Identification of Freshwater Invertebrates

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Taxonomy is the science of classifying and naming organisms according to their characteristics. All living organisms are classified into seven levels: Kingdom, Phylum, Class, Order, Family, Genus, and Species.

This book classifies **Benthic Macroinvertebrates** by using their Class, Family, Genus, and Species. The Classes are the categories at the top of the page in colored text corresponding to the color of the page. The Family is listed below the common name, and the Genus and Species names are customarily written in italics, with the Genus being capitalized and the species being lower case. For example: *Genus species.*

This book classifies **Plankton** by Phylum, Genus and Species.

For each organism the following information is given:

HABITAT: Where the organism would be found.
SIZE: The average size of the organism.
IDENTIFICATION: Key features of the organism to help you identify it.
INTERESTING FACT: An interesting fact about the organism, or how it affects aquatic life.

Benthic Macroinvertebrates

Arachnida

Water Mite
Family: HYDRACHNIDAE

Identification:
Resembling fat little spiders, they have a flat, round body with four hairy pairs of legs, and move swiftly through the water.

Size:
1 to 5 mm

Habitat:
Found in all freshwater habitats. Like to swim in slow-flowing, shallow water among plants.

Interesting Facts:
While all water mites have the same simple body plan, some can have hard bodies, and others can have soft bodies.

Pollution Sensitive

Bivalvia

Quagga Mussel (*Dreissena bugensis*)
Family: DREISSENIDAE

Identification:
Pale shells with finer stripes and more oval shape than zebra mussel shells.

Size:
Up to 51 mm

Habitat:
Able to live where any hard substrates (ex: rocks, pipes) exist on which they can attach.

Interesting Facts:
Quagga mussels are cousins of the zebra mussel! One important difference between them is that quagga mussels can tolerate colder, deeper waters.

Pollution Tolerant

Zebra Mussel (*Dreissena polymorpha*)
Family: DREISSENIDAE

Identification:
Yellow or brown "D" shaped shell, usually with dark and light colored stripes; usually grow in clusters.

Size:
Up to 51 mm but most are less than 25 mm

Habitat:
Generally found in algae-rich water from 2 to 10 meters deep.

Interesting Facts:
Zebra mussels live in colonies of 30,000 to 50,000 square meters and each mussel is capable of filtering 1 liter of water per day!

Pollution Tolerant

Bivalvia

Fatmucket Clam (*Lampsilis siliquoidea*)
Family: UNIONIDAE

Identification:
Elongated-elliptical shell.

Size:
About 90 mm

Habitat:
Lakes and small- to medium-sized streams in mud, sand, or gravel.

Interesting Facts:
The male fatmucket clam is usually larger than the female.

Pollution Sensitive

Giant Floater Clam (*Pyganodon grandis*)
Family: UNIONIDAE

Identification:
Elliptical, smooth shell; shell is light yellow or yellowish-green in younger individuals and dark green to brown in older shells.

Size:
About 127 mm

Habitat:
Ponds, lakes, and sluggish mud bottomed pools of creeks and rivers.

Interesting Facts:
Giant floater clams can reach up to 254 millimeters in length!

Pollution Sensitive

Clitellata

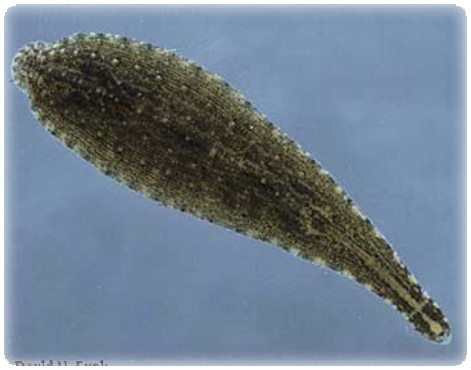
Leech (*Helobdella sp.*)
Family: GLOSSIPHONIIDAE

Identification:
Flat body; brown with spots, segmented (usually 34 segments).

Size:
10-250 mm

Habitat:
Shallow waters.

Interesting Facts:
Leeches were commonly used in the past for medical procedures on humans.



Pollution Tolerant

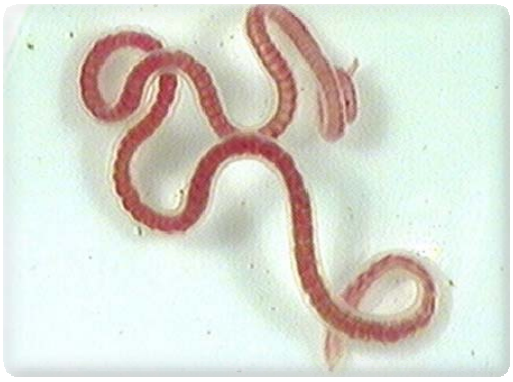
Aquatic Worms (*Limnodrilus sp.*)
Family: TUBIFICIDAE

Identification:
Thin cylindrical segmented bodies; may be red, tan, brown, black; may also have small hairs that are not easily seen.

Size:
1 to 30 mm

Habitat:
Soft sediments in bodies of freshwater that are rich in organic matter.

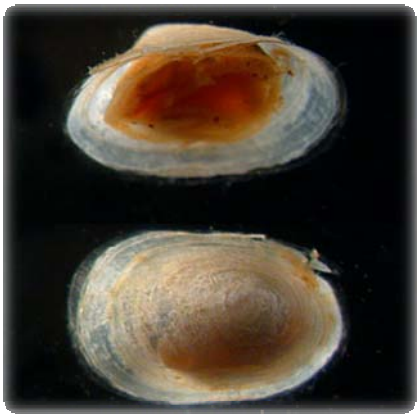
Interesting Facts:
Aquatic worms are capable of inhabiting areas of low dissolved oxygen concentrations and areas that contain large amounts of organic pollution.



Pollution Tolerant

Gastropoda

Freshwater Limpet
Family: ANCYLIDAE



Identification:
Small and cone-shaped with a flat bottom.

Size:
4 to 5 mm

Habitat:
Likes to inhabit rocky riffles, and low nutrient, well-oxygenated streams with good water quality.

Interesting Facts:
Freshwater limpets are pulmonates, meaning they breathe through a lung, but they also have gills to aid in respiration.

Pollution Sensitive

Gilled Snail
Family: LYMNAEIDAE

Identification:
Soft body inside a hard, spiral-shaped shell. The spiral opening to the shell is usually on the right.

Size:
2 to 70 mm

Habitat:
Usually found grazing on a variety of substrates.

Interesting Facts:
Gilled snails have a shell "door" called an operculum, which they can close when they go into their shell.

Pollution Sensitive

Gastropoda

Lunged (Pouch) Snail
Family: PHYSIDAE

Identification:
Soft body inside a hard, spiral shaped shell. The spiral opening to the shell is usually on the left.

Size:
2 to 70 mm

Habitat:
Ponds and pools where oxygen is low, and slow polluted rivers.

Pollution Tolerant

Interesting Facts:
The snail's shell provides protection from enemies and acts as a handy oxygen container. When a snail is seen crawling upside down on the surface of a pond, it is gathering fresh air into its shell.

Orb Snail
Family: PLANORBIDAE

Identification:
Hard, coiled shell. Usually gray or black.

Size:
2 to 70 mm

Habitat:
Clean, quiet waters.

Pollution Tolerant

Interesting Facts:
Snails have a muscular foot with slime glands. The slime aids them while they crawl on their foot.

Hydrozoa

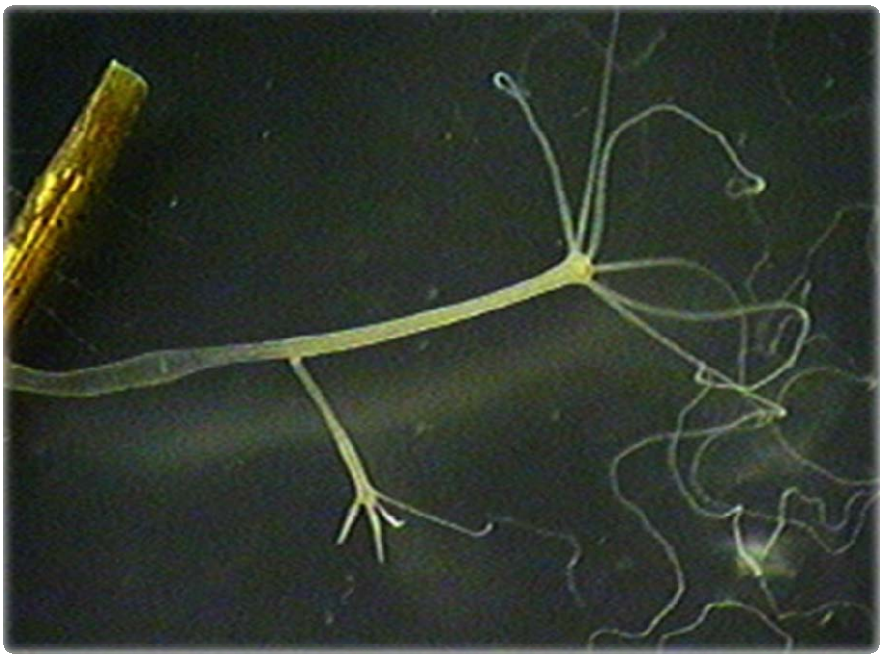
Hydra (*Hydra oligactis*)
Family: HYDRIDAE

Identification:
Brown and radially symmetrical. It consists of a stalk that supports a crown of five to eight long tentacles . The tentacles, which contain stinging cells, surround a mouth that is capable of swallowing large microcrustaceans like copepods and waterfleas.

Size:
Up to 3 mm

Habitat:
Submerged vegetation in unpolluted ponds, ditches, and streams in quiet shallows.

Interesting Facts:
Hydras reproduce asexually by budding. Changes in the environment (temperature, carbon dioxide, light, or an increase in noxious substances) induce sexuality.



Pollution Sensitive

Insecta

Predacious Diving Beetle
Family: DYTISCIDAE

Identification:
Smooth, oval, and streamlined with hairy, paddle-shaped hind legs.

Size:
Up to 13 mm

Habitat:
Primarily found in the still waters of lakes and ponds, but can also be encountered in streams.

Interesting Facts:
Diving beetles breathe through an air bubble under their wing that they take in when they break the surface.

Pollution Tolerant

Aquatic Beetle Larva
Family: ELMIDAE

Identification:
Distinct head with well-developed chewing mouth parts. The body is long with many segments and is relatively hard and stiff.

Size:
1 to 6 mm

Habitat:
Specially adapted to cling to rocks in fast flowing water.

Interesting Facts:
Aquatic beetle larvae are often called "water tigers" because they are fierce hunters.

Pollution Intermediate

Insecta

Riffle Beetle
Family: ELMIDAE

Identification:
Small, oval body, usually black with one pair of tiny antennae.

Size:
1 to 6 mm

Habitat:
Found in clean, fast-moving waters and usually indicate an ample oxygen supply.

Interesting Facts:
Riffle beetles are able to fly when they emerge from the water as juveniles, but lose this ability when they return to the water.

Pollution Sensitive

Whirligig Beetle
Family: GYRINIDAE

Identification:
Black, or nearly black, flattened and streamlined for aquatic life.

Size:
3 to 35 mm

Habitat:
Often congregate in both slow-, and fast-moving waters, especially in streams and ponds. Spend most of their lives at the surface of the water.

Interesting Facts:
Whirligig beetles' eyes are divided, allowing them to see both above and below the water surface at the same time.

Pollution Intermediate

Insecta

Crawling Water Beetle
Family: HALIPLIDAE

Pollution Intermediate

Identification:
Oval in shape, and generally yellow to light brown in color with patterns of dark dots along the back.

Size:
1.5 to 5 mm

Habitat:
Generally found in aquatic vegetation along the edges of small ponds, lakes, and quiet streams.

Interesting Facts:
Crawling water beetles actually swim poorly, so they prefer to get around by crawling.

Water Scavenger Beetle
Family: HYDROPHILIDAE

Pollution Intermediate

Identification:
Smooth, oval, dark brown or black bodies and short, hairy, clubbed antennae. Some have a conspicuous ridge on the underside of the thorax.

Size:
Approximately 40 mm

Habitat:
Usually found in ponds, shallow lakes, and along the shoreline of flowing water.

Interesting Facts:
Water scavenger beetles, as the name implies, feed on dead materials such as dead or decaying plants.

Insecta

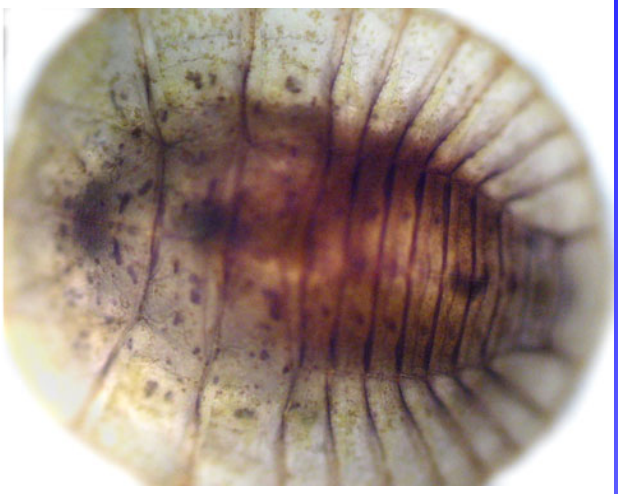
Water Penny
Family: PSEPHENIDAE

Identification:
Small and circular, resembles a penny. Usually black or brown.

Size:
3 to 5 mm

Habitat:
Usually found in fast moving waters with an ample supply of oxygen.

Interesting Facts:
Water pennies are often hard to remove because they look and act like miniature suction cups that stick to rocks and other substrates.



Pollution Sensitive

Midge Larva
Family: CHIRONOMIDAE

Identification:
White or red in color; anterior and posterior pairs of prolegs; generally large larvae greater than 13 mm.

Size:
2 to 30 mm

Habitat:
Streams, lakes, ponds, and wetlands.

Interesting Facts:
Midge larvae can live from two weeks to several years, but the adults only live for a few days.

Pollution Tolerant

Insecta

Blackfly Larva
Family: SIMULIIDAE

Identification:
Bowling pin or "club-shaped" with a soft body and a fan-like mouth sometimes with bristles.

Size:
3 to 12 mm

Habitat:
In swift currents on rocks and submerged vegetation.

Interesting Fact:
As adults, blackflies are serious pests because they inflict painful bites to warm-blooded animals.

Pollution Intermediate

Cranefly Larva
Family: TIPULIDAE

Identification:
Milky, light brown, or greenish in color with digestive tract often visible. Has finger like appendages on hind end.

Size:
10 to 100 mm

Habitat:
Under rocks, overhanging vegetation, and leaf packs.

Interesting Facts:
This fat, worm-like larvae will grow up to look like a "giant mosquito" with long skinny legs; however, they are harmless.

Pollution Intermediate

Insecta

Mayfly Larva

Family: CAENIDAE

Identification:
Usually have three long tails, and feather-like gills along their abdomen.

Size:
15 mm or less

Habitat:
Mostly found in cool, more permanent water bodies like streams and lakes.

Interesting Facts:
Mayfly nymphs can take from three weeks to two years to become an adult, but only live as adults for a few days.

Pollution Intermediate-Pollution Sensitive

Family: EPHEMERIDAE

Insecta

Giant Water Bug
Family: BELOSTOMATIDAE

Identification:
Brown and flat with "prey-grasping" front legs and a body resembling that of a cockroach.

Size:
Approximately 76 mm

Habitat:
Commonly found in lakes, ponds, and quiet streams.

Interesting Facts:
They are fierce predators that stalk their prey and inject them with a highly digestive saliva. Their bite is considered one of the most painful that can be inflicted by any insect.

Pollution Intermediate

Water Boatman
Family: CORIXIDAE

Identification:
All water boatmen have a striped pattern on their back and swim right side up. Closely resemble a back swimmer.

Size:
1.5 to 15 mm

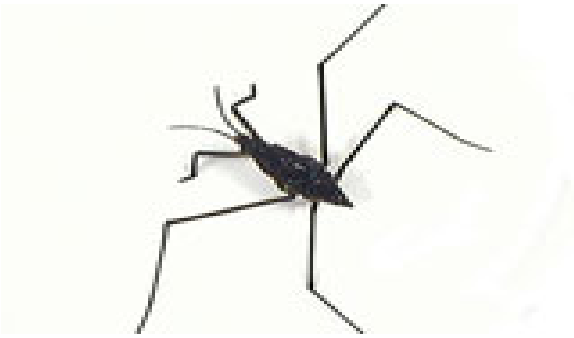
Habitat:
Still ponds and slow-flowing creeks among vegetation.

Interesting Facts:
They like to cling to objects in the water, including fish!

Pollution Tolerant

Insecta

Water Strider
Family: GERRIDAE



Identification:
Usually dark brown or black with six thin, long legs. The front pair of legs are short, and the middle and back legs are very long.

Size:
8 to 12 mm long

Habitat:
Found living on the surfaces of ponds, slow streams, marshes, and other quiet waters.

Interesting Facts:
Are often called pond skimmers or Jesus bugs because their long legs and light body allow them to "walk" on the water.

Pollution Tolerant

Water Scorpion
Family: NEPIDAE

Identification:
Long legs, thin bodies, and are often confused with walking sticks.

Size:
Up to 50 mm

Habitat:
Commonly found in slow-moving water and among vegetation.

Interesting Facts:
Their long legs are not much use in swimming, so most water scorpions spend their life near the shoreline.

Pollution Intermediate

Insecta

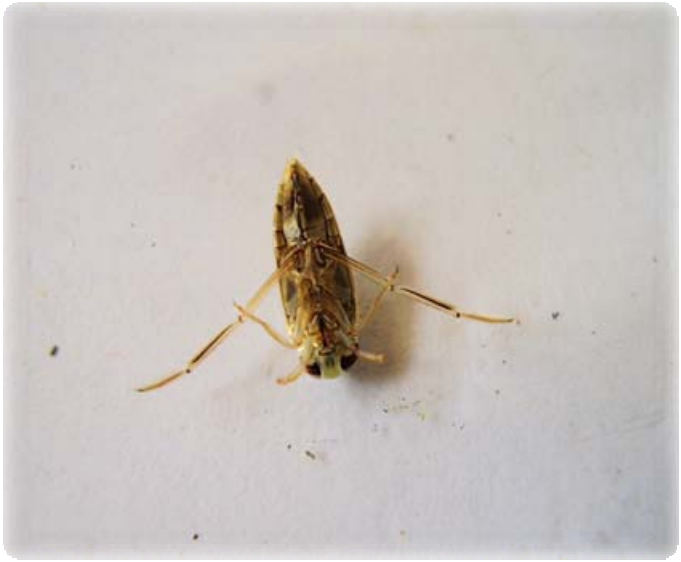
Backswimmer
Family: NOTONECTIDAE

Identification:
Can be recognized by their curved back, large eyes that occupy most of the head, and long hairy legs.

Size:
Up to 11 mm

Habitat:
Usually found in slow-flowing waters.

Interesting Facts:
Backswimmers get their name because they do indeed swim up-side down through the water.



Pollution Tolerant

Insecta

Dobsonfly Larva
Family: CORYDALIDAE

Identification:
Yellowish to brown, stout, segmented, caterpillar-like bodies, large pinching mandibles, six legs on the thorax and short, spiny projections on the abdomen.

Pollution Sensitive

Size:
10 to 65 mm

Habitat:
Shallow, fast-flowing portions of streams, creeks, and small rivers; hiding beneath rocks and logs.

Interesting Facts:
Dobsonfly larva are also called hellgrammites and are commonly used as fish bait, especially for largemouth bass.

Alderfly Larva
Family: SIALIDAE

Identification:
Reddish-brown in color with one straight feathery tail. Each leg has tiny pinchers at the end.

Pollution Sensitive

Size:
1 to 25 mm

Habitat:
Can be found on the bottom of clear, cool, slow-flowing streams; usually in the mud or under stones.

Interesting Facts:
Alderfly larvae are fearsome predators that feed on other bugs and are often called "toe-biters."

Insecta

Damselfly Larva
Family: COENAGRIONIDAE

Identification:
Slender body with three feather-like structures at then end of the abdomen.

Size:
16 to 33 mm

Habitat:
Usually found among stones or debris at the bottom of ponds or slow-flowing rivers.

Pollution Intermediate

Interesting Facts:
Damselflies do not go through a pupal stage to become an adult.

Dragonfly Nymph
Family: LIBELLULIDAE

Identification:
Short and chunky with wing pads and six legs, all located near the head.

Size:
18 to 49 mm

Habitat:
Among stones and debris at the bottoms of ponds or slow-flowing rivers.

Pollution Intermediate

Interesting Facts:
Unlike most aquatic insects, the dragonfly nymph does not need to surface to breathe air, instead it squeezes water over its internal gills to take oxygen out of the water.

Insecta

Stonefly Larva
Family: NEMOURIDAE

Identification:
Has only two tails at the end of the abdomen and two sets of wing pads with gills on the middle body segment.

Size:
5 to 35 mm

Habitat:
Prefers fast-moving, clear streams with a bottom of rocks and stones.

Interesting Facts:
Stonefly larva can take up to three years to develop into adults!

Pollution Sensitive

Insecta

Caddisfly Larva

Identification:
Some larvae have gill tufts down the underside of the abdomen and have a tuft at the end of their abdomen.

Others look more worm-like, with three pairs of well developed legs on the first three body segments and hooks on the last one.

Size:
Up to 20 mm

Habitat:
A wide range of environments from fast-flowing streams to freshwater ponds.

Interesting Facts:
Caddisfly larvae can be free-living, or make a case for themselves out of bits of wood, stone, or debris.

Pollution Sensitive

Family: HYDROPSYCHIDAE

Family: PSYCHOMYIIDAE

Family: PHILOPOTAMIDAE

Family: LIMNEPHILIDAE

Malacostraca

Aquatic Sowbug (*Asellus sp.*)
Family: ASELLIDAE

Identification:
Small, flattened, and disk-shaped.

Size:
5 to 20 mm

Habitat:
Unpolluted, shallow waters under rocks, vegetation, and debris.

Interesting Facts:
Sow bugs are scavengers that feed on dead or decaying plant material. They primarily inhabit unpolluted shallows and are usually found less than three feet below the surface of the water.

Pollution Intermediate

Malacostraca

Crayfish
Family: CAMBARIDAE

Pollution Intermediate

Identification:
A shrimp-like crustacean that can be yellow, green, white, or brown in color. It has a hard exoskeleton, four pairs of legs, and sharp claws.

Size:
About 76 mm

Habitat:
Common in streams and lakes concealed under rocks and logs.

Interesting Facts:
Crayfish regularly grow too big for their exoskeleton and must shed their hard outer covering and grow a new one.

Scud (*Gammarus sp.*)
Family: GAMMARIDAE

Pollution Intermediate

Identification:
A shrimp-like crustacean with seven pairs of legs. Scuds, also called side-swimmers, swim on their sides and can be white, clear, or pink with distinct black eyes.

Size:
5 to 20 mm

Habitat:
Usually found in overhanging vegetation in streams, ponds, and lakes.

Interesting Facts:
Side-swimmers are more active at night than during the day and usually carry single-celled protists on their external body.

Turbellaria

Planarian
Family: PLANARIIDAE

Identification:
Elongated, flattened, and leaf-like body. Head has pointed flaps and some have two eyes that appear to be crossed.

Size:
6 to 18 mm

Habitat:
On vegetation or under submerged objects in quiet or moving waters.

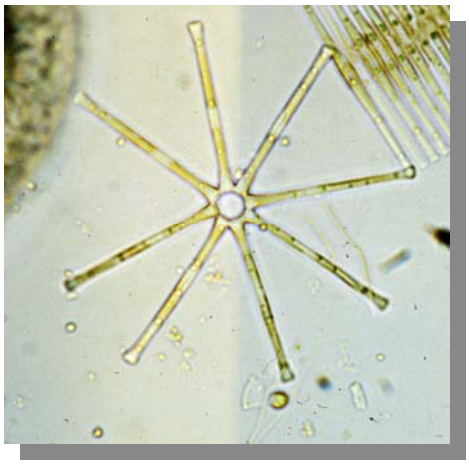
Interesting Facts:
Planarians cannot swim, instead they glide on a film of water propelled by hair-like cilia.

Pollution Tolerant

Plankton

Bacillariophyta (Diatoms)

Asterionella sp.



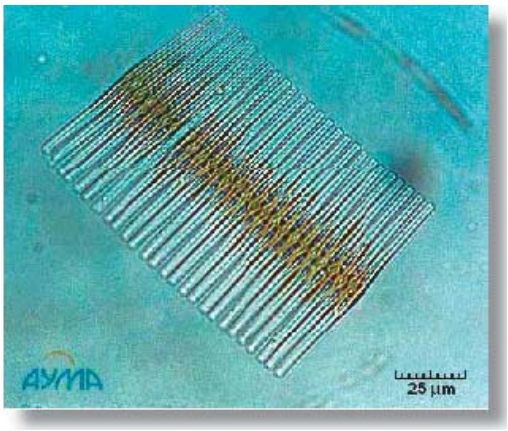
Identification:
Green to golden brown in color; spoke-like arrangement with a common center.

Size:
160 µm in diameter

Habitat:
Open waters.

Interesting Facts:
Asterionella sp. is an excellent indicator of hard water, especially water with high levels of calcium and magnesium salts.

Fragellaria sp.



Habitat:
Quiet and open waters, and moving waters as film on rocks and other submerged substrates, and in shallow waters among aquatic plants.

Size:
140 µm in length

Identification:
Green to golden-brown; key-shaped cells of *Fragellaria sp.* often form long, twisted filaments.

Interesting Facts:
Diatomaceous earth, composed of *Fragellaria sp.* and other diatom cases, is used to produce chalk.

Bacillariophyta (Diatoms)

Melosira sp.

Identification:
Cells usually form chains connected by spines and mucilage pads.

Size:
20 µm in length

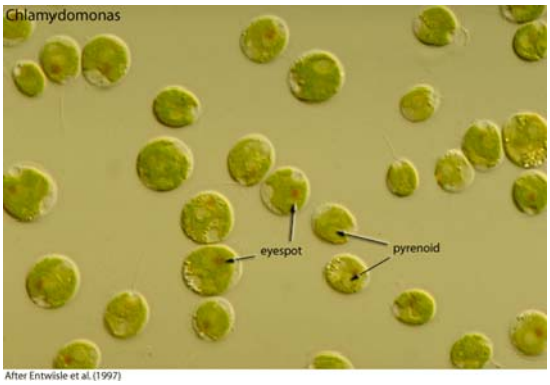
Habitat:
Quiet waters and open waters.

Interesting Facts:
This species was first described in 1824.

Chlorophyta
(Green Algae)

Chlamydomonas sp.

Identification:
Red or green, round body with a cup-shaped (or H-shaped) chloroplast, two flagella, and an eyespot.



Size:
Body 10 µm in diameter, flagella 10 µm long

Habitat:
Soils and sands, mats and films, and quiet waters.

Interesting Facts:
"Red Snow" in mountainous areas is the result of the immense concentration of these cells and their red pigment.

Coelastrum sp.

Identification:
Colonies spherical; fixed number of cells (4, 8, 16, 32, or more); inner empty space; cell body mostly spherical with some conical or globular bulges.

Size:
Individual cells average about 20 µm

Habitat:
Usually found in quiet waters, soils and sands, and in larger phytoplanktonic microcommunities.

Interesting Facts:
It is generally accepted that green algae gave rise to plants.

Chlorophyta
(Green Algae)

Netrium sp.

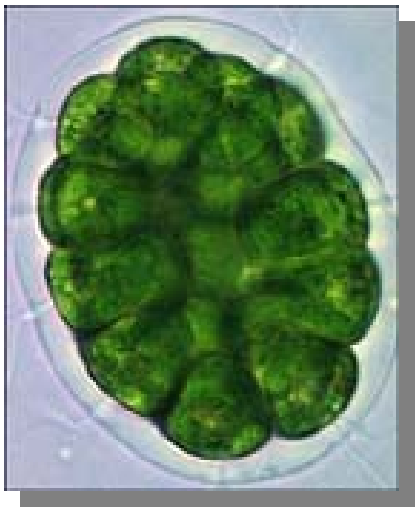
Identification:
Green, cucumber-shaped cells; has two chloroplasts, one in each half of the cell.

Size:
80 to 200 µm

Habitat:
Quiet and open waters, lakes, and ponds.

Interesting Facts:
Netrium blooms give water a watermelon-like taste.

Pandorina sp.



Identification:
Pear-shaped cells with two flagella coming out of the gelatinous matrix that envelops the colony. Colony is spherical or oval and contains up to 16 cells; can tumble and roll.

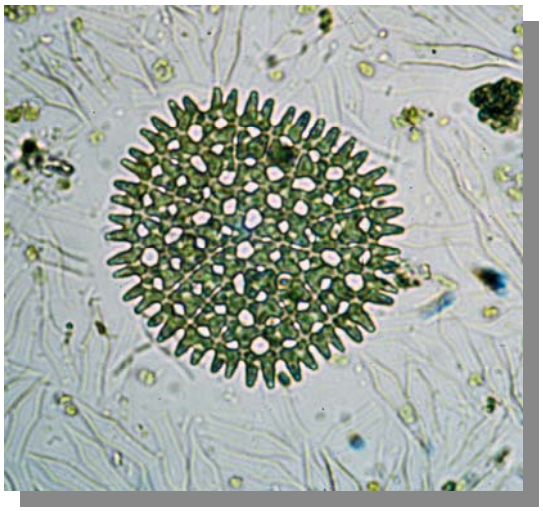
Size:
Colony is 50 to 250 µm

Habitat:
Quiet and open waters.

Interesting Facts:
Blooms occur in water rich in nitrogen.

Chlorophyta
(Green Algae)

Pediastrum duplex



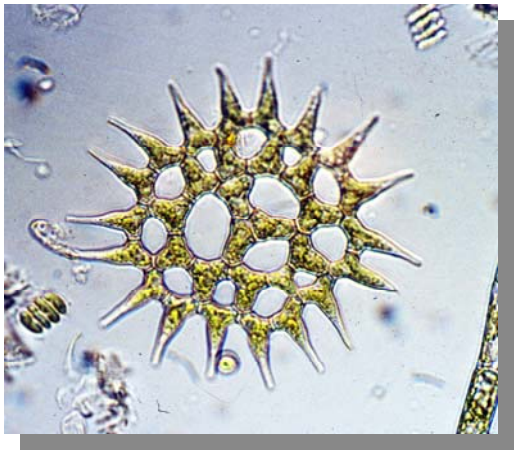
Identification:
Colonies consist of 32 to 64 cells.

Size:
Colony is 50 µm in diameter

Habitat:
Soils and sands, and quiet water (especially prevalent below sand layer at water's edge).

Interesting Facts:
P. duplex reproduce asexually. One cell from the colony will empty and the contents will form a new daughter cell.

Pediastrum simplex



Identification:
Colonies of a fixed number of cells; cells are flat, circular in shape; cell body polygonal in shape, with horn-like projections; cell wall granulated, wrinkled, or notched.

Size:
12-18 µm

Habitat:
Soils and sands, quiet waters.

Interesting Facts:
Colonies consist of fewer cells than *P. duplex*, usually about 16 cells.

Chlorophyta
(Green Algae)

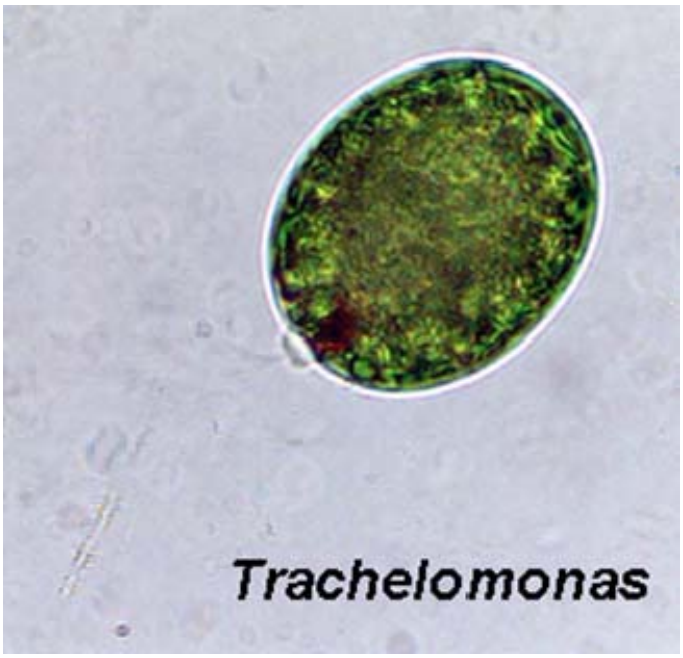
Trachelomonas sp.

Identification:
Yellowish-brown; numerous spines; pill-shaped; single flagellum.

Size:
40 mm

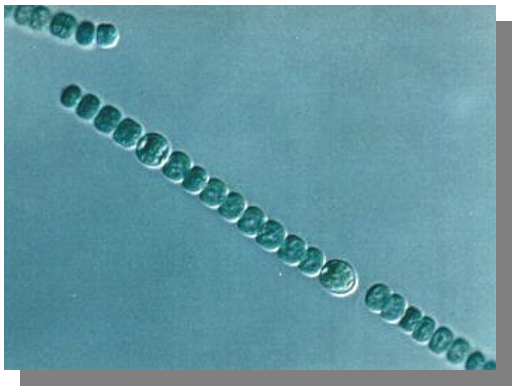
Habitat:
Quiet waters; primarily in ditches among aquatic weeds.

Interesting Facts:
Trachelomonas sp. uses its single flagellum to propel itself through the water.



Cyanobacteria (Blue-Green Algae)

Anabaena sp.



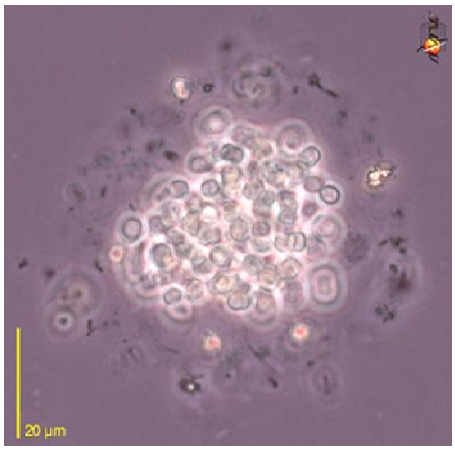
Identification:
Green; grow in long filaments.

Size:
Filament 8-10 µm in diameter

Habitat:
Soils and sands, mats and films, and quiet waters.

Interesting Facts:
A filament of *Anabaena sp.* consists of barrel-shaped cells in a row. Blooms of *Anabaena sp.* can sometimes produce lethal toxins to animals that drink the infected water.

Anacystis sp.



Identification:
Globular cells in a gelatinous matrix.

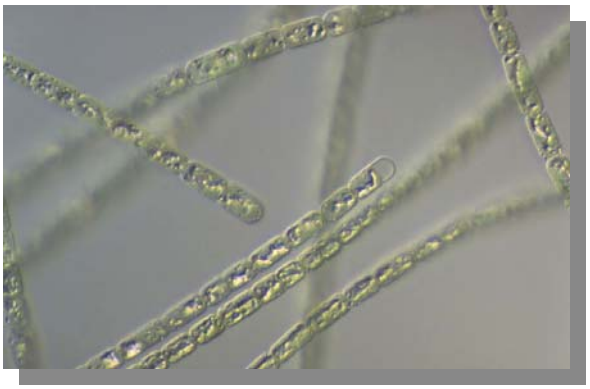
Size:
3-7 µm in diameter

Habitat:
Mats and films, quiet waters floating on surface.

Interesting Facts:
Some cyanobacteria can be toxic and frequently inhabit waters high in organic materials.

Cyanobacteria (Blue-Green Algae)

Aphanizomenon sp.



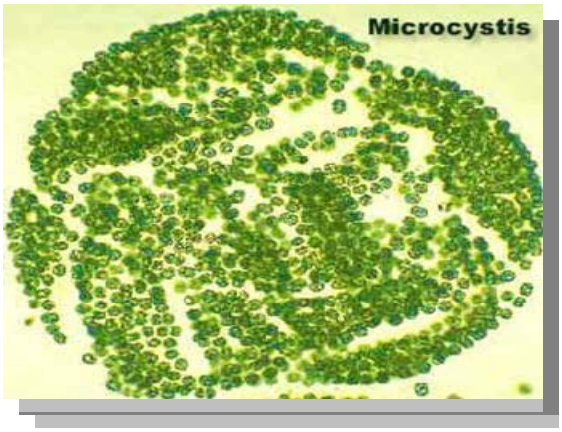
Identification:
Long, green, parallel filaments that lie in bundles.

Size:
Filaments up to 100 µm long

Habitat:
Ponds and lakes.

Interesting Facts:
Aphanizomenon sp. grows vertically in order to obtain needed nutrients.

Microcystis sp.



Identification:
Colony is globular and can consist of over 100 cells; usually blue-green in color but may also be brownish, black, or purple.

Size:
Individual cells 3-7 µm in diameter; colony may be up to 1 mm in diameter

Habitat:
Mats and films, quiet and open waters.

Interesting Facts:
Blooms can produce lethal toxins that can harm animals that drink the contaminated water.

Cyanobacteria (Blue-Green Algae)

Nostoc sp.

Identification:
Coiled threads of bead-like green to blue-green cells inside a firm globular gelatinous matrix.

Size:
Individual cells 5-8 µm in diameter; colonies up to 2 cm in diameter

Habitat:
Mats and films, quiet and moving waters on rocks and other submerged objects.

Interesting Facts:
In some Asian nations, *Nostoc* is eaten and considered a delicacy.

Oscillatoria sp.

Identification:
Rectangular-shaped, blue-green cells arranged in rows that seem to oscillate; sometimes intermingle with protists.

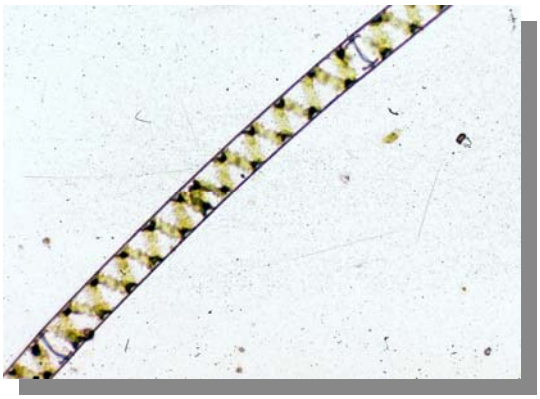
Size:
Filaments 2 to 10 µm in diameter

Habitat:
Mats and films, quiet and moving waters in moist soils and dripping rocks.

Interesting Facts:
If left in a shallow dish, *Oscillatoria sp.* will creep to the sides and over the top! It is also very tolerant of organic pollution.

Gamophyta
(Filamentous Green Algae)

Spirogyra sp.



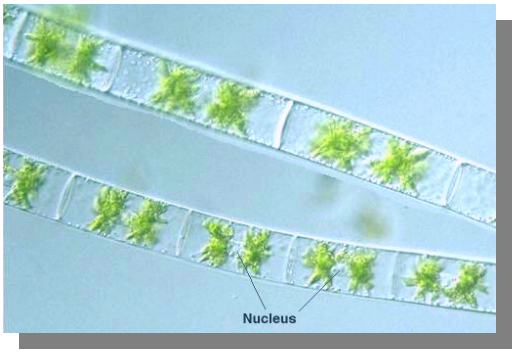
Identification:
Green clouds of hair-like strands just below the surface of quiet waters or shorelines. Barrel-shaped cells are arranged into macroscopic threads the thickness of human hair. This genus was named for its spiraling band-shaped chloroplasts.

Size:
Filaments 10-100 µm wide

Habitat:
Mats and films, quiet waters.

Interesting Facts:
In times of impending stress, *Spirogyra sp.* reproduces sexually by exchanging genetic material across conjugating tubes.

Zygnema sp.



Identification:
Cells are arranged in macroscopic threads (filaments), which form floating mats. Green or yellowish-brown; divisions are easily observed. Individual cells each have two star-shaped chloroplasts.

Size:
Cell body 30-68 µm in length

Habitat:
Mats and films, quiet waters.

Interesting Facts:
Many protists store food as starch, a solid carbohydrate.

Pyrrophycophyta (Dinoflagellates)

Ceratium hirundinella

Identification:
Body flattened; one anterior and two to three posterior horn-like processes; chloroplasts yellow, brown, or greenish.

Size:
100 µm

Habitat:
Quiet and open waters.

Interesting Facts:
C. hirundinella occurs in blooms of individuals and may make the water a gray-chocolate color.

Arthropoda (Cladocera)

Bosmina sp.

Identification:
Various internal colors; generally circular with a transparent shell (carapace) that covers its legs, stubby antennae, and long, pointed rostrum. Moves in a series of hops produced by movements of the antennae.

Size:
Up to 0.5 mm

Habitat:
Open waters away from emergent vegetation.

Interesting Facts:
Cladocera, *Bosmina's* order, are very important in the aquatic food chain and are a source of food for young and adult fish.

Daphnia sp. (Water Flea)

Identification:
Varied internal coloration; transparent shell that covers legs; has a pointed spine. Feathery antennae stand outstretched; antennae move *Daphnia sp.* in a zigzag motion.

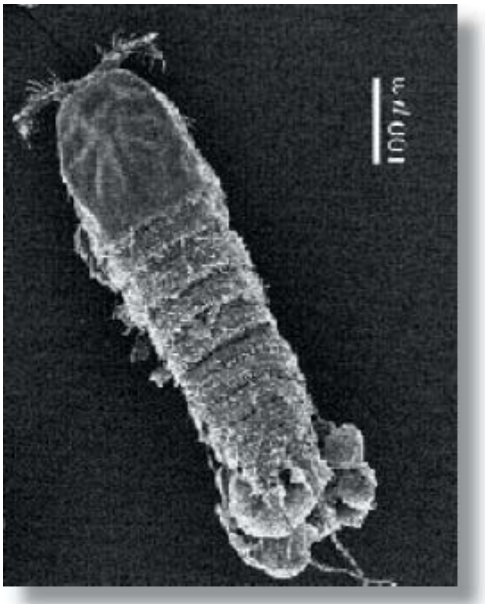
Size:
Up to 3 mm

Habitat:
Open waters and quiet waters away from emergent vegetation.

Interesting Facts:
Daphnia sp. feed on suspended bacteria and green protists. They are also parthenogenic reproducers, meaning their eggs develop without being fertilized.

Arthropoda (Arthropods)

Canthocamptus sp.



Identification:
Grayish or brownish; elongate body; short antennae that usually do not extend past the first body segment; tail bristles are not equal length; crawls or runs around on rocks and other substrates.

Size:
0.7 to 1.0 mm

Habitat:
Soils and sands, quiet waters along bottom surface of emergent vegetation.

Interesting Facts:
Canthocamptus sp. can sometimes be found in damp forest mosses.

Ceriodaphnia sp.

Identification:
Head small and depressed; antennules small.

Size:
Up to 2 mm

Habitat:
Quiet waters.

Interesting Facts:
Ceriodaphnia sp. can live in both oxygen-rich and oxygen-poor environments due to their ability to synthesize hemoglobin.

Arthropoda (Copepods)

Copepod nauplius

Identification:
Usually transparent when found in open waters; dart very quickly; moderately long secondary antennae.

Size:
Up to 100 µm

Habitat:
Open waters of ponds or lakes; waters edge.

Interesting Facts:
The Copepod nauplius is the first stage of life for the copepod after developing from the egg.

Cyclops sp.

Identification:
Grayish brown; elongate body; antennae are one-third as long as the body; two eyespots that may appear as one; tail bristles of equal length; use antennae and swimming legs to move.

Size:
Male: 1 to 2 mm
Female: 1 to 1.5 mm

Habitat:
Quiet and open waters among emergent vegetation.

Interesting Facts:
Copepods show cycles of vertical migration in lakes and deep ponds with a greater concentration of individuals in the upper waters at night and near the bottom during the day.

Arthropoda (Copepods / Ostracods)

Diaptomus sp.

Identification:
Grayish or brown; some may be brightly colored; elongate body with two prominent eyespots and conspicuous antennae that are usually as long as the body.

Size:
Male: 1.0 to 2.0 mm
Female: 2.5 to 3.0 mm

Habitat:
Soils and sands, quiet waters, open waters.

Interesting Facts:
Diaptomus sp. move about by beating its antennae, legs, and fan-like maxillae.

Ostracods (Seed Shrimp)

Identification:
White, yellow, brown, or green; two shells with valves joined by a hinge; shells have hairy margins; slow creep or rapid bouncing.

Size:
1-3 mm

Habitat:
Soils and sands, mats and films, quiet waters, and moving waters among aquatic vegetation along bottom shallows.

Interesting Facts:
Ostracods are widely represented in the fossil record! Examine surfaces of shale and other bottom sediments with a magnifying glass.

Ciliophora (Protozoa)

Bursaria sp.

Identification:
Transparent; colored by ingested food. The body of *Bursaria sp*. is oval with a large mouth.

Size:
500-1,000 µm

Habitat:
Quiet waters and shallows among decaying vegetation.

Interesting Facts:
Bursaria sp. is one of the largest ciliates known. It can be easily seen in a jar of pond water.

Epistylis sp.

Identification:
Transparent and vase shaped, each cell has an expandable collar with cilia inside; colonies join together to form dichotomous branches.

Size:
Individuals 50-180 µm; colonies up to 6 mm

Habitat:
Quiet waters attached to aquatic plants and other submerged objects including turtle shells, gills, crayfish, and aquatic insects.

Interesting Facts:
Individuals and colonies do not contract because they lack contractile fibrils.

Ciliophora
(Protozoa)

Vorticella sp.

Identification:
Cells are transparent; clusters are on a single stalk that contracts like a spring.

Size:
Individuals are 50-150 µm; clusters may be up to 6 mm

Habitat:
Quiet waters attached to aquatic plants and other submerged objects.

Interesting Facts:
Clusters of *Vorticella sp.* are not colonies because individuals do not share a common stalk. You may see individuals change into motile forms, migrate several inches, settle down, and grow new stalk.

Rotifera
(Rotifers)

Asplanchna sp.

Identification:
Resembles a transparent sac or purse; internal organs can be seen clearly; uses broad wheel organ for locomotion.

Size:
Up to 1.5 mm

Habitat:
Open waters away from aquatic plants.

Interesting Facts:
Asplanchna sp. are great subjects to observe predation and microdigestion– just look through their transparent skin to see into the intestine!

Brachionus sp.

Habitat:
Open waters and quiet waters.

Size:
Up to 300 µm

Identification:
Anterior rim of shell is thorned; has one red eye.

Interesting Facts:
Brachionus sp. are commonly found in calcium-rich lakes.

Rotifera
(Rotifers)

Kellicotia sp.

Identification.
Brownish in color; large, slender, and shelled; has anterior and posterior spines; may be colored by ingested rotifers or green protists.

Size:
Up to 1 mm

Habitat:
Open waters away from aquatic plants.

Interesting Facts:
Shell spines aid in flotation.

Keratella sp.

Identification:
Each individual has several anterior spines, and one or two posterior spines that are one-half the organism's body length; the upper plate of its shell is sculpted to reveal interconnecting facets.

Size:
Up to 400 µm in length

Habitat:
Open waters.

Interesting Facts:
Keratella sp. is a common rotifer. Like all rotifers it has a short life span of 7 to 20 days.

Rotifera
(Rotifers)

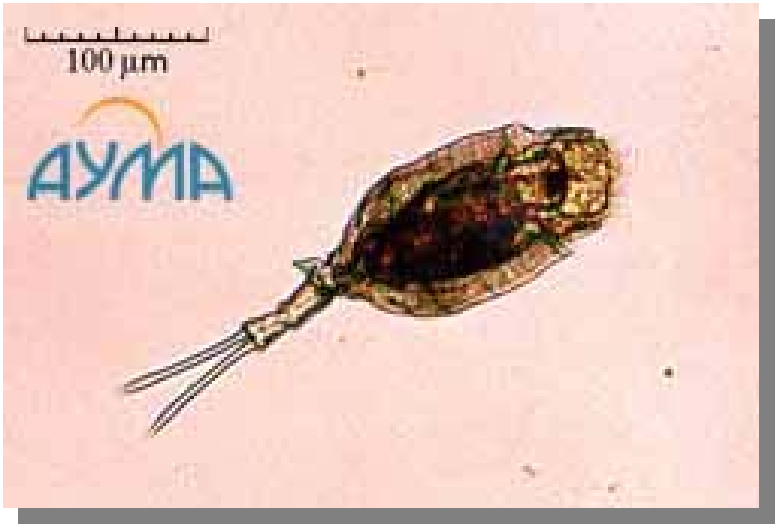
Trichotria sp.

Identification:
Box-like, shelled body with large facets, two spines at the base of the foot, and two dorsal spines on the first joint of the foot.

Size:
Up to 400 µm

Habitat:
Quiet and open waters; most species found near the shoreline.

Interesting Facts:
Rotifers procreate by unisex reproduction or parthenogenesis, the production of young by females not fertilized by males.



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