BEATY BIODIVERSITY MUSEUM

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Trematode Life Cycle

Trematodes are common organisms in ocean habitats. Because they infect two or three hosts during their complex life cycles, these parasitic flatworms have big effects on their communities. Trematodes take advantage of predictable interactions between their hosts to pass from one to the next. Intermediate hosts are those in which trematodes reproduce asexually; in definitive or primary hosts, trematodes reproduce sexually. The following is a general example of a marine trematode life cycle.

1) EGG: Trematode eggs are released in a bird, mammal or fish's poop.

2) MIRACIDIUM: The egg hatches, releasing a miracidium covered in hair-like cilia. Miracidia use their cilia to swim through the water in search of the first intermediate host in the trematode's life cycle - usually a gastropod, like a snail.

3) ASEXUAL REPRODUCTION: Once a miracidium finds a host, it bores into and feeds on its tissues. Many copies of a new life stage - cercariae - are produced via asexual reproduction.

4) CERCARIAE: Cercariae are released from the first host and swim through the water to locate a second intermediate host. Gastropods, crustaceans, bivalves and fish are second hosts for different trematode species.

5) MORE ASEXUAL REPRODUCTION: A cercaria infects a second intermediate host, boring into its tissues and reproducing asexually again to make metacercariae.

6) METACERCARIAE: Metacercariae have protective walls around their bodies called cyst walls. Unlike cercariae, metacercariae do not leave the host's body. Instead, they wait for the second host to be eaten by a third and final host - the definitive host. The definitive host is usually a bird, a mammal or a fish.

7) SEXUAL REPRODUCTION: The enzymes in the definitive host's digestive system break down the metacercariae's cyst walls, releasing adult trematodes. The adult flatworms reproduce sexually and their fertilized eggs are released in the bird, mammal or fish's poop. The cycle begins anew!

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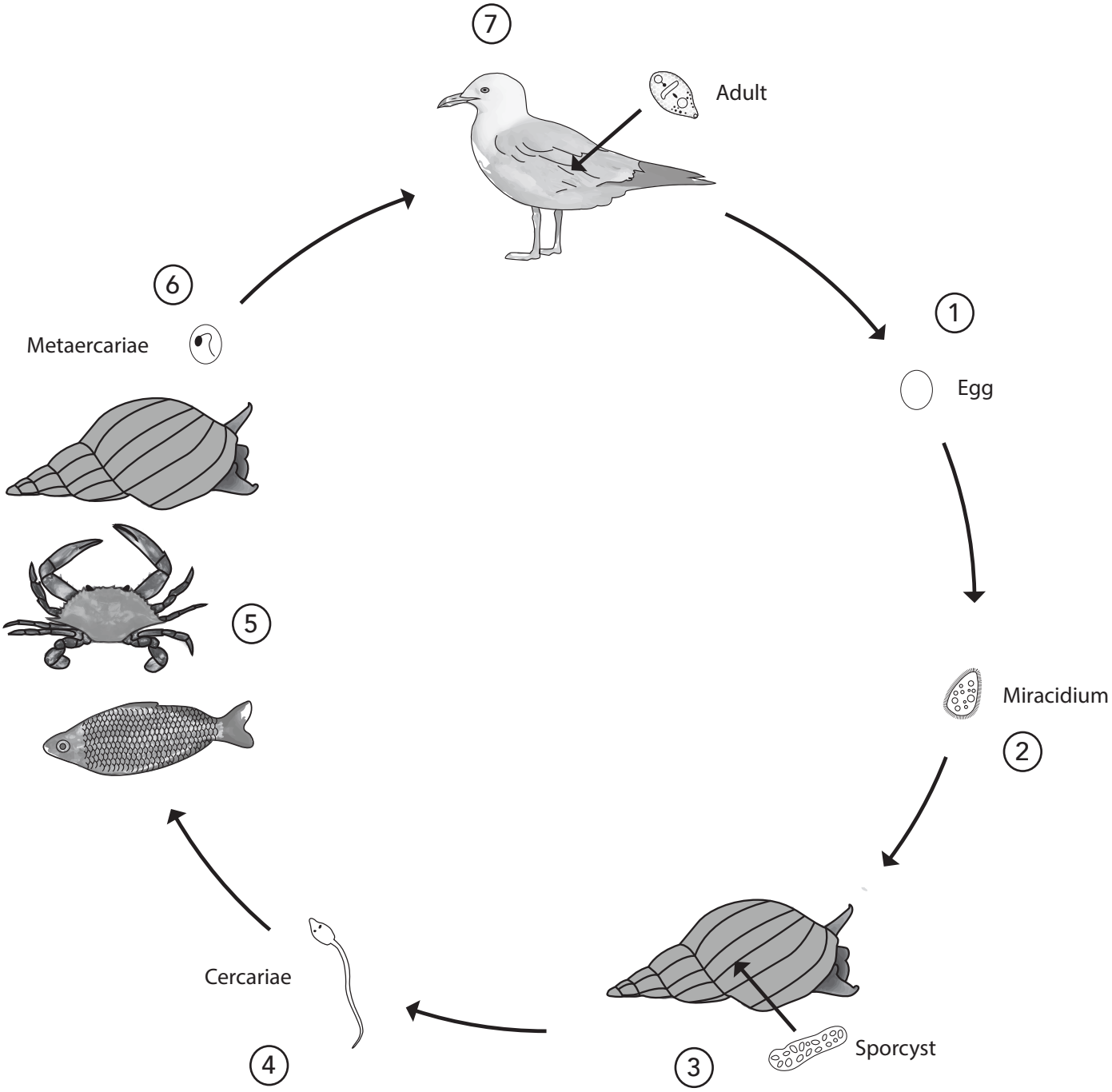

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Discussion Questions	Example Answers
Why do parasitic trematodes reproduce asexually during their life cycles?	• Asexual reproduction allows one egg to produce many, many new eggs • For example: asexual reproduction in the first intermediate host can produce many thousands of cercariae from just one miracidium! • If some or even lots of the swimming life stages don't find hosts, chances are others will ("hedging your bets")
Why do trematodes have such complex life cycles?	• Intermediate hosts allow trematodes to increase their spread (= likelihood of survival and reproduction) by reproducing asexually • Hosts higher up in the food web (ex: birds, mammals) may have been added to simpler life cycles to reduce trematode mortality via predation on earlier hosts (ex: gastropods, crustaceans) •Turning mortality from predation into gain • Hosts higher up in the food web may have been added to simpler life cycles since hosts with higher body mass allow trematodes to increase reproductive output • New intermediate hosts may have been added to simpler life cycles to increase parasite transmission between them
What roles do parasites like trematodes play in ecosystems?	• Swimming stages liker cercariae are zooplankton - they provide food for non-host organisms • Parasitic trematodes regulate populations of their host species

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Discussion Questions	Example Answers

About half of all animals are parasites - what makes parasitism such a successful way to live life?	• Lots of available habitats!
	  • For parasites: every animal is a potential habitat
	  • Within animals, there are smaller microhabitats to specialize on or in