



Note

Distribution, abundance and exploitation of green mussel, *Perna viridis* (Linnaeus, 1758) (Bivalvia), in Vellar Estuary, southeast coast of India

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Abstract

The green mussel, *Perna viridis*, bed was not present in Vellar Estuary prior to the year 2000. Their large scale settlement in the estuary after this period is attributed to the temporary high saline regime that set in due to successive failure of northeast monsoon up to 2004. Details collected on their distribution, abundance and size in Vellar Estuary, the quantity exploited and marketed are reported. However, the killer tsunami led to sedimentation which smothered the mussel beds leading to mass mortality. The heavy floods during the northeast monsoon in 2005 was also a factor which wiped out the remaining few individuals and now there are no mussel beds in this estuary.

The green-lipped mussel, *Perna viridis* which is widely distributed in tropical/subtropical Asia, forms a good and cheap source of animal protein and is also an important cultivable species in China and Southeast Asian countries, such as Philippines, Singapore and Thailand besides India (Yu *et al.*, 2000). It occurs as small beds in the intertidal zone to a depth of 15m along the east and west coasts. This sessile bivalve also occurs naturally in the estuaries where the salinity ranges from 27 to 33 ppt and temperature from 26°C to 32°C. Lower limit of salinity for its occurrence was found to be about 16 ppt (Kuriakose and Nair, 1976). Vellar Estuary is situated on the southeast coast of India. Earlier this species was not found in the estuary but few isolated beds were seen in the inshore waters of Parangipettai waters and was not exploited by the local fishermen. However, due to the failure of the north-east monsoon continuously for 4 years from 2000, the salinity in the estuary became almost equal to that of the inshore waters. Correspondingly there was an increase in population size and expansion of green mussel beds in this estuary. The fishermen started exploiting them. As no study has been made so far on the mussel resources here, a survey was undertaken during June – August 2004 to evaluate the extent of mussel beds, abundance, total number, quantum of exploitation, method of harvest and marketing.

Materials and methods

The survey was conducted at 10 stations at equal interval of 200m in the Vellar Estuary from mouth to the railway bridge situated at a distance of 2 km. The substratum was sampled from a unit area of 0.5 m² marked by a quadrant. Two samples from each station were

collected from the upper and lower intertidal regions. The extent of mussel bed was noticed by observation and enquiry with mussel pickers. In case of dense settlement, sub-samples were taken. The biomass per m² was calculated based on shell-on weight of mussels inhabiting unit area. From this data, the biomass for each station was estimated.

Results

The depth varied from 1.8 to 3.2 metres (Table 1). The minimum depth was noticed in station 3 and maximum at 8. The nature of the substratum was silty clay in stations 1 and 2 and muddy in rest of the stations. The salinity was on the higher side and varied from 34 to 35.17ppt, temperature from 29.4 to 31.3°C and dissolved oxygen from 3.1- 4.3ml/l. The maximum extent of bed was noticed in stations situated away from the mouth of estuary (stations 7 and 8). The abundance of mussels was on the higher side in stations situated in the middle of the study area than at other stations. The total number of mussels in the bed also followed more or less the above pattern. The biomass also followed a pattern similar to that of total number. The size of the mussel varied from 2.6cm to 15 cm in length.

Mussels were harvested from the estuary throughout summer and pre-monsoon seasons by handpicking. The major part of the harvested mussels were sent to markets in Kerala. Information on the total exploitation of mussel from Vellar Estuary was collected for 3 months (June-August) in 2004. The total quantity harvested in June was 1,51,500kg of which only 1500kg were consumed locally and the rest sent to Kerala. In July there was a slight

Table 1. Depth, extent of mussel bed, abundance, total number and the biomass recorded at different stations in Vellar Estuary

Stns.	Depth (m)	Extent of mussel bed (m ²)	Abundance of mussels (No/m ²)	Total number of mussel bed (x000)	Estimated biomass of mussels (kg)
1	2.0	600	45	27.0	405
2	2.3	580	45	26.1	392
3	1.8	640	60	38.4	576
4	1.9	800	70	56.0	840
5	2.0	1160	85	98.6	1479
6	2.2	1180	60	70.8	1062
7	3.0	2140	45	96.3	1445
8	3.2	2220	20	44.4	666
9	2.8	1800	30	54.0	810
10	2.7	1600	45	72.0	1080

decline in production and out of the 1, 37,500kg exploited, 2500 kg were used locally and 1, 35, 000kg sent to Kerala. By next year there was a further decline and out of the 91,000kg exploited, 90,000kg were sent to Kerala. Thus in 3 months during these years time as much as 3, 80,000 kg were exploited. The hand picked mussels without any further processing were packed in sacs and sent to the markets by trucks. While the meat taken out was used for edible purpose, the shells were used for lime production. The price of the mussels was in the range of Rs. 20-50 per kg in Parangipettai based on the size and meat content. Only a small quantity was consumed locally by fishermen community. Pickle prepared using mussel locally was marketed in nearby urban areas.

Discussion

Occurrence of green mussel in the estuaries of Hong Kong was reported by Morton (1987). Shafee (1979) observed that *Perna viridis* has the greatest growth rate among the mussels studied to date. Chatterji *et al.* (1984) related high growth rate of the green mussel to high salinity. The abundant occurrence of green mussels in Vellar Estuary during 2000 to 2004 is attributed to the higher saline regime throughout in these years. The salinity was equal to that of the inshore waters due to failure of monsoon during successive years. The impact of tsunami on benthic organisms is being studied extensively. The present study brings to the fore the impact of

tsunami on the mussel population in Vellar Estuary. The killer tsunami which devastated and battered the southeast coast of India on 26 December 2004 brought quite a lot of sediments into the estuary which smothered the mussel beds leading to mass mortality. Subsequent to tsunami, colonization of mussels in the estuary was not noticed. The salinity during the northeast monsoon (October-December) period in the estuary during 2005 was low due to floods. Therefore, the mussels could not establish themselves in the estuary and are now absent.

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