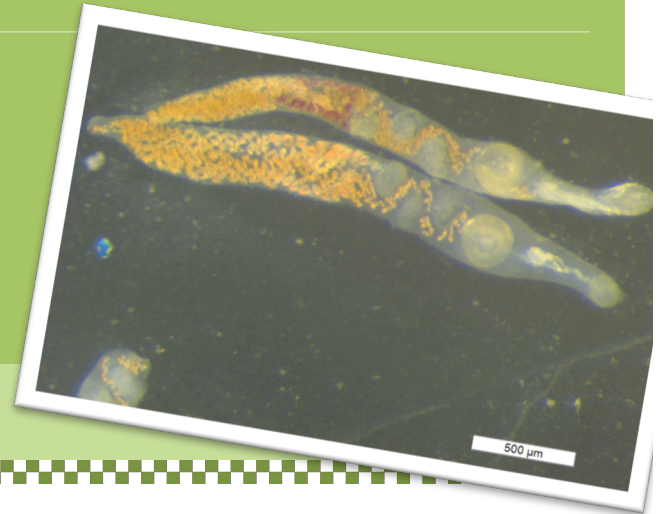


# Animal Parasitology

“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: MWF: 1:00 – 2:00 PM (CBB 148) *or by appointment*

Office: TNR 446  
Phone: 715-346-4249

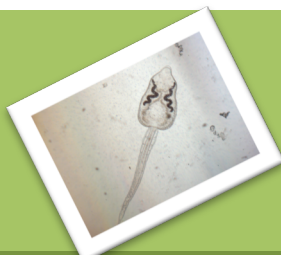
Email: Sarah.Orlofske@uwsp.edu

Text: *Foundations of Parasitology (FOP)*, 9<sup>th</sup> 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 9<sup>th</sup> 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. The grant proposal will be completed in stages with the opportunity for instructor and peer – feedback prior to completing the final draft.

**Case Studies:** 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 and obtain specimens for collections. Students will use background from the scientific paper discussions as well as other literature to propose and test their own scientific questions. The lab report will follow the format of the results and discussion section of a scientific paper. Students will choose 2 of the 3 dissection and data collection labs for the report.

## 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	100 75	Practicals 3 X 50	150
Case Studies 1 X 50 (Group)	50	Scientific Paper Readings (4 X 10 points each)	40
Grant Proposal Draft & Peer Review	25	Lab Reports 2 X 30	60
Grant Proposal - Final	50	Specimen Collection	50
<b>Total</b>	<b>300</b>	<b>Total</b>	<b>300</b>

## Grading scale and Point distribution

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

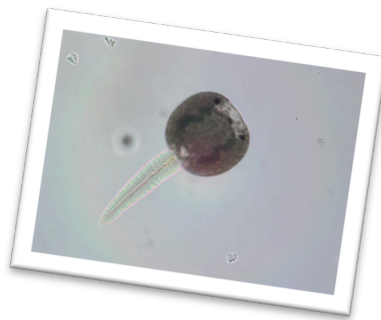
A = $\geq 93\%$	A- = 89.9%
B+ = 87%	B = 83%
B- = 79.9%	C+ = 77%
C = 73%	C- = 69.9%
D+ = 67%	D = 63%
F $\leq 59.9\%$	

## 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

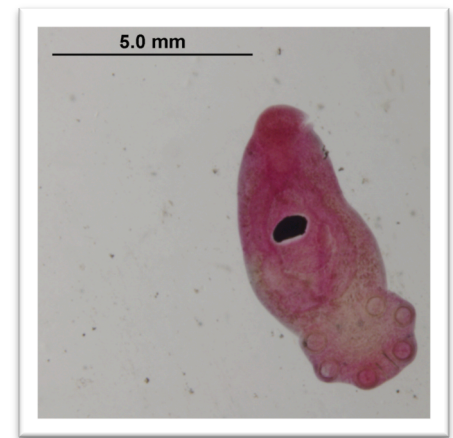
educational institutions to provide reasonable accommodations for students with disabilities.

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:

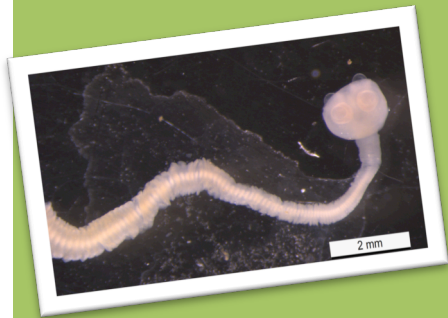
- Distinguish parasitism as a life history strategy
- Identify the major groups of animal parasites: Trematoda, Cestoda, Nematoda, Acanthocephala, Protista, Insecta, etc.
- Describe general parasite life cycles, geographic distribution, and patterns of host use.
- Apply knowledge of parasite biology 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 & WED  
8-10:50 AM

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
Jan 21	NO Class MLK Day!	
Jan 23	Introduction, general principles, definitions	Chap. 1 & 2
	<b>Lecture Continued:</b> Parasite adaptations, host specificity, Begin Platyhelminthes	
Jan 28	Turbellaria, Monogenea, Aspidoboth.	Chap.13-14,19
	<b>Lab 1:</b> Turbellaria, Monogenea & Aspidobothrea + Laboratory Expectations & Tutorials	Lab: 1-10
Jan 30	Digenea: schistosome pathology, immunology, distribution, & life cycle	Chap. 3, 15-16
	<b>Lab 2:</b> Digenea I (Adult worms)	Lab: 11-17
Feb 4	Other medically important trematodes + <b>Case Study 1 Intro</b>	Chap. 17 & 18
	<b>Lab 3:</b> Digenea II (Adult worms)	Lab: 18-29
Feb 6	Trematode community ecology	
	<b>Lab 4:</b> Larval Digenea & Life Cycles + <i>Paper Discussion 1 (Snail infection)</i>	Lab: 30-35
Feb 11	Cestoda intro: Cestodaria, Pseudophyllidea	Chap. 20
	<b>Descriptive Statistics + Lab Report Intro</b>	Handout
Feb 13	Medically important Cestodes	Chap. 21
	<b>Lab 5:</b> Cestodaria & major eucestode orders + <i>Paper Discussion 2 (Passerines)</i>	Lab: 36-42
Feb 18	Parasite-host energetics, <i>Hymenolepis</i> competition	
	Passerine Dissection + Preservation Techniques	Protocols
Feb 20	Guest Lecture: Dr. Robert Jadin, UW- Eau Claire Parasite population ecology and evolution	
	<b>Lab 6:</b> Cyclophyllideans	Lab: 43-53
Feb 25	<b>Case Study Presentations</b>	
	<b>Lab 7:</b> Nematodes I	Lab: 54-64
Feb 27	Nematodes: General features and Major groups	Chap. 22
	<b>Lab Practical 1</b>	
Mar 4	<b>Lecture Exam 1 Happy H.B Ward Day!</b>	
	<b>Lab 9:</b> Fecal analysis & Egg ID	Lab: 85
Mar 6	Geohelminths	Chap. 23 - 28 (in part)
	<b>Lab 8:</b> Nematodes II (Passerine Lab Report Due)	Lab: 65-84
Mar 11	Nematodes: Guinea worm, filarial worms	Chap. 29-30
	<b>Lab 10:</b> Acanthocephala, Mollusca, Annelida & Pentastomida+ <i>Paper Discussion 3 (Waterfowl)</i>	Lab: 86-96
Mar 13	Nematomorpha & Acanthocephala & Annelida	Chaps. 31-32
	Waterfowl Endoparasite Dissection + Preservation Techniques	Protocols
Mar 18 & 20	SPRING BREAK NO CLASS ☺	

## Tentative Course Schedule Continued

Date	Topic	Reading
Mar 25	Parasitic Crustacea	Chaps. 34
	<b>Lab 11:</b> Parasitic Crustacea + <i>Paper Discussion 4 – Fish</i>	Lab: 97-101
Mar 27	<b>Grant Proposal Intro</b>	
	Fish Dissection + Preservation Techniques	Protocols
April 1	Parasitic Arthropods	Chaps. 33
	<b>Lab Practical 2</b>	
April 3	Chelicerates (mites & ticks), Insecta: Siphonaptera	Chaps. 41, 38
	<b>Lab 12:</b> Mites, Ticks & Siphonaptera ( <b>Waterfowl Lab Report Due</b> )	Lab:102-109
April 8	<b>Lecture Exam II</b>	
	<i>Specimen Collections – Staining and Mounting</i>	Protocols
April 10	Insecta: Phthiraptera (Mallophaga & Anoplura)	Chaps. 36
	<b>Lab 13:</b> Insecta: Phthiraptera (Mallophaga & Anoplura)	Lab:110-114
April 15	Insecta: Diptera, biological control and Hymenoptera <b>Draft Grant Proposal Due; Peer-review Assigned</b>	Chaps. 37, 39 & 40
	<b>Lab 14:</b> Insecta: Diptera I: sand flies, mosquitoes, black flies, etc...	Lab: 115-126
April 17	Cnidaria (Myxozoa), Protista: Microspora & Amoebae	Chap. 4, 11 & 7
	<b>Lab 15:</b> Insecta: Diptera II, Hemiptera, Hymenoptera, & Coleoptera ( <b>Fish Lab Report Due</b> )	Lab: 127-135
April 22	Gut and Reproductive Tract Flagellates	Chap. 6
	<b>Lab 16:</b> Myxozoa & Amoebae (Staining + Mounting) + <b>In Class Grant Proposal Review</b>	Lab: 136-142
April 24	Hemoflagellates II: New World Sleeping Sickness, Leishmaniasis	Chap. 5
	<b>Lab 17:</b> Gut Flagellates & Opalineia (Staining + Mounting)	Lab: 143-148
April 29	Ciliates & Apicomplexa I: Gregarines & Coccidia	Chap. 10, 8
	<b>Lab 18:</b> Hemoflagellates & Ciliates (Staining + Mounting)	Lab: 149-154
May 1	Apicomplexa II: <i>Toxoplasma</i> life cycle & epidemiology	Chap. 9
	<b>Lab 19:</b> Apicomplexa: Gregarines & Coccidians (Staining + Mounting)	Lab: 155-164
May 6	Malaria life cycle & pathology	Chap. 9
	<b>Lab 20:</b> Malaria (Staining + Mounting)	Lab: 165-176
May 8	Malaria diagnosis, treatment & genetic adaptations to malaria	Chap. 9
	<b>Lab Practical 3 + Final Specimen Collection Due</b>	
May 16 (TH)	<b>10:15-12:30 Final Lecture Exam + Final Grant Proposal Due</b>	



## 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:

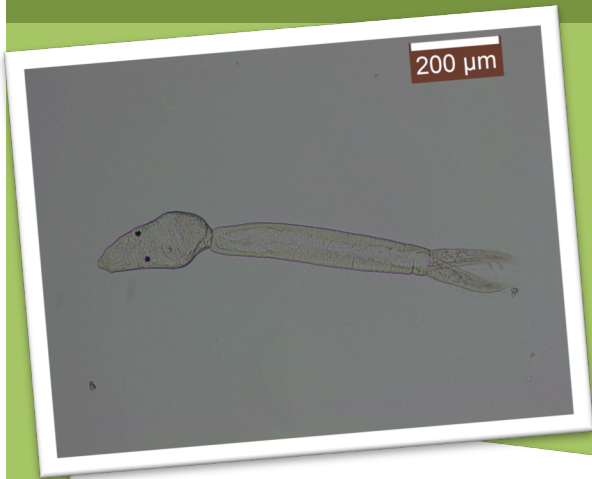
Assorted carcasses (e.g., passerines, waterfowl, assorted fish, etc...) are available for student dissection and research projects. Donations of legally obtained hosts (from hunting/fishing) are also welcome. Please discuss specimens or questions about hosts for use in the class with the instructor prior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