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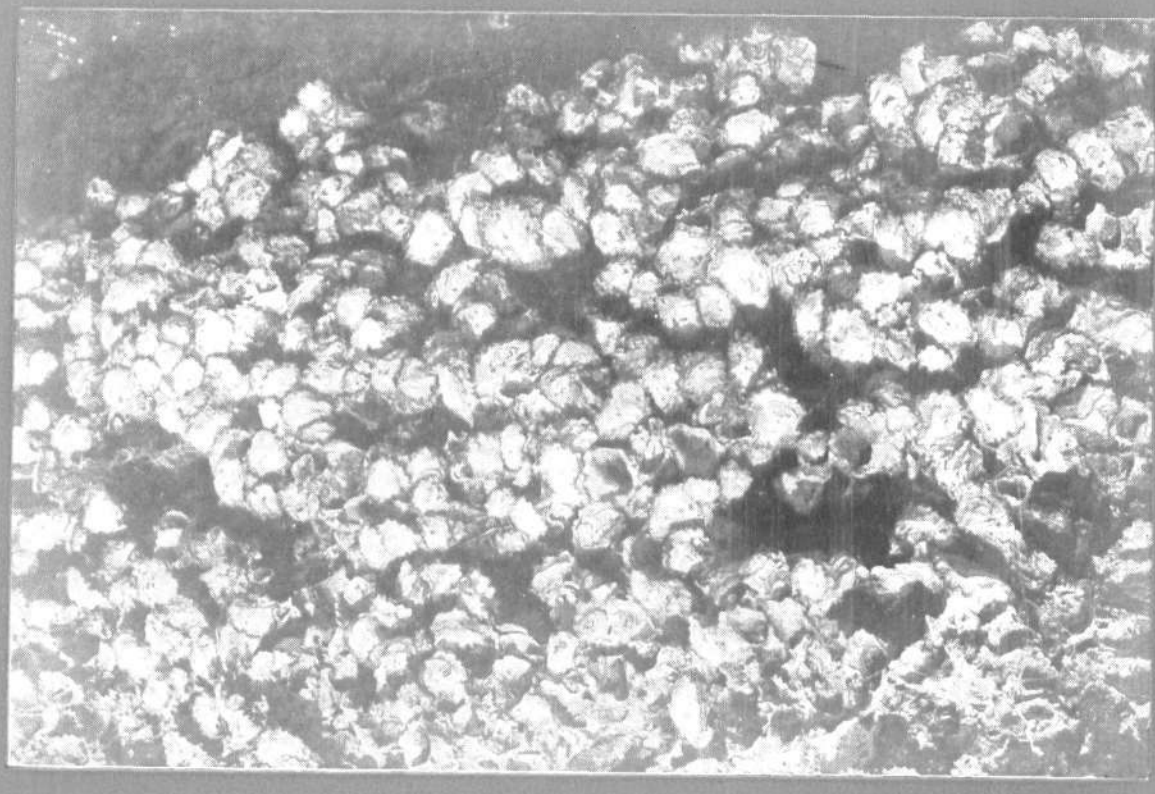

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THE CURRENT TREND OF THE MUSSEL FISHERY IN THE KANYAKUMARI DISTRICT OF TAMIL NADU

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The Kanyakumari district at the southern end of the Indian peninsula spans about 58 km along its western coast and 10 km on the eastern. There are massive formations of mussel beds in the coastal waters of this district and a fishery for the brown mussel *Perna indica* regularly operates during September–March at many centres where there are submerged or partially submerged rocks in the near-shore waters. Stray numbers of the green mussel *Perna viridis* are also found settled on them. The distribution of the brown mussel is limited within a coastal stretch of about 150 km, roughly between Kanyakumari and Quilon.

Though a seasonal fishery had traditionally existed here, the mussel in the district does not seem to have been fully exploited in the past. Based on the information collected during 1968, Jones and Alagarswami *(Proc. Symp. Living Resources of the seas around India,* 641-647, 1973) reported that some of the submarine rocks here have an extent of about 800 m length and 70 m width at about 7 m depth. They estimated the number of catamarans (each with a crew of 2) engaged in this fishery in the district at 270 and the annual catch at 322.4 t. Subsequently, Alagarswami *et al. (Workshop on Mussel Farming, Cent. Mar. Fish. Res. Inst.,* Madras, India, 25–27 September, 1980, mimeo.) observed increased mussel landings in this area, but, in the absence of exact catch figures, estimated a 10% increase over the figures given by Jones and Alagarswami (above cited) and envisaged scope for increasing the production to thrice the then level.

Though there had been better harvest in some years subsequently, the mussel fishery took a positively upward turn only during its 1986-'87 season and the trend improved further in the subsequent 1987–'88 season. During these two seasons, particularly in the latter, intensified mussel fishing operations were on, at a level unprecedented in this region in recent years. These fishing centres included the areas where this resource had so far been known to be exploited only at a low sustenance level. The outcome was the beaching of tonnes of mussel. The urge for this intensification was apparently an expanded market for this in the adjacent Trivandrum district of Kerala, to where about 75% of the mussels collected here was transported.

The mussel fishing centres in the district at present are – from south – Kadiapatnam, Colachel, Kodimunai, Vaniakudi, Kurumpanai, Enayam and Enayamputhenthurai. There are other rocky area having mussel settlement, namely, Chinnamuttom (the only centre in the eastern coast of the district near Kanyakumari with possibilities of mussel fishery), Kanyakumari, Kovalam (near Kanyakumari), Muttom, Melamidalam and Ramanthurai. But mussel fishing in these centres is occasional, only a few persons collecting them for their domestic use and the landings are negligible.

The following is a report on the mussel fishery in the district for the seasons beginning from 1981–'82 upto 1987–'88, with special reference to the last two seasons, based on the fishery survey statistics collected for six of the centres, Colachel, Kodimunai, Vaniakudi, Kurumpanai, Enayam and Enayamputhenthurai. Based on these data, estimated landings for the whole district consisting of 7 mussel fishing centres, Kadiapatnam being the only uncovered centre, have been worked out. Additional information gathered by personal observation and enquiries with fishermen (mussel divers and others), mussel merchants and a cross section of the consumers (coastal as well as interior) is also incorporated in the report. The part given under disposal is relevant only to the last two seasons reported here.

Exploitation

Normally, the mussel beds within a depth of 12 m are exploited. Where the rocks are very close to the shore, the fishermen swim to the spot. But in other cases, a catamaran is used usually by two persons. During peak mussel fishing season, the divers set out at about 0600 hrs and return around noon except when larger collection is required. The persons in the catamaran dive alternately.

The scalpriform tool ('uli') with a long (about 0.5m) light-weight wooden handle continues to be used to scrap the mussel directly into the net bag ('kachal') taken with the diver for the purpose. Hand-picking of mussels, which was once common, is now obsolete. A goggle ('kannadi') is used by most divers.

The mussel usually occurs in clusters and in layers, the upper layer consisting of younger ones which settled at a later date. At the beginning of the fishing season, the divers who are particular about bigger shells remove the smaller ones of the upper layer to get at the larger adult ones. At the end of a dive, the diver lets off the tool free and it darts to the surface and floats. Then follows the diver with his haul which is deposited in the catamaran. Now it is the turn of his partner to dive. Together they make normally about 30 to 50 dives per trip and collect upto 300 kg. Those who fish for lobster (whose fishery season coincides with that of the mussel) also collect some quantity of mussel, which goes to them as bycatch.

Fishery

The season-wise mussel landings and other related details for five seasons beginning from 1981–'82 are given in Table 1. A more detailed tabulation of the mussel fishery for the next two seasons, 1986–'87 and 1987–'88, *i.e.*, the period of enhanced mussel fishing operations, is separately given in Table 2.

During the first five seasons, the estimated mussel landings have ranged from as low as 182 t in 1982–'83 to 1,534 t in 1981–'82. During the same period the seasonal average quantity of mussel collected per fishing trip varied from 40 kg in 1982–'83 to 93 kg in 1984–'85.

Table 1. *Season-wise mussel landings in Kanyakumari district with other details for five seasons beginning from* 1981–'82

Seasons	Estimated landings (t)	Estimated no. of fishing trips	Range of monthly average landings per trip (kg)	Seasonal average landings per trip (kg)
1981–'82*	1,534	18,688	43–105	82
1982–'83	182	4,527	37–44	40
1983–'84	1,190	16,193	15–111	73
1984–'85*	1,320	14,210	41–155	93
1985–'86	472	6,113	55–84	77

*Data were not available for February, 1982 and December, 1985.

1986–'87 *season:* Mussel fishing for this season started from the last week of September and came to a halt by the middle of February. During this period an estimated quantity of 1,802 t was brought ashore in the district. The monthly landings had its peak in December with 857 t and were at its minimum during September and February with 49 and 19 t respectively. The monthly average quantity of mussel collected per trip ranged from 29 kg in February to 81 kg in November with a seasonal average of 63 kg. The mussel fishing trips per day per centre varied from 8 in February to 60 in December with a seasonal average of 34.

1987–'88 *season:* Commencing from October and lasting till February, this season had an estimated total landings of 8,837 t which show about a 5-fold increase from the previous season. Peak landings of 3,554 t

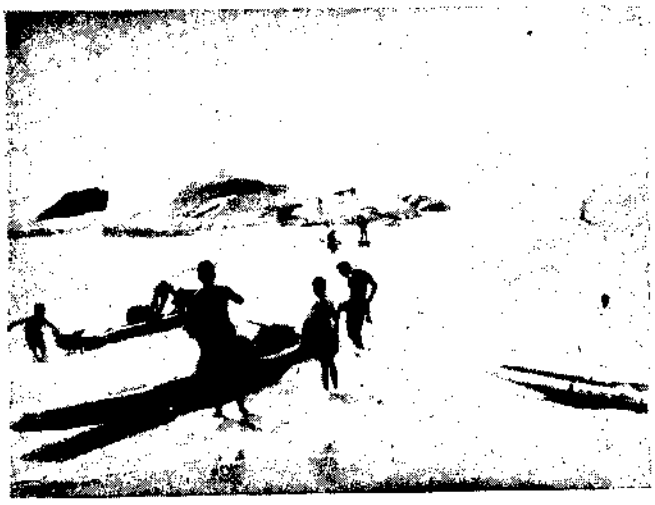

Fig. 1. Landing of mussel fishing crafts.

Fig. 2. The mussels being unloaded from catamarans.

Table 2. *Month-wise mussel landings in Kanyakumari district during the two seasons,* 1986–'87 and 1987–'88.

Seasons	Months	No. of mussel fishing days	Estimated landings (t)	Estimated no. of trips	Average collection per trip (kg)	Average no. of trips per day per centre
1986–'87	September	4	48.7	672	73	24
	October	25	180.9	2,712	67	16
	November	25	457.8	5.643	81	32
	December	27	856.7	11,416	75	60
	January	27	238.6	7,340	33	39
	February	12	19.3	672	29	8
	Total	120	1,802.0	28,455	—	—
	Seasonal Average		—	—	63	34
1987–'88	October	26	2,598.6	14,560	179	80
	November	25	3,553.8	22,400	157	128
	December	26	1,574.7	14,196	111	78
	January	26	949.2	13,680	70	75
	February	25	161.2	4,783	34	27
	Total	128	8,837.5	69,619	—	—
	Seasonal Average		—	—	127	78

were recorded in November with an average landing rate of 157 kg per trip. During the same month, an average of 128 trips were made per day per centre. At the end of the season in February, the monthly landings fell to 161 t with the month's average collection rate of 34 kg per trip and a reduction of 27 trips per day in a centre. The seasonal average quantity collected in a trip works out to 127 kg and the average number of trips per day per centre, 78.

The fluctuation in the quantity collected per trip on different days may be due to the number of dives made. Besides turbid and turbulant water and dim light impede the collection rate. The contrary factors like clear and calm water and bright sunlight are optimum conditions for mussel fishing. Tides are not considered to be a limiting factor since the tidal amplitude in this region is very low.

Disposal and marketing

Trucks of 2 tonnes capacity, having mussels to the brim, plying northward from Kanyakumari district were a common sight during the mussel fishery seasons, since the major portion (about 75%) of the landings was transported to markets in Trivandrum district

Fig. 3. Pre-selling treatment – cleaning and grading.

(which itself is a mussel fishing region in the southernmost part of Kerala) where the mussels were reportedly sold at prices lower than that of the mussels collected locally. For instance, an actual figure from a trader's record shows that from Colachel alone, 52 truck-loads were sent within 11 days during the second half of December, 1987. A truckful of mussel, already graded and cleaned of extraeneous attachments and encrusta-

tions on the shells, ranged in price from Rs. 700/- to 1,000/- during different occasions at the point of despatch.

The retail price in and around the fish landing centres varied from Rs. 2 to 4 per hundred though occasionally it went up to Rs. 7. During its season, it is a sure item fetching better selling rates in most interior fish markets in Vilavancode and Kalkulam taluks of the district.

Utilisation

The mussel, locally known as 'thodu', 'chippi' and 'kallikka', is eaten mostly cooked with condiments, though boiled mussel is also consumed without any mix. The larger ones are preferred. Though it is a much relished item of seafood in some quarters, the mussel is not in high demand in the district. That about 75% of the catch is sent out, is an indication of the attitude towards it of the local people to whom it is so easily accessible. There seem to be many reasons for this: some have a preconceived notion that it is a poor man's food capable of causing ill effects; some others hesitate to go for it for the mere reason that it invities a lot of labour in the culinary treatment, like boiling to remove the flesh from the shells and removing the byssus thread from the flesh.

So far, mussel from India has not had a promising export market. Some Arabian countries are inclined to import mussel and trial supplies are being sent. An outside market for it might arise sooner or later.

Crushed mussel is used as bait for lobster fishing. Shells are used for lime preparation. A regular business exists in one of the centres, Enayam, where many fishermen dive for the empty shells around the rocky beds, all through the year, except during monsoon months.

Fisherfolk's awareness of the fishery

Fishermen are naturalists in their own way. Experienced divers ('kuzhiyalu' in Tamil) say that during 'Panguni and Chithirai' (Tamil months corresponding to the period from March middle to May middle) a 'kara' is formed in the sea and following that attachment of 'podi chippi' (small mussels) begins. This process repeats, according to them, after a few months. Studies have shown that mussels spawn over an extended period with a peak from June to August and a secondary spurt in October and November (Jones, 1950, *Bombay nat. Hist. Soc.*, **49** (3): 519-528) and that spawning of *Perna indica* in the Vizhinjam (near Trivandrum region commences by May and lasts till September (Appukuttan and Prabhakaran Nair, 1980, Mussel Farming, *CMFRI Bull.*, **29**: 5-9). Though 'kara' is a term fishermen generally use to describe a bloom (usually of plankton), here what the divers call as 'kara' during that period may be the brick-red eggs released in millions, followed by early larval stages of the mussels, and the formation of 'podi chippi', the spat settlement.

Fig. 4. Packing for transporting to markets.

Local fishermen believe that there are mussel-scalps beyond the conventional grounds. Scientifically this can be ascertained only after conducting surveys. But, the feasibility of exploiting them commercially from beds deeper than the skin-divers' reach, would require new viable fishing methods to collect them economically.

Future prospects

At the end of the 1986-'87 season, the fishermen were sceptical about the chances of another successful mussel fishery here during the ensuing season. Because, they had made a thorough sweep of the mussel beds within the exploited depth range. But they were astonished by the multifold increase in the fishery when the feared season prevailed. Further, the 1987-'88 season was deemed as closed not because of lack of mussel on the rocks, but due to the fact that the available larger mussels had their meat shrunken and were not easily mastecateable, the characteristics perhaps of spawned individuals. So, towards the end of this season, some divers started collecting smaller shells also. All this points towards a reasonable understanding that, at the present level of exploitation, the beds are not likely to be depleted, unless by some unusual predation or some

Fig. 5. The mussels being loaded into the truck.

calamitous environmental change resulting in the destruction of the larvae, failure of spat settlement and their growth.

To encourage the consumption of this protein-rich food, all false apprehensions among the people about eating mussels must be dispelled and the fact stressed that mussels are highly nutritious food which, like any other good food, causes no ill-effect when consumed uncontaminated and in reasonable quantities. This can be achieved by extension work by governmental agencies as well as socio-economic organisations of the region.

As the observations were in progress in January, 1988, a press report stated about the Indian Council of Agricultural Research having sanctioned a Rs. 3.25 lakh project for the Kerala University on product development from bivalve meat. This project is reportedly aimed at developing edible products from bivalve meat and fixing biochemical and microbiological standards for such products. If sea-mussels also figure in the study and the results lead to better utilisation of the same, Kanyakumari district has the scope to contribute raw material to an appreciable extent by gearing up production in the presently unexploited centres also. Naturally, when mussel fishing becomes more profitable than now, more fishermen will get engaged in this fishery.

Fig. 6. An innovative method to transport mussels to short distances in meshed bags.