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OYSTER FARMING*

Introduction

Large quantities of the edible oyster, *Crassostrea madrasensis* (Fig. 1) growing wildly in most of the tidal creeks and estuarine regions along the east coast of India are allowed to perish unexploited. The shell lime industry, however, quarry agglutinated dead shells from rugged beds and those found as subfossil deposits in river beds. Realising the edibility of the oyster meat, Hornell initiated oyster culture experiments as early as in 1910 at Pulicat lake. For some unaccountable reasons this was not followed up by later workers. As a part of global strategy for developing oyster farming following the great strides made in this venture by developed nations, the Central Marine Fisheries Research Institute focussed its attention in developing systems for the culture of edible bivalves, identifying edible oyster farming and mussel farming as priority areas for Research and Development. Evaluation of the resources potential, identification of suitable water spread and areas for culture, evolving proper techniques to collect required seed for farming, introducing an appropriate method of farming and establishing a model farm formed the broad objectives of the project initiated in 1975 on edible oyster culture.

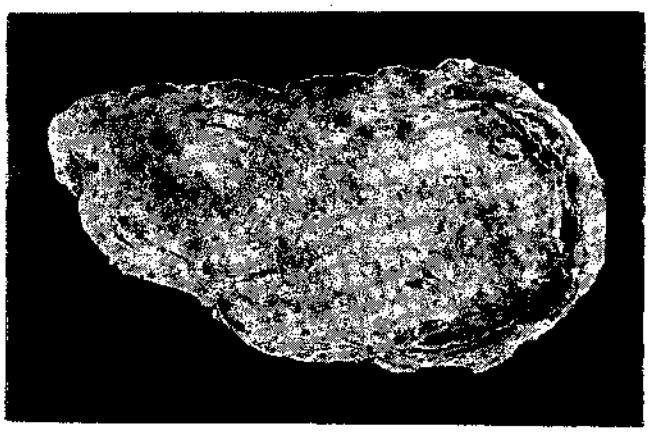

Fig. 1 View of the oyster *Crassostrea madrasensis*

The existence of considerable expanse of natural beds in several of the tidal inlets (Fig. 2) and the presence of shallow bay area in the vicinity of Tuticorin facilitated oyster farming experiments to be started at Tuticorin. Regular sampling of the oysters in the beds showed a biannual spawning habit with a peak spawning period in April-May and the water quality in the area exhibited favourable factors for healthy oyster growth. By employing suitable method for spat collection and providing better growing conditions for the seed so collected it appeared distinctly possible to raise large number of oysters achieving faster growth rate and better meat yield. Weighing the pros and cons of the different systems of oyster culture followed in other countries and bearing in mind the local conditions, it was decided to experiment with the 'rack' system of culture. By this system oysters kept on a wooden

Fig. 2 Natural bed of oyster

platform above the bottom but below the water surface will receive maximum quantity of water filtration and feeding promoting physiological efficiency towards fast growth and flesh weight increment.

Spat collection

Of the several types of spat collectors like bamboo reapers, concrete blocks, nylon meshed net pieces, bamboo

Fig. 3 Lime quoted tiles used for spat collection

*Prepared by S. Mahadevan, K. Nagappan Nayar and P. Muthiah, Tuticorin Research Centre of CMFRI.

Table 1: *Details of spat collection in* 1978 *and* 1979.

	No. of tiles	Minimum No. of Spat/tile	Maximum No. of Spat/tile	Average/ tile	Area of collection
April–May 1978	27,000	5	64	24	Karapad creek beds
September–October 1978	30,000	—	—	—	–do–
April–May 1979	18,000	11	97	33.5	Tuticorin bay near creek
	10,000	1	21	10.8	Creek proper
	20,000	1	16	8.7	Near natural beds
September–October 1979	20,000	—	5	5.0	Tuticorin Bay

mats, strings of coconut shells, rens of green mussel and oyster shell valves, country tiles (with and without lime coating) tried in different locations around the bed, the most satisfactory results were obtained from twice lime-coated semicylindrical country tiles (Fig. 3) laid completely submerged on wooden platforms. Determining accurately the spawning period of oysters and laying tiles just at the right time of release of oyster spawn increases the percentage of success. April–May spawning period proved to be the ideal time for large scale collection work. September–October period was not so effective. The results of spat thus collected are shown in Table 1.

Post spat collection period

a) *Spat removal:* Spat settled on collectors (Fig. 4) were allowed to grow on them up to a size of 30 mm–35 mm after which removal of individual spat is easily done without injuring the fleshy interior. Pressure slightly exerted dislodges the spat without damage. After the removal of spat the tiles can be stored and recycled for use in the next season. Depending on handling they are good for at least four seasons.

Fig. 4 Oyster spat settled on tiles

b) *Initial transplantation:* Initially the scraped oysterlings are put in nylon meshed (12 mm mesh size) cages of 6 mm iron rod frame for a period of two months (Fig. 5). Each cage (measuring 40 x 40 x 10 cm) can easily hold 200 oysterlings. Later they can be transferred to large rectangylar cages of 22 mm meshed nylon netting (size 90 x 60 x 15 cm).

Fig. 5 Just transplated oyster spat grown in box type cages

Erecting racks for growing oysters

Each rack is so constructed as to occupy an area of 26.5 sq.m. with a length of 13.2 m and breadth of 2 m. A midwater wooden platform of interconnected teakwood stubs of 2 m length is put up supported by two parallel rows of 6 teakwood poles each planted vertically down at a distance of 2 m, pole to pole. All wooden materials are treated with tar prior to being used in the rack erection. The platform in each rack can carry a total of 20 rectangular cages of 150–200 oysters each and is

so positioned that only during the lowest low tide periods the cages get partially exposed (cover photo).

During initial stages of experiments 30 such racks were set up side by side in Karapad creek. Siltation in the farm area and erosion of creek bunds posed problems. Notwithstanding these, growth of oysters was fast and harvestable size of 90 mm length was attained in 12 months. The various processes involved from spat collection to oyster growing were streamlined by the experience during this experimental period. In 1978 the oyster farm was shifted to the nearby open sea coast and as many as 90 racks were erected. Spat collected in 1979 spawning season were transferred to racks, each rack carrying 3,000 oysters in 20 cages. During the early stages of growing in farm, unexpected predation of oysters of size 35–45 mm was noticed by a gastropod, *Cymatium cingulatum* which caused a mortality of 15% of the stock. This problem was tackled by removing the predators by hand-picking. No other disease problem was encountered. Oysters reached 85–90 mm size in 12 months time with a meat weight of 8–10%, each oyster weighing 120 g (shell on) with a meat weight of 10 g. A total of 2,00,000 oysters attained harvestable size.

Prospects

The oyster culture experiments successfully carried out at Tuticorin marks only the first stage in ushering in an era of oyster industry in India. Based on the experiences during the course of these experiments several areas of research and development efforts appear to be warranted on priority basis before total success can be achieved.

Spat collection is one aspect where the present experiments have indicated the enormous potentiality of the coastal regions which can be usefully tapped to get adequate seed supply from natural sources. Although only a few lakhs of spat were collected for the experiments at Tuticorin, it appears distinctly possible to collect several millions by employing large number of spat collectors using the lime coated tile technique. The rack culture system yielded fruitful results in harvestable oysters being made available within a short span of 12 months unlike in other countries where growing period is protracted. Production of an average of 0.48 tonnes of oysters from a single rack has been demonstrated at Tuticorin. In one hectare it is possible to put up at least 280 racks and stock nearly one million oysters resulting in an yield of a minimum of 135 t. oysters (with shell) with a total meat yield of 13.5 t. Experiments are in progress to evolve modifications towards bringing down the capital investment on materials. Future research in this direction would aim at employing less costly materials for rack erection as well as for the trays used for growing oysters.

Marketing oysters is one area that warrants our immediate attention in as much as there is very little market either locally or in the interior places for the oyster meat. Extension work like market development, marketing the products at competitively low rates, ascertaining the consumer preferences of the quality of the flesh before marketing are all areas which will have to be taken up for intense developmental study during the course of next few years. Proper technology of oyster meat preservation to satisfy consumer taste and foreign market is another aspect needing immediate attention. In the extensive culture of oyster in the coastal areas, care has to be shown to avoid locating farm sites in places which are likely to interfere with the use of such water areas by the local fishermen for traditional fishing. Concerted efforts to tackle the above problems will hasten the establishment of a new production oriented seafood industry in India.