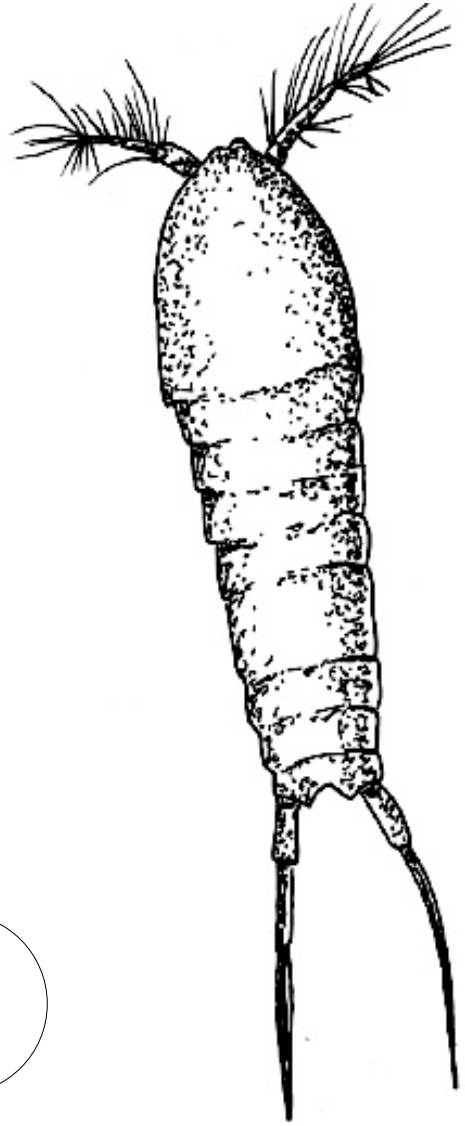

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Harpacticoid Copepod

(1.5 mm long)

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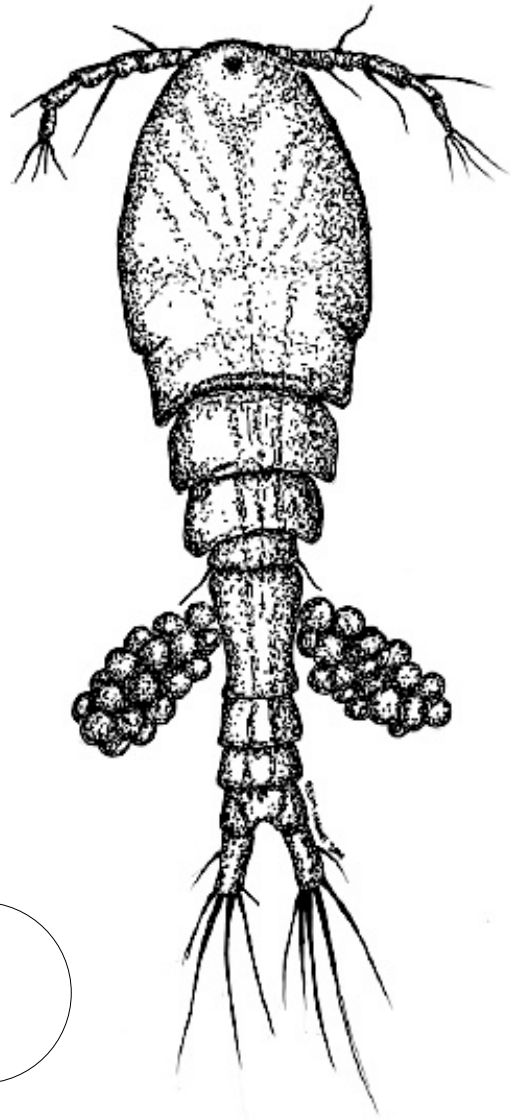

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Cyclopoid Copepod

(1.5 mm long)

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

Look	Have short antennae and a wide, worm-like body.
Eat	Feed in the benthic zone on detritus (dead things), algae, bacteria, and fungus. They scrape or grab food from surfaces
Wow	Like other copepods, they often have smaller organisms (ciliates, algae, fungi, bacteria) called epibionts attached to their bodies. Epibionts can compete with the copepod for food, or make them more susceptible to predation.
Eaten	Major food for larger invertebrates and many fish species. An energy-rich and efficient food source.

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

Look	Have short antennae, and two egg sacs.
Eat	Are carnivores (eat zooplankton), with mouthparts perfect for grasping & chewing. Watch out!
Wow	One common species is active all year, even in the winter when many other species are not. Reproduce sexually. Females produce 12-13 clutches of eggs each year and can store sperm to fertilize multiple egg clutches. Eggs hatch within a few days. Can be intermediate hosts to human parasitic worms (tapeworms, roundworms), but also eat A LOT of mosquito larvae.
Eaten	Eaten by many fish species including alewives, shiners, bass, perch, and young whitefish and walleye.

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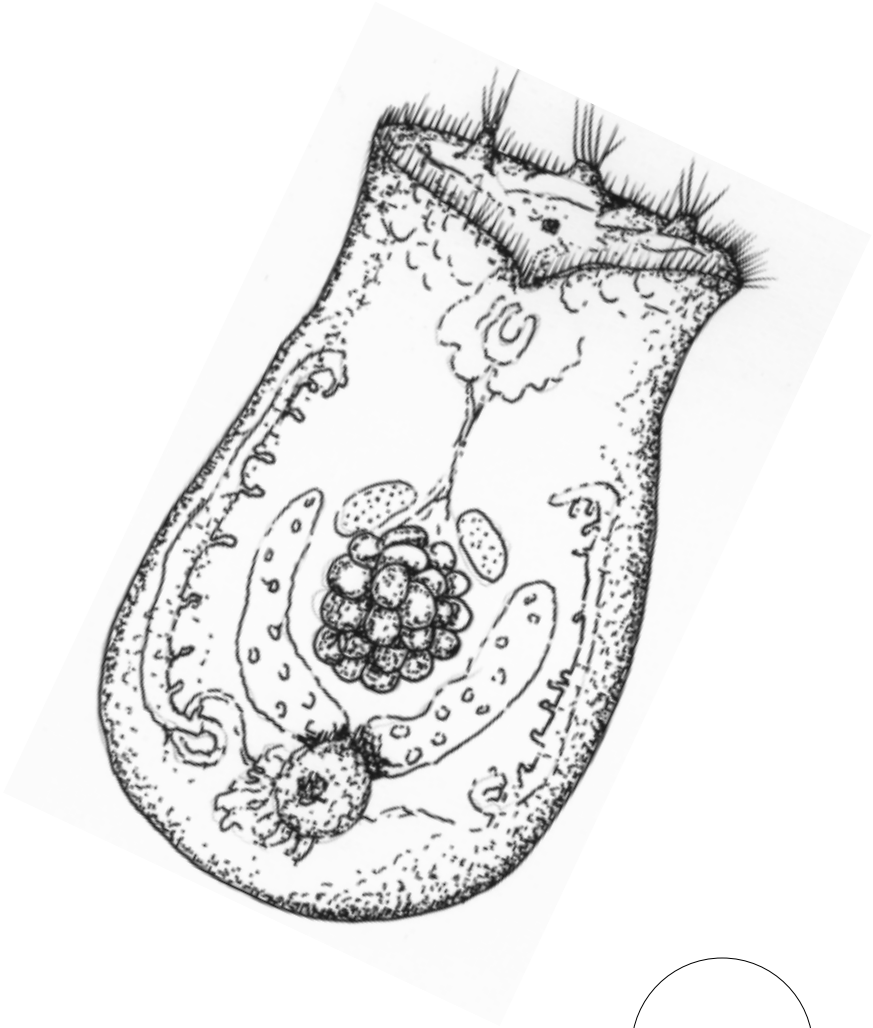
Colonial Rotifer

(1 mm long)



Asplanchna

(1 mm long)

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About 25 species of rotifers form colonies. Common ones that we might see include *Conochilis unicornis* and *Conochilis hipocrepis*.

Look	Many individuals of one species (from 4 to more than 50) link-up to make a colonial rotifer.
Eat	They eat very, very tiny particles (<10 µ), including phytoplankton and cellular organelles. Cilia wiggle to sweep food into the rotifer's mouth.
Wow	Eggs are so well developed when they are laid that they hatch within an hour. Offspring attach to their parents to form a colony. When the colony gets too big, it breaks off to form a new colony.
Eaten	Eaten by other zooplankton including *Leptodora*.

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Asplanchna is one genus in the animal phylum Rotifera. *Asplanchna* species are:

Look	Soft-bodied and sac-like. Transparent so internal organs are visible.
Eat	Predators. They eat zooplankton (cladocerans, copepods, rotifers), but also large phytoplankton They have special jaws that push food into the stomach, and pull undigested waste back out the mouth.
Wow	Most individuals are female. They produce eggs they fertilize themselves, which then develop into females. In fact, males are produced from unfertilized eggs. Females live 4-10 days. Males do not eat and live 2-5 days.

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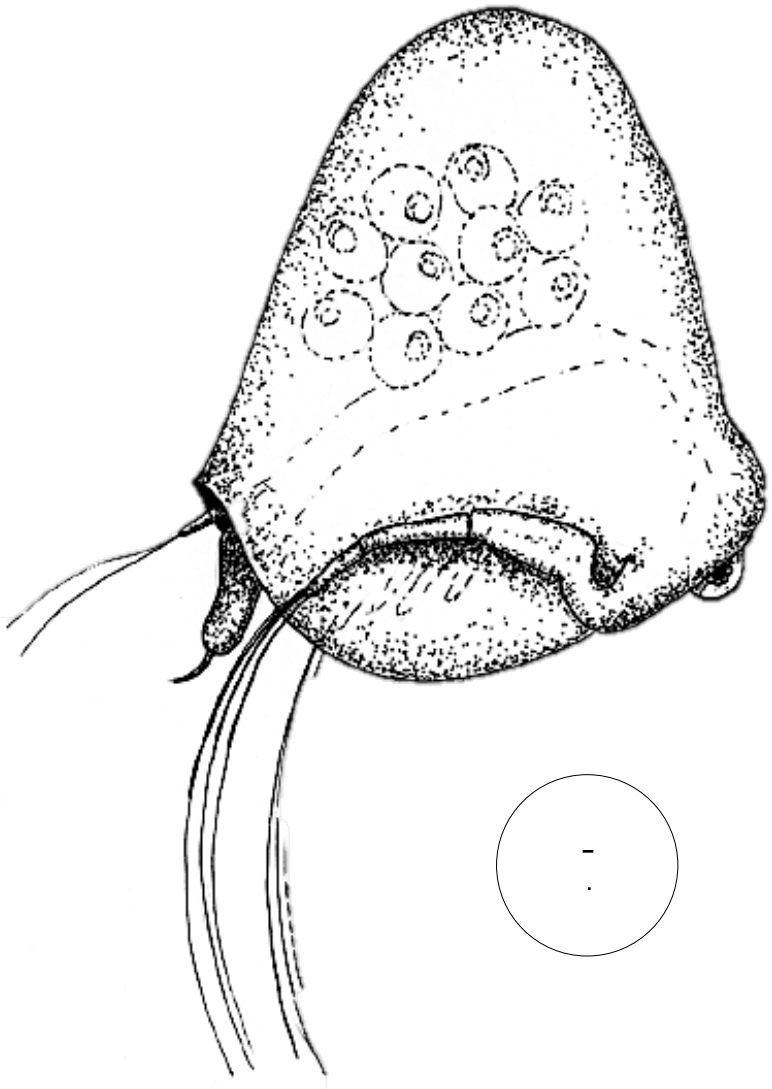

Holopedium gibberum

(Females 1 - 2 mm long
Males 0.5 mm long)

Holopedium gibberum is a species in the Cladoceran plankton group.
Cladocerans are a type of crustacean.

Look	A gelatinous blanket (called a mantle) covers the hump-shaped body. This one swims upside down!
Eat	Filter feeder and omnivore – eats several species of phytoplankton, and tiny zooplankton.
Wow	The gelatinous mantle increases the volume of this species by 8 times. However its small body size makes it less desirable for predators. The mantle may also taste bad.
Eaten	Occasionally eaten by cisco, bloater, and Arctic char.

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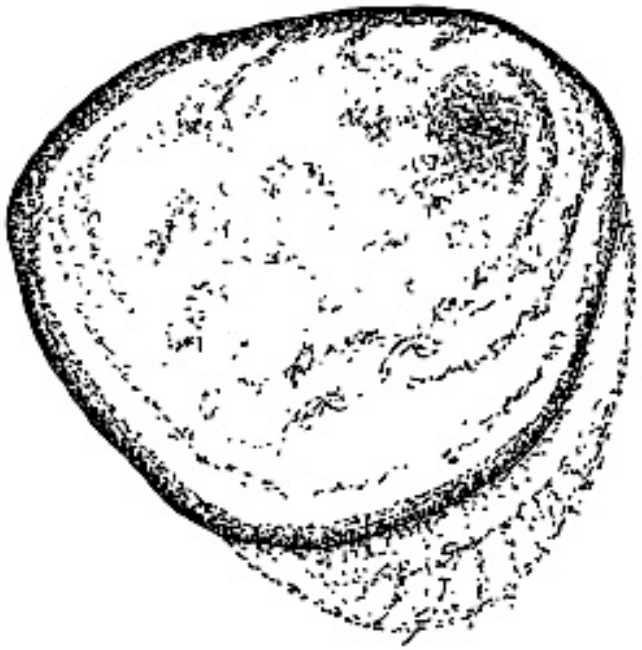
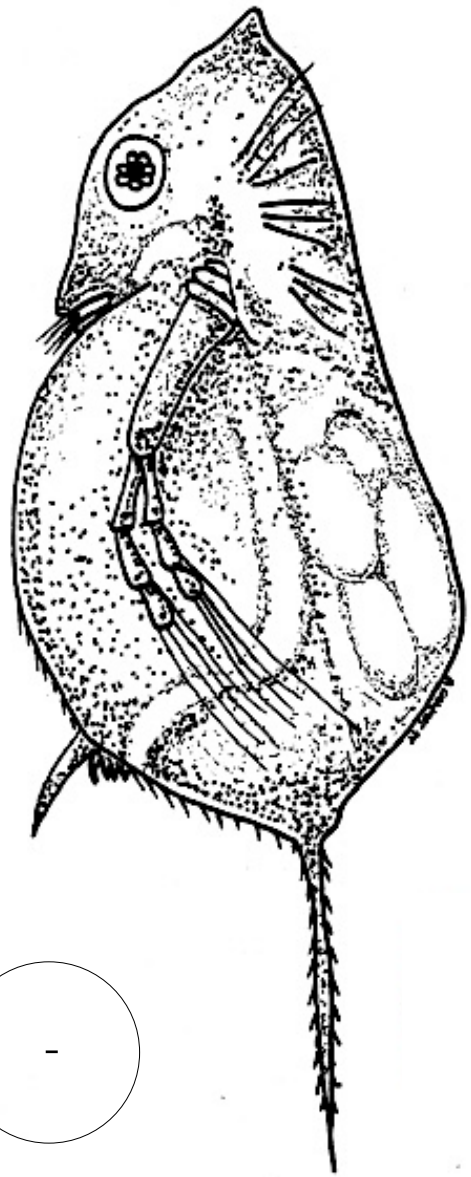


Zebra Mussel Veliger

(0.08 - 0.5 mm long)



Daphnia sp.

(1 - 3 mm long)

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Look	Veligers do not have legs! Instead, look for a veil that hangs down from the body.
What	Planktonic larvae of zebra and quagga mussels. They won't always be plankton.
Wow	A single female mussel can produce 300,000-400,000 eggs at a time and more than 1 million eggs each year. (Eggs hatch into veligers.) Veligers float around for several weeks until they develop into juveniles, settle on the bottom, and produce a shell. Zebra and quagga mussels most likely arrived to the Great Lakes from the Black and Caspian Seas as veligers in the ballast water of ocean-crossing ships.

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Daphnia are a type of Cladoceran.

Look	The body is clear so everything happening inside is visible! Look for the beating heart, just behind the head. It beats quickly – 180 beats/min. You might also see movements of blood in capillaries, young in the brood patch, or muscles moving the eyes.
Eat	Filter feeder – eat unicellular algae (phytoplankton), protists, bacteria, and other tiny particles.
Wow	Often called "water fleas" because they "jump" when swimming. Like all Cladocerans, for most of the year nearly all individuals are females. Females can reproduce asexually. Eggs hatch inside the female before being released. Males are produced in the fall.
Eaten	Eaten by many fish species and other zooplankton

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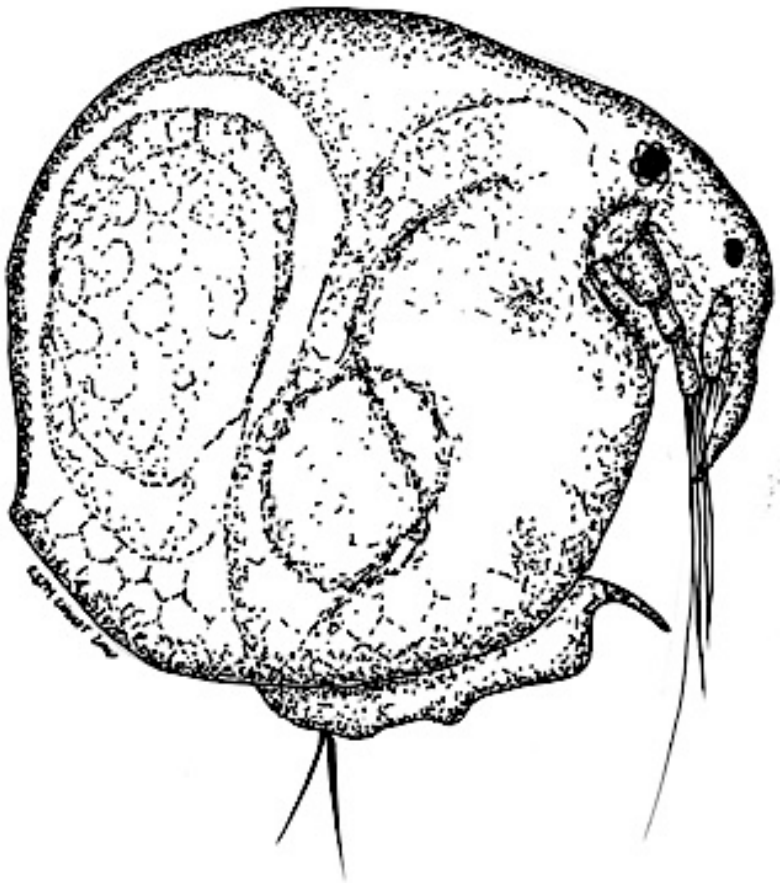
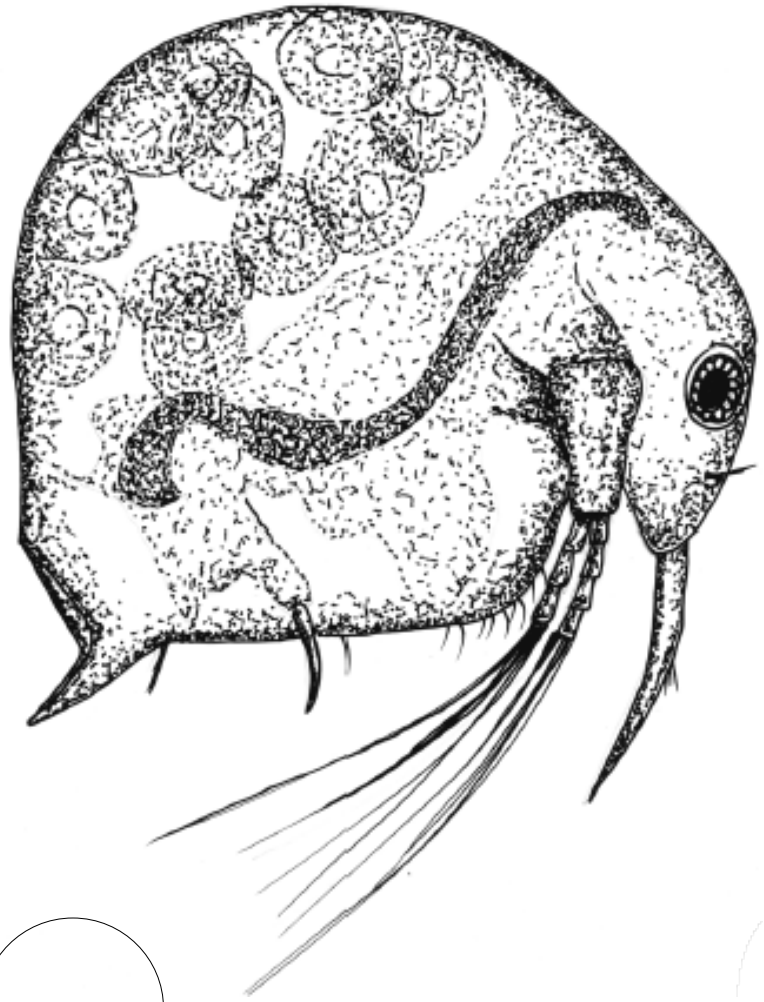


Chydorus sp.

(0.2 - 0.5 mm long)



Bosmina sp.

(0.5 mm long)

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Chydorus are a type of Cladoceran.

Look	Spherical body shape. No appendages stick out (unlike the drawing here).
Eat	Filter feeder of small algae (phytoplankton) and detritus. AND Scrapes diatoms and detritus from algal filaments and aquatic plants.
Wow	Swims well for short distances, but usually found clinging to thread-like alga. Spends days near the bottom of the lake and migrates up only at night. Occupies a wide range of pH: 3.5-9.5 Unlike most cladocerans, survives the winter as adults and can reproduce under the ice.
Eaten	Eaten by many juvenile fish species.

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Bosmina are a type of Cladoceran.

Look	Rounded body, but not a sphere. Look for the pointed "beak" and pointed tip at the back of the body.
Eat	Filter feeder of algae and tiny protozoans.
Wow	Lives less than one month. Overwinter as resting eggs, which all hatch out as females, who can produce offspring without males. This type of asexual reproduction is called *parthenogenesis*.
Eaten	Eaten in small numbers by fish: bass, perch, crappie, walleye fry, small bloater, young whitefish, and alewife. *Mysis relicta* also eats *Bosmina*.

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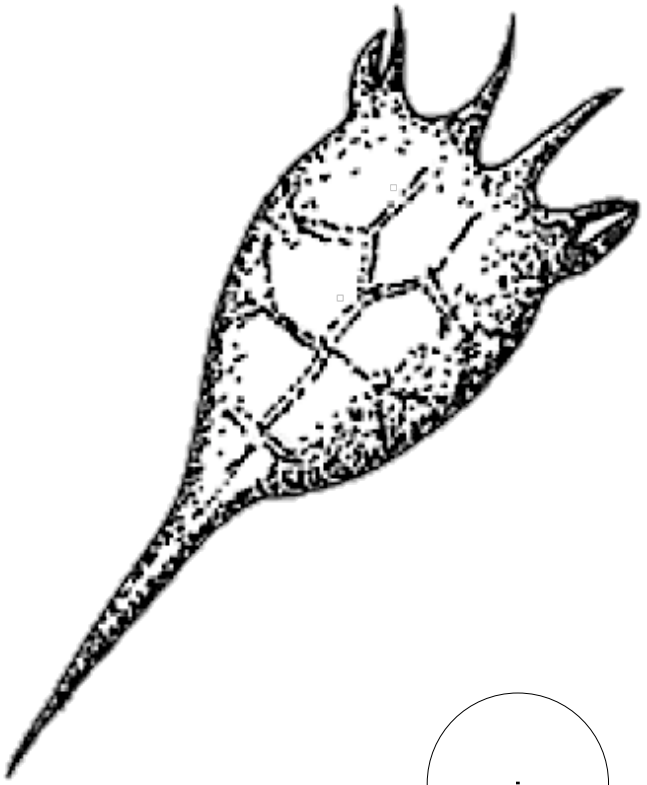
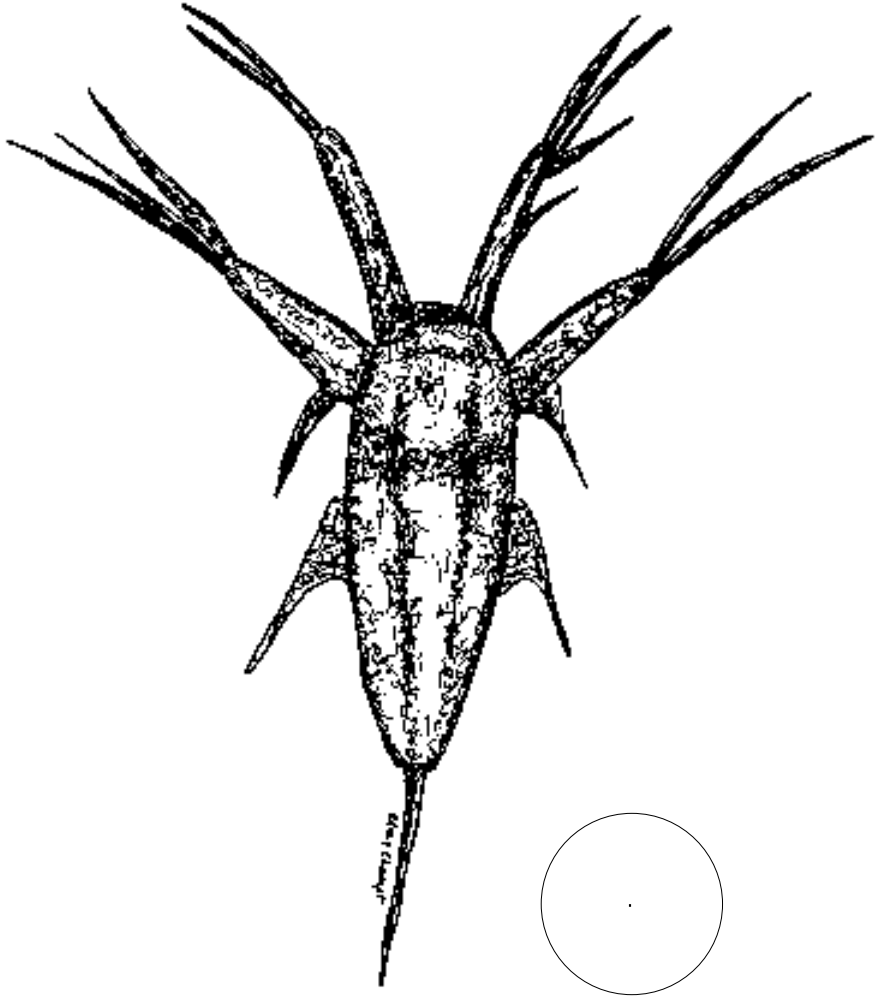


Keratella

(0.5 mm long)



Copepod Nauplius

(0.1 – 0.4 mm long)

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Keratella are a type of Rotifer.

Look

Look for the spine at the rear of the body. Some individuals have a short spine, or no spine.

Keratella will spin as though this spine is pinned down.

Eat

Filter feeder of phytoplankton. Cilia around the mouth direct food into the gut and cause the body to move and spin.

Wow

Live for a few days or weeks.

Whether or not the offspring has a posterior spine is dependent on how many predators are in the body of water where the rotifer lives.
Females without a spine can produce offspring with a spine and vice versa.

Eaten

Eaten by other zooplankton: cladocerans, *Asplanchna* and cyclopoid copepods.

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There are ten orders (groups) of copepods. It is not possible to tell which group of copepod a nauplius belongs to.

Look

Appendages fan out from the body.

What

Nauplius is the name for the juvenile stage of many crustacean species.
It extremely difficult to identify nauplii to species, so we just lump them all together in one group.

Eat

Filter feeder and ambush predator.

Wow

Grow and mature by molting. At each stage nauplii gain legs and grow longer; 5-6 molts gets a nauplius to a sub-adult, another 5 molts is required to gain full maturity.
It can take several months to mature.

Eaten

They are tiny, so probably lots of things eat them: other zooplankton, and small fish

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