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How Clean is Your Freshwater Habitat?

Many freshwater animals can be grouped by how sensitive they are to pollution.

Very sensitive animals: These animals will only be found in very clean, unpolluted water and incvlude stonefly nuymphs, yabbies (crayfish) and mayfly nymphs.

Sensitive animals: These animals can withstand some pollution. They include freshwater shrimps, water mites, dragonfly nymphs, damsefly nymphs and caddislfy larvae.



caddislfy larvae

Tolerant animals: These animals are quite tolerant of pollution and include flatworms, leeches, snails, hydra, true bugs such as water boatmen and beetles such as the dytiscid beetle.

Very tolerant animals: These animals can live in stagnant or polluted water. They include mosquito larvae and aquatic earthworms. Bloodworms (red midge fly larvae) are the most tolerant.

mosquito larvae



Vertebrates Found in and Around Fresh Water

Spotted Grass Frog: This frog is common in gardens. It grows up to 4.5 cm in length and is light brown colour. It shelters under rocks or branches close to pools, swamps and creeks. Its call is a quick 'uk-uk-uk'.



NOTE: Frogs are protected in all Australian States. Tadpoles must not be removed from their natural habitats without a permit.



Eastern Long-necked Tortoise: This reptile is very common in swamps, billabongs and slowmoving streams. It feeds on crustaceans, tadpoles and small fish. It is found throughout south-eastern Australia. Its eggs are laid in early summer in a hole in the bank.

Mountain Galaxias (native trout): Theset although are very small compared with the introduced trout. they feed on a wide range of aquaticinvertebrates and insects which land on the water surface.





Black Duck: This is a large brownish duck with white lines above and below the eye. It makes a deep 'quack-quack' sound. It lives in pairs or flocks and feeds on aquatic plants and animals on the survace of the water. Its nest is make of grass, lined with feathers and constructed amongst rushes and grasses near water. The female lays 8 to 14 off-white or greenish eggs between July and February. the young are often eaten by cats, kookaburras and currawongs.

Eastern Water Dragon: this animal is common around many of the ponds and waterways. It is a mottled grey colour to a metallic green in summer. Young hatch from the eggs which are laid in moist soil and rotting vegetation.



Types of Water Plants

Water plants are often defined by how and where they grow, whether their roots are floating or rooted, and which parts of the plant are sticking out of the water. There are four main types:

1. Rooted in soil, emergent stems:

These are plants like bullrushes, rushes and sedges. They grow close to the banks in shallow water.

Cumbungi (bullrush)



Spiny-headed Mat-rush

2. Rooted in soil, floating leaves:

These plants include waterlilies, swamp lily, Nardoo Monochoria. Nardoo is a water fern which spreads by means of underground stems. Spores are produced in capsules formed by the fusing of underwater leaflets. The spores of Nardoo were an important food for Aboriginal people from many parts of Australia.



3. Free-floating:

Two examples of free-floating water plants are Ferny Azolla and Water Hyacinth. Water hyacinths have introduced to Australia. they reproduce rapidly and strangle waterways. The decomposing plants foul the water. Ferny Azolla is an example of water fern.

Ferny Azolla



Water Hyacinth

4. Submerged - either rooted or non-rooted:

Examples are Ribbonweed (rooted) and pond scum (non-rooted). Pond scum is made up of microscopic plants which are an essential part of freshwater life because they supply much of the food for underwater animals.



Ribbonweed

Spirogyra species, a microscopic plant found in pond scum

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Some aquatic animals such as the water strider live on the water surface and absorb air directly from the atmosphere. Water striders have specially arranged hairs on their legs to prevent them from sinking.

Water Strider

Bloodworms, the larvae of the midge fly, are bright red because they contain the pigment haemoglobin, which helps them take on oxygen from stagnant or polluted water.



Bloodworm



Mosquito pupae have a tube called a siphon which allows them to obtain oxygen from the atmosphere. This enables them to live in stagnant water.

Feeding: Aquatic animals may be herbivorous, carnivorous oromnivorous. Others are scavengers.

Animals such as snails and caddisfly larvae are herbivorous. They use modified mouth parts to scrape a thin film of algae from the surface of stones etc.

are s to of stones etc. caddisfly larvae

dragonfly head



Beetle larvae and dragonfly nuymphs are predators (carnivores) and have mouthparts designed for catching and holding their prey. the dragonfly nymph has a built-in food trap in its lower jaw. This covers the mouth like a mask when not in use. An extension comes out of this mask when needed. The extension has a pair of sharp hooks that are used to grab prey.

Yabbies or freshwater crayfish are scavengers, waiting at the bottom of creeks and ponds for their food to come to them. They eat decaying water plantsd and sometimes the flesh of dead fish.

3.

Adaptations of Freshwater Animals

The freshwater environment is not uniform. The water may become stagnant and lose oxygen during dry times and may flow very swiftly at other times.

Resisting the flow (holding on):

The ability to hold on is important in areas where the current is flowing swiftly or during times of heavy rain.

Many animals have flattened or streamlined bodies: others, like many insect larvae, have strong legs with claws which enable them to cling to rocks and plants.

Flat worms and fish resist the water flow by swimming against the current.





Water snails have a strong muscular foot which enables them to attach themselves to rocks and other surfaces.

hydra

perch

Some animals, eg. *Hydra*, are attached permanently to rocks and so are not swept away by the current.

Breathing: A major problem for aquatic animals is how to get oxygen, particularly in areas where water is not moving swiftly.

Dytiscid beetles take oxygen from the air under water by trapping bubbles of air beneath their wing covers.



The damselfly nymph absorbs oxygen through leaf-like gills or filaments at the end of its body.

Tadpoles, crayfish and some nymphs absorb oxygen directly from the water using gills.

Micro-organisma in a Freshwater Habitat

Freshwater is not 'pure' water. It contains many salts and dissolved oxygen as well as hundreds of organisms that cannot be seen by the human eye.

Here are magnified diagrams of some of these tiny organisms. To see them you need to use a microscope or hand lens.



Small Animals in a Freshwater Habitat



Hollow-bodied Animals: These are very simple animals, such as Hydra, found attached to rocks in areas of fast-

Hydra



Wheel animals: These are tiny animals such as rotifer, that are easy to see becase they are frequently spinning through the water.

Rotifer

Soft-bodied animals with hard shells: These animals may have a single shell (gastropods) as in the case of the water snail or a shell in two parts (bivalves), like the mussel.



Worms: Worms such as flatworms and leeches can survive in polluted water.

Leech



Water snail

Mussel



breaks off and drifts aay. Flowering water plants must be specially adapted for both pollination and seed dispersal. In some, the flower stalk is raised above the water so insects can pollinate the flower. Some plants release pollen into the water where it drifts to the stigma of another flower.

Reproduction: Many water plants reproduce vegatatively when a part of a plant

Free-floating plants such as Ferny Azolla float with their leaves uppermost to receive maximum light from the sun. If disturbed, they will return quickly to their original

Some plants have leaves under the water that are different from those on top.

Others such as ribbonweed have streamlined, strap-like leaves.

position. they also repel water from their upper survace.

Ribbonweed (Vallisneria gigantea) has both male and female flowers. The male flowers form in a capsule at the base of the plant. They float to the surface when mature and release pollen that may pollinate the famale flowers, which form on long stems above the water. After pollination the long slender stalk contracts like a spiral spring, taking the seed case below the survace where it ripens.



Seeds of some water plants have a protective waterproof coating that prevents rotting. Others have an oily surface that repels water.

Many seeds have little floats to enable them to be carried away from the parent plant.

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Adaptations to Life in Freshwater

Adaptations of freshwater plants: The freshwater environment can make life difficult for plants and many have very specialised adaptations to enable them to survive.

They must cope with currents that can tear their roots from the soil and be able to adapt to changing water levels.

Reproduction within the aquatic environment is also difficult.

Adaptations to chemical conditions such as low levels of oxygen in the water are often required.

Stems: Water supports plants so their stems don't need to be very strong, however they must be flexible and move with the current as well as adjust to changing water levels.



Leaves: Some plants such as milfoils have leaves thate finely divided, enabling water \to flow past them easily.

Water Milfoil



Crustaceans: These animals have an exoskeleton (an external protective covering) and include water fleas, shrimps and yabbies (freshwater crayfish).

The common water flea (belonging to the genus Daphnia) is 0.25-10 mm long and feeds on or near the bottom of a pond or stream. It provides food for many aquatic organisms and is called 'water flea' because of the hopping movements it makes as it swims through the water using its long-jointed antennae.



Arachnids:

Water mites and water spiders belong to this group.



Water spider





Insects Life in a Freshwater Habitat

Note: insects not drawn to scale

Freshwater habitats are teeming with insects that can be placed in groups according to the way they live and whether they produce their young above, below or on the surface of the water.

1. Adults and larvae live on the surface

These animals skim across the surface of the water very quickly.



Water Strider

2. Adults and young living below the surface

Animals in this group: • water boatmen • backswimmers • water bugs

water beetles
Backswimmer



3. Adults on surface, larvae below

The whirligig beetle is an example from this group.

4. Larvae and nymphs in water, adults free-flying



Note: insects not drawn to scale