

A BEGINNERS GUIDE TO

Waterbug

Identification



Waterwatch



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Melbourne Water is owned by the Victorian Government.

We are the caretakers of 8,400 kilometres of rivers and creeks across the greater Melbourne region. Our waterways support a huge community of plant and animal species such as native waterbugs, frogs, fish, birds, reptiles and mammals like platypus and rakali. Some of Melbourne's wetlands are recognised as being of international significance due to the diversity of life they support.

We encourage the community to get involved with monitoring projects such as Healthy Waterways Waterwatch and the Macroinvertebrate Monitoring Program. These programs enable us to gauge the health of our waterways by keeping an eye on the animal populations that live there.

This guide is intended as a way of identifying some of the more common freshwater animals to aid in surveys and observational data collecting.

Waterwatch

Taxonomy is the science of grouping living things based on shared characteristics. These groups can be very broad or extremely specific. For example, a phylum is a very big group which includes many smaller families. Within the phylum Arthropoda we find crustaceans, insects, spiders and many other unique classes and orders.

Taxonomy in this guide



Common name
Name used by general public; varies from place to place.

Class
Broad group such as insect, bird, reptile. Contains many smaller groups.

Order
More specific. eg. Odonata groups together all dragonflies and damselflies.

Family
A distinct group. eg. Zygoptera contains only Damselflies.

The animals we call 'waterbugs' are a diverse group of insects, worms, molluscs, crustaceans and other invertebrates. Depending on the species, they live in different parts of a waterway such as the water surface, waterway floor, shoreline or amongst aquatic vegetation. There is plenty of food available in freshwater environments and waterbugs have evolved many different feeding strategies to survive. Within the waterbug group you'll find predators, herbivores, algae grazers, filter feeders and many animals that combine two or more of these feeding styles.

Diet

**Carnivore**

This bug species gets its energy by eating other animals.

Diet

**Herbivore**

This bug species gets its energy by eating plants, algae or bacteria.

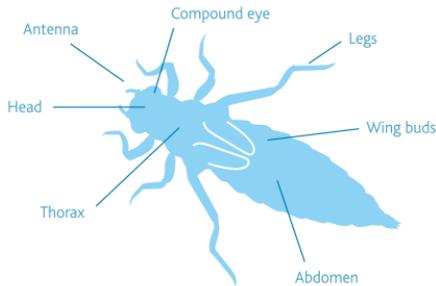
Diet

**Detritivore or filter feeder**

This bug gets its energy by collecting and eating tiny organic particles.

Many of the waterbugs described in this guide are insect larvae, which means that they are the juvenile form of an insect. Most larvae look and behave very differently to their parents, who are often air-breathing, flying insects. All animals that are classed as insects have six legs, a head, thorax (middle segment) and abdomen (final segment).

Characteristics of an insect



Larva



Adult



These icons indicate whether a waterbug is a larva or an adult.

Waterbugs live in various habitat types in our waterways. From the edge to open water and from the surface to the sediment, species thrive in their specific habitats. Many waterbugs depend on the vegetation in a waterway. Loss of plants and erosion can threaten waterbugs and the food chains they support. Revegetation and stormwater management can improve the diversity and abundance of waterbugs in a waterway. To get a closer look at these creatures find a safe spot on a bank, sweep a net through the water and against submerged plants, and empty into a bucket of water. Be sure to return bugs to their original spot.

Habitat



Habitat



These icons indicate an open water or edge environment.

Habitat



Habitat



These icons indicate a substrate or surface habitat.

Habitat



Habitat



These icons show if a bug lives on vegetation or near aquatic vegetation.

SIGNAL

There is likely to be some kind of waterbug in almost any aquatic environment, but healthy waterways tend to have a much higher diversity (more species) than polluted waterways. All the bugs in this guide have been given a SIGNAL score (Stream Invertebrate Grade Number – Average Level) between 1 and 10 based on how sensitive they are to pollution. Bugs that cannot tolerate high levels of pollution get a high SIGNAL score; bugs that can tolerate polluted waters get a low score. This scoring system allows us to use waterbug samples as a measure of waterway health. To get a SIGNAL score from a sample, add up all the scores of the bugs you've found and then divide that by the number of bug types in your sample. As a rough guide, a SIGNAL grade higher than six indicates a healthy waterway, a grade lower than four would indicate severe pollution.

For more information on SIGNAL scores you can read Bruce Chessman's paper referenced on page 38 Further Information.

Signal

5

This icon indicates the SIGNAL grade of the waterbug species.

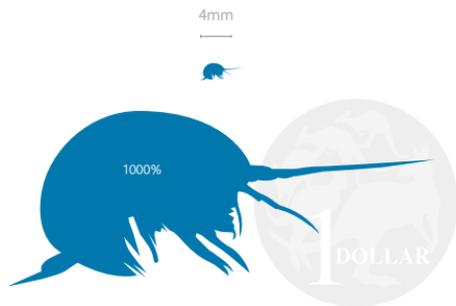
Amphipods



Amphipods, also known as scuds and side-swimmers, are common crustaceans in almost every aquatic habitat. They are laterally (from the sides) flattened animals with seven pairs of legs and two sets of antennae. Amphipods can be found in all sorts of aquatic environments within flowing and still water and even in underground cave systems. They are generally found near the edges or bottoms of waterways living under rocks, branches and plant matter. Amphipods are omnivores who predominantly graze, shred or forage for vegetable matter, but they will also feed on other animals if the opportunity arises. During breeding the male amphipods will guard their female mates against competition from other males.

Amphipods

Subphylum Crustacea
Class Malacostraca
Order Amphipoda



Size

2mm–
4mm

Key identifying features

Laterally compressed bodies
with rounded outline.
Seven pairs of walking legs.
Large antennae.



Diet



Habitat



Adult



Signal

3

Backswimmers



Backswimmers are one of the most common waterbugs found in Victoria and will turn up almost anywhere there is water. They are true bugs which swim backstroke with their strong, paddle-shaped hind legs. In addition to being great swimmers they can also fly well and so are capable of finding new habitats quickly and easily. This group of bugs are predators who prey on other invertebrates and animals as large as tadpoles and small fish. Backswimmers are found in slow-moving freshwater environments such as ponds, lakes and creeks. The backswimmer's backstroke style of swimming and generally larger size (up to 16mm) distinguishes it from its relative, the waterboatman.

Backswimmers

Class	<i>Insecta</i>
Order	<i>Hemiptera</i>
Family	<i>Notonectidae</i>



Size

4mm-
11.5mm

Key identifying features

Enlarged, paddle-like hind legs with fringing.
Body lightly coloured on back surface.
Swims upside down.

Location



Diet



Habitat



Adult



Signal

1

Baetid mayflies



These sleek, streamlined nymphs can be found living in most kinds of aquatic environments such as streams, rivers, wetlands and farm dams, but the greatest diversity occurs in cool rivers and creeks. Like all mayfly nymphs, baetids have long antennae, prominent gills along their abdomen and a long three-pronged tail. Baetid nymphs feed on algae and organic particles which they scrape off rocks and wood. As their streamlined shape would suggest, these nymphs are fast swimmers who move easily through their aquatic habitat. They tend to be no bigger than 10mm. Baetids can be distinguished from leptoflebs due to their unflattened bodies with a distinctively curved back.

Baetid mayflies

<i>Class</i>	<i>Insecta</i>
<i>Order</i>	<i>Ephemeroptera</i>
<i>Family</i>	<i>Baetidae</i>

— 10mm —



Size

Up to
10mm

Key identifying features

Three-pronged tail,
prominent gills.
Curved back, stream-lined
shape.

Location



Diet



Habitat



Larva



Signal

5

Biting midges



Ceratopogonid larvae are quite a diverse group, with some species having long bristles along their worm-like bodies and others looking a lot like bloodworms with no front legs. The most common type is a tiny worm-like creature with a dark, bullet-shaped head. They are so small (~12mm) that they can look like a living eyelash. The larvae live in out of the way habitats such as rock pools, water-filled tree hollows and quiet parts of a streambed, where you can find them in mud or piles of vegetation debris. Ceratopogonid larvae are omnivorous, feeding on vegetation particles, fungus, algae and other invertebrates.

Biting midges

Class	<i>Insecta</i>
Order	<i>Diptera</i>
Family	<i>Ceratopogonidae</i>

— 12mm —



Size

Up to
12mm

Key identifying features

Tiny worm-like animals.
Abdomen made up
of nine segments.
Circle of hairs on final
segment.

Location



Diet



Habitat



Larva



Signal

4

Black flies



Simuliid larvae are small, pear-shaped creatures that can be found attached to rocks in fast-flowing water. These larvae create silk mats which they attach to rocks on the streambed and use a hook-lined disc on their abdomen to cling to it. If they are washed away by the current or want to escape a predator they can release themselves from the mat but stay attached by a silk line. They have brushes on their head capsules which they use to filter out food particles as the current flows past them. They can not survive in slow-flowing water. Simuliids don't swim; rather, they walk through their habitat with a caterpillar-like motion. This can make them appear a little like leeches, but simuliids can be distinguished by their distinct head.

Black flies

Class	<i>Insecta</i>
Order	<i>Diptera</i>
Family	<i>Simuliidae</i>

~ 7mm ~



Size

Up to
7mm

Key identifying features

Pear-shaped body.
Feathery mouthparts.
Leech-like movement,
but with a distinct head.

Location



Diet



Habitat



Larva



Signal

5

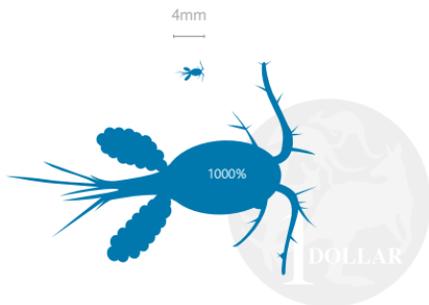
Copepods



Copepods are teardrop-shaped swimming crustaceans characterised by a pair of large antennae, a single eye in the centre of the head and the dual egg sacs that females often carry. They use their large antennae in combination with their limbs to propel themselves through the water. Most copepods live on the muddy base of waterways or suspended in the water column where they feed on microscopic food like bacteria, algae and plankton.

Copepods

Subphylum Crustacea
Class Maxillopoda
Subclass Copepoda



Size

Up to
4mm

Key identifying features

Teardrop shaped carapace protecting body.
Females hold egg sacs externally.
Large antennae used as swimming organs.

Location



Diet



Habitat



Adult



Signal

N/A

Damselflies

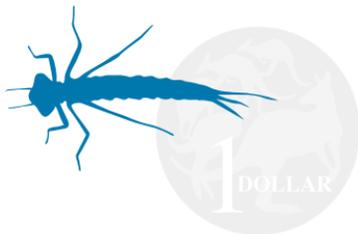


Damselfly larvae are similar to dragonfly larvae, to which they are related, but are more slender and have a long tail tipped with three fanlike gills. They have the same hinged jaws as dragonfly larvae and also active predators that feed on other insect larvae. They are found in a diverse range of habitats such as rivers, lakes, swamps, ponds and wetlands, often living within vegetation. Damselflies can further be identified by their characteristic way of moving: a rapid side-to-side 'dance' that propels them forward. The colours of damselfly larvae can vary dramatically, even within the same species, from bright greens to dull browns depending on which particular habitat they live in.

Damselflies

<i>Class</i>	<i>Insecta</i>
<i>Order</i>	<i>Odonata</i>
<i>Family</i>	<i>Zygoptera</i>

30mm



Size

Up to
30mm

Key identifying features

Slender body.
Hinged jaws tucked under head.
Long tail with three
fan-shaped gills.

Location



Diet



Habitat



Larva



Signal

Varies

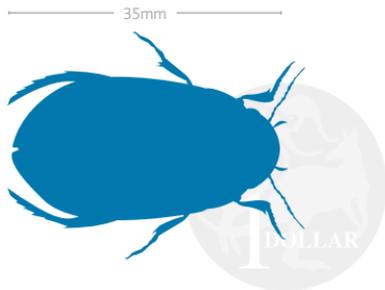
Diving beetles – adult



Adult diving beetles are distinguished by their streamlined shape (with both upper and lower sides being slightly curved outwards), fine antennae and strong hind legs fringed with fine hairs. Like their larvae, diving beetles are predators that feed on insects, crustaceans, worms, leeches, snails, tadpoles and small fish. Diving beetles get their oxygen from the air above the water surface and hold an air bubble under their wing cases at all times. Their habit of continually returning to the water surface for air is where they get the name 'diving beetle'.

Diving beetles – adult

Class	<i>Insecta</i>
Order	<i>Coleoptera</i>
Family	<i>Dytiscidae</i>



Size

Up to
35mm

Key identifying features

Rounded shape.
Fine antennae.
Hind legs fringed
with fine hairs.

Location



Diet



Habitat



Adult



Signal

2

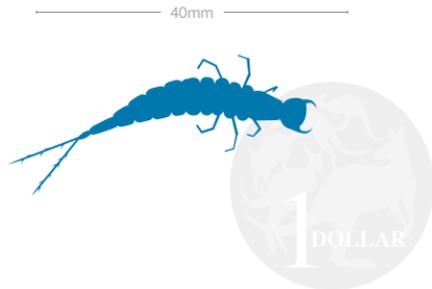
Diving beetles – larvae



Diving beetle larvae have big heads with big piercing mouthparts used to grab their prey, which consists of other aquatic invertebrates and occasionally even tadpoles and small fish. Once a diving beetle larva has captured its prey, it will inject them with digestive enzymes and suck out the animal's fluids. They have short antennae, long legs and can grow up to 40mm long. Some species have distinctive projections on their large heads. They are most often found living in the edges of non-flowing water bodies such as ponds and lakes.

Diving beetles – larvae

Class	<i>Insecta</i>
Order	<i>Coleoptera</i>
Family	<i>Dytiscidae</i>



Size

Up to
40mm

Key identifying features

Big heads, wider than the body.
Short antennae, sometimes
with projections.
Sharp, piercing mouthparts.

Location



Diet



Habitat



Larva



Signal

2

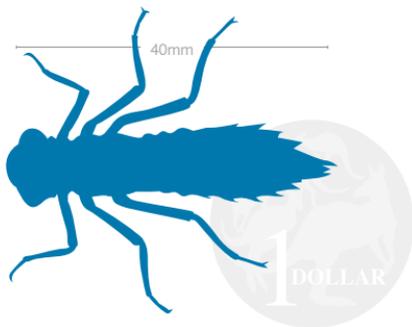
Dragonflies



Dragonfly larvae, often called 'mudeyes', are quite distinctive and often the largest insect you'll find within a sample. They have big heads, stout bodies, six legs and are often very well camouflaged. All dragonfly larvae are predators that will either stalk their prey or stay motionless and use their camouflage to ambush it. They have unique hinged mouths, which fold up under their heads and can be rapidly extended to grab prey. Dragonfly larvae mainly feed on the larvae of other insects. These larvae breathe by sucking water in and out of their abdomen, so they are able to shoot out a forceful jet of water and propel themselves away from danger if they feel threatened.

Dragonflies

Class Insecta
Order Odonata
Suborder Epiproctoptera



Size

Up to
40mm

Key identifying features

Big head and eyes.
Hinged jaws tucked under head.
Short, stocky body.

Location



Diet



Habitat



Larva



Signal

Varies

Flatworms



Flatworms

Phylum	<i>Platyhelminthes</i>
Class	<i>Turbellaria</i>
Order	<i>Tricladia</i>

— 20mm —



Flatworms are flat, incredibly thin worms sometimes with arrow-shaped heads which can grow up to 20mm. They have an odd gliding movement which distinguishes them from almost all other worms. Flatworms possess light-sensitive 'eye-spots' rather than true eyes, and these primitive organs give us an idea of how eyes first evolved. Flatworms both prey on smaller invertebrates and graze on bacteria and algae. In addition to being able to reproduce by laying eggs, flatworms can also regenerate into two individuals if they are cut in half. They are found in a variety of freshwater habitats usually hidden underneath debris like branches and rocks.

Size

Up to
20mm

Key identifying features

Extremely flat, bilaterally symmetrical, wormlike body. Very simple body-plan, no complex systems visible.

Location



Diet



Habitat



Adult



Signal

2

Free-living caddis



Hydrobiosids are free-living members of the caddisfly family – a group usually distinguished by its larvae, which use constructed cases for protection. All free-living caddis are predators and have forelegs modified into pointy instruments like pincers and hooks. Hydrobiosids grow from 8–15 mm and are typically predators feeding on worms, fly and beetle larvae. Their preferred habitat is rocky streambeds of cool, flowing streams. Some free-living caddis have adapted to their habitat of flowing water by using a line of silk to attach themselves to the rocks on the floor of the stream to prevent them from being washed away.

Free-living caddis

Class	<i>Insecta</i>
Order	<i>Trichoptera</i>
Family	<i>Hydrobiosidae</i>

— 15mm —



Size

8mm–
15mm

Key identifying features

Forelegs modified for grasping.
First segment after the head is always covered in a tough, shiny covering.
No protective case.

Location



Diet



Habitat



Larva



Signal

8

Freshwater mussels

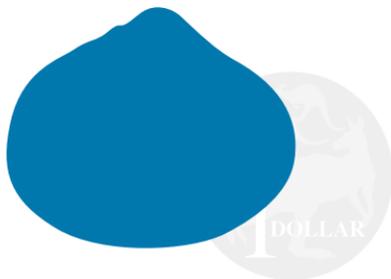


Like the freshwater snails, these mussels have evolved from marine ancestors that have adapted to a freshwater environment. Like their marine cousins, these animals find their food by filtering water through their hinged shell and extracting any organic particles. Bivalves are able to move a little using a muscular foot that they can stick out of their shell, but they tend to sit still in the mud at the bottom of streams, lakes and pools.

Freshwater mussels

Phylum Mollusca
Class Bivalvia

40mm



Size

5mm –
200mm

Key identifying features

Shell with two halves joined together on one side.
Soft body enclosed in shell.

Location



Diet



Habitat



Adult



Signal

3

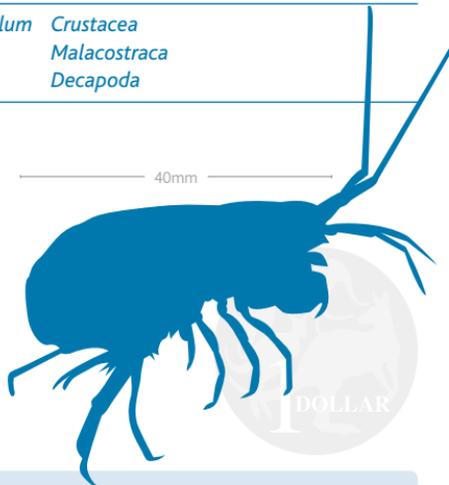
Freshwater shrimps



Freshwater shrimps are one of the more recognisable aquatic invertebrates due to our familiarity with their relatives from the ocean: crayfish, prawns, crabs etc. They have ten legs with the front pair characterised by a pair of brushes, rather than the pincers of most decapods. Their head and thorax are fused and they have a fan-shaped tail which they use to propel themselves. Shrimps can be found in slow-flowing rivers or lakes and tend to be found sheltering within vegetation or under rocks, stones or branches. They feed on small organic particles such as rotting vegetation, algae and other detritus they collect with their grasping front legs.

Freshwater shrimps

Subphylum Crustacea
Class Malacostraca
Order Decapoda



Size

20mm–
40mm

Key identifying features

Five pairs of legs.
Front pair of legs equipped with small brushes.
Head and thorax fused with tail that ends in fan-shaped tip.

Location



Diet



Habitat



Adult



Signal

1

Freshwater snails



Freshwater snails are found in a broad variety of aquatic environments living on muddy streambeds, aquatic vegetation and attached to plant debris, rocks and pebbles. They inhabit a number of ecological niches such as predator, scavenger and grazer – in all cases using their specially modified tooth-row (called a radula) to obtain their food. Like most other snails we are familiar with, freshwater snails have a soft muscular foot, a coiled shell, two tentacles and eye-stalks. Australian freshwater snails have evolved to deal with dry conditions and can live in temporary bodies of water that dry up during drought. Freshwater snails have a large range of body sizes, from 3mm to 30mm.

Freshwater snails

Phylum *Mollusca*
Class *Gastropoda*

————— 30mm —————



Size

3mm–
30mm

Key identifying features

Soft, unsegmented body.
Single, coiled shell.
Muscular foot-like body.

Location



Diet



Habitat



Adult



Signal

1

Hydra



Hydra

Phylum	<i>Cnidaria</i>
Class	<i>Hydrozoa</i>
Order	<i>Anthomedusae</i>

30mm



Animals from the phylum Cnidaria such as jellyfish and sea anemones are most commonly known from marine environments, but representatives of this group are also found in freshwater, the most common being the hydra. Hydra are similar to sea anemones in that they are radially symmetrical, immobile animals that obtain their food by capturing small animals with their tentacles. They can be found in ponds, lakes and streams and can tolerate quite degraded habitats – some species can tolerate moderately salty water. They are generally found attached to rocks and plant matter, often in large groups. Hydra are predators and subdue their prey with special stinging cells in their tentacles.

Size

Up to
30mm

Key identifying features

Small animal (~30mm)
no complex systems visible.
Tube-like body with a crown
of tentacles at the top.

Location



Diet



Habitat



Adult



Signal

1

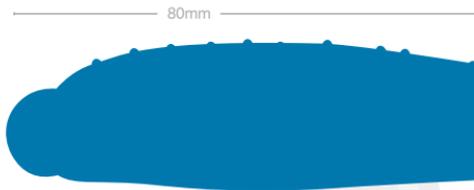
Leeches



Leeches are a type of predatory worm that are found in a wide variety of freshwater environments all over Australia. Although leeches are mostly known to humans as blood-suckers, many species are hunters who feed on worms, molluscs, insect larvae and crustaceans. They have long, segmented bodies with two suckers, one on the tail and one on the mouth. They tend to live on the muddy bottoms of waterways. Some leeches are also good swimmers that move through the water like an eel. Some species of leeches in the glossophoniid family are very good parents – they will carry their young around on their back after they hatch and catch snails for them to eat.

Leeches

Phylum *Annelida*
Class *Hirudinea*



Size

Up to
80mm

Key identifying features

Wormlike, segmented body.
Two suckers; one at the head,
one at the tail.
No hairs, legs or distinct
body sections.

Location



Diet



Habitat



Adult



Signal

1

Leptofleb mayflies



Leptofleb mayflies

Class	<i>Insecta</i>
Order	<i>Ephemeroptera</i>
Family	<i>Leptophlebiidae</i>

— 20mm —



Leptofleb nymphs are characterised by a flattened head, body and legs which decrease its fluid resistance and helps it to avoid getting washed away in the fast-flowing rivers and creeks where they live. They can also be found in slower-moving lowland rivers, lakes and dams. Like all mayfly nymphs, leptoflebs have long antennae, prominent gills along their abdomen and a long, three-pronged tail. Leptoflebs are grazers of algae and collectors of organic particles, which they get by scraping the surface of rocks and logs. These nymphs are nocturnal which may be an adaptation for avoiding predators such as fish which are active during the day.

Size

Up to
20mm

Key identifying features

Three-pronged tail,
prominent gills.
Flattened body and head.
Flattened and thick upper legs.

Location



Diet



Habitat



Larva



Signal

9

Mosquitoes



Mosquito larvae are small worm-like creatures with a distinctive swimming style that involves thrashing their body around, giving them their common name, 'wrigglers'. Wrigglers feed on algae using special brushes on their mouth, which draw water towards them and sift out food. They have no legs, and the three segments after their distinctive heads are a little enlarged compared to the abdomen. These larvae can often be found floating near the surface of the water with their abdomen sticking into the air, which they breathe through a siphon on their tail, like a snorkel. For this reason, mosquito larvae can tolerate water with very low oxygen levels and can be found in standing, stagnant water of all kinds.

Mosquitoes

<i>Class</i>	<i>Insecta</i>
<i>Order</i>	<i>Diptera</i>
<i>Family</i>	<i>Culicidae</i>

— 10mm —



Size

Up to
10mm

Key identifying features

Small, worm-like larva.
Swims with a wriggling motion.
Three segments after head
wider than abdomen.

Location



Diet



Habitat



Larva



Signal



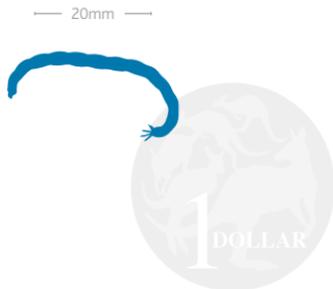
Non-biting midges



The larvae of non-biting midges are long fleshy animals with a tough casing around their head like a helmet. Chironomid larvae have many different feeding modes depending on the species. Some species are collectors of organic particles, some build tubes and make silk nets for them to filter the water for food, some are predators and others bore into wood. They are found in almost all aquatic habitats. The larvae of *Chironomus*, a common urban species, are called 'bloodworms' due to their bright red colour. Bloodworms are red because they have pigments similar to those found in our blood which are specialised for extracting oxygen. This allows them to live in oxygen-poor and organically polluted waterways.

Non-biting midges

Class	<i>Insecta</i>
Order	<i>Diptera</i>
Family	<i>Chironomidae</i>



Size

Up to
20mm

Key identifying features

Long, fleshy worm-like larvae.
Head is enclosed with a dark casing.
Two pairs of legs near the head, one pair on last segment.

Location



Diet



Habitat



Larva



Signal

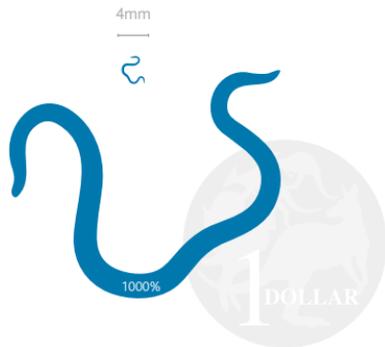
3

Roundworms



Roundworms

Phylum *Nematoda*



Nematode worms are one of the most abundant animal groups on the planet. They are superficially similar to the earthworms that most people are familiar with (which are oligochaetes), but with a few key differences. They are usually pale-coloured with a pointed end (the tail) and a blunt end (the head). They are very small, usually not exceeding 4mm. They are incredibly diverse and can be found in almost every kind of freshwater environment, living within the sediment or just above it. This diversity is reflected in their lifestyles with some species living as predators, some herbivores and some parasitic on other animals.

Size

Up to
4mm

Key identifying features

Elongate, wormlike body that is round in cross-section.
One pointed end, one blunt end.
Usually a pale colour.

Location



Diet



Habitat



Adult



Signal

3

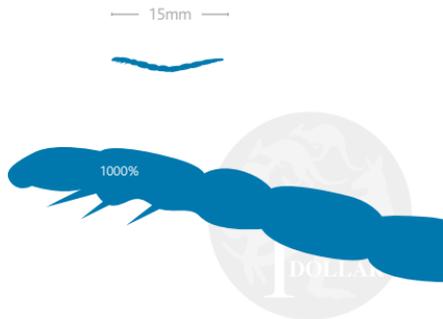
Scorpionflies



The larvae of the scorpionfly are worm-like creatures with a distinctive dark rectangle on the first segment after the head. They swim in an s-shaped movement and although they resemble worms, they have six legs positioned near the front of their body. They live where mud and sand accumulates in high-quality cool streams. Mecopteran larvae are fleet predators feeding on bloodworms (chironomid larva) and other fly larvae. They are able to pick up the movements of their prey within the mud and then hunt them down.

Scorpionflies

Class *Insecta*
Order *Mecoptera*



Size

Up to
15mm

Key identifying features

Worm-like animal with six-legs near front of body.
Dark rectangle on first segment after the head.
Swims quickly in an s-shape.

Location



Diet



Habitat



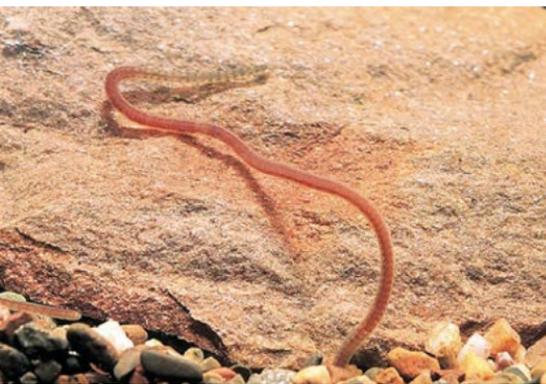
Adult



Signal

10

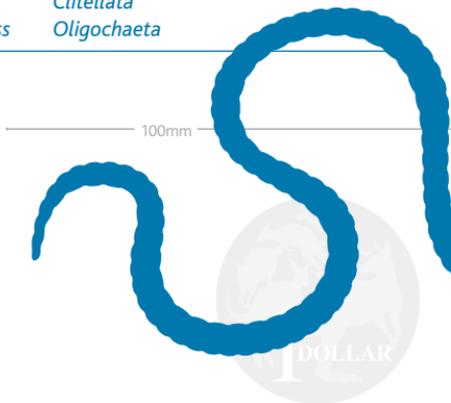
Segmented worms



Annelids include many freshwater worm species, as well as the familiar earthworm. They are segmented worms with no legs or suckers, which distinguishes them from polychaete worms and leeches respectively. Like earthworms they are usually brown, pink or red. Most freshwater annelids burrow in the soft sediment of waterways and feed on the microscopic organisms which live there such as bacteria and algae. A couple of species of annelids are predators. Annelids are very tolerant to pollution and can even be found living in sewage outflows and extremely degraded urban waterways.

Segmented worms

Phylum *Annelida*
Class *Clitellata*
Subclass *Oligochaeta*



Size

Up to
100mm

Key identifying features

Wormlike, segmented body.
No legs or suckers.

Location



Diet



Habitat



Adult



Signal

2

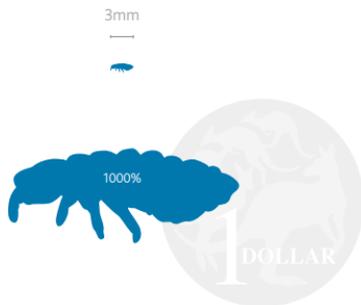
Springtails



Springtails are unusual animals that were previously thought to be a kind of insect, but have now been classified in their own group. They have six legs, no wings and are typically tiny – less than a couple of millimetres. However, despite their small size they are remarkable jumpers. Using their 'springtail', a forked appendage usually held under their abdomen, they can launch themselves up to 30cm into the air. Springtails are found on the surface of still waters like ponds, pools and lakes where they eat the microorganisms that feed on decomposing organic matter. They are able to stay on the surface of water bodies due to having waterproof skin.

Springtails

Phylum *Arthropoda*
Class *Entognatha*
Subclass *Collembola*



Size

1mm–
3mm

Key identifying features

Looks a bit like an insect, but has no wings.
Forked appendage at the end of abdomen, usually tucked underneath body.

Location



Diet



Habitat



Adult



Signal

1

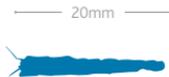
Stick caddis



Leptocerids are one of the most common families of caddisflies in Australia, and like most members of this family, the larvae make protective cases from debris found in their freshwater environments. One of the most common groups of this family found in Melbourne are known as 'stick caddis', due to their habit of making a case by chewing out the inside of a stick or plant stem. Other leptocerids make their cases from plant fragments or sand grains. This family is found in a variety of habitats such as fast-flowing, cool mountain creeks, slow-flowing streams, swamps, lakes and temporary pools. There are all sorts of different feeding modes found within the Leptocerid family including grazers, predators and organic particle foragers.

Stick caddis

Class	<i>Insecta</i>
Order	<i>Trichoptera</i>
Family	<i>Leptoceridae</i>



Size

Up to
20mm

Key identifying features

Long antennae.
Very long hind legs
Constructed protective case.

Location



Diet



Habitat



Larva



Signal

6

Stoneflies



Stonefly larvae are characterised by long antennae, two sets of wing-pads and a two-pronged tail. The larvae of many stonefly species have a tuft of feathery gills at the end of the abdomen. This is a sensitive group of insects and although there are exceptions, they are typically only found in healthy, fast-flowing streams and rivers. The larvae of most stonefly species feed on plants or organic particles. In some species, the larvae adopt a carnivorous diet as they develop. After maturing, adult stoneflies only live for a few months at the most.

Stoneflies

Class *Insecta*
Order *Plecoptera*

30mm



Size

Up to
30mm

Key identifying features

Six legs, long antennae,
two pairs of wing pads.
Two-pronged tail.

Most species have feathery
gill tufts at tip of abdomen.

Location



Diet



Habitat



Larva



Signal

10

Toebiters



Toebiter larvae are ferocious predators that prey on other aquatic insect larvae. They are toughly built animals with strong carapace segments protecting their heads and thorax. The segments of their abdomen have a pair of long strands on each side. Toebiters need high-quality aquatic habitats and can be found in streams, rivers, lakes and swamps. After the larvae metamorphose into adults they don't eat, living for only a few hours or days.

Toebiters

Class *Insecta*
Order *Megaloptera*

30mm



Size

Up to
30mm

Key identifying features

Strongly reinforced head and thorax.
Body segments have paired strands on each side.
Biting mouthparts.

Location



Diet



Habitat



Adult



Signal

8

Waterboatmen



Waterboatmen are aquatic bugs who propel themselves through the water with their paddle-shaped hind limbs. These are small bugs (up to 12mm), usually coloured dark brown with rounded triangular heads and large compound eyes that wrap around the sides. Although they are very well adapted to an underwater lifestyle, they still retain the ability to fly and can move to and from different water bodies easily. Their habitat consists of slow-moving or still pools and ponds where they are found near the edges amongst vegetation or swimming near the lakebed. They are predominantly omnivorous, foraging for small bits of plant and animal matter, although some species are predatory and hunt other aquatic invertebrates and even the occasional tadpole.

Waterboatmen

Class	<i>Insecta</i>
Order	<i>Hemiptera</i>
Family	<i>Corixidae</i>

— 12mm —



Size

Up to
12mm

Key identifying features

Enlarged, paddle-like hind legs,
scoop-like front legs.

Body is flattened top to bottom.
Fine lines on the wings.

Location



Diet



Habitat



Adult



Signal

2

Water fleas



These crustaceans are called water 'fleas' due to the jerky swimming motion created by the beating of their antennae. They have five to six pairs of legs, two pairs of antennae and one centrally positioned compound eye. Water fleas feed by creating currents with their legs, which stream water through their carapace and allows them to filter out food like algae, bacteria and organic particles. Female water fleas are able to reproduce asexually and often have large amounts of cloned eggs within their carapace, allowing them to rapidly reproduce when food is abundant. Water fleas are generally found in vegetation around edges and bottoms of slow-moving waterways.

Water fleas

Subphylum Crustacea
Class Branchiopoda
Order Cladocera

6mm



Size

4mm–
6mm

Key identifying features

Single eye in the centre of the head.
Females hold eggs internally.
Large antennae used as swimming organs.

Location



Diet



Habitat



Adult



Signal

N/A

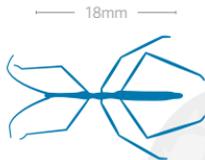
Water measurers



Water measurers are very distinctive bugs with a thin, elongated body that skate across the surface of the water on their thin legs. Their light weight spread evenly across their six legs enables them to move on the water surface without breaking the surface tension. Their eyes are positioned midway on their lengthened head, making them look like they have a long snout. Water measurers are predators and scavengers who feed on animals that they find on the water surface such as fly larvae, springtails and freshwater shrimp. Once caught, the prey is carried to land, pierced with the water measurer's proboscis and is drained of all its fluids.

Water measurers

Class	<i>Insecta</i>
Order	<i>Hemiptera</i>
Family	<i>Hydrometridae</i>



Size

7.8mm–
18.1mm

Key identifying features

Elongate, thin body.
Eyes halfway along head.
Moves slowly on the surface
of the water.

Location



Diet



Habitat



Adult



Signal

3

Water mites



Water mites are in the same class as spiders and scorpions, and like them they have four pairs of legs. Unlike their relatives, water mites don't have any distinctive body sections and their bodies have a spherical appearance as a result. They are one of the more colourful aquatic invertebrates and can be bright red, blue, yellow or green. They can be found in most types of freshwater environments but particularly in slow-moving or still water environments with lots of vegetation. In a water sample, they often appear as tiny, coloured dots swimming haphazardly around the container. Water mites are predatory and use a beak-like mouthpart to attack small prey like insect larvae and crustaceans.

Water mites

Subphylum Chelicerata
Class Arachnida
Subclass Araci

5mm



Size

Up to
5mm

Key identifying features

Four pairs of legs.
No antennae.
Small, no bigger than 5mm.

Location



Diet



Habitat



Adult



Signal

6

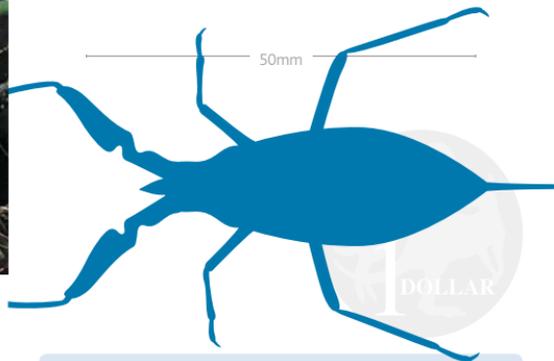
Water scorpions



Although they look a bit like scorpions, these animals are actually very specialised bugs. They have large grasping claws on their front legs and a long tail which is used as a snorkel to collect air which is stored under their wings. These bugs are predators that sit quietly within vegetation waiting to ambush other bugs, such as waterboatmen, or tadpoles and small fish which they grab with their strong claws. They are able to catch these fast swimming animals due to their keen eyesight. Water scorpions are found in slow-moving waterways amongst debris and vegetation. They are not strong swimmers and are rarely observed flying, yet they sometimes seem to be able to find and colonise new habitats quickly.

Water scorpions

<i>Class</i>	<i>Insecta</i>
<i>Order</i>	<i>Hemiptera</i>
<i>Family</i>	<i>Nepidae</i>



Size

Up to
50mm
(excluding
tail)

Key identifying features

Long bodies, some species quite thin.
Huge, grasping forearms.
Long, thin, tube-like tail.

Location



Diet



Habitat



Adult



Signal

3

Whirligig beetles – adult



Whirligig beetle adults are medium-sized (up to 15mm), speedy swimmers protected by a streamlined, shiny black carapace. Unlike diving beetles, whirligigs have long front legs and short mid and hind legs. They are often found in groups, swimming in small circles on the water surface. They hunt on the water surface for live prey or scavenge for dead organisms. Due to their preference for the water surface, they have evolved split-screen eyes, separated so that the lower half can see in the water and the upper half can see in the air. They are also able to secrete a detergent-like substance which reduces the friction between the beetle and the water and allows them to move faster.

Whirligig beetles – adult

Class	<i>Insecta</i>
Order	<i>Coleoptera</i>
Family	<i>Gyrinidae</i>

— 15mm —



Size

Up to
15mm

Key identifying features

Eyes split into two sections.
Front legs longer than
hind legs.
Found on surface of the water,
often in groups.

Location



Diet



Habitat



Adult



Signal

4

Whirligig beetles – larvae



Whirligig beetle larvae are long and worm-like but with three pairs of segmented legs. They have long feathery pairs of gills on each side of their abdominal segments with two pairs on the last one. These larvae are active predators, using their thin, sickle-shaped jaws to hunt soft-bodied prey such as worms and other insect larvae with their thin, sickle-shaped jaws. Larvae are found within lakes, ponds and dams and within sheltered sections of slow-flowing rivers and creeks.

Whirligig beetles – larvae

Class	<i>Insecta</i>
Order	<i>Coleoptera</i>
Family	<i>Gyrinidae</i>

— 20mm —



Size

Up to
20mm

Key identifying features

Long thin body.
Ten gill pairs on each body segments, last segment has two.
Jaws are thin and sickle-shaped.

Location



Diet



Habitat



Larva



Signal

4

For further information

The Waterbug Book.

2002. John Gooderham & Edward Tsyrlin
CSIRO Publishing

Macroinvertebrate Monitoring Agreed Level Taxonomy (ALT)

<http://www.thewaterbug.net/ALT.html>

Australian Freshwater Invertebrates, Murray-Darling Freshwater Research Centre

<http://www.mdfrc.org.au/bugguide/index.htm>

SIGNAL 2 – A Scoring System for Macro-invertebrates (‘Water Bugs’) in Australian Rivers

2003. Bruce Chessman
Monitoring River Heath Initiative Technical Report
no 31, Commonwealth of Australia, Canberra



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