

Scope for Mussel Farming in Brackish Waters

V. Sundararaj, P. Natarajan and M. D. K. Kuthalingam

Fisheries College

Tamil Nadu Agricultural University Tuticorin - 628003

Mussel farming is gaining worldwide importance in the field of mariculture or coastal aquaculture since mussels are low in the food chain. The question of manuring or supplemental feeding never arises in this culture practice as in the case of fresh or brackish water fish farming. Further, in any other system of culture, there is no cultivable species, which could equal to this would be a plus point for mussel farming. From the available literature it is seen that the world mussel production is around 4,00,000 tons. This amount of production is only from the leading countries like Spain, Holland, France and Italy which have already taken up mussel farming as an industry. Developing countries like ours also have brought to light the possibilities of mussel farming by the method of rope culture in raft in the coastal waters.

In our country, resources are enormous for farming of mussels. Earlier reports showed that 3079 tons of mussels are landed every year. These estimates are only approximate because of the insufficient sampling method adopted to survey mussel beds. In fact, mussels are attached to the rocks to a considerable depth below the water level which could not be considered in arriving at this estimated figure as discussed by Prof. Shetty in the recently held workshop on mussel farming in Madras. The availability of mussels along our coasts should be definitely much more than what is being estimated.

Eventhough mussels are distributed abundantly in our country, the rate of growth in nature is slower compared to the cultured ones and the meat percentage is also less. By culture the growth rate can be enhanced to 3 to 25 times as reported elsewhere. It is seen from the reports that in the case of *Perna indica*, the production rate is five folds greater in Vizhinjam. Another advantage is that in our country green and brown mussels grow faster and reach harvestable size in 5-7 months time whereas in certain parts of Europe, mussels reach harvestable size only after a period of 2½ years. To utilise these and the cultivable area to increase production, solve protein famine, create employment opportunity and export, it is the right time to take up mussel farming on a bigger scale, paying equal attention on the estuaries, which are more productive than the coastal waters. Studies on mussel farming, have been carried out by the Central Marine Fisheries Research Institute in Vizhinjam, Kovalam (Madras) and Calicut in the coastal waters and they have brought out dependable and encouraging results. Based on the achievements made, mussel farming practice can be extended all along the coast, both in the east and the west and this would result in solving protein famine both within and outside the country.

Mussels are sedantary shell fish growing in the sea, attached to rocks

and other hard substratum by their byssal threads and also available in shallow coastal waters, in the intertidal region or in the submerged rocks. By the gregarious nature of the mussels, it is possible to collect their spats from nature, in various parts of our country as amply pointed out by Alagar-samy (1980). The young ones of the mussels, which are comparable to the fry or fingerlings of fish are called "spats" in the case of mussels. They are the "seed materials". They are available in abundance even at the rate of 11,000 /sq. m. as reported from Goa region (Qasim *et al* 1977). Mussel beds are also found in certain brackish water regions of our country (Bopaiah and Neelakantan, 1980; Jeyapaul *et al* 1980; Krishnamurthy and Prince Jaya-seelan, 1980; Parulekar, 1980; Parulekar and Dalal, 1980; Rajan, 1980; Sundaram, 1980). In fact, culture works were also undertaken in the Ennore and Mandovi estuaries (Rajan 1980; Paruleka, 1980). Mussel culture using rafts has been perfected for the coastal waters in India by Central Marine Fisheries Research Institute. Submerged rafts have also been developed by the said institution and successfully used in Madras to escape some extra rough wind and wave action.

While considering the vastly available productive brackish waters in the estuaries, backwaters, creeks and mangroves of our country, it is an urgent need that mussel farming should be taken up in estuaries also. Some of our scientists are of the opinion that mussel farming cannot be taken in estuaries due to various environmental factors like salinity, turbidity and so on. This may not be a practical truth since no attempt has been made to this effect.

Problems like the heavy wind, surf and unexpected rough weather, have always become a handicap for the open sea mussel culturists to float their rafts in the sea whereas in estuaries, backwaters and the mangroves, these difficulties are not felt originally.

The fertility of the brackish waters is many times higher than the sea water as evidenced from the nutrients, chlorophyll or primary production (Sundararaj and Krishnamurthy 1973; Ramadhas, 1977). Further more, the mussels cultured in estuaries are said to be tastier than those farmed in the open sea and this could act as a vital factor in the export of mussels "sea food". There is a common belief, in France that the best quality mussels occur in places where marine and freshwater mingle. Eventhough this may be a point to be established in India, it would also support taking up mussel culture in the estuaries. The suitability of mangrove environments for aquaculture has been sufficiently pointed out earlier in view of their ecology (Sundararaj, 1978). As such the mussels which reach harvestable size in 5 and 7 months in the sea water, could be harvested even at an earlier period, in the brackishwater environment opening ways for many crops or harvests or continuous harvests.

A survey of hydrobiological studies indicated that some of the estuaries in our country are well studied. Different regions of high salinity are marked in estuaries based on salinity distribution (Dyer and Ramamurthy, 1969). In places like the Kazhuveli tank, in Tamil Nadu more than 50% of the entire area is found to be highly saline without much chance for dilution of the water due to inflow of fresh

water. In Pulicat lake also the salinity is suitable and high enough due to the closure of the river mouth and fit for mussel culture during the premonsoon or the summer season which is longer. Certain areas in the mangrove (Walsh, 1974), also maintain high salinities and have minimum dilution. These could be surveyed and marked on national level and used since phytoplankton is more, dissolved oxygen is sufficient, and no threat of pollution. Based on the annual variation of the salinity, the high saline periods could be conveniently known. Certain parts of the mangroves, backwaters, lagoons and mangrove bordered estuaries always enjoy high salinities and in these water ways, dilution is not going to effect the life or growth of the mussels if sufficient care is taken. Besides, mussels by themselves are euryhaline in nature and hence they are well suited to adjust to any amount of varying salinities (Theede, 1963; Milne, 1940; Robertson, 1964). The physiological mechanism present in Mussels is so great to maintain the salt concentration of the "mussel fluid" at 24 parts per thousand even when salinity in the environment is falling as low as 4 parts per thousand (Milne, 1940). Certain experiments conducted on the mussels elsewhere have also proved that the rate of respiration, filtration and heart beats are not affected even if the sea water is diluted upto 16 parts per thousand. This would sufficiently indicate possibilities of mussels escaping

any undesirable sudden variation in the environment due to dilution.

While considering the mussel culture and the yields reported in the various parts of India it induces to remark that estuaries are the most suitable areas for mussel farming provided salinity is above ten (Qasim *et al* 1977).

However, as a best manager in mussel farming, one should exercise the maximum care to select regions, which are atleast 50% saline, some what deep and less turbid in nature with plenty of phytoplankton so that the culture programme could be progressive. Since estuaries are more dynamic in nature enjoying the tidal flow, mussels can have the best choice factors during high tides. If the site selection is properly made, based on annual studies mussels need not suffer even during the low tide due to salinity or turbidity. Even if mussels are exposed during the low tide period this would help in reducing the attack of fouling organisms. Certain parasites also cannot tolerate the widely varying salinities as mussels can. These factors in other words would help to increase the growth of the mussels since fouling and parasites attack are avoided. Thus, the estuarine ecology itself can look after part of the mussel farming management. This line of thinking, if put in the form of plans and experiments are made, there could really be a further major break through in mussel farming. □