Name _____

Ecology & Evolutionary Biology 4274

Platyhelminthes Lecture Exam #2 October 22, 2014

Read through the exam once before you begin. Read the questions CAREFULLY; be certain to provide all of the information requested. In instances in which you are asked to answer only a SUBSET of the questions, if you answer more questions than indicated, your answers will be graded in order, and you will be graded only on the number of questions you are required to answer. Note: for HOST species, the common name is sufficient; for parasite taxa the correct full scientific name is required.

1. Use the epidemiological situations in the colour images labeled A through Q to answer questions about 6 (SIX) of the following 10 parasitic diseases (i.e., a through j below). You may NOT use an image more than once. When identifying hosts common names are fine. (4 points each; 24 total points)

   a. Schistosomiasis involving the urinary bladder:

   (i) Image (provide letter): _____

   (ii) What host(s), if any, beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

   (iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

   b. Opisthorchiasis:

   (i) Image (provide letter): _____

   (ii) What host(s), if any, beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

   (iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

   c. Fascioliasis:

   (i) Image (provide letter): _____

   (ii) What host(s), if any, beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

   (iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

d. Cercarial dermatitis:

(i) Image (provide letter): _____

(ii) What host(s), if any, beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

(iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

e. Cysticercosis:

(i) Image (provide letter): _____

(ii) What host(s), if any, beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not require

(iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

f. Diphyllobothriiasis:

(i) Image (provide letter): _____

(ii) What host(s) beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

(iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

g. Echinococcosus:

(i) Image (provide letter): _____

(ii) What host(s) beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

(iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

h. Schistosomiasis involving the small intestine:

(i) Image (provide letter): _____

(ii) What host(s) beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

(iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

i. Salmon poisoning:

(i) Image (provide letter): _____

(ii) What taxon(taxa) beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the "individual(s)" in the photo? Write N/A if additional hosts are not required.

(iii) What is the etiological agent of this disease?

j. Taeniasis:

(i) Image (provide letter): _____

(ii) What host(s) beyond those shown in the photo you have selected would need to be present in order for contraction of this disease to be a real possibility for the individual(s) in the photo? Write N/A if additional hosts are not required.

(iii) What life-cycle stage of the parasite is infective to the individual(s) shown?

2. By definition, what is the main difference between a paratenic host and intermediate and definitive hosts? (3 points)

3. Connect each of the metazoan parasite species provided in the list at the left below to an appropriate larval stage in the list at the right. You may NOT use a larval stage more than once. (10 points)

	metacercaria
Taenia saginata	microcercous cercaria
Fasciola hepatica	oncomiracidium
Diphyllobothrium latum	sporocyst
Leucochloridium paradoxum	simple cysticercus
Austrobilharzia variglandis	redia
Paragonimus westermani	cotylocidium
Dactylogyrus vastator	hydatid cyst
Echinococcus granulosus	miracidium
Nanophyetes salmincola	furcocercous cercaria (i.e., with forked tail)
Schistosoma japonicum	hexacanth
	procercoid
	schistosomula

4. Provide an example of a platyhelminth taxon that fulfills all of the criteria for FIVE (5) of the following 8 statements. You may NOT use a species more than once. (10 points)

   a. A proglottized species that is zoonotic in humans as a larva. _____

   b. A terrestrial, heteroxenous digenean species that relies on ants for transmission. _____

   c. A monozoic cestode order with a decacanth embryo. _____

   d. A superorder whose members bear a haptor that is *never* divided and *never* bears clamps. _____

   e. A digenean species that *never* encysts in or on anything! _____

   f. A class of neodermatans that includes a few species that do *not* parasitize vertebrates in their adult stage. _____

   g. A neodermatan genus that exhibits large and small adult forms that, by necessity, occupy different sites of its host. _____

   h. A monoeceous species that pairs in the lungs of its definitive host. _____

5. Each year to raise funds to support student travel to their national meetings, members of the American Society of Parasitologists hold a fund raising auction. Members pride themselves in coming up with creative but *accurate* auction items. This year a lab submitted a number of candidate bumper stickers. Of course the auction committee reserves the right to exclude/modify inaccurate contributions. For the following 4 candidate bumper stickers, identify those that are accurate and thus can remain as stated by writing "correct" in the space provided. In the cases of those that are inaccurate, *explain your concern* **and** provide a suggestion for a *corrected version* of the bumper sticker—lest the auction's legitimacy be called into question. (8 points)

    a. "Schistosomes do it in the blood."

    b. "Hydatid cysts are for fish lovers."

    c. "Sequential polyembryony—it's a digenean thing!"

    d. "Help keep your kids off of drugs—cook their food."

6. While the eggs of most liver flukes exit the definitive host by way of the faeces, juvenile liver flukes do not all pass to the liver via the same route. Describe two *different* routes used by juveniles of the various species of liver flukes to arrive in the liver of their definitive host. (4 points)

    a.

    b.

7. a. List two aspects of the morphology or biology of *Dicrocoelium dendriticum* that identify it as a member of the phylum Platyhelminthes. (4 points)

   (i)

   (ii)

   b. List two aspects of the morphology or biology of *Dicrocoelium dendriticum* that identify it as a member of the subclass Digenea. (4 points)

   (i)

   (ii)

8. Anoletta spent her entire Saturday out collecting parasites—she is very good at collecting parasites! She returned home with the following specimens: a planarian, a species of *Polystoma,* a species of *Taenia*, a species of *Aspidogaster*, a species of *Fasciolopsis*, a species of Gyrocotylidea, a species of *Temnocephala,* a species of *Dicrocoelium*, and an unidentified schistosome species. Answer 6 (SIX) of the following 9 (NINE) questions based on her collection. You may NOT use any of her specimens more than once. (12 points)

   a. Does her collection include a platyhelminth? YES/NO (circle one)

      If so, list a specimen: _____

   b. Does her collection include a "turbellarian" that is parasitic on vertebrates? YES/NO

      If so, list a specimen: _____

   c. Does her collection include a liver fluke? YES/NO

      If so, list a specimen: _____

   d. Does her collection include a species that is polyzoic? YES/NO

      If so, list a specimen: _____

   e. Does her collection include a Neodermatan? YES/NO

      If so, list a specimen: _____

   f. Does her collection include an ectoparasite? YES/NO

      If so, list a specimen: _____

   g. Does her collection include a species that is heteroxenous? YES/NO

      If so, list a specimen: _____

   h. Does her collection include a species that is monozoic? YES/NO

      If so, list a specimen: _____

   i. Does her collection include a species that is dioeceous? YES/NO

      If so, list a specimen: _____

9. You have just been awarded your first grant to study various aspects of the life-cycle of *Paragonimus westermani*. Your first goal is to establish the life-cycle in the lab. (6 points)

   a. Assuming your budget is essentially unlimited (and that you are *not* allowed to use human subjects) what hosts would you need in order to complete the life-cycle in the lab? (Be as specific as possible; common names of hosts will suffice).

   b. How will you go about infecting, or at least ensuring infection of, the definitive host?

   c. How will you determine when you have successfully infected the experimental definitive host?

10. For 3 (THREE) of the following five cases explain why the circumstances described would NOT result in the production of **eggs** by the parasite indicated. (6 points)

    a. A small child accidentally ingests a gravid proglottid of *Taenia saginata*.

    b. A man surf casting off the New England coast wanders into waters infected with numerous cercariae of *Austrobilharzia variglandis*.

    c. A previously uninfected woman in Africa wades into a freshwater pool and one very healthy cercaria of *Schistosoma mansoni* penetrates her leg.

    d. A boy wanders into a pond loaded with oncomiracidia of *Dactylogyrus vastator*.

    e. A girl romping in a sheep pasture accidentally ingests a slime ball containing cercariae of *Dicrocoelium dendriticum*.

11. We have covered a number of platyhelminth species that are known to parasitize humans. Among the species covered, which would you personally *least* like to host. *Convincingly* justify your answer. (3 points)

12. For 2 (TWO) of the following 4 species describe the pathology associated with infection in humans. (6 points)

    a. *Schistosoma mansoni*

    b. *Taenia solium*

    c. *Diphyllobothrium latum*

    d. *Clonorchis sinensis*

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BONUS QUESTION: Identify a class that includes both the largest *and* some of the smallest platyhelminths.