

MINIECOSYSTEM ORGANISMS



EARTHWORM

Genus: *Lumbricus*

Species: *sp.*

Size: Up to 25 cm (10 in.) long

Range: Worldwide except polar regions

Natural History: Earthworms live in the upper layers of the soil but will tunnel as deep as 2 m (6.5 ft.) if conditions are too dry or too cool. They prefer light, loamy soils to those high in clay and sand. Temperatures of about 13°C (60°F) are ideal.

Food: Earthworms eat decaying organic material (detritus). They decompose the organic material and return nutrients to the ground.

Predator: Birds, frogs, toads, salamanders, lizards, shrews, minks, raccoons, and turtles

Shelter: Tunnels in the upper layers of soil

Reproduction: Earthworms are hermaphroditic (have both male and female sex organs). The mating pair fertilize each other. An enlarged ring produces a cocoon. The cocoon is left behind in the soil when the pair separate. Tiny earthworms emerge in 2–4 weeks.

Abiotic Impact: The movement of earthworms helps break up and loosen soils.

Human Impact: Humans add earthworms to gardens to improve the quality of the soil. They also use earthworms as fish bait.



AQUATIC SNAIL

Genus: *Planorbis*

Species: *sp.*

Size: Shell up to 3 cm (1.2 in.) diameter

Range: Temperate and tropical freshwater ponds

Natural History: Snails have a hard, spiraled shell. It gets bigger toward the opening as the snail grows. The muscular part that protrudes from the shell is the foot. The snail scrapes algae from the surfaces over which it travels.

Food: Algae, aquatic plants, and detritus (decaying organic material). Snails eat whatever food is left over by fish.

Predator: Large fish, birds, waterfowl, shrews, and turtles

Shelter: If threatened, an aquatic snail pulls into its shell and closes the opening with an operculum.

Reproduction: Snails have both male and female sex organs (they are hermaphroditic). During mating, two snails exchange sperm and both may lay eggs. Eggs are laid on plants in a jelly capsule. The eggs hatch into tiny larvae that swim freely until they begin to grow a shell. The shell weighs them down, and they begin a life of crawling along the water bottom.

Abiotic Impact: Absence of calcium in the environment causes weak shells.

Human Impact: Aquatic snails are kept in home aquariums to reduce the amount of algae and detritus.



ISOPOD

Genus: *Oniscus*

Species: *sp.*

Size: 1.8 cm (0.7 in.)

Range: Temperate and tropical regions

Natural History: Isopods are found in dark, damp areas, especially under rocks and in leaf litter.

Food: Detritus (decaying organic material), fruit, fungi, and young plants

Predator: Birds, frogs, lizards, turtles, and salamanders

Shelter: Under rocks and logs, and in leaf litter. Some species roll into a tight ball if threatened.

Reproduction: Females carry eggs until they hatch.

Abiotic Impact: Must stay moist

Human Impact: Minor agricultural pest



GUPPY

Genus: *Poecilia*

Species: *reticulata*

Size: 3 cm (1.2 in.) long

Range: Freshwater streams of Central America and northern South America

Natural History: Guppies are small fish that bear live young. Females are usually beige or silver gray. Males are smaller and have longer, flowing tails.

Food: These omnivores eat detritus (decaying organic material), algae, smaller fish, and plants.

Predator: Larger fish and adults eat unprotected young.

Shelter: Females and young hide in vegetation. Guppies can live in an unheated aquarium unless room temperatures go below 15°C (65°F) or above 29.5°C (85°F).

Reproduction: Guppies breed easily in home aquariums. Females can store sperm and may produce several broods from one mating. Babies are born live and must find shelter to avoid being eaten.

Human Impact: Bred for home aquariums. Feeder guppies are raised as food for larger aquarium fish.



SCUD

Genus: *Gammarus*

Species: *sp.*

Size: 5–30 mm (0.2–1.2 in.) long

Range: Fresh water in the Northern Hemisphere

Natural History: *Gammarus* is much more active at night than during the day. It crawls and walks using its legs in addition to flexing its body.

Food: Bacteria, algae, and detritus (decaying organic material)

Predator: Fish, toads, salamanders, waterfowl, and crustaceans

Shelter: Detritus or plant material. Amphipods usually live close to the bottom or among submerged objects where they can hide from predators. They prefer dark areas.

Reproduction: Most scuds breed between February and October. Eggs and young develop in a brood pouch on the female. Young stay in the pouch about a week or so.



TUBIFEX WORM

Genus: *Tubifex*

Species: *sp.*

Size: Up to 4 cm (1.5 in.) long

Range: Temperate freshwater ponds and streams

Natural History: *Tubifex* worms live on the bottom of ponds with their heads stuck into the substrate and tails waving in the water.

Food: Bacteria and detritus (decaying organic material)

Predator: Fish, amphibians, and crustaceans

Shelter: Burrows into the soil and gravel at the bottom of ponds

Human Impact: Raised as food for tropical aquarium fish



LAND SNAIL

Genus: *Helix*

Species: *sp.*

Size: Shell up to 3 cm (1.2 in.) diameter

Range: Worldwide

Natural History: Snails have two sets of tentacles on their heads. The upper set contains nerve cells that are sensitive to light and smell. The two smaller tentacles on the bottom are sensitive to touch and are used to detect food, other snails, and surfaces. Snails are ectothermic and become inactive if too cool.

Food: Decaying plant material, plants, and calcium sources

Predator: Birds, skunks, and raccoons

Shelter: Snails live on the ground and will move to cool, damp places to escape dry conditions. They retreat inside their shells and form a crusty layer over the opening to preserve the moisture in their bodies. This semihibernation is called estivation.

Reproduction: Snails have both male and female sex organs (they are hermaphroditic). During mating, two snails exchange sperm; both may lay eggs. Eggs are laid underground.

Abiotic Impact: Absence of calcium in the environment causes weak shells.

Human Impact: Snails are often considered a garden and agricultural pest. For that reason, the USDA controls the movement of *Helix* across state lines. *Helix* is quarantined from some states. Some species of snail are eaten as a delicacy.



ELODEA

Genus: *Elodea*

Species: *canadensis*

Size: Sprigs up to 1 m (3 ft.) long

Range: Throughout North America



DUCKWEED

Genus: *Lemna*

Species: *minor*

Size: 0.5 cm (0.2 in.) diameter

Range: Temperate freshwater ponds and lakes worldwide



ALFALFA

Genus: *Medicago*

Species: *sativa*

Size: 30–90 cm (1–3 ft.) tall

Range: Temperate grasslands

Natural History: *Elodea* grows in freshwater ponds and slow-moving streams throughout North America. Member of the tape-grass family.

Food: Photosynthesis

Predator: Fish, insects, aquatic snails, crayfish, turtles, and salamanders

Shelter: Freshwater ponds and quiet streams

Reproduction: *Elodea* usually reproduces vegetatively. It may produce small flowers at the tip, with seeds in small green capsules.

Abiotic Impact: Productivity depends on light, water, and temperature levels.

Human Impact: *Elodea* is a popular aquatic plant for home aquariums. Populations that have been introduced to the wild can reproduce quickly and clog natural waterways.

Natural History: Duckweed is tiny, but huge populations can cover the entire surface of ponds and lakes. Member of the duckweed family.

Food: Photosynthesis

Predator: Fish, aquatic snails, birds, water rats, and turtles

Shelter: Surface of freshwater ponds and lakes

Reproduction: Mostly by vegetative reproduction; sometimes sexual reproduction, if flowers appear.

Abiotic Impact: Productivity depends on light, water, and temperature levels.

Human Impact: Sold in aquarium stores for home aquariums

Natural History: Alfalfa has a high tolerance for drought, cold, and heat. It has a taproot that may grow as deep as 15 m (50 ft.). Member of the pea family.

Food: Photosynthesis

Predator: Insects, birds, rodents, deer, and grazing livestock

Reproduction: Small bunches of flowers at the ends of the stems develop into coiled seed pods. Flowers are pollinated by insects, primarily solitary bees.

Abiotic Impact: Productivity depends on light, water, and temperature levels.

Human Impact: Alfalfa is cultivated as a pasture crop or for hay. Growing alfalfa improves soil quality.



RYE GRASS

Genus: *Lolium*

Species: *sp.*

Size: 1–2 m (3–6 ft.) tall

Range: Temperate grasslands of Europe, Asia, and North America



WHEAT

Genus: *Triticum*

Species: *sp.*

Size: 30–90 cm (12–36 in.) tall

Range: Grasslands worldwide

Natural History: Rye grass grows in areas that are unfavorable for other cereal grains. It can be grown as a winter crop and thrives at high altitudes. Member of the grass family.

Food: Photosynthesis

Predator: Birds, insects, rodents, deer, and grazing livestock

Reproduction: Flowers are wind-pollinated.

Abiotic Impact: Productivity depends on light, water, and temperature levels.

Human Impact: Rye is an important grain cultivated throughout the world.

Natural History: Wheat grows best in a temperate climate with rainfall between 30 and 90 cm (12 and 36 in.) per year. Member of the grass family.

Food: Photosynthesis

Predator: Birds, insects, rodents, deer, humans, and grazing livestock

Reproduction: Flowers are wind-pollinated.

Abiotic Impact: Productivity depends on light, water, and temperature levels.

Human Impact: Wheat is an important grain, distributed throughout the world by humans.



GLOSSARY

abiotic – Nonliving.

adaptation – Any trait of an organism that increases its chances of surviving and reproducing.

alkaline lake – A salty lake where the pH is greater than 7.

allele – Variations of genes that determine traits in organisms; the two corresponding alleles on two paired chromosomes constitute a gene.

aquatic – Of the water.

autotroph – Organisms that make their own food.

biomass – The total organic matter in an ecosystem.

biotic – Living organisms and products of organisms.

carbohydrate – Food in the form of sugar or starch.

carrying capacity – The maximum size of a population that can be supported by a given environment.

chromosome – A structure that transfers hereditary information to the next generation.

community – All the interacting populations in a specified area.

consumer – An organism that eats other organisms.

decomposer – An organism that consumes parts of dead organisms and transfers all the biomass into simple chemicals.

detritivore – An organism that eats detritus, breaking the organic material into smaller parts that a decomposer could use for food.

detritus – Small parts of organic material.

dominant allele – A form of a gene that is expressed as the trait when a dominant allele is present.

ecosystem – A system of interacting organisms and nonliving factors in a specified area.

environment – The surroundings of an organism including the living and nonliving factors.

exoskeleton – A tough, outer covering that insects and other organisms have for protection.

feature – A structure, characteristic, or behavior of an organism, such as eye color, fur pattern, or timing of migration.

food chain – A sequence of organisms that eat one another in an ecosystem.

food pyramid – A kind of trophic-level diagram in the shape of a pyramid in which the largest layer at the base is the producers with the first-level, second-level, and third-level consumers in the layers above.

food web – All the feeding relationships in an ecosystem.

gene – The basic unit of heredity carried by the chromosomes; code for features of organisms.

genotype – An organism's particular combination of paired alleles.

herbivore – An organism that eats only plants.

heterotroph – An organism that cannot make its own food and must eat other organisms.

heterozygous gene – A gene composed of two different alleles (a dominant and a recessive).

homozygous gene – A gene composed of two identical alleles (e.g., both dominant).

incomplete metamorphosis – A process of gradual maturing of an insect (egg, nymphal stages or instars, adult).

individual – One single organism.

instar – An immature nymphal stage of an insect as it grows into an adult form.

limiting factor – Any biotic or abiotic component of the ecosystem that controls the size of the population.

molting – The process of shedding exoskeleton in order to grow.

morph – A form in a species that occurs in one or more forms (such as colors).

natural selection – The process by which the individuals best adapted to their environment tend to survive and pass their traits to subsequent generations.

omnivore – A consumer that eat both plants and animals.

organism – A living thing.

phenotype – The traits produced by the genotype; the expression of the genes.

photosynthesis – The process by which producers make energy-rich molecules (food) from water and carbon dioxide in the presence of light.

phytoplankton – A huge array of photosynthetic microorganisms, mostly single-celled protists, that are free-floating in water.

population – All the individuals of one kind (one species) in a specified area at one time.

proboscis – A tubelike beak for sucking fluids from plants. True bugs have this structure.

producer – An organism that is able to produce its own food through photosynthesis.

recessive allele – A form of a gene that is expressed as the trait only when a dominant allele is not present.

reproductive potential – The theoretical unlimited growth of a population over time.

species – A kind of organism; members of a species are all the same kind of organism and are different from all other kinds of organisms.

terrestrial – Of the land.

tertiary – Third level.

trait – The specific way a feature is expressed in an individual organism.

trophic levels – Functional role in a feeding relationship through which energy flows.

tufa tower – A naturally occurring, gray, lumpy structure that forms under water in a salt lake because of a chemical reaction between calcium and salt in the water.

variation – The range of expression of a trait within a population.

zooplankton – Microscopic adult animals and larval forms of animals found free-floating in fresh water and seawater.

