

# Oyster **Funky** Facts

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## **FACT:** Oysters are a valuable commercial species

An oyster belongs to a large group of animals called molluscs' and within this, a sub group called 'bivalves' (meaning two shells). Oysters live in marine or brackish habitats. There are three species of oysters commonly eaten in Australia - Sydney rock oysters, Pacific oysters & Flat oysters. Whilst the Pacific oyster is the most common species grown worldwide, the Sydney rock oyster is a species endemic (native) to Australia and is New South Wales' dominant commercial species. With a current annual production of about 70 million oysters worth \$35 million, oyster farming is the oldest and most valuable aquaculture industry in New South Wales, having contributed to the State's economy for over 140 years.

Sydney rock oysters account for about 80% of edible oyster production in NSW and 40% of Australia's oyster harvest. NSW has a growing market for Pacific oysters, and this species makes up 100% of the industry in Tasmania & South Australia. Almost all commercial stocks of oysters are farmed; there is no commercial harvesting of wild oyster stocks. It takes about 3 to 4 years for a Sydney rock oyster to be a suitable size for market, however only 1-2 years for a Pacific oyster due to their faster growth rates.

## **FACT:** Oyster reefs provide habitat

As a population, oysters can have fifty times the surface area of an equally extensive flat bottom! Nooks and crannies between all the shells provide habitat for an enormous range of other animals, such as worms, snails, sea squirts, sponges, small crabs and fishes. Even young oysters (spat) hide inside empty shells to escape predators!

## **FACT:** Oysters provide an ecosystem service

Oysters are filter feeders. They consume microscopic plankton, bacteria and suspended particles by filtering water at a rate of up to 4 to 5 litres per hour! (that's over 50 x 2ltr coke bottles every day!). An excess of algae in the water blocks sunlight from reaching underwater grasses (called seagrass). These underwater plants need sunlight to grow. When oysters consume the excess algae, this allows more sunlight to penetrate the water and promotes seagrass growth.



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## **FACT:** Oysters change sex!

Oysters change sex during their lifetime. They start out as males and spawn (release sperm) in their early life. After around two or three years of growing larger and developing more energy reserves, the oysters then spawn as females - releasing eggs. Although spawning can occur at any time of year, the usual season is summer into autumn between December and June. Certain environmental conditions, such as an increase in water temperature along with suitable tides and currents (to aid distribution of spawn), triggers the male oyster to release sperm, and the female to release eggs into the water.

A chain reaction of spawning eventuates that clouds the water with millions of eggs and sperm. This is referred to as 'broadcast spawning'.

During spawning, a female oyster can release up to 20 million eggs whilst a male releases hundreds of millions of sperm. The eggs are fertilized in the water and, within hours, develop into microscopic larvae that drift about with the currents as plankton. The larvae drift in coastal and estuarine waters for up to three weeks during which they develop transparent shells and a retractable foot. Survival rates during this phase of the life cycle is less than 0.1%, however, the millions of eggs released in one season ensures the survival of some individuals.

Oyster larvae (still only about 0.3mm in length) settle on a clean, hard substrate (surface) using the foot to find a suitable site for permanent settlement. Once attached, the foot of the larvae is reabsorbed. Juvenile, attached oysters are called 'spat'. As they grow and mature, the shell hardens and darkens and the small animal takes on the appearance of an adult oyster.

There is no way of telling male oysters from females by examining their shells. About 75% of prime eating oysters are female.



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## **FACT:** Oysters have a history!

Wild oysters have been a source of food for Australia's indigenous communities who collected them for thousands of years before Europeans arrived. Shell deposits in Sydney middens (remains of a feasting area) have been carbon dated to around 10,000 BC.

Cultivation of oysters is not a recent innovation...as early as 2,000 BC the Japanese were raising oysters, whilst the ancient Greeks and Romans discovered oysters to be a food delicacy worth cultivating from around 100 BC. More recently an oyster industry has existed for a couple of hundred years whilst Australia's history of cultivation started in the 1870's. During the 1860's, the use of oyster shells as a source of lime in cement production resulted in almost total depletion of natural (wild) oyster stocks. Government controls were then introduced that led to the establishment of set oyster lease areas. Confined to certain areas, farmers soon realized they needed to manage their stocks, and started to develop more specialized cultivation practices.

## **FACT:** Oysters are good to eat!

Oysters are available all year round. They can be eaten raw or cooked and are highly nutritious. There is no waste (besides the shell) and the flesh is 100% edible. Oysters are high in calcium, iron and protein and they contain carbohydrates that are generally lacking in most other flesh foods.

Oysters are best eaten when freshly shucked (opened) but can be kept whole for up to 14 days at the correct temperature. If cooked, they require only minimal cooking using a variety of methods. Oysters have an excellent flavour and texture which varies depending on where and how the oyster was grown.

It's important to note that as filter feeders, oysters can take in toxins that are present in the surrounding water. Until these toxins are processed or eliminated by the oyster, they may be unsuitable for human consumption. Good water quality is therefore essential to oyster health and human health. Oyster farmers undertake frequent water quality testing to ensure that their oysters are healthy and fit for human consumption.



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## **FACT:** Oysters are more than just a piece of meat... They have hearts too!

Oysters breathe much like fish, using gills. The gills around the edge of the animal have tiny hair-like parts called cilia that create small water movements and act as a pump to bring a stream of water into the shell and expel waste. Gills also sieve out food particles and take these to the animal's mouth. The mantle is lined with many small, thin-walled blood vessels that extract oxygen (O<sub>2</sub>) from the water and expel carbon dioxide (CO<sub>2</sub>). A small, three chambered heart, lying under the adductor muscle, pumps colorless blood to all parts of the oyster's body. At the same time, a pair of kidneys, located on the underside of the adductor muscle, purifies the blood of any waste products.

## **FACT:** Oysters under pressure!

Oysters are sensitive to water quality and therefore susceptible to coastal pollution. Human impact is a key threat, predominantly via pollution that affects the water quality such as sewage, heavy metals and other contaminants, fertilizer run-off and erosion that can dirty the water.

Oysters have several predators including other molluscs such as carnivorous sea snails (e.g. Mulberry whelk, Oyster drill) that have a drill-like tongue (radula) that bores through the oyster shell. Sea stars open oyster shells by exerting continued pressure on the shells, using their suction feet to weaken the oyster's adductor muscle, responsible for keeping the shell closed. Mud crabs can also open oyster shells using their strong pincers. The Australian Pied Oystercatcher is a marine bird that has a beak adapted for prising open oyster shells. Oysters are also prey to fish including stingrays.

Oysters can also suffer from disease. Like humans, if they are run-down and weak from combating stressors (such as water pollution), they are more susceptible to disease, and are more likely to die following infection. There are two parasites that infect and bring about the death of large numbers of oysters; *Bonamia roughleyi* (which causes 'winter mortality') and *Marteilia sydneyi* (which causes 'QX' disease). Selective breeding programs implemented by the New South Wales Department of Primary Industries are producing breeding lines of oysters that are disease resistant to winter mortality and QX disease. Mudworms and flatworms are other parasites that can be a serious problem for the oyster industry. Oyster farmers have developed farming techniques to reduce the risk of infestation by mudworms and flatworms.