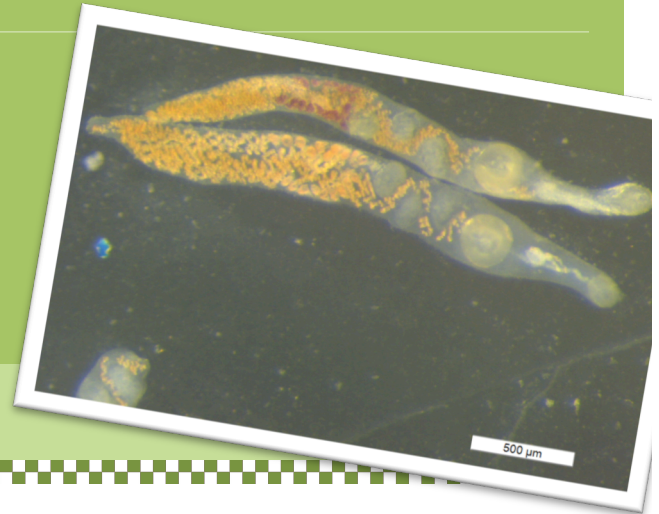


Animal Parasitology

“The medical tapestry of the world is full of organisms too small to see, carried by flying and creeping creatures too numerous to eradicate.” Robert Desowitz, *New Guinea Tapeworms and Jewish Grandmothers*



Instructor: Dr. Sarah A. Orlofske

Office Hours: M & W: 12:30 – 2:00 PM

Office: TNR 446

Phone: 715-346-4249

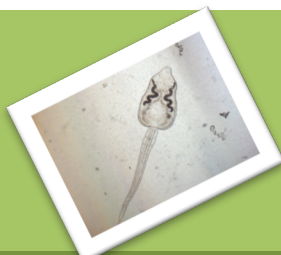
Email: Sarah.Orlofske@uwsp.edu

Text: *Foundations of Parasitology (FOP)*, 9th Ed. Roberts & Janovy (Bookstore rental)

Lab Supplies: *Animal Parasitology Laboratory Manual* by Taft, Huspeni & Orlofske (Available from the Bookstore) and **Dissection Kit**

Course Objectives

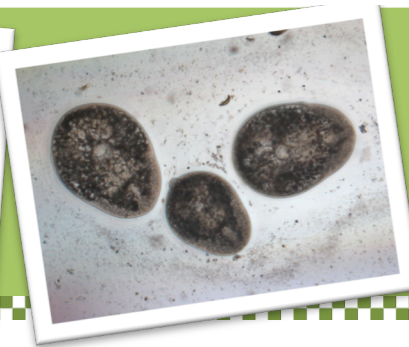
- To help students gain a fundamental understanding and familiarity with the diversity of animal parasites, interactions with hosts, life history, physiology, and evolution.
- To assist students with incorporating knowledge of parasites into other branches of biology including community ecology, behavioral ecology, and conservation.
- To help students distinguish between parasites and disease and recognize the conditions that result in disease as well as appropriate and efficient preventative measures and management responses.
- To provide students realistic preparation for field and laboratory disease investigations through hands on experiences.



PARASITOLOGIST:

Quaint person who seeks truth in strange places; a person who sits on one stool, staring at another.

Roberts and Janovy 9th Edition.



Assignments

Hands on projects – Doing the work of a Parasitologist.

Parasite Specimen Collection:

Throughout the semester students will necropsy hosts for parasite specimens from hosts provided for research projects or those they choose to donate for class projects. The purpose will be to obtain a collection of molecular and morphological specimens that will become a permanent part of the UWSP Parasitology Museum Collection for future research.

Grant Proposal: Students will write *an individual grant proposal* based on an original question they would like to

pursue related to concepts and topics in parasitology. Proposals will be 4-6 double spaced pages and include at least 4 primary scientific sources.

Parasite Public Outreach:

Scientists frequently communicate their research to non-scientist audiences. Students work in groups to make a display for a public audience to be hosted on campus for the UWSP Parasitology Museum Collection.

Case Study: Students will work as groups to solve real-life parasitology problems.

Students participate in class discussions, give oral presentations or write position statements about their proposed solutions.

Lab Reports: Dissection of specimens will take place during necropsy labs. Students will generate original data as well as obtain specimens for collections. Students will choose 2 of the 4 labs to write a formal lab report will follow the format of the results and discussion section of a scientific paper.

Assessments of your learning

Lecture Exams: Lecture exams will emphasize key concepts, principles, taxonomic groups and characteristics of organisms and diseases they cause. Questions will include matching, multiple choice, short answer and essay.

Practicals: Practical exams will be given in lab and will require

students to identify organisms, life stages, host use, anatomical structures as well as conduct diagnoses of infections based on host use, pathology, and geography. Microscopes will be used to present the specimens for identification.



Lecture	Points	Lab	Points
Lecture Exams 2 X 50 Final Exam 1 X 75 (25 pts comprehensive)	100 75	Practicals 2 X 50	100
Case Study (Group)	30	Lab Quizzes 6 X 10 (Lowest Score Dropped)	50
Outreach Project	20	Scientific Paper Readings (3 X 10)	30
Grant Proposal Draft & Peer Review	25	Lab Reports 2 X 30	60
Grant Proposal - Final	50	Specimen Collection	60
Total	300	Total	300

Grading scale and Point distribution

Final grades will be assigned based on the following **minimum** cutoff percentages:

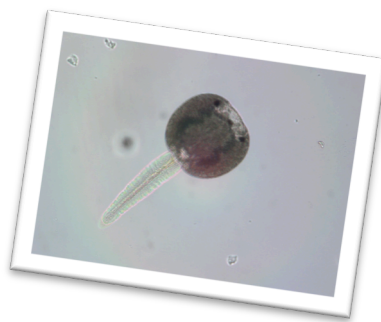
A = $\geq 93\%$	A- = 89.9%
B+ = 87%	B = 83%
B- = 79.9%	C+ = 77%
C = 73%	C- = 69.9%
D+ = 67%	D = 63%
F $\leq 59.9\%$	

Course policies

Attendance.

Attendance for lecture and lab is mandatory, and past experience indicates there is a strong positive correlation between the amount of time a student spends in class and her/his final grade. We will frequently use living material, and scheduling make-up opportunities for missed classes is exceedingly difficult. Make-up exams will be provided only in the case of serious illness (requiring a physician's note), or the death of a relative. However, absences relating to a

student's religious beliefs will be accommodated according to [UWS 22.03](#), providing the student notifies the instructor within the first three weeks



You don't want to miss exciting parasite action!

of the beginning of class regarding the specific dates she/he will be absent.

Academic Integrity.

UW-Stevens Point values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, we have developed a set of expectations for all students and instructors. This set of expectations is known as the *Community Rights and Responsibilities* document, and it is intended to help establish a positive living and learning environment at UWSP. Click here for more information:

<http://www.uwsp.edu/dos/Documents/CommunityRights.pdf> - page=11.

Continued

Academic integrity is central to the mission of higher education in general and UWSP in particular. Academic dishonesty (cheating, plagiarism, etc.) is taken very seriously. Don't do it! The minimum penalty for a violation of academic integrity is a failure (zero) for the assignment. For more information, see the UWSP "Student Academic Standards and Disciplinary Procedures" section of the *Community Rights and Responsibilities* document, Chapter 14, which can be accessed through the link above.

Disabilities.

The Americans with Disabilities Act (ADA) is a federal law requiring

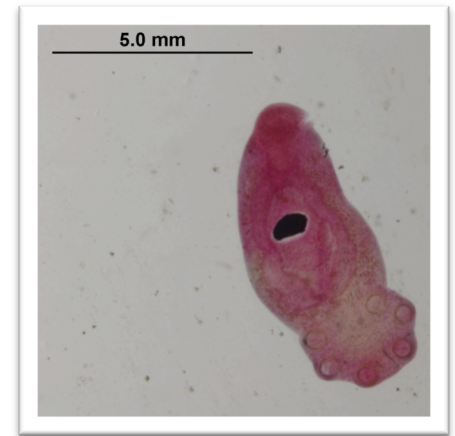
educational institutions to provide reasonable accommodations for students with disabilities.

For more information about UWSP's policies, check here:

<http://www.uwsp.edu/disability/Pages/faculty/lawAndPolicy.aspx>.

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technology Center and then contact me at the beginning of the course. I am happy to help in any way that I can. For more information, please visit the Disability and Assistive Technology Center, located on the 6th floor of the Learning

Resource Center (the Library). You can also find more information here: <http://www.uwsp.edu/disability/Pages/default.aspx>.



Contact me early if you need accommodations!

Learning Objectives - After completing the course students should be able to:

- Distinguish parasitism as a life history strategy
- Identify the major groups of animal parasites: Trematoda, Cestoda, Nematoda, Acanthocephala, Protista, Insecta, etc.
- Describe general parasite life cycles, geographic distribution, and patterns of host use.
- Apply knowledge of parasite biology to fundamental questions in ecology and evolution.
- Design treatment or management strategies based on parasite biology in the context of wild and domestic animal and human health.
- Synthesize scientific resources to evaluate real-world problems including the role of parasites in host conservation, invasive species establishment and persistence, food web stability, and spillover between domestic and wild animals.

Tentative Course Schedule (Subject to Change)



Course

Location: TNR 460

Meeting times:

Mon and Wed

2 - 4:50 PM

Coming late to class is disruptive. Please arrive to class on time!



Important notes about grading!

I will return graded material no later than 1 week after the assignment is due (2 weeks on rare occasions). If you believe I've made a mistake in grading your work, you must bring your concern to my attention within one week of receiving the graded assignment and I will reevaluate it outside of class time. I will not reconsider the assigned grade after one week.

Date	Topic	Reading
Sept 2	No Lecture – Labor Day!	
	No Lab	
Sept 4	Introduction, general principles, definitions	Chap. 1 & 2
	Lecture continued during lab: Parasite adaptations, host specificity, Begin Platyhelminthes	
Sept 9	Turbellaria, Monogenea, Aspidoboth.	Chap.13-14,19
	Lab 1: Turbellaria, Monogenea & Aspidobothrea + Laboratory Expectations & Tutorials	Lab: 1-10
Sept 11	Digenea: schistosome pathology, immunology, distribution, & life cycle + Case Study Intro	Chap. 3, 15-16
	Lab 2: Digenea I (Adult worms)	Lab: 11-17
Sept 16	Other medically important trematodes	Chap. 17 & 18
	Lab 3: Digenea II (Adult worms)	Lab: 18-29
Sept 18	Trematode community ecology	
	Data Recording and Descriptive Statistics and Lab Report Intro + <i>Paper Discussion 1 Snail Infection</i>	Handouts
Sept 23	Case Study Presentations	
	Lab 4 + Dissection: Larval Digenea & Life Cycles	Protocols, Lab: 30-35
Sept 25	Cestoda intro: Cestodaria, Pseudophyllidea	Chap. 20
	Computer Modeling Lab	Protocols
Sept 30	Medically Important Cestodes (Guest Lecture)	Chap. 21
	Lab 5: Cestodaria & major eucestode orders	Lab: 36-42
Oct 2	Introduce Outreach Assignment	
	Work on Outreach Assignment/Computer Lab	
Oct 7	Parasite-host energetics, <i>Hymenolepis</i> competition	
	Lab 6: Cyclophyllideans + <i>Paper Discussion 2 Waterfowl</i>	Lab: 43-53
Oct 9	Nematodes: General features and Major groups	Chap. 22
	<i>Waterfowl Endoparasite Dissection + Preservation Techniques + Computer Lab DUE</i>	Protocols
Oct 14	Nematodes: General features and Major groups	Chap. 22
	Lab 7: Nematodes I (<i>Cockroach Dissection</i>) + <i>Mammal Parasite Life Cycle Paper Discussion</i>	Lab: 54-64
Oct 16	Lecture Exam 1	
	Lab 9: Fecal analysis & Egg ID + Introduce Grant Proposal Assignment	Lab:85 & Protocols
Oct 21	Geohelminths	Chap. 23 - 28 (in part)
	<i>Mammal Dissection and Preservation Techniques</i>	Protocols
Oct 23	Nematodes: Guinea worm, filarial worms	Chap. 23-28 (part)
	Lab 8: Nematodes II + Outreach Projects DUE!	Lab: 65-84

Tentative Course Schedule Continued

Date	Topic	Reading
Oct 28	Nematodes: Guinea worm, filarial worms Lab 10: Acanthocephala, Mollusca, Annelida & Pentastomida	Chap. 29-30 Lab: 86-96
Oct 30	Nematomorpha & Acanthocephala & Annelida <i>Specimen Collections – Staining and Mounting</i>	Chaps. 31-32 Protocols
Nov 4	Intro to Arthropoda: Parasitic Crustacea Lab 11: Parasitic Crustacea + Dissection Lab Report DUE!	Chaps. 33, 34 Lab: 97-101
Nov 6	Chelicerates (mites & ticks), Insecta: Siphonaptera Lab Practical 1	Chaps. 38, 41
Nov 11	Insecta: Phthiraptera (Mallophaga & Anoplura) Lab 12: Mites, Ticks & Siphonaptera	Chaps. 36 Lab: 102-109
Nov 13	Insecta: Diptera, biological control and Hymenoptera Lab 13: Insecta: Phthiraptera (Mallophaga & Anoplura) + Draft Grant Proposal DUE– In class Peer Review	Chaps. 37, 39 & 40 Lab: 110-114
Nov 18	Lecture Exam II Lab 14: Insecta: Diptera I: sand flies, mosquitoes, black flies, etc...	Lab: 115-126
Nov 20	Cnidaria (Myxozoa), Protista: Microspora & Amoebae Lab 15: Insecta: Diptera II, Hemiptera, Hymenoptera, & Coleoptera	Chap. 4, 11 & 7 Lab: 127-135
Nov 25	Gut and Reproductive Tract Flagellates Lab 16: Myxozoa & Amoebae (Staining + Mounting) + Collection Check In!!!	Chap. 6 Lab: 136-142
Nov 27	Hemoflagellates II: New World Sleeping Sickness, Leishmaniasis Lab 17: Gut Flagellates & Opalineia (Staining + Mounting)	Chap. 5 Lab: 143-148
Dec 2	Ciliates & Apicomplexa I: Gregarines & Coccidia + Final Grant Proposal DUE Lab 18: Hemoflagellates & Ciliates (Staining + Mounting)	Chap. 10, 8 Lab: 149-154
Dec 4	Apicomplexa II: <i>Toxoplasma</i> life cycle & epidemiology Lab 19: Apicomplexa: Gregarines & Coccidians (Staining + Mounting)	Chap. 9 Lab: 155-164
Dec 9	Malaria life cycle & pathology Lab 20: Malaria (Staining + Mounting)	Chap. 9 Lab: 165-176
Dec 11	Malaria diagnosis, treatment & genetic adaptations to malaria Lab Practical 3 + Final Specimen Collection Due	Chap. 9
Dec 18 (W)	10:15-12:30 Final Lecture Exam	



Open Lab Time:

I will attempt to leave the lab door open (or unlocked) during all other available hours. Students should plan dissections and slide preparation activities accordingly during open blocks of room time. Generally, prepared slides will be available for student review during all open lab times.



Dissection Specimens:

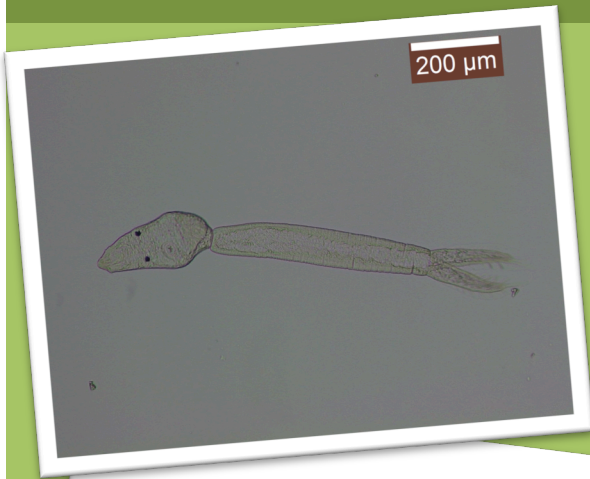
Assorted carcasses (e.g., passerines, waterfowl, assorted fish, etc...) are available for student dissection and research projects. Donations of legally obtained hosts (from hunting/fishing) are also welcome. Please discuss specimens or questions about hosts for use in the class with the instructor prior to dissection.

Course Expectations:

The lecture and laboratory portions of the course are intended to complement and reinforce one another and are given equal weight. The lecture will cover the diverse taxonomic groups of animal parasites and the concepts related to the study of parasitology and of its interdisciplinary components, ecology, evolution, behavior, molecular biology, conservation and medicine. The laboratory will consist of demonstrations, dissections, and examples of the groups of parasites covered, their lifecycles, host use, pathology, physiology, and development. The laboratory will also serve as a realistic research experience as students will collect, preserve, and identify parasite specimens as well as analyze data and prepare a scientific research paper.

Welcome to the World of Parasites!

Have a fun and productive semester.



Notes: