook (hence the 3-ring binder) into the appropriate spot. These assignments will be useful to you on the lab exam.

Grading. You will be graded on the following information in your notebook.

Organization & Legibility (120 pts)

The first page of the notebook should be a Table of Contents and should look professional (20 pts).

Laboratories should be in order from the 1st class through the last. All laboratory exercises should be labeled and all pages numbered. I need to be able to read and understand your notebook. All scientific notebooks, whether in industry or academia, are subject to review by your supervisor and so should be legible and easy to understand. In industry, notebooks are considered the property of the company, in which case they can be *used in a court of law for evidence*. So, be sure that your notebook is not filled with chickenscratch.

Detail of the Text/Observations/Figures (380 pts)

You will be providing detailed descriptions of the organisms we work on class using a variety of instruments including:

1. Pens/pencils/colored pencils
2. Photomicroscope
3. Cell phone (or separate camera)

In addition to legibility, the contained information should sufficiently describe the task at hand. An illustration without the text to describe it is artwork and this is not an art class. Always (at minimum) include a brief description of what you are working on (taxon name, dissection, etc). Label all drawings (see below). If you are asked to illustrate a specimen or a dissection, do so. While the incorporation of photographs into a notebook is acceptable (cellphone cameras), they can only be used to enhance detail, not replace it. A photograph by itself is just a picture – you need to label it. You also learn by drawing what you see, even if your artwork is not aesthetically pleasing to the eye. Make drawings sufficiently large – at least one-half page size at minimum. You have plenty of paper, so use it. You will be graded based on the information content of your illustrations and photographs. Points will be deducted for lack of labels and incorrect labels.

Always include taxonomic information for each lab. For example: know phylum name, class name (if necessary), species name, and the disease the parasite might cause. See example on following page.

Example page from a laboratory notebook showing illustrations of specimens in class. All illustrations are labeled and other relevant information (phylum, species, date) is also presented.

1/28/13 - Tapeworm Anatomy

Phylum Platyhelmin

Species: Dipylidium caninum - dogs/cats

Taenia sp. - pig/human

