

IX

MUSSEL FARMING ON THE EAST COAST OF INDIA

K. RANGARAJAN
K. A. NARASIMHAM

At Kovalam bay (Madras) rafts made of casuarina poles have been used to suspend mussel seed transplanted ropes for culture. An average growth of mussel at the rate of 12.8 mm per month is reported. Harvestable size of 75 mm is reported to have been reached in 3½ months time. However similar experiments done at Kakinada (Andhra Coast) and Ennore (north of Madras) did not yield conclusive results.

INTRODUCTION

Although green mussel population is restricted along the east coast of our country the very fact that the mussels here grow to large size in the natural beds indicates that the ecological characteristics of the water mass over the natural beds favour settlement and growth as in the case of west-coast. The absence of adequate settling and growing grounds appears to be one of the handicaps for the patchy occurrence of mussel beds. Even the existing natural grounds in many areas face the serious problem of siltation due to developmental activities in the estuarine regions as is happening in the case of Courtalayar Estuary at Ennore and Uppateru canal mouth joining the Kakinada Bay. Mussel culture practice is one sure method of overcoming some of these problems whereby dense stock of mussel seed can be kept in suitable substrates and grown. Another objective in taking up mussel culture in the east-coast was to try and evolve an appropriate technique of growing mussels to suit local environmental conditions. There is a distinct difference in the pattern of monsoon system in the east-coast when compared with the west coast. The intense season of choppy sea and floods in the rivers happens to be between October to December in the East Coast. It is not uncommon also to come across cyclonic storms during this season. Occasionally summer cyclonic storms are also witnessed during May-June affecting the area between Pondicherry to Masulipatnam. The mussel spat settling season in the east-coast also shows a marked variation from that of the west-coast. Therefore the success in mussel farming

depends on how best the seed availability and favourable weather conditions are exploited. One encouraging factor in hoping to achieve the above goal is the ability of the green mussels of our waters to grow to marketable size in a short period of less than 150 days as has been shown by the experiments at Calicut.

The above considerations formed the basis of the experiments in mussel culture conducted at Kovalam (near Madras), Ennore back-water and at Vekalapudi near Kakinada. Rope culture using rafts was tried at Kovalam in the open sea. At Kakinada, nylon-mesh cages were hung from rafts in which mussels were kept and grown in the open sea. Because of the shallowness of the Ennore Estuary, casuarina pole frames were erected over the bottom and ropes were suspended in the shallow water.

CONDITIONS IN THE FARM AREA

Kovalam Bay

The annual rainfall varies from 150-180 cm, the maximum precipitation occurs during October-November. The tidal range in the Kovalam Bay (Madras) is about a metre. During rough weather, waves ranging in height from 2-4 m are seen in the Bay. The salinity fluctuates between 20.14 to 34.55‰. After January the salinity values go up showing high values from March to September with little fluctuations. During the North-East Monsoon, the surface salinity becomes low.

The oxygen values in the Bay varies from 3.80 to 5.25 ml/l. During summer months there is very little fluctuation. The plankton in the bay is rich. Blooms of phytoplankton consisting of *Chaetoceros*, *Thalassiothrix*, *Skeletonema*, *Coscinodiscus*, etc., occur during March-May.

During May, strong surface winds blow from land to sea carrying lot of sand particles making the water quite turbid. During September-October before the onset of the North-East Monsoon, the water in the Bay is quite clear.

Kakinada :

The temperature of the sea water off Vakalapudi near Kakinada varies from 26.0 to 30.5°C and the salinity from 23.2 to 34.88‰.

SEEDING TECHNIQUE

In Madras, mussel seed of size range 10-20 mm were collected at Ennore from concrete piles and large iron buoys used by Madras Electricity Supply and transported to Kovalam. The seed were removed with a sharp knife, cleaned of the fouling organisms and seeded to coir ropes with the help of a strip of knitted cotton cloth about 6 m long and 20 cm wide. The cleaned seed were uniformly spread at the rate of 0.5 kg/m along the rope which was placed over the cloth, the edges of the cloth tightly rolled and stitched all along the rope. The two ends of the cloth were firmly tied to the rope and a granite stone of about 2 kg was tied to the rope so that they could be vertically hung from the raft. Both coir ropes and nylon ropes were used for seeding the mussel at Ennore and Kovalam. Seeding of the ropes was generally carried out early in the morning or in the night to avoid seed mortality. At Kakinada, mussel seeds were kept in nylon cages.

RAFT

The rafts used at Kovalam were fabricated out of casuarina poles covering an area of 25 sq. m. Each raft was buoyed up with the help of sufficient number of diesel oil drums and anchored by 25m long tested anchor chain using stalkless anchors weighing 60 kg each. The rafts were floated at depths ranging from 8 to 10 m. At Kakinada, rafts were anchored in identical fashion at slightly shallower water in the open sea (5 m depth).

GROWTH

From the experiments at Ennore it was noticed that the mussels grow to 64 mm in 8 months showing a growth rate of about 8 mm per month. The growth of mussels in the open sea (Kovalam) was found to be much faster. During a period of 3 months in 1978

the cultured mussels grew from an average length of 13.63 mm to 52.0 mm showing an average growth rate of about 12.8 mm per month. The weight during the same period increased from 0.30 to 12.3g. During the 1979 season the mussels grew from a seeding size of 25-30 mm to the harvesting size of 70-75 mm in 3½ months showing a growth rate of 13 mm per month. The average weight attained by the mussels was 17.5 g. 4.5 kg of seed used on a rope attained a weight of 39 kg during 3½ months showing a nine-fold increase in weight.

Off Vakalapudi, near Kakinada, during a period of 5 months the mussels grew from 13-25 mm (mean 21.7 mm) to 53-70 mm (mean 66.6 mm). The increase in mean size was 44.9 mm giving an average growth of 9 mm per month. In the natural bed at Kakinada, the mussels were known to attain an average length of 63 mm in 6 months, 92.2 mm in 1 year, 117 mm in 2 years, 129 mm in 3 years and 135 mm in 4 years. In natural bed, growth was fast in the I and II quarters accounting for 68.6% of the annual increase in length.

A differential growth rate was observed on the culture rope, the mussels at the upper layers showing a slightly higher average length than those at the bottom level. The slightly higher growth rate at the surface might be due to the availability of more food at the surface. As the mussels grew in length the percentage of flesh weight decreased. The percentage of shell weight and flesh weight was more or less equal in mussels of average length of about 55 mm. In older mussels the shell weight often accounted for two-third of the total weight of the mussel.

PRODUCTION

Based on the percentage edibility values, mussels of size range 75 mm to 80 mm are harvestable. In the case of Kovalam each raft accommodating 50 ropes of 6 meter length produced about 2 tonnes of mussels in a period of 4 months (i.e. when the mussel reaches 75 to 80 mm). Although experiments are yet to be conducted by floating rafts over vast stretches to calculate the actual yields per hectare the values obtained from the experiments conducted now are encouraging.

Comparable production figures in respect of Ennore estuarine conditions and in the Kakinada Bay could not be given due to farm management difficulties encountered during the period of culture.

REMARKS

Open-sea mussel culture in the east-coast is beset with many problems that need attention before large-scale attempts are made.

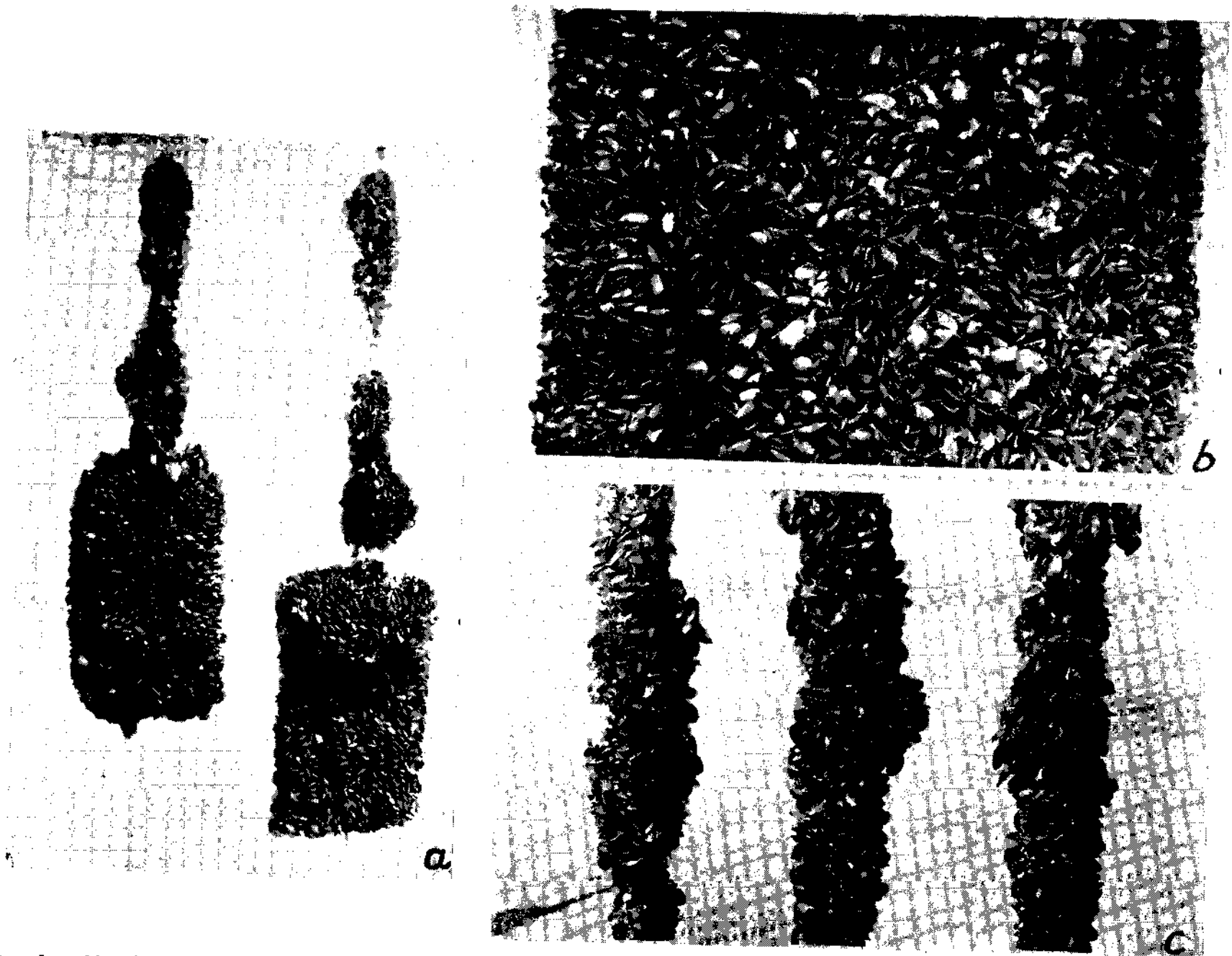


PLATE I. a. Mangalore tiles showing intense mussel spat fall. b. A close up view of a tile showing mussel seeds. c. A close up view showing the mussels growing on ropes.

(a) Interference to normal fishing activities in the coastal area due to the anchoring of large-sized rafts in a series, over expansive stretches. The present mood of the fishermen is against this effort since they report that their operation of boat-seines and drift-nets are drastically obstructed to.

(b) East coast is a cyclone prone area, the severity of which is felt almost every year during May-June and October-December period. Therefore any attempt in open-sea mussel culture all the year round needs stabilisation of appropriate technique to keep the seeded ropes and the stock thereon from large-scale destruction, causing economic loss to the culturist. This calls for developing all-weather proof raft structures at low cost or change in the technique of culture. Fending of the wave action by encircling the raft floated areas by laying automobile tyres may help to prolong the life of the raft tiding over difficult choppy seas. This method is being tested for its efficiency. Experiments using submerged raft are also in progress here to withstand rough sea conditions.

(c) The third problem, is making available large quantity of mussel seed that may be needed for com-

mercial-scale farming. Collection of seed by suspending Mangalore tiles from the rafts had succeeded to a limited extent at Kovalam enabling collection of seed of 15-20 mm size upto 10 kg/tile (Plate 1. a & b). Intensifying these efforts in the area may help to a very great extent to procure large quantities of spat not only from this area but also in the adjacent mussel populated coastal strips. Alternate method of hatchery production of mussel seed is being developed to meet large-scale demands.

(d) At present, predators, parasites, diseases and pollution problem have not cropped up in the culture experiments. But these are some of the potential dangers to be tackled and research efforts in this direction have been initiated.

(e) Regarding the market for the mussels in the east coast, there is at present very little demand. Even the people living along the coastal areas including the fishermen very rarely use the mussels in their diet. They are occasionally sold in the Madras City market at the rate of 15 per rupee. There is an urgent need to popularise the use of mussels as food among the coastal people. A post-harvest technology should be developed for the utilization of the mussels.