



A pearl oyster is a bivalve (or two-shelled) mollusc and is therefore related to mussels and clams. And a pearl is a pearl oyster's way of protecting itself from damage to its flesh.*

If a parasite or a sharp grain of sand gets inside its shells, the oyster can cover it with layers of smooth pearl. These gleaming layers around the irritant become a blister attached to the inside of the shell or, much less commonly, a free spherical pearl that can be very valuable.

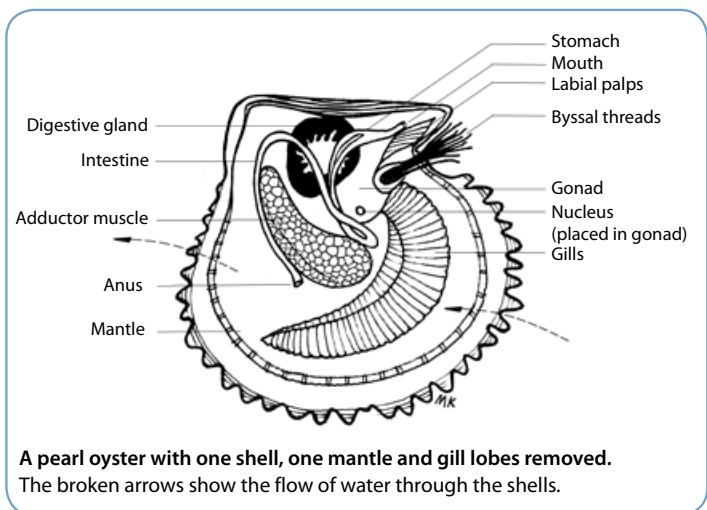
Anatomy

The pearl oyster relies on pumping seawater over its gills. The gills consist of four crescent-shaped flaps covered with fine hairs called cilia, which move water through the inside of the gaping shells. The oyster's gills, like those of a fish, are responsible for extracting oxygen that is dissolved in the water.

The gills also filter food – microscopic floating plants (phytoplankton)* from the water. The cilia pass the food particles to the mouth, which is hidden under two horizontal lips, the labial palps. The mouth leads into the stomach contained within a brown mass called the digestive gland. Used food passes along an intestine to pass out of an anus, conveniently placed where water currents leave the oyster.

Why is it so difficult to open the shells of a living oyster? The largest muscle in the oyster, the adductor, holds the two shells tightly shut if the oyster is exposed at low tide or threatened by a predator* – although many bivalve molluscs have two adductor muscles the pearl oyster has only one.

Oysters usually have separate sexes and the gonads* in both sexes are creamy yellow in colour. Sperm and ova develop in the gonads of males and females respectively.



An amazing living filter

When the pearl oyster's two shells gape open it can pump up to 20 litres of water each hour removing food and gaining oxygen from the sea.



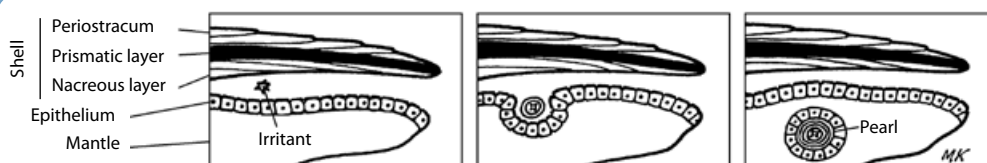
The black-lipped pearl oyster, *Pinctada margaritifera*, with one of its shells removed. A pearl is lying on the oyster's mantle.

Shell and pearl formation

How does an oyster with two hard shells grow in size?

The oyster's body is covered by the mantle, a fold of tissue, edged with small tentacles. The mantle has specialised cells that produce additional shell material as the oyster grows and can encase irritants with concentric layers of mother-of-pearl or nacre.

A cross-section of a typical mollusc shell is shown in the figure at the back. The shell consists of three separate layers, an outer periostracum, a middle prismatic layer and an inner nacreous layer made up of thin layers of nacre. Iridescent colours are created by light waves reflected from the thin overlapping layers.



Pearl formation in pearl oysters. An irritant between the shell and the mantle is enveloped by the mantle which produces concentric layers around it. Very rarely, a pearl is formed around the object.

From: King M. 2007. Fisheries biology, assessment and management. UK, Oxford: Wiley-Blackwell. 400 p.

Pearl farming

In the Pacific region, the black-lipped pearl oyster, *Pinctada margaritifera*, is grown, often on hanging ropes, to produce dark coloured pearls. After growing in the sea for about two years, each oyster has a small bead inserted in it by a skilled technician – a process called seeding.

It takes another two years for layers of nacre to be laid down around the bead and for the pearl to develop inside the oyster. Within a lifespan of 10 years, an oyster can be seeded and produce pearls several times. Many factors affect the success rate, but out of 100 oysters seeded, typically only five will produce a high quality, round pearl.

Management

Management is necessary to ensure that pearl farms continue to be productive and provide benefits to the farmers and the country.

The sites of pearl farms have to be carefully chosen to ensure that sea currents are sufficient to bring food and remove waste material from the oysters as they grow. Farms must be well spaced to avoid poor growth and the spread of oyster disease. As a healthy oyster is needed to produce a good pearl, it is in the interest of farmers as well as government authorities to maintain good environmental conditions.

