

M. Sc. IV Sem.
Paper Elective Paper III
Fishery Science, Culture Fishery

Pearl culture

Pearl a jewel from the sea is one of the oldest of the known jewellery or gems, produced by pearl oyster. Pearl fisheries in an old trade in India practised for over 2000 years. The industry however was established in an organised manner only since 1955. Large number molluscs are found on the land and in the water resources like sea, brackish water and fresh water. They are used for food, for shells and in pearl industries. The pearl is a white, highly shining globular concretion found within the shell of an oyster. It is also commonly known as Moti or Muktafhal. Pearl shells produce huge quantity of lime and form the raw material for several lime industries.

Pearl oysters yielding pearls of high quality are *Pinctada fucata*, *Pinctada vulgaris*, *P. margaritifera*, *P. chemnitzii*, *P. anamioides* and *P. atropurpurea*, all marine. The most important of these is the *P. fucata* which has a very wide distribution. Pearl oysters occur along the coasts of India and dense populations are found along the rocky ridges called pearl banks. The most productive areas are near Tuticorin. They are also found in the Gulf of Kutchh, gulf of mannar Pak way and Baroda.

Collection of Oysters

The oysters are collected from the sea bottom by the divers. The divers usually have got training for proper diving into the sea water. The well protected suits of cotton with cap are used at the time of diving. Each diver has a small hand net at the time of diving when he or she goes upto 5 metre depth. The hand net helps in the collection of oysters from the sea bottom. The oysters collected by nets are stocked in the wooden bucket. The best time for diving is from the early morning to mid day. Oysters are also caught by special types of cages (84 X 54 X 20 cm) by covering a heavy wire frame with 2 cm mesh size.

Rearing of the oysters

The collected oysters are stocked and reared in the special type of cages called as rearing cage. These cages are almost similar to those of collection cages except that they are further divided into 4 to 6 smaller chambers and lack the diagonal sub-divisions. They are also covered with metal mesh and with nylon nets. These cages are protected from enemies of oysters as like Eel, Devil fishes and Octopus. The collected oysters are first cleaned with water and then placed into the culture cages for a period of about 15 to 20 days to recover the damage or injury due to excessive handling and for the physiological adjustment to the shallow water conditions.

Insertion of the nucleus

The insertion of the nucleus as foreign particle is very much more technical process and is of great importance for the pearl culture. For the insertion of nucleus, oysters are fixed in a desk clamp in the position of right valve facing upward. The mantle folds are smoothly touched to expose the foot and the main body mass followed by an incision into the epithelium of the foot and a slender channel into the main mass. Suddenly one graft tissue (the piece of tissue which is inserted inside the mantle is called as graft tissue) piece is placed into the channel and the nucleus is placed over the graft tissue which functions as a bed for the nucleus. Now the bamboo peg is quickly removed and oyster shells are closed automatically. For the insertion of the second nucleus similar operation is performed from the left side in the gonadal tissue and third insertion should never be tried. The operation period should not increase beyond 30 minutes and the oysters can not survive beyond one hour of the operation period. So the operation and insertion of nucleus should be performed by the experienced persons.

Selection of suitable sites

Areas with salinity above 30 parts per million (ppm), good phytoplankton, mild or moderate current, low siltation and depth 2 to 3 metres and above are most suitable sites for the healthy production of the pearls.

Post operational care

Nucleated oysters are placed into cages and suspended into the sea water and attached within floating raft to a depth of 2 to 3 metres for 6 to 7 days to recover from the injury due to the operation. This period of 6 to 7 days is known as recovery period. Now oysters are examined carefully and properly and dead individuals are removed from the cages. Now-a-days, it is examined by X-rays whether oysters are having inserted nucleus or not. About 3000 to 6000 nucleated oysters are kept in different cages suspended in sea water at 2 to 3 metres depth for 3 to 6 years and undisturbed except at the time of cleaning and inspection. The pearl oysters grow best in warm shallow waters generally not more than 14 metres deep.

Harvesting of pearl

Pearls are harvested in the month of December to February which may slightly vary according to the climatic conditions of the industrial area. After the completion of 3 years of the insertion of nucleus, the pearl oysters are harvested from the sea and the pearls are taken out from the shell. The harvesting of cultured pearls is usually done manually. The pearls obtained are of variable shapes and sizes. They may be white or cream red or pink red in colour. The best quality of pearl is known as Lingha pearl.

Processing

In some cases pearls are removed from pearl-sac without damage or broken in such a way that the oyster can be reused for implantation. The harvested pearls are washed in distilled water, polished with refined salt and again washed in distilled water. They are sorted

according to size, colour, shape, shine, iridescence and other external characteristics into A, B and C grades.

Marketing

Pearls are sold by weight, either as loose or as stringed. Grade A pearls cost Rs. 1800 rupees per gram if they are of 3 to 5 mm in diameter. Grade B cost Rs. 1300 rupees and Grade C Rs 800 rupees per gram. The global cultured pearl industry has an estimated wholesale value of US dollar 1.3 billion and retail value between US dollar 3.5 and 5.5 billion.

Natural pearl formation

The natural pearl formation is an interesting phenomenon for protection against foreign invaders, parasites, sand particle, sand grain, small broken twigs of sea-seeds or small insect accidentally entering the body of the oyster which happens to adhere to a part of its mantle. The mantle epithelium at once encloses it like a sac and starts to secrete concentric layers of nacre around it from defence point of view and completely encloses it gradually. The nacre is secreted continuously by the epithelial layer of the mantle and deposited around the foreign particle in the form of several layers and ultimately the pearl is formed.

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