

CRUSTACEANS

ARMOURED INVERTEBRATES

CRUSTY CREATURES

These animals are covered with a protective outer shell so are named **crustacea**, meaning 'hard-shelled'. Crustaceans belong to the group of animals called **arthropods**, meaning 'joint-legged'. This group also includes insects, spiders and scorpions. They are among the most widespread and diverse of all animals and occur in virtually all land, marine and freshwater habitats.

There are around 50,000 known crustacean species and scientists estimate there are many more yet to be discovered. The most recognised crustaceans include prawns, lobster and crabs but there are many more, less familiar groups such as barnacles, water fleas and sea lice. Crustaceans range in size from the massive Japanese spider crab, which has a leg span of close to 4 m, to tiny organisms that drift about as part of the plankton.

CRUSTACEAN CHARACTERISTICS

Crustaceans vary a great deal in shape and form, making it very difficult to recognise some of them. In general, however, crustaceans have a hard, jointed external skeleton, which can be thick and tough as with lobsters or thin and transparent as in water fleas. Their limbs are also jointed and can move in nearly every direction. Many also have specialised appendages for feeding, swimming, walking, respiration and reproduction.

They have a segmented body – typically divided into a head, thorax (middle region) and abdomen (tail region). In the majority of larger crustaceans, the head and thorax are fused into a 'cephalothorax' and covered by a single shield-like plate called a 'carapace'. At some stage of their life cycle, crustaceans have two pairs of antennae – unlike other arthropods, which only have one pair.



Photo: Clay Bryce

In Hollywood, crustaceans have been used as inspiration for creepy monsters and aliens in some well-known science fiction and horror films.

BREATHING IN AND OUT OF THE WATER

Respiration in crustaceans can differ. Many of the smaller crustaceans have no special respiratory organs and so gas is exchanged directly through their body surfaces. Larger crustaceans have gills that may be within their bodies or on specialised appendages. Some crabs can spend long periods out of the water. They keep their gills moist in special gill chambers and extract oxygen from the air.



Photo: Andrew Cribb

Many crabs can be seen scurrying down to the water in order to wet their gills, which must be kept moist in order to breathe.

IMPORTANCE

The larger decapod crustaceans (such as crabs, lobsters and prawns) are economically valuable. Western Australia has large commercial fisheries of western rock lobster, blue swimmer crab and a number of different prawn species. Blue swimmer crabs, mud crabs, various rock lobster and freshwater marron are also popular with recreational fishers.

Crustaceans, particularly the small planktonic creatures such as krill and copepods, play a major part in marine food webs. Detritus-feeding crustaceans eat decomposing plants and animals and so are an important part of the nutrient cycle, particularly in Western Australia.



REPRODUCTION

Many crustaceans exhibit elaborate courtship behaviour, and the males may fight for the chance to mate. In most crustaceans the sexes are separate, with females producing eggs and males producing sperm. In many species, females 'brood' the eggs beneath their abdomen (that is, they carry the eggs until they hatch). These females are said to be 'in berry' when carrying eggs.

After fertilisation the eggs can take anywhere from several days to several weeks to develop and hatch, depending on the species. Some crustaceans hatch young that immediately look like smaller versions of the adult. Most however, go through a free-swimming larval stage called a 'nauplius'. After a series of changes (called 'metamorphosis'), the larvae eventually look like a miniature adult. They continue to feed and grow into 'juveniles' (adult animals that are not yet able to reproduce).



DECAPOD OR NOT

The most well-known crustaceans such as crabs, crayfish, lobsters, prawns and shrimps belong to a group called 'decapods', meaning ten legs. Decapods are the largest and most advanced crustaceans, and support several fisheries in Western Australia.

Less familiar groups are the non-decapod crustaceans – those that do not have ten legs. These include barnacles, sea lice, brine shrimps, mantis shrimps and water fleas. By far the most numerous non-decapod crustaceans are the tiny planktonic animals such as copepods and the larvae of larger crustaceans.

Sea monkeys are a type of crustacean called *Artemia* or brine shrimps. They inhabit some hyper-saline lakes and their egg-like cysts can lay dormant for several years.



Photo: Clay Bryce

HOW DO THEY GROW?

The hard shell or external skeleton of crustaceans serves as a suit of armour and helps protect them from predators. It also prevents them from growing like other animals. Instead they must periodically shed this exoskeleton in order to increase in size – a process called 'moulting'. A soft new skeleton grows under the old one. When the old skeleton is discarded it leaves the animal without its main means of protection until the new shell hardens.



Hermit crabs are unable to produce a hard exoskeleton so they inhabit empty mollusc shells. When they grow, they simply move to a larger shell.



To escape predation, crustaceans can quickly break-off their appendages – which eventually grow back.

DIVERSE DIETS

Some crustaceans are filter feeders, collecting tiny plankton and other organic particles of food from the water. Others feed on vegetation or are active predators, seeking out small shellfish and other animals. Many crustaceans are scavengers, feeding on 'detritus' (dead and dying marine life). Several species are even parasitic, often during their larval stages. Crustaceans, in turn, are eaten by many animals, including human beings.



Photo: Clay Bryce

POPULAR CRUSTACEANS

BARNACLES



Barnacles are hermaphrodites – they have both male and female sexual organs.

Barnacles have free-swimming larvae that attach themselves head-down onto hard surfaces including rocks, jetties, boat hulls and even other marine invertebrates. As they grow, their external shell becomes a series of plates, and their jointed legs develop into feathery appendages to feed on plankton.

LOBSTERS AND CRAYS



South-west WA has several species of small burrowing crayfish of the *Engaewa* genus living within freshwater swamps and seepages – and three of these are all listed as threatened.

Around eight species of rock lobster are found in Western Australian tropical and temperate waters, but the most abundant by far is the western rock lobster. This tasty crustacean supports one of Western Australia's largest and most valuable fisheries.

In WA, the term crayfish is usually given to freshwater species such as marron, gilgies, koonacs and the introduced yabby.

DID YOU KNOW?

- It is estimated that 120 million Christmas Island red crabs inhabit the island – that equates to nearly a million crabs per square kilometre!
- The Cambrian Period is known as "The Age of Trilobites." Trilobites were one of the first crustaceans. Although they were very common, they became extinct 248 million years ago.
- The claws of many crustaceans are capable of exerting hundreds of pounds of pressure. Mantis shrimp appendages are so strong they can break the glass of an aquarium or split a human thumb to the bone with one strike.

KRILL



Photo: Christine Pau

Krill is a general term used to describe over 80 different species of marine crustaceans known as euphausiids. These small shrimp-like creatures are a vital link in the marine food web between the tiny photosynthetic phytoplankton and larger carnivores such as fish, whales, seals, squid, penguins and many other seabirds. The most successful animal on the planet in terms of biomass is the Antarctic krill (*Euphausia superba*) – which has a biomass of over 500 million tonnes, or roughly twice that of humans.

PRAWNS AND SHRIMPS



Photo: Clay Bryce

Found in both marine and fresh water, these long-tailed decapods vary in colour – though their shells usually have regular patterns. In Australia, large shrimps are generally known as prawns. Various prawn species, mainly tiger, king and banana prawns, are fished along WA's north-west coast.

Cleaner shrimps wait at 'cleaning stations' for fish to visit, where they remove and eat small parasites from the fish.

CRABS



Crabs come in many colours, shapes and sizes and are found in just about every possible habitat, from the intertidal zone to the deep sea – and terrestrial (land) species exist as well. Of the hundreds of species of crabs in WA, the best known is probably the blue swimmer crab, which is caught for its tasty flesh. Others include rock crabs, decorator crabs – which specialise in camouflage, spider crabs and hermit crabs – which inhabit empty mollusc shells.