

Name _____

Ecology & Evolutionary Biology 4274
Lecture Exam #3

Nematoda, Miscellaneous phyla & Arthropoda, ecology, etc.

December 16, 2009

This exam consists of two (2) parts (Parts I and II). You must provide answers for each part. However, you are required to answer only a SUBSET of the questions in each part. If you answer more questions than indicated in the instructions provided, your answers will be graded in order, and you will be graded only on the number of questions you are required to answer. You have one hour to complete this portion of the exam. Feel free to use diagrams to augment your answers.

Part I. Answer 10 of the following 14 questions (ANSWER ONLY 10!) (8 points each).

1. Describe how each of the following taxa attaches to its definitive host.

- (i) *Necator americanus*
- (ii) *Sphyrion*
- (iii) *Ergasilus*
- (iv) acanthocephalans
- (v) *Ctenocephalides canis*
- (vi) *Demodex folliculorum*
- (vii) *Argulus*
- (viii) *Pediculus humanus*

2. Answer each of the following 8 questions. (8 points)

- (i) Identify a **species** that produces microfilaria in dogs. _____
- (ii) Identify a **species** that uses fresh-water copepods as its intermediate host. _____
- (iii) Identify the smallest **species** of nematodes known to parasitize humans.

- (iv) Glochidia larvae are produced by members of a family that belongs to what **phylum** of animals?

- (v) Identify a **species** that grows to be over 5 cm long in its definitive host. _____
- (vi) Identify a **phylum** that includes species that are parasitic in insects as larvae, but are free-living in water as adults. _____
- (vii) Identify a **genus** in which the adults of both sexes exhibit bodies that are whip-like in form.

- (viii) Identify an **order** of parasitic hexapods the adults of which are laterally flattened.

3. Answer each of the following 8 questions:

- (i) Where in/on the definitive host would you expect to find female adults of *Tunga penetrans*?
- (ii) Where would you expect to find larvae of *Ctenocephalides felis*?
- (iii) Where would you expect to find adults of *Onchocerca volvulus*?

- (iv) Where in/on the host would you expect to find eggs of *Enterobius vermicularis*?
 - (v) Associated with what type of host would you expect to find parasitic barnacles of the genus *Sacculina*?
 - (vi) In what major organ system of their “reptile” hosts would you expect to find adult pentastomes?
 - (vii) In/on what type of host would you expect to find adults of *Argulus*?
 - (viii) Where in the definitive host would you expect to find an adult acanthocephalan?
4. Identify a genus of parasite that could be acquired by a vertebrate as a result of each of the following activities (your answers need not be unique). In each case also indicate the type of definitive host involved
 - (i) Eating raw/undercooked copepods.
 - (ii) Eating raw/undercooked pork.
 - (iii) Eating raw/undercooked oligochaetes.
 - (iv) Eating raw/undercooked walrus.
 5. Describe the pathology associated with infections of each of the following parasites.
 - (i) *Wuchereria bancrofti* in humans.
 - (ii) *Ascaris lumbricoides* in humans.
 - (iii) *Trombicula* in humans.
 - (iv) *Necator americanus* in humans.
 6. Describe how you would diagnose a human infection with each of the following:
 - (i) *Ascaris lumbricoides*
 - (ii) *Pediculus humanus capitis*
 - (iii) *Wuchereria bancrofti*
 - (iv) *Ancylostoma duodenale*
 7. Provide a full labeled diagram of the life-cycle of a nematode species that is either heteroxenous or, if monoxenous, occupies at least 2 distinct sites within its vertebrate host over the course of its life.
 8. (i) Of all of the nematode, miscellaneous phyla and arthropod species we have examined, which species would you least like to acquire as an infection? Justify your answer
 - (ii) Of all of the nematode, miscellaneous phyla and arthropod species we have examined, if you had to host an infection with one, which would you choose? Justify your answer.
 9. Describe each of the following structures and indicate in what type of taxon you would expect to find the structure. Feel free to use illustrations to augment your descriptions.
 - (i) comb
 - (ii) hypodermis
 - (iii) buccal capsule teeth
 - (iv) bulla
 10. Identify the 3 important families of parasitic mites. In each case, provide an example of a member and describe the pathology associated with infection of that member.
 - (i)
 - (ii)
 - (iii)
 11. It has been suggested that transmission of many parasites among hosts can be attributed to “the five F’s” Explain this concept; be sure to identify these five factors.
 12. Describe 3 negative effects ticks themselves have been known to have on their hosts.
 - a.

b.

c.

13. Describe 3 trends in adaptations towards parasitism seen among parasitic copepods. In each case, identify a genus of copepod that exemplifies each of the trends you have chosen to describe.

a.

b.

c.

14. Lillian had a wonderful time on her cruise! The ocean liner stopped at a diversity of Ports throughout the West coast of Africa. She was able to spend several days in the countryside visiting local villages around each Port. She has just noticed that she has returned with a “companion”. She can see it poking out a small hole in her leg.

(i) Is Lillian likely to die from this parasite infection? Explain your answer.

(ii) To what nematode Order does the parasite that is inhabiting the hole in her leg belong?

(iii) Lillian couldn't resist going into the water at several of the Ports. Could she have prevented her infection had she stayed on land? Explain your answer.

(iv) Should she worry about transmitting the infection to her grandchildren when they visit her this holiday season? Explain your answer.

15. Tonito has just returned from a 2 month internship with the Peace Corp in

Part II. Complete 20 cells in the following Table. Note: each row must represent a DIFFERENT parasite species (1 point per cell).

Parasite species	Phylum	Infective stage and its mode of entry into/onto host indicated	Site occupied by parasite in host indicated	Disease caused
<i>Gasterophilus intestinalis</i>	Arthropoda	Horse: eggs swallowed	Horse: stomach	myiasis
<i>Trichinella spiralis</i>	Nematoda	Human: J1 consumed in undercooked meat	Human: intestinal epithelial cells	Trichinosis
<i>Phthirus pubis</i>	Arthropoda	Human: person to person transfer	Human: pubic hair	“crabs”
<i>Ancylostoma braziliense</i>	Nematoda	Human: J3 burrow through skin	Human: tunneling through skin	cutaneous larval migrans
<i>Enterobius vermicularis</i>	Nematoda	Human: eggs eaten	Human: large intestine	Enterobiasis
<i>Toxocara canis</i>	Nematoda	Human: J3 burrows through skin	Human: liver, lungs, in humans	visceral larva migrans
<i>Myxobolus cerebralis</i>	Myxozoa	Trout: triacinomyxon in oligochaete eaten	Trout: brain	Whirling disease