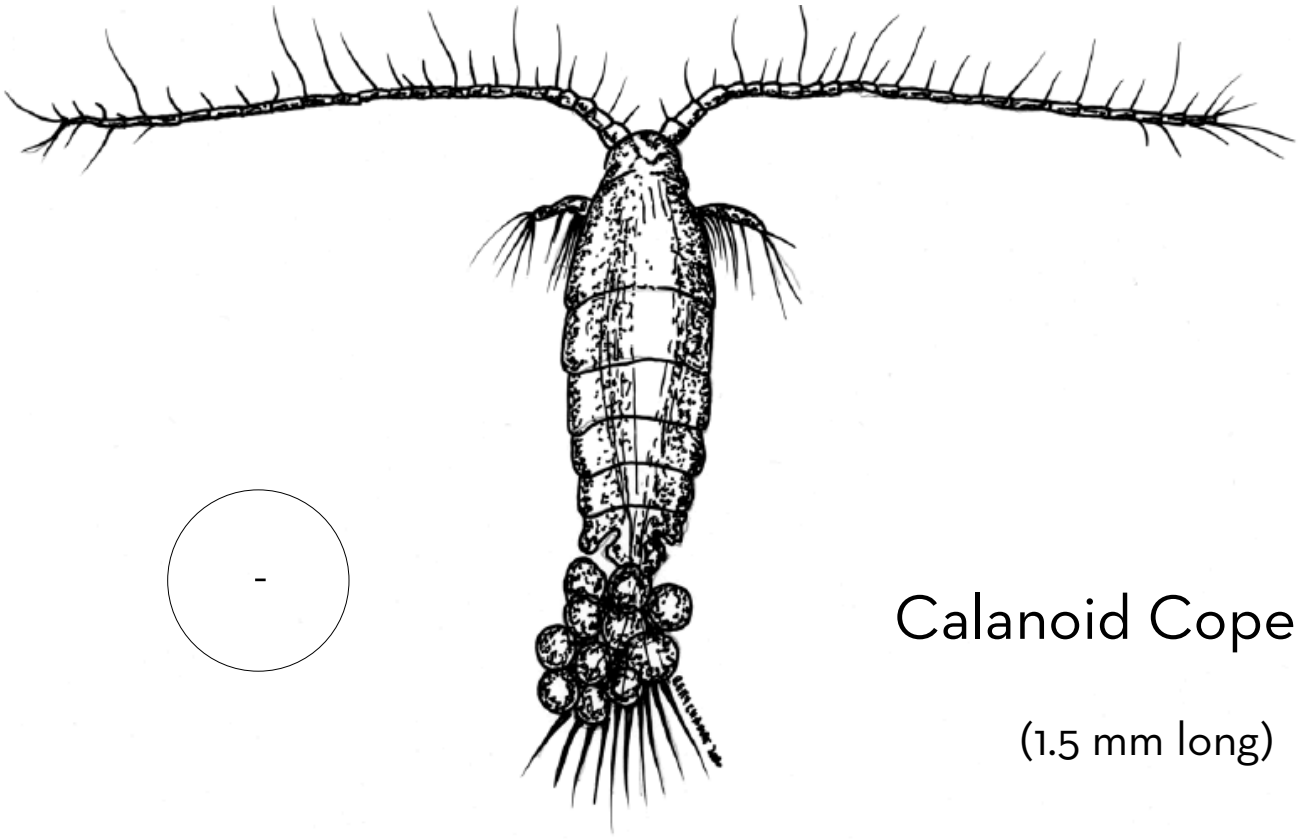
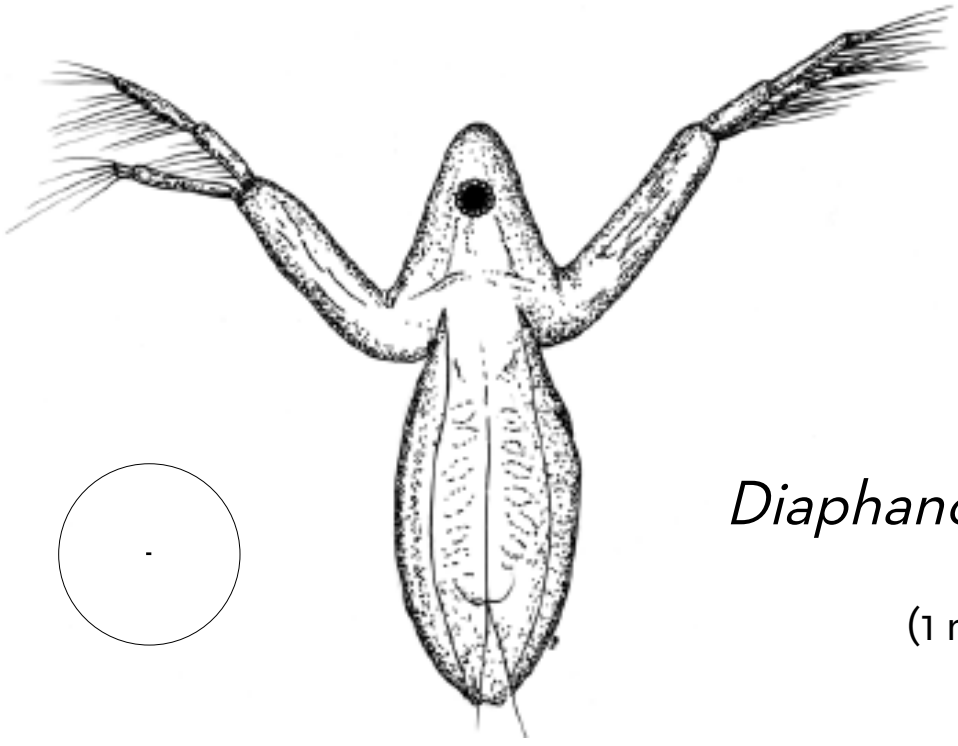


Calanoid Copepod

(1.5 mm long)

Inland Seas Education Association, www.schoolship.org



Diaphanosoma birgei

(1 mm long)

Inland Seas Education Association, www.schoolship.org

There are ten orders (groups) of copepods. Those in the Calanoid Copepod group:

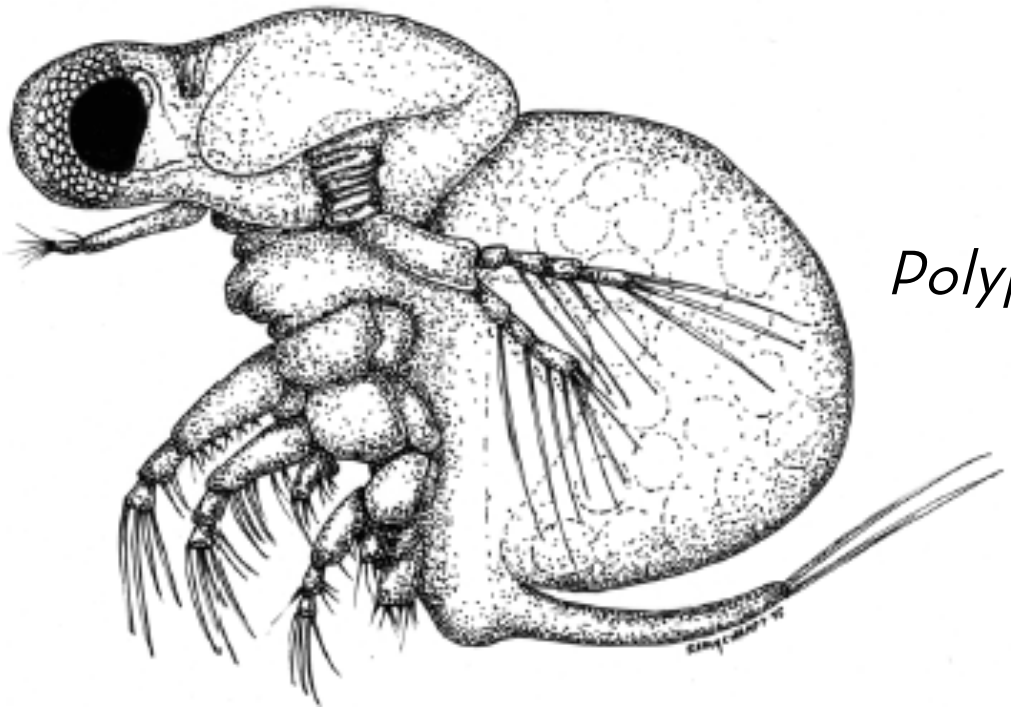
Look	Have long antennae, and a single egg sac. Males have a kink at the end of the right antenna.
Eat	Are omnivores (eat phytoplankton and zooplankton), but they prefer active prey. Move their legs to create currents that bring food to them, and use receptors on their antennae to identify and select appropriate prey.
Wow	Reproduce sexually. In most species the females do not store sperm and so must mate before every clutch of eggs. Can live up to one year. Some species are very quick and can easily escape predation. They can move at 35 cm/sec (0.8 miles/hour).
Eaten	Are eaten by Cyclopod copepods, juvenile fish, and insect larvae.

This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org

Diaphanosoma birgei is a Cladoceran.

Look	First antennae are tiny. Second antennae are huge – those arm-like things are the second antennae.
Eat	Consumes very tiny phytoplankton by filter feeding.
Wow	In spring and summer almost all individuals are female. These females can lay eggs that develop into new females without begin fertilized by a male. This is called parthenogenesis and is a form of asexual reproduction. Parthenogenesis is common to all cladocerans.
Eaten	Is eaten by many different species of fish such as largemouth bass, shiners, and yellow perch.

This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org

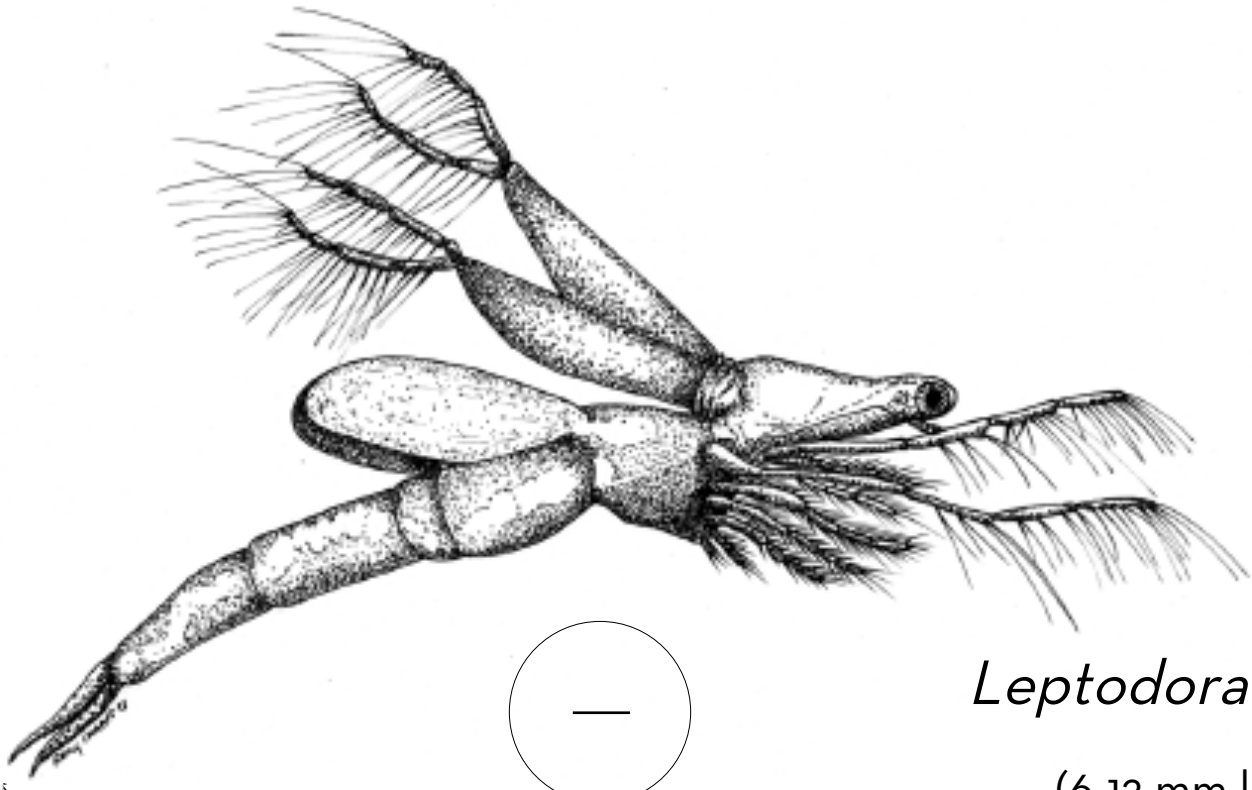


Polyphemus pediculus

(1 - 2 mm long)

-

Inland Seas Education Association, www.schoolship.org



—

Leptodora kindtii

(6-12 mm long)

Inland Seas Education Association, www.schoolship.org

Polyphemus pediculus is a Cladoceran.

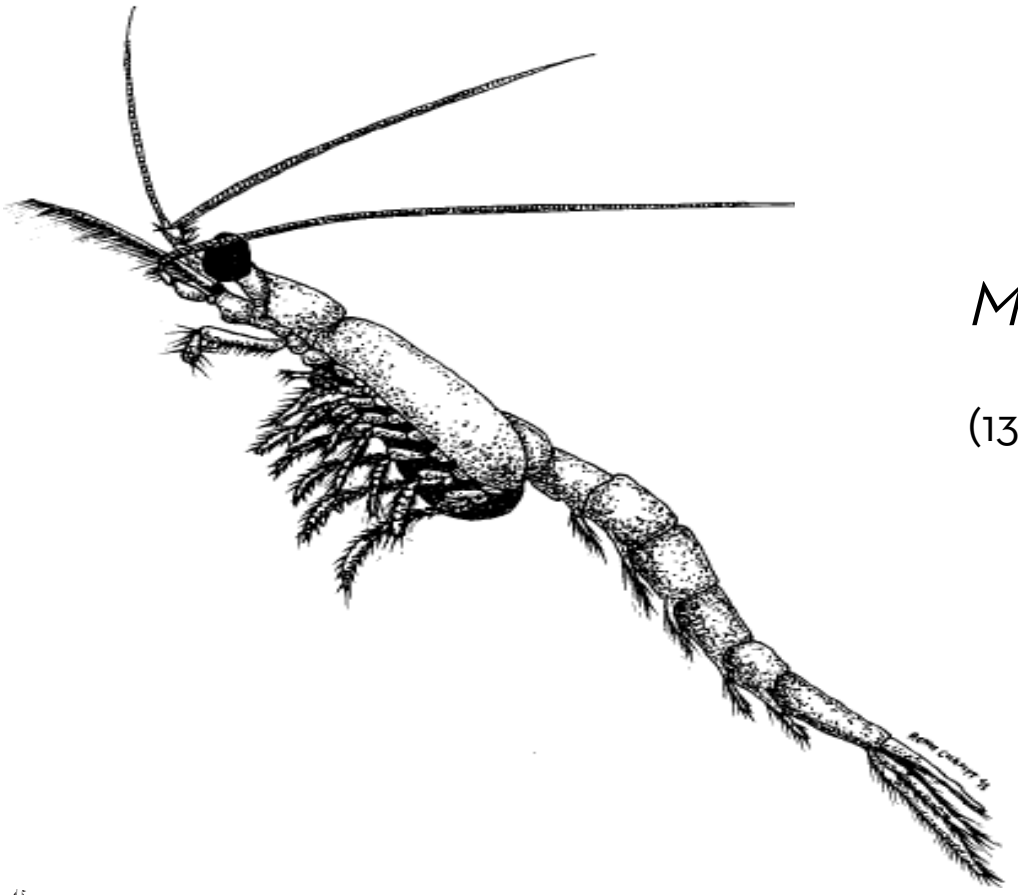
Look	Distinct features include: A single large eye, globe-shaped brood chamber, large swimming arms, and long "tail" with two whiskers.
Eat	A predator of protozoans, rotifers, and other cladocerans. It does not eat copepods or copepod nauplii, although it may eat algae.
Wow	Most often found in top first few meters of water, and in shallow areas or small lakes, but will move to open water areas at night. Unusual among the plankton because it is a visual predator. Very good at estimating prey size, which is impressive because it has only one eye, and lives in murky conditions.
Eaten	Consumed by bloaters (a type of fish), but rarely. Does not seem to be a common prey for any species.

This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org

Leptodora kindtii is a Cladoceran.

Look	Long, transparent body, and very difficult to see. Find it by looking for debris that is moving a lot, revealing its swimming movements.
Eat	Eats rotifers and cladocerans including *Daphnia, Bosmina, and Polyphemus*. Waits for prey to come near, so eats slow-moving and densely abundant species.
Wow	Unlike other cladocerans, the young from overwintering eggs hatch as nauplii before maturing into the adult form. The eye is the only part of the body with pigment and it is structured in a way that scatters light and makes it nearly invisible to both predators and prey.
Eaten	Important prey of bass, trout-perch, shiners, crappie, walleye, perch, cisco, and freshwater drum. Transparency and strong vertical migration pattern prevent *Leptodora* from being eaten to extinction.

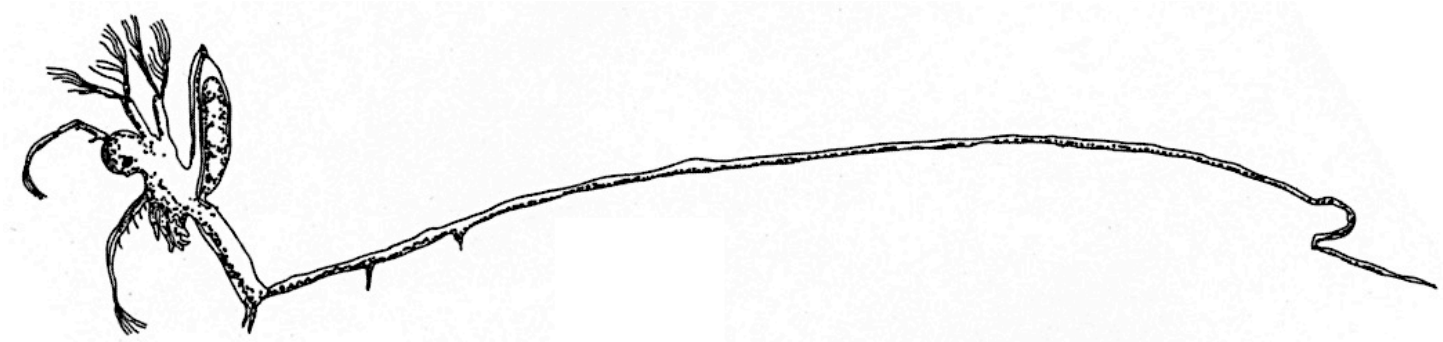
This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org



Mysis relicta

(13 - 25 mm long)

Inland Seas Education Association, www.schoolship.org



Cercopagis pengoi

(9.5 mm long)

Inland Seas Education Association, www.schoolship.org

Mysis relicta is a species of crustacean, but it not a Cladoceran or a Copepod.

Look	Two compound eyes on stalks. Many legs, and an elongated thorax.
Eat	Filter feeders and true omnivores who eat almost anything (phyto- and zooplankton). Diet varies with food availability. In Lake Michigan *Mysis* primarily eats phytoplankton so does not compete with exotic predatory zooplankton such as *Bythotrephes* or *Cercopagis*.
Wow	Lives in deep cold waters; at the bottom during the day (>26 meters) and migrates to the surface at night. Moves closer inshore in winter. Mating occurs in the winter. Males die after mating but females carry the eggs and developing young in a pouch under the body for 3-4 months, giving the common name "opossum shrimp."
Eaten	Primary food source for several fish: sculpin, burbot, lake whitefish.

This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org

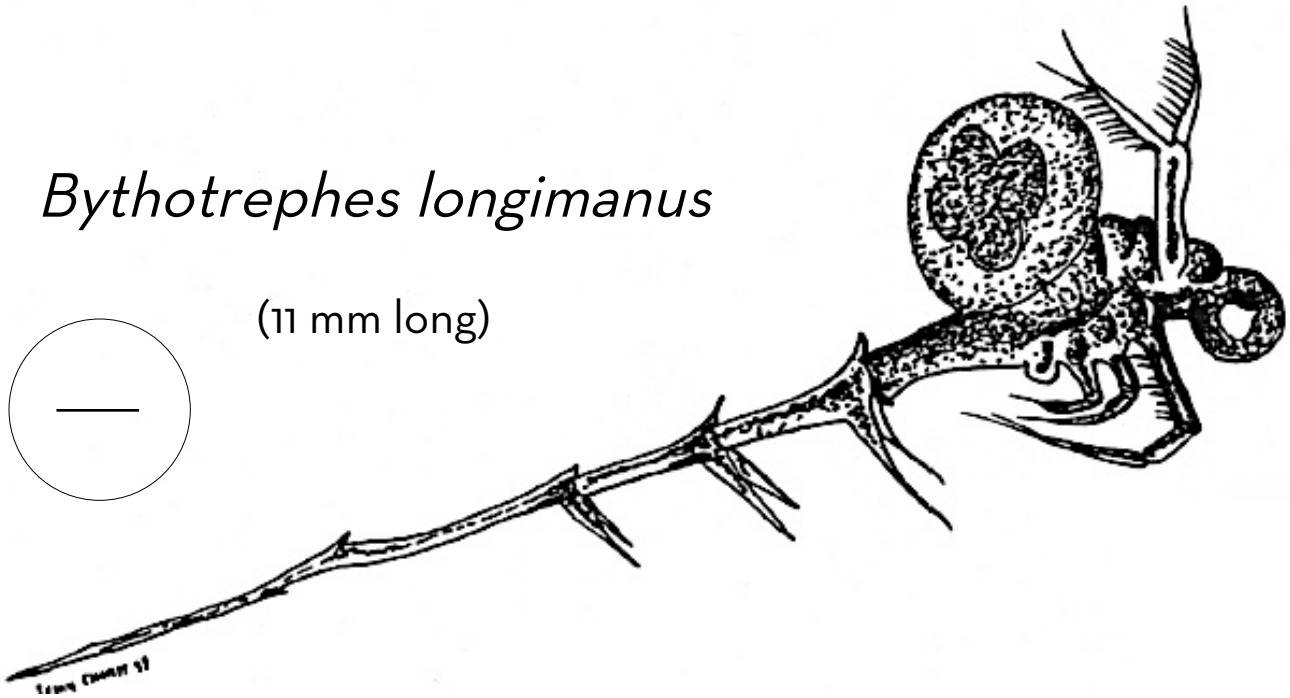
Cercopagis pengoi is a Cladoceran.

Look	Extremely long tail spine with a loop at the end, giving the common name, fishhook waterflea.
Eat	Predators of zooplankton such as *Daphnia* and *Leptodora*. Eats up to 16 individuals per day. May compete with small fish for food.
Wow	Invasive species native to the Black and Caspian Seas. Arrived here in the ballast water of transatlantic ships. Appeared in Lakes Erie and Ontario in 1998, and Lake Michigan in 1999. First discovered in Lake Michigan by the Schoolship *Inland Seas*.
Eaten	Long spiny tail makes it difficult to eat, although fish large enough can ingest it. More research is needed to know the impact of *Cercopagis*.

This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org

Bythotrephes longimanus

(11 mm long)



Inland Seas Education Association, www.schoolship.org

Ostracad

(1 mm long)

Inland Seas Education Association, www.schoolship.org

Bythotrephes longimanus is a Cladoceran.

Look	Long straight tail spine with several spikes, a single large eye, and a round brood pouch. These ones are big!
Eat	Eats cladocerans (*Bosmina, Daphnia, Cercopagis, Leptodora),* but not copepods which are very quick and difficult to catch. Since its introduction in the mid 1980's *Daphnia* densities have declined.
Wow	Like the fishhook waterflea, will clump and fowl fishing gear, appearing like wet cotton on fishing lines. Offspring hatch and develop inside the female before being released. The mother does not survive the birth. An invasive species in the Great Lakes. Native to the Black and Caspian Seas. First discovered in Lake Michigan in 1986.
Eaten	Readily eaten by fish large enough to eat the spine (5 cm or larger) including yellow perch, walleye, alewife, chinook salmon, emerald shiner, spottail shiner, rainbow smelt, lake herring, and lake whitefish.

This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org

Ostracods are a type of Crustacean, but not a Copepod or a Cladoceran.

Look	Shaped like a jellybean with legs.
Eat	Feed on bacteria, mold, algae, and detritus found in substrates. Found at the bottom of the lake.
Wow	Ostracods have the best fossil record of all the crustaceans, and were the only fossil crustaceans abundant in the Great Lakes.
Eaten	Although eaten by round gobies, they are tough enough to resist being crushed by the fish (which successfully crushes zebra and quagga mussels), and can still be alive when finally pooped out.

This work by Inland Seas Education Association is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. www.schoolship.org