Perna indica (Kuriakose & Nair, 1976)*

Biji Xavier

IDENTIFICATION

Order	:	**Mytilida**
Family	:	**Mytilidae**
Common/FAO Name (English)	:	**Brown mussel**

Local names: Kallumakkai, Kadukka (**Malayalam**)

MORPHOLOGICAL DESCRIPTION

Brown mussels as the name suggests have brown coloured shells. They have elongate, equivalved and equilateral shells with pointed and straight anterior end. Dorsal ligamental margin and ventral shell margin are straight. The two valves of the shell are hinged at the anterior end with terminal umbo. Interior of shell is lustrous with muscle scar deeply impressed. It has a finger shaped, thick and extensible foot. Byssus threads emanate from the byssus stem and the threads are long, thick and strong with a well developed attachment disc at their distal end. It can change its position by discarding old byssus threads and secreting new ones.

* *Perna perna* (Linnaeus, 1758) as per Wood et al., 2007.

Source of image : Molluscan Fisheries Division, CMFRI, Kochi

PROFILE

GEOGRAPHICAL DISTRIBUTION

The mussel beds are spread both in west coast (Quilon to Cape Comorin) and east coast (Cape Comorin to Thiruchendur). Important centres are Cape Comorin, Colachal, Muttom, Poovar, Vizhinjam, Kovalam, Varkalai and Quilon.

HABITAT AND BIOLOGY

The species forms dense populations along the rocky coasts from the intertidal region to depths of 10 m. Large sized individuals are found at 0.5 to 2 m depth. Maximum recorded length is 121 mm. Sexes are separate and fertilization is external. Natural spawning starts in May and lasts till September with peak during July to August.

BREEDING IN CAPTIVE CONDITIONS

The breeding and larval rearing of *Perna indica* was successfully carried out on an experimental basis at Vizhinjam R. C. of CMFRI. Brooders collected from wild were used for breeding purpose. Rise in temperature by 4 °C from normal led to successful spawning. The sperm released from the male induced the females to spawn. Fertilized eggs sank to the bottom and reached morula stage within four hours of spawning.

LARVAL REARING

Larval rearing was done in FRP tanks with filtered sea water. The larval density was maintained at 10,000-15,000 nos./l upto 5th day and subsequently reduced to 5,000-6000 nos./l. Trochophore larvae developed after 7 h of fertilization. The larvae reached early veliger and D shape at 20 h and 24 h post fertilization. Early umbo and late umbo stages were observed on 7th and 9th day, respectively. At this stage, larvae were characterised by the presence of thick greenish yellow digestive gland in the antero-dorsal region, which was visible through the transparent shell. On 13th day, larvae reached the eyed stage, characterized by dark pigmented eye spot ventral to the digestive gland. From 16th day onwards, pediveliger larvae observed were with slightly oblique valve, protruding foot and reduced velum. Shells became thick and appearance of brown colouration started. From 17th day onwards, the velum totally disappeared and pediveliger larvae started settling. It reached a length of 780 µm on 21st day and 2.7 mm on 32nd day. Larva were fed with microalgae *Isochrysis galbana* and *Pavlova* sp. from straight hinge veliger stage. The quantity of microalgae fed was increased gradually as the larvae grew to umbo (5,850 cells/larvae/day), eyed (11,700 cells/larvae/day) and pediveliger (17,550 cells/larvae/day) stages. Mixed phytoplankton comprised chiefly of *Isochrysis galbana* (30,000 cells/ml/day) were fed to the spat.

NURSERY REARING

Spat settled in hatchery tanks or wild collected were nursed, either in open sea or in enclosed bay system, for further growth.

GROW-OUT

Rope culture was initiated in 1971 at Vizhinjam, Kerala, India. Production from the bay area was around 150 t and from open sea was around 180-200 t. Ideal length of mussel for seeding was 20-35 mm. Roofing tiles, iron cages and split nylon ropes were used as spat collectors. Seeds were also collected manually from the rocks with the help of iron chisel. The collected seeds were cleaned and spread over a piece of old cotton net or mosquito net and the nylon rope was kept over the net. The net was wrapped over the rope keeping the seeds intact, and both the ends of the net were stitched with cotton twine. After seeding, the ropes were suspended from rafts.

One hundred seeded (25-40 mm size seed) ropes were suspended from long lines (20 m long), which were spaced 5 m apart and were provided with 100 l capacity barrels for floatation. Seeded mussels attached to the ropes within 3-4 days. During six months of culture, average monthly growth rate was 6.55 mm. The average production (shell on weight) was 52.6 kg/rope (11.76 kg/m of rope). Suspended mussel culture using floating rafts was also productive with an average production of 10 kg mussels/m length of rope.

FOOD AND FEEDING

It is a filter feeder, feeding on phytoplankton.

GROWTH RATE

Average growth rate in rope culture in bays was 35 mm/year, whereas in open sea, it was 25 mm in 5 months. Mussels grew faster in open sea conditions.

DISEASES AND CONTROL MEASURES

Boring sponge infestation was most commonly observed in raft and rope cultured mussels. Major species includes *Cliona lobata*, *Cliona vastifica*, *Cliona margaritifera* and *Cliona celata*. Epizootic fungus, *Sirolpidium* sp. caused heavy mortality in larvae in culture systems. It was prevented by proper treatment of seawater. Raising water temperature to 32.5 °C for several hours also killed the fungus without affecting the larvae. Bacterial toxins from *Vibrio* and *Pseudomonas* impacted larvae. Epizootics such as bryozoans, ciliates and ascidians were controlled by the use of pentachlorophenyl (1 mg/l), formalin (40 mg/l) and dichlorophene.

PRODUCTION, MARKET AND TRADE

PRODUCTION

Spain leads in mussel farming with a production of 7,70,000 t in 2005. Total mussel production in India was about 20,000 t in 2009-2010.

MARKET AND TRADE

Brown mussel has good demand in markets of Kerala. The products are prepared and marketed through the intervention of Self Help Groups (SHGs) in the state.

CHALLENGES TO MARICULTURE

Limited availability of natural mussel seed, seasonality of the natural mussel spat, lower growth rate in brackish water and the difficulties in maintaining the mussel rafts in open sea are the major constraints for large scale mussel farming. Hence, mass scale availability of hatchery produced seeds round the year is of paramount importance and needs to be prioritised for boosting mariculture.

FUTURE PROSPECTS

The local demand for mussel meat is high in south west coast of India. Currently culture systems in place use wild seed which is not sustainable. Hatchery production of brown mussel seed will be a solution to this challenge, ensuring conservation of wild stocks while earning livelihood to the mussel farmers.

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