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CULTURE OF BROWN MUSSEL *PERNA INDICA* AT VIZHINJAM*

Two species of sea mussels occur along the Indian coasts. The green mussel *Perna viridis* has a wide distribution on both the east and west coasts of India. On the other hand, the brown mussel *Perna indica* (Fig. 1) has a very restricted distribution along the south-west coast from Cape Comorin to Quilon. A traditional sustenance fishery exists for the brown mussel in Cape Comorin, Muttom, Enayam and Vizhinjam and a few other centres. The mussel meat is considered a delicious food item by the coastal people. At Vizhinjam the annual production of brown mussel from the natural beds varies from 50-150 tonnes.

In the recent years the Central Marine Fisheries Research Institute has given priority for developing appropriate technologies for coastal aquaculture. As a part of this programme, experiments on the culture of brown mussel were initiated at the Vizhinjam Research Centre of the Institute in 1971. The work has been carried out in the Vizhinjam Bay, which is about 16 km south of Trivandrum. The breakwaters constructed for the Fishing Harbour afford protection from heavy wave action during the monsoon. Natural settlement of mussel seed is abundant in the intertidal rocky area around Vizhinjam, meeting one of the needs of mussel culture. Experiments have been conducted almost uninterrupted through the years developing suitable techniques for the culture of the brown mussel in the bay. Besides, work on mussel culture in the open sea outside the bay were initiated in 1978. The present report contains some of the results obtained during the period 1976-1979.

Raft culture of mussel

Raft culture was adopted for the farming of brown mussel both in the bay and in the open sea. The rafts are of different sizes, ranging from 6×6 m to 10×10 m. These are fabricated with teak and bamboo poles lashed by coir or nylon ropes. Metal drums of about 200 litres capacity, treated for anticorrosion, are used as floats to give buoyancy for the rafts. The rafts are moored by anchors, by required length of anchor chain. While the rafts could be maintained in the bay

Fig. 1 Brown mussel *Perna indica* from Vizhinjam

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throughout the year, those in the open sea could be kept in position only during the calm season from January to May. The depth of Vizhinjam Bay varies from 10 to 15 m and the bottom is muddy. There is an increase in silting rate below 2 m and water becomes highly turbid from May to October. The temperature range is 20.75°C–30.05°C, the lowest in July and the highest in January/February. The salinity ranges from 31.51 ppm to 36.00 ppm. Thus the variations are narrow. But in the years 1977 and 1978 a sudden decline in salinity was noticed in November due to influx of fresh water.

The open-sea mussel culture experiments were carried out about 1-2 km away from the shore at depths ranging from 15-25 m. The sea was calm from the end of December to end of May when the rafts could be kept in position. Rest of the year, the sea is subject to heavy wave action making it difficult to maintain the rafts.

Seed availability

The brown mussel starts spawning in May which lasts till September. The period of peak spawning is July-August. Settlement of mussel seed on the rocks begins by July and high density of seed is seen during September-October. The young mussel attains the mode of 15-19 mm in length in July, 25-29 mm in August and 30-34 mm in September. Seed in the size range of 20-35 mm is considered suitable for rearing in the mussel farm. The ideal period for collection of seed from the natural beds is from September to November. The seed required for the mussel farm was collected from the rocky area between the Light House and the breakwater of Vizhinjam Bay. Mussel seed suitable for farming purposes is also available from nearby centres such as Avaduthura and Mulloor. A preliminary survey has shown that mussel seed is available in good quantities at Enayam, Colachel, Muttom and Neendakara. Good spatfall occurs inside the bay on split ropes suspended from rafts. The seed collected on the ropes were also used in the farm.

Seeding

The seed collected from different areas are washed in sea water and the fouling organisms removed. The seed are wrapped around a rope and secured by cotton netting or bandage cloth (Fig. 2). Both coir ropes and nylon ropes have been used for seeding, but the nylon rope has been found to be more economical considering the life of the rope. The length of the rope seeded ranged from 5 m to 10 m. To avoid slipping of seed in the initial stage, wooden pegs were inserted at regular intervals in the rope. The average weight of mussel seed per metre length of rope (seeded portion) ranges from 1.4-2.0 kg. Seeding is done during September-December. The seeded ropes are suspended from the rafts. Except for periodical examination for recording data on the growth of mussels and other factors the ropes are not disturbed.

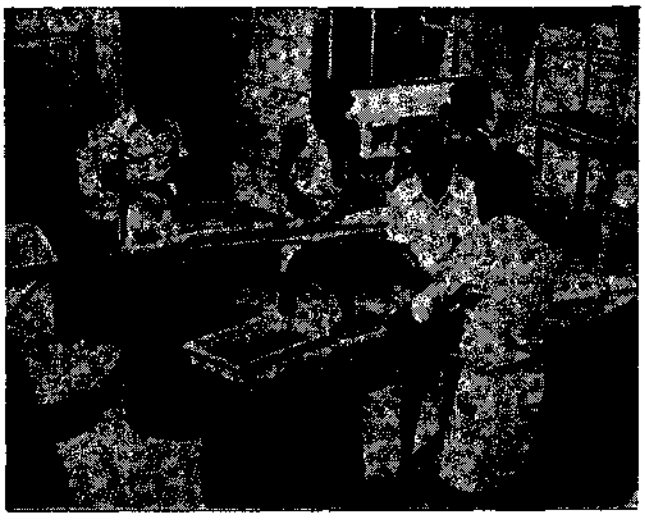

Fig. 2 Seeding of mussel on ropes

Growth of mussel and production

As mentioned before, seeding of ropes with young mussels is done during September-December period. In the Vizhinjam Bay, the brown mussel reaches the modal size of 55-60 mm in 8 months, giving an average growth of 2.94 mm per month. In the 1979 experiments the growth rate observed was 3.54 mm per month. The size 55-60 mm is marketable. The ratio of flesh weight to shell-on weight is 41.31% in May. After June, due to influx of freshwater into the bay and also increase in weight of ropes, there is a tendency for the farm-grown mussels to fall out. Hence harvesting should be done in May-June when the production is at its peak.

The open sea mussel culture is restricted to the calm season only. The growth of mussel is relatively faster in the open sea as compared to the bay. A modal size of 60-65 mm is attained in 5 months in the open sea farm, recording a growth rate of 5 mm per month. In 1979 a growth rate of 5.7 mm per month was obtained. The flesh weight constitutes 43.33% of the total weight of mussels in May. Also May is the period for harvest in the open sea farm.

The average rate of production is 10-12 kg of mussel per metre length of rope in the bay in 7 months, and 15 kg in the open sea in 5 months (Fig. 3). In a raft of 30 sq.m area, 50 ropes, each of 6 m length, can be used for growing mussels.

Prospects and problems

In the existing sustenance fishery for the brown mussel at Vizhinjam the production ranges from

Fig. 3 Growth of mussel on ropes under raft culture

50-150 tonnes a year. Based on the results obtained in experimental culture of the mussel in the bay as well as the open sea, it is possible to increase mussel production in the area by adopting raft culture techniques. The Department of Fisheries of Government of Kerala has taken up a Pilot Project on mussel culture at Vizhinjam.

The Central Marine Fisheries Research Institute is now engaged in two important areas of research in mussel culture to make the technology viable for large-scale commercial operation. At present we are depending on the mussel seed collected from the natural beds for stocking the farm. Settlement of spat on the rocks is seasonal and subject to natural fluctuations. This cannot meet the seed requirements of large-scale operations. It would be necessary to develop a technology for induced spawning and rearing of larvae and the young mussels in hatcheries upto a stage suitable for transplantation to the rafts. Investigations on these aspects are in progress. The second major area of research relates to developing suitable methods for year-round operations in the open sea. The growth of mussel and production rate are higher in the open sea than in the bay. If suitable raft or long-line culture methods could be developed for rearing the mussel in the open sea throughout the year, it will enable two crops in an year giving higher returns. Experimental work on these aspects are being carried out at Madras and Calicut besides at Vizhinjam.