# **Caddisfly Larvae**

## **Very Sensitive Bug**



Class: Insecta Order: Trichoptera

**Size:** Caddisfly Larvae themselves can grow to 20mm but their case can be anywhere between 4-50mm.

Appearance: Caddisfly Larvae protect their soft bodies by building a protective case around them. The materials vary depending on the speed of the water in which it lives, the materials available and individual preference. They may include a hollow stick, reed, leaf, plant stem or even sand!



Habitat: Caddisfly Larvae are found among aquatic vegetation, rocks and snags in slow-moving streams, swamps, lakes and temporary pools or fast-flowing freshwater such as mountain creeks.

**Diet:** Caddisfly Larvae can be herbivores; collecting plant material, detrivores; scraping algae from rocks or carnivores; catching other aquatic invertebrates.

**Movement:** Caddisfly Larvae creep slowly along, dragging their case with them or they may poke their heads and front legs out and be seen thrashing wildly to propel themselves forward.

Predators: Dragonfly Nymphs, frogs, fish and platypus





Life Cycle: Egg, larva, pupa, winged adult (complete metamorphosis)



### **Did You Know:**

- Caddisfly Larvae spend 95% of their life as larvae
- Some Caddisfly Larvae are free living
- Caddisfly Larvae can chew out the inside of a stick or plant stem to make their case hollow
- Some Caddisfly Larvae even make a square-shaped 'log cabin' case out of small sticks





# **Stonefly Nymph**

## **Very Sensitive Bug**







Class: Insecta Order: Plecoptera Size: Stonefly Nymph grow to 30mm

Appearance: Stonefly Nymph are characterized by long antennae, two sets of wing-pads and a two-pronged tail. Some species have a tuft of feathery gills at the end of the abdomen.



Habitat: Stonefly Nymph generally live in healthy, cool, fastflowing streams and rivers. Some live on or under rocks, some cling to aquatic plants, some burrow and some live among woody debris.

**Diet:** Stonefly Nymph can be herbivores; feeding on algae and plant material, detrivores; foraging for decaying plant material and some become carnivores as they develop; preying on other aquatic invertebrates.

**Movement:** Stonefly Nymph move slowly and deliberately and may try to crawl out of your sampling tray !

Predators: Fish, invertebrates and birds

Life Cycle: Egg, nymph, winged adult (incomplete metamorphosis)



### **Did You Know:**

- Stonefly Nymph development can be delayed in drought conditions to wait for rain
- Eggs are laid in water and have a sticky coating to keep them fixed to the bottom
- After maturing, adult Stoneflies only live for a few months
- Some adult Stoneflies run and jump instead of flying. Many skim over the water using their wings to propel them like a hovercraft



# **Mayfly Nymph**

### **Very Sensitive Bug**







Class: Insecta Order: Ephemeroptera Size: Mayfly Nymph grow to 20mm

Appearance: Mayfly Nymph have three tails edged with hairs, two antennae, gills along their abdomen. They can be confused with Damselfly Nymph but have stouter bodies and thinner tails.



Habitat: Mayfly Nymph can be found in still to fast-flowing freshwater, under rocks and logs and in vegetated areas

**Diet:** Mayfly Nymph can be herbivores; feeding on algae and phytoplankton, detrivores; eating decaying organic matter and carnivores; preying on other aquatic invertebrates.

**Movement:** Very slow with fast bursts of movement when hunting. They have gills along either side of their abdomen that they flutter.

Predators: Fish and invertebrates.

Life Cycle: Egg, nymph, winged adult (incomplete metamorphosis)



### **Did You Know:**

- Most of the life of a Mayfly is spent as a nymph
- Their three tails, some edged with swimming hairs, help them move in the water
- They can be confused with Damselflies because they both have three tails
- Mouthparts have scraping blades or brushes that aid feeding
- They have one claw on the end of each leg for anchorage
- The female adult Mayfly lays eggs in flight, bombing the surface of the water



## Water Mites

### **Sensitive Bug**





Class: Arachnida Order: Acariformes Size: Water Mites grow to 5mm

Appearance: Water Mites are in the same class as spiders and scorpions and, like them, have four pairs of legs. However, juveniles often have only six 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 are often red due to their parasitic diet.



Habitat: Water Mites can be found in most types of freshwater environments but particularly in slow-moving or still water with lots of vegetation.

**Diet:** Water Mites are predatory and use a beak-like mouthpart to attack small prey like insect larvae and crustaceans and suck the juice from them (parasites).

**Movement:** Water Mites will often appear as tiny, coloured dots swimming haphazardly around in sample trays.

### Predators: Filter-feeding organisms

Adult Water Mites

**Life Cycle:** They have a complex lifecycle with four major stages. After hatching from eggs, the juveniles attach to an aquatic insect host where they feed on the juices in it's body. Eventually the young mites leave the host and become free swimming.



#### **Did You Know:**

- Young mites attached to flying insect hosts are able to live out of water. Hitch-hiking mites use this opportunity to disperse and colonise new water bodies.
- Bright red mites have a toxic and distasteful substance in their skin so creatures choose not to eat them.
- Many mites have two pairs of eyes



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

## **Marsh Beetle Larvae**

## **Sensitive Bug**



Photo features various types of beetle larvae





Class: Insecta Order: Coleoptera

Size: Marsh Beetle Larvae grow to 10mm

Appearance: Flattened, cockroach-like larvae with simple bodies, short legs and long antennae. They can be yellow, brown or even black.



Generic sketch of beetle larvae anatomy

Habitat: Marsh Beetle Larvae are found living in the edges of flowing water bodies and wetlands (the littoral zone).

**Diet:** Marsh Beetle Larvae are detrivores, filtering algae or decaying plant matter from the surface of leaves and stones using complex comb-like mouthparts.

Movement: Marsh Beetle Larvae crawl slowly.

**Predators:** Fish, frogs, water spiders, water rats, platypus, reptiles and birds.

Life Cycle: Egg, larva, pupa, winged adult (complete metamorphosis)



Generic life cycle of beetle larvae

#### **Did You Know:**

- Water Beetles spend most of their life as larvae (grubs)
- There are many families of beetles. They form the largest group of animals on earth



# **Black Fly Larvae**

## **Sensitive Bug**





Class: Insecta Order: Diptera Family: Simuliidae Size: Back Fly Larvae grow to 5mm

Appearance: Black Fly Larvae have broadly swollen abdomen giving them a 'chicken drumstick' appearance. They have expandable antennae modified to form broad 'antlers' for filter feeding.



Habitat: Black Fly Larvae like fast flowing waters with solid surfaces such as logs, rocks or aquatic plants to cling onto.

**Diet:** Black Fly Larvae are carnivores, feeding on insect larvae.

**Movement:** Black Fly Larvae move like a leech, rarely losing hold of the substrate. They vomit up gluey silk then use hooks on their bottom to cling onto the silk, repeating the process to move forward.



Black Fly Larvae

Predators: Fish, wading birds, frogs and platypus

Life Cycle: Egg, larva, pupa, winged adult (complete metamorphosis)



#### **Did You Know:**

- Black Fly Larvae reproduce rapidly and are found in large numbers
- Large groups of larvae gather, finding the ideal surface (such as a rock) in fast flowing water to attach to.
- They defend this position from other larvae
- Their antennae then extend to catch food particles that are washing past in the water flow



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

# Amphipod (Side Swimmer or Scud)

### **Tolerant Bug**







Class: Crustacea Order: Amphipoda Size: Amphipods grow to 2-4mm

Appearance: Amphipods, also known as scuds and sideswimmers, are laterally (from the sides) flattened animals with seven pairs of legs and two sets of antennae. Their tough outer skin must be shed to allow growth.



Habitat: Amphipods can be found in all sorts of aquatic environments within slow moving 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.

**Diet:** Amphipods are omnivores who predominantly graze, shred or forage for vegetable matter, but they will also feed on dead animals if the opportunity arises.

**Movement:** Amphipods swim in bursts of movement, usually on their sides.

Predators: Water bugs, water beetles, fish and frogs.

**Life Cycle:** Young Amphipods are released from the female's brood chamber when she moults and resemble small adults. They become adults themselves after the 6<sup>th</sup> moult.



### Did You Know:

- During breeding the male Amphipods will guard their female mates against competition from other males
- Amphipods are related to crabs and can be green, red, grey or brown coloured
- Some Amphipods have adapted to live on land (eg under rotting logs), some live in rotting seaweed on the shore and others in the sea



## **Freshwater Mussel**

## **Tolerant Bug**







Phylum:MolluscaClass:BivalvaFamily:HyriidaeSize:FreshwaterMussels can grow up to 40mm long.

Appearance: Freshwater Mussels are a shell made of two halves joined together on one side. A soft body is enclosed in the shell. They are often a brown or black colour.



Habitat: Freshwater Mussels can be found partially buried in soft bottom sediment in permanent or semi-permanent bodies of freshwater.

**Diet:** Freshwater Mussels filter-feed small particles of organic matter and bacteria from the water through their hinged shell and extract any organic particles.

**Movement:** Freshwater Mussels are able to move a little using a muscular foot that they can stick out of their shell but they tend to sit still.

**Predators:** Species of ducks and other aquatic birds eat mussels. Some birds will dive under the water to grab buried mussels and crack them open with their beaks.

Life Cycle: Freshwater Mussels are hermaphrodites. Eggs hatch within the protective shell of the parent and are then released into the surrounding water. Reproduction can occur at any time of year but most young are produced during the warmer months.



#### **Did You Know:**

- Freshwater Mussels, like Freshwater Snails, have evolved from marine ancestors that have adapted to a freshwater environment
- Freshwater Mussels are a source of bushtucker for Traditional Owners. They need to be rested in fresh water for a time to let the sand and grit pass through then they can be eaten raw, boiled or roasted on hot ashes.



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

# **Leafy Water Scorpian**

## **Tolerant Bug**







**Size:** Leafy Water Scorpians can grow up to 90mm including the tail (breathing tube).

Appearance: Leafy Water Scorpians differ from land-based scorpians. They have a long flat oval-shaped body and a front pair of bent, pincer-like legs. They are the only leaf-shaped water scorpion species in Australia.



Habitat: Leafy Water Scorpians are found in wetlands, ponds and slow-moving water. They are uncommon but spectacular.

**Diet:** Leafy Water Scorpians are carnivores, eating other bugs such as water boatmen, tadpoles or small fish.

**Movement:** Leafy Water Scorpians sit quietly within vegetation waiting to ambush their prey.

Predators: Fish, wading birds, frogs and platypus

Life Cycle: Eggs are deposited on aquatic vegetation near the surface. Leafy Water Scorpians undego five moultings before reaching maturity. They look the same throughout the life cycle.

#### Did You Know:

- Leafy Water Scorpians extend the tube on their back out of the water to breathe air through it like a snorkel.
- They can ambush fast-swimming prey, such as small fish, catching them between their front legs and stabbing them with their pointed proboscis.



# **Glass Shrimp**

## **Tolerant Bug**







Class: Crustacea Order: Decapoda

Size: Freshwater Shrimp grow between 20-40mm.

Appearance: Freshwater Shrimp have five pairs of legs with the front pair equipped with small brushes rather than the pincers of yabbies and prawns. The head and thorax are fused and the fan-shaped tail is often curled under the body.



Habitat: Freshwater Shrimp can be found in slow-flowing rivers or lakes and tend to be found sheltering within vegetation or under rocks, stones or branches.

**Diet:** Freshwater Shrimp feed on small organic particles such as rotting vegetation, algae and other detritus they collect with their grasping front legs. They are detrivores (feeding on decomposing matter).

**Movement:** Freshwater Shrimp propel themselves with their fan-shaped tail. They flip around when in a sample or ice-cube tray.

#### Predators: Fish, birds, platypus and water rats.

Life Cycle: Females produce 50-250 eggs that are carried by the last 5 pairs of legs (pleopods) under the abdomen. Upon hatching the larvae bear no resemblance to adults. The larvae are termed 'plankton' and go through many stages of development before reaching adulthood.



#### **Did You Know:**

- Glass Shrimp eyes are on short stalks
- Brushes on the front two pairs of legs help to draw food into the mouth
- Glass Shrimp are one of the more recognizable macroinvertebrates because of the similarity to their relatives; prawns



# **Dragonfly Larvae**

## **Tolerant Bug**







Class: Crustacea Order: Odonata

Size: Dragonfly Larvae can grow up to 40mm.

Appearance: Dragonfly Larvae are quite distinctive and often

the largest insect you will find within a sample. They have big heads, stout bodies, six legs and are often very well camouflaged among the debris in a sample tray.



Habitat: Dragonfly Larvae can be

found in vegetation around the edges

of both fast and slower moving freshwater. They may also be found in the sediment on the bottom of waterways.

**Diet:** Dragonfly Larvae are predators that will either stalk their prey or stay motionless and use their camouflage to ambush it. They have unique hinged mouth, which fold up under their heads and can be rapidly extended to grab prey.



**Movement:** Dragonfly Larvae breathe by sucking water in and out of their abdomen. They are able to shoot out a forceful jet of water from their bottoms to propel themselves away from danger if they feel threatened.

**Predators:** Fish, frogs, platypus, reptiles and birds. **Life Cycle:** Egg, nymph, winged adult (incomplete metamorphosis)



#### **Did You Know:**

- Dragonfly Larvae are commonly called 'mudeyes' and are a popular fishing bait
- Nymphs can live for 40 days to 7 years, depending on conditions and temperature
- They breathe through their bottoms so that air can reach internal gills
- Dragonfly Larvae might be left behind in the bottom of your bucket of sample water so make sure you tip everything out !



# **Damselfly Larvae**

### **Tolerant Bug**







Class: Crustacea Order: Odonata

Size: Dragonfly Larvae can grow up to 30mm.

Appearance: Damselfly Larvae are slender and have a long tail tipped with three fan-like gills. Their heads often appear triangular and the eyes are prominent on the sides of the head. The colours of damselflies can vary dramatically from bright greens to dull browns depending on which particular habitat they live in.



Habitat: Damselfly Larvae are found in a diverse range of habitats such as rivers, lakes, swamps, ponds and wetlands, often living within vegetation.

**Diet:** Damselfly Larvae have the same hinged jaws as dragonfly larvae and are also active predators that feed on other aquatic creatures including water fleas, small fish, worms, tadpoles, mosquito wrigglers, fly larvae and beetles.

**Movement:** Damselfly Larvae can be identified by their characteristic way of moving; a rapid side-to-side 'dance' that propels them forward.

Predators: Platypus, fish, frogs, reptiles and birds.

Life Cycle: Egg, nymph, winged adult (incomplete metamorphosis)



#### **Did You Know:**

- They are related to dragonflies
- Damselfly Larvae emerge from eggs inserted into plants growing in the water
- Damselfly Larvae have 10-15 developmental stages lasting from 5 months to several years
- They climb out of the water to enable the final moult to adult form
- Damselflies only live for a couple of weeks as free flying adults
- You may find a shed skin in your sample



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

## Beetle Larvae (incl. Whirligig Beetle Larvae)

**Tolerant Bug** 







Adult Whirligig Beetles

Adult Water Beetles

Class: Insecta Order: Coleoptera Size: Beetle Larvae grow to 15mm

Appearance: Beetle Larvae can vary but most have big heads and piercing mouthparts to grab their prey. They have short antennae and long legs. Some species have distinctive projections on their large heads.



Adult Whirligig Beetles have a streamlined black shiny shell. Unlike Diving Bettles, Whirligig Beetles have long front legs and short mid and hind legs.

Habitat: Beetle Larvae are found in the edges of ponds and lakes or on the sandy or muddy bottoms of flowing freshwater. Whirligig beetle adults live on the water surface.

**Diet:** Beetle Larvae eat other aquatic invertebrates and occasionally even tadpoles and small fish. Others feed on algae or decaying plant matter. Whirligig Beetles hunt on the water surface for live prey or scavenge for dead organisms.

**Movement:** Some Beetle Larvae crawl slowly and some swim fast with legs and by undulating their abdomen. Whirligig Beetles can be seen swimming in circles on the surface.

**Predators:** Fish, frogs, water spiders, water rats, platypus, reptiles and birds.

**Life Cycle:** Egg, larva, pupa, winged adult (complete metamorphosis) spending most of their life as larvae.



#### **Did You Know:**

- Some water beetles obtain oxygen by trapping an air bubble under the abdomen using special hairs
- Due to their preference for the water surface, Whirligig Beetles have evolved split-screen eyes, so the lower half can see in the water and the upper half the air
- Whirligig Beetles are able to secrete a detergent-like substance reducing friction between the beetle and the water allowing them to move faster



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

## Water Strider

## **Tolerant Bug**







#### Class: Insecta Order: Hemiptera

Size: Water Striders bodies grow to 20mm in length and their leg span to 70mm

Appearance: Water Striders have a very thin body, two long legs out each side at angles of 45 degrees and one pair of legs out the front near two antennae. Water striders have a sharp mouthpart, called a rostrum, to suck up body juices from prey.



Habitat: Water Striders live in wetlands and at river edges in quiet waters and can be seen skating on the surface of the water.

**Diet:** Water Striders eat living and dead insects on the surface of the water. Some are aquatic insects, such as mosquito larvae coming up from the bottom, and others are terrestrial insects, such as butterflies or beetles that accidentally land on the surface. Injured dragonflies are a favourite food, as are worms that fall in the water.

**Movement:** Water Striders have very good vision and move quickly on the water. The short front legs of a water strider are for grabbing prey. The middle legs push the insect forward, and the hind legs steer. The shape of their legs and their light weight keep them from breaking through the surface.

**Predators:** Water Striders must always keep moving so they don't become prey themselves to fish or other predators. As they do not have wings, they are usually in large groups and prefer the protection of overhanging trees and shade.

**Life Cycle:** Water Striders go through five larval stages of metamorphosis, reaching adulthood usually around one month of age.

### **Did You Know:**

- Water Striders can live for many months. During winter they can crawl inside a plant stem when it gets too cold.
- Water striders use the high surface tension of water, their long hydrophobic legs and weight distribution to help them stay above water.



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

## **Bloodworm** (Chironomid/non-biting midge)

### **Tolerant Bug**







Class: Insecta Order: Diptera

Size: Bloodworms grow to 20mm

Appearance: The larvae of non-biting midges are long fleshy animals with a touch casing around their head like a helmet. They are called bloodworms because of their bright red colour. Bloodworms are red because they have pigments similar to those found in our blood which are specialized for extracting oxygen. This allows them to live in oxygen-poor and organically polluted waterways.



Habitat: Bloodworms can be found in almost aquatic habitats; on or under rocks, plants and among the sediment at the bottom of waterways.

**Diet:** Chironomid larvae have many different feeding modes depending on the species. Some species are collectors of organic particles and bacteria (detrivore), some build tubes and make silk nets to filter the water for algae (herbivore) and some suck on the juices of other organisms (parasite).

**Movement:** Bloodworms coil and uncoil quickly in a figure of eight, sometimes thrashing or using prolegs to drag themselves along the ground.

**Predators:** Water beetles, water bugs, fish, spiders and frogs. Birds and bats prey on the adults.

Life Cycle: Egg, larva, pupa, winged adult (complete metamorphosis)



#### **Did You Know:**

- Chironomid larvae have several eyes
- Some construct portable sand covered cases for protection
- They come in a variety of colours
- Their eggs are laid in a group, called an eggstring or egg mass
- Adults emerge from the water in early evening, often in great swarms when conditions are right.
- Adult non-biting midges look like mosquitoes



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

## **Freshwater Snails**

## **Very Tolerant Bug**







Class: Gastropoda Order: Pulmonata

Size: Freshwater Snails grow 3-20mm

Appearance: Freshwater Snails have a soft muscular foot, a coiled shell, two tentacles and eye-stalks. They can be very small or quite big.



Habitat: 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. Australian Freshwater Snails have evolved to deal with dry conditions and can live in temporary bodies of water that dry up during drought.

**Diet:** Freshwater Snails can be predators, scavengers or grazers. They use their specially modified tooth-row (called a radula) to obtain their food which is largely algae and leaves. They are herbivores.

**Movement:** Typical of a snail, very slow ! They will often be observed on the bottom or side of sample trays and, because of their suction abilities, they may remain in sample trays or buckets after the water has been emptied.

They secrete mucus to assist movement across surfaces using their muscular foot.

Predators: Fish, birds, turtles, frogs, platypus and yabbies.

**Life Cycle:** Fertilised eggs are laid in jelly-like clumps and are stuck to plants and stones. Miniature snails emerge from these eggs.



#### Did You Know:

- Snails able to withdraw into their shell when threatened and some snails have an operculum (door) that can be closed over the shell's opening for further protection
- Shells can either coil to the left of the right
- Some aquatic snails have both male and female body parts
- Fertilised eggs are laid in jelly-like clumps and are stuck to plants and stones. Miniature snails emerge from these eggs.



## **Backswimmers**

## **Very Tolerant Bug**







Size: Backswimmers grow within a range of 4-11mm

**Appearance:** Backswimmers have strong, paddle-shaped, fringed hind legs. Beak-like mouthparts are used for piercing their prey. The Backswimmer's backstroke style and larger size distinguishes it from its relative the Water Boatman.



Habitat: Backswimmers are one of the most common waterbugs found in Victoria and will turn up almost anywhere there is water. In addition to being great swimmers they can also fly well and so are capable of finding new habitats quickly and easily. Backswimmers are found in slow-moving freshwater environments such as ponds, lakes and creeks.

**Diet:** Backswimmers are predators who prey on other invertebrates. They suck body fluids from small animals such as bloodworms, snails and crustaceans and animals as large as tadpoles and small fish.

**Movement:** Backswimmers swim backstroke whilst upsidedown. They move in small bursts but are still at the surface while they re-fill their air supplies.

**Predators:** Fish, turtles, waterbirds, platypus and sometimes larger Backswimmers.

Life Cycle: Egg, nymph, winged adult (incomplete metamorphosis)

Adult Backswimmers



#### **Did You Know:**

- Female Backswimmers lay eggs into holes that they have drilled into the stems of water plants. Others glue eggs to the stems of water plants.
- Backswimmers collect an air bubble at the water surface through the tip of their abdomen and use this for breathing
- Backswimmers are fierce hunters



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

## **Water Beetles**

## **Very Tolerant Bug**





Class: Insecta Order: Coleoptera

Size: Water Beetles grow to 35mm

Appearance: Water 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.



Habitat: Water Beetles can be found in ponds, lakes and slowmoving freshwater. They continually return to the water surface for air and is where they get the name 'diving beetle'.

**Diet:** Water Beetles are carnivores and feed on creatures that fall into or live in the water; insects, crustaceans, worms, leeches, snails, tadpoles and small fish. Some feed on algae (herbivore), others feed on decaying matter (detrivore).

**Movement:** Strong fast swimmer using hind legs, rarely stops moving.

Predators: Fish, frogs, reptiles, water rats, platypus and birds.



Life Cycle: Egg, larva, pupa, winged adult (complete metamorphosis)



#### **Did You Know:**

- Beetle Larvae inject prey with digestive enzymes and suck out the fluids.
- Water Beetles get their oxygen from the air above the water surface and hold an air bubble under their wing cases at all times
- Many adult water beetles can fly between bodies of freshwater
- Water Beetles have mandibles (biting mouthparts) to tear their food into pieces
- They have hardened wing covers to protect their abdomen and hind wings



## Water Boatmen

## **Very Tolerant Bug**





Adult Water Boatmen



Class: Insecta Order: Hemiptera Size: Water Boatmen grow to 12mm

Appearance: Water Boatmen are small bugs, usually coloured dark brown with rounded triangular heads and large compound eyes that wrap around the sides.



Habitat: Water Boatmen are very well adapted to an underwater lifestyle but also retain the ability to fly to different water bodies. Their habitat consists of slowmoving or still pools and ponds where they are found near the edges amongst vegetation or swimming near the bed.

**Diet:** Water Boatmen 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.

**Movement:** Water Boatmen propel themselves through the water with their paddle-shaped hind limbs.

Predators: Fish and waterbirds

Life Cycle: Egg, nymph, winged adult (incomplete metamorphosis)



### **Did You Know:**

- Some male Water Boatmen rub their front legs across a ridge on top of their head. This produces a sound that attracts females.
- Unlike other bugs, they have short blunt triangular mouthparts
- An air bubble for breathing is captured from the water surface and carried underneath the body
- Their front legs are much shorted than their other two pairs of legs
- The middle and hind legs have a fringe of hairs to assist swimming



## Flatworm

### **Very Tolerant Bug**





Class: Turbellaria Order: Tricladia

Size: Flatworm grow to 20mm

Appearance: Flatworms are flat, incredibly thin worms sometimes with arrow-shaped heads which can grow up to 20mm. Flatworms possess light-sensitive 'eye-spots' rather than true eyes, and these primitive organs give an idea of how eyes first evolved.



Habitat: Flatworms are found in a variety of freshwater environments usually hidden underneath debris like branches and rocks.

**Diet:** Flatworms prey on smaller invertebrates and graze on decomposing plant and animal matter.

**Movement:** Flatworms swim and glide contracting their cilia (microscopic hairs) to glide on a secreted mucus trail. Their movement distinguishes them from almost all other worms.

**Predators:** Most predators avoid eating them as they exude a foul-tasting, toxic substance.

Life Cycle: Many Flatworms are hermaphrodites. In addition to being able to reproduce by laying eggs, Flatworms can also regenerate into two individuals if they are cut in half. During poor conditions, the reproductive organs may be





### Did You Know:

- Flatworms are able to glide upside down on the under-side of the water surface
- Flatworms breath through their thin skin.
- Flatworms eat and remove waste through their mouth
- Many Flatworms are hermaphrodites (having both male and female body parts)
- In poor conditions Flatworms can reabsorb their reproductive organs and use them for energy



## **Slender Water Scorpian**

## **Very Tolerant Bug**







Class: Insecta Order: Hemiptera

Size: Slender Water Scorpians can grow up to 90mm including their breathing tube (tail).

Appearance: Slender Water Scorpians differ from land-based scorpians. They have large grasping claws on their front legs and a long tail which is used as a snorkel to collect air that they store under their wings.



Habitat: Slender Water Scorpians are found in still or slowmoving waterways amongst debris and vegetation.

**Diet:** Slender Water Scorpians are 'sit and wait' predators, eating other bugs such as water boatmen, tadpoles or small fish.

**Movement:** Slender Water Scorpians swim awkwardly so prefer to sit quietly amid vegetation to ambush their prey.

Predators: Fish, wading birds, frogs and platypus

**Life Cycle:** Their eggs are deposited above the waterline in vegetation during the springtime, and hatch anywhere from two to four weeks. The resulting nymphs take about two months to mature.

#### **Did You Know:**

- Slender Water Scorpians are not strong swimmers and are rarely seen flying, yet they sometimes seem to be able to find and colonise new habitats quickly.
- Slender Water Scorpians are able to catch fast swimming creatures due to their keen eyesight
- Slender Water Scorpians are uncommon but spectacular



# Leech

### **Very Tolerant Bug**









#### **Class:** Hirudinea

Size: Leeches can be up to 100mm long when stretched out but are smaller when contracted.

**Appearance:** Leeches have long bodies with 34 segments and two suckers; one on the tail and one on the mouth. Juvenile Leeches look like miniature adults.



Habitat: Leeches are found in a wide variety of freshwater environments amongst plants, stones and decomposing material on the bottom of the waterway.

**Diet:** Some Leeches feed on the blood of vertebrates such as fish, frogs, birds and mammals. Some suck the juices from worms, snails and larvae.

**Movement:** Leeches can swim but mostly suck onto something and move in a looping pattern.

Predators: Fish, aquatic insects and yabbies

**Life Cycle:** All Leeches are hermaphrodites with both male and female body parts. Eggs may be brooded or deposited in cocoons in the water.



#### **Did You Know:**

- Many forms of leeches have three small jaws with sharp teeth for attachment to their prey
- Leeches can hibernate during drought by burrowing in the mud
- Leeches can survive up to twelve months after a meal
- Leeches have saliva that stops blood from clotting
- Some species of Leeches are take care of their young, providing food (mucus), transport and protection. This is unusual behaviour for invertebrates.
- Since 1000BC, Leeches have been used in medicine



## **Mosquito Larvae**

## **Very Tolerant Bug**





Adult Mosquito



Class: Insecta Order: Diptera

Size: Mosquito Larvae grow to 10mm

Appearance: Mosquito Larvae hatch from eggs within 48 hours and have no legs. They have brush-like mouthparts. They hang upside down from the water surface and breathe though a siphon on their tail like a snorkel.



Habitat: Because they can draw oxygen from the air, Mosquito Larvae can tolerate water with very low oxygen levels and can be found in stagnant freshwater of all kinds often amongst vegetation.

**Diet:** Mosquito Larvae are omnivores and filter-feed on algae, smaller wrigglers, bacteria and fungi using special brushes on their mouth which draw water towards them and sift out food.

**Movement:** Mosquito Larvae are small worm-like creatures with a distinctive swimming style. They are often called wrigglers as they twist and squirm just below the surface of the water.

**Predators:** Fish, frogs, tadpoles and invertebrates such as Water Boatmen.

Life Cycle: Egg, larva, pupa, winged adult (complete metamorphosis) Mosquito Larvae become pupae after the fourth moult. Adults emerge from a pupal shell after 7 days then fly off to mate.



#### **Did You Know:**

- Adult females drink blood so that their eggs mature prior to being laid and males drink nectar or sap
- 1,200,000 adult mosquito bites would drain the blood from an adult human. They are attracted by body heat, human scents, dark colours and exhaled carbon dioxide.



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet

## Yabby

### **Very Tolerant Bug**





Family: Parastacidae

**Size:** Yabbies start as mini adults at 1cm long and can grow up to 30cm long. They grow very quickly in their first year, outgrowing and moulting their hard shells several times.

Appearance: Yabbies have a hard shell called an exoskeleton that protects their bodies. Shell colours vary by region and water conditions from brown to blue, olive to black. Yabbies have two claws, two pairs of antennae and four pairs of walking legs.



Habitat: Yabbies live in freshwater including creeks, rivers, dams, lakes and wetlands.



**Diet:** Yabbies search for decaying plants and animals, small fish and aquatic plants at the bottom of waterways. If food is scarce they will eat each other.

**Movement:** Yabbies walk with sudden flips when disturbed. They prefer to walk backwards when on land.

**Predators:** Larger fish such as Murray Cod, water birds such as cormorants and ibis. Other yabbies, platypus, water rats, turtles and humans all prey upon adult yabbies.

Life Cycle: Females keep hundreds of eggs safe by placing them under her tail until they hatch in 20-40 days after fertilization. Fully formed babies emerge from eggs laid during spring and summer.

#### **Did You Know:**

- Yabbies can live for four to five years
- Sometimes yabbies eat their old shells after they moult to increase their calcium reserves
- If water dries up, yabbies burrow into mud in search of moisture, re-emerging when water returns



For more waterbug teaching and learning resources head to; www.riverdetectives.net.au Photos courtesy of Christine Walsh, kindly shared by Corangamite CMA's 'Now and Then' booklet