

# Observations on spawning activity of green mussel *Perna viridis* in relation to surface water temperature in Pulicat Lake and Ennore backwaters

Shoba Joe Kizhakudan, Raja, S., Gupta, K. S., Thiagu, R., Sethi, S. N., Joe K. Kizhakudan, Geetha, R., Vivekanandan, E. and Zacharia, P. U.\*

*Madras Research Centre of CMFRI, Chennai*

The green mussel *Perna viridis* is an important bivalve species in India that is farmed in good quantities in few parts of west coast of India. These

mussels are found to inhabit marine intertidal and subtidal zones with rocky patches favouring spat settlement. Protected estuarine and backwater

habitats have been reported as potential sites owing to their high natural productivity and sheltered environment. While a lot of study has been carried out on the wild population of green mussels and their amenability to culture along the west coast of India, this resource has not gained the same attention along the east coast. Some studies conducted in the past show the suitability of several localities along the east coast of India as ideal for green mussel culture. Ennore estuary, Muttukadu backwaters, Edaiyur backwaters and Palar estuary along the north Tamil Nadu coast have been reported as potential sites with seed resources available. A preliminary study was conducted under the project on National Initiative on Climate Resilient Agriculture (NICRA), on the availability and distribution of *P. viridis* in the backwaters of Pulicat (13° 25' 31.0 N; 080° 18' 55.3 E) and Ennore (13° 15' 49.9 N; 080° 19' 52.9 E) (Fig. 1) during the period February 2011 to January 2012.



Fig. 1. Map showing sites of green mussel collection

Length composition, sex ratio and reproductive phases of the mussels were studied across the months. The male-female sex ratio was 1:1.15 and 1:1.1 at Pulicat and Ennore, respectively. Total length ranged from 11 to 120 mm at Pulicat and 26 to 95 mm at Ennore (Fig. 2).

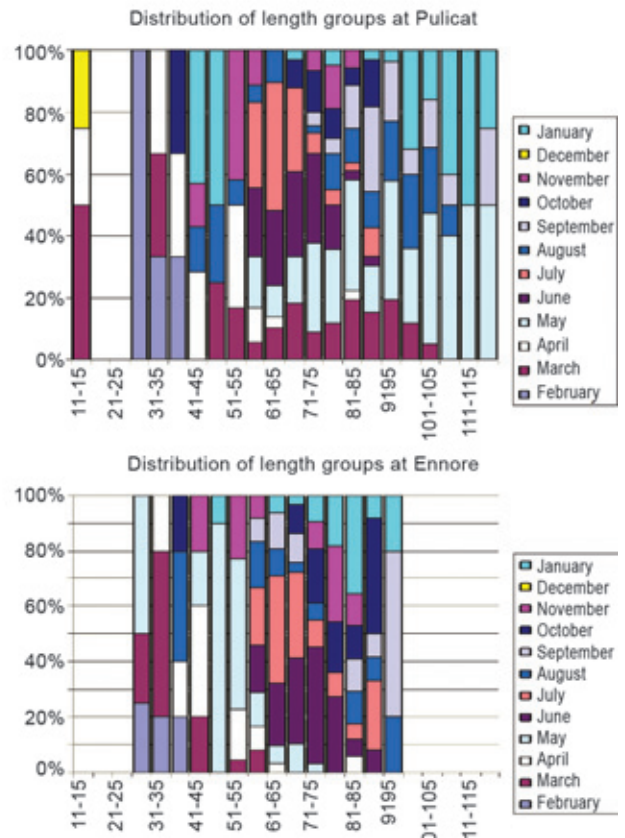


Fig. 2. Monthly size frequency distribution of *P. viridis* in Pulicat and Ennore waters

The availability of marketable sizes of 51-75 mm and above was found to be higher during April-July and again during September-January (Figs. 1&2). Two spawning peaks were observed at both stations, one in May and one in September. Earlier studies report two spawning peaks for *P. viridis* (May-June and October-November) in the Edaiyur backwaters and indicate that the reproductive activity of the mussel is directly linked to water temperature. The surface temperature profile in the two water bodies in the present observation showed two well defined maxima: one in May-June and the other in September-October, coinciding with the spawning peaks. Temperature ranged from 28°C (February, August and December) to 30.2°C (May) and 30.5°C (September) at Pulicat and from 28°C (December and January) to 30.1°C (May) and 30.5°C (September) at Ennore (Table 1).

Table 1. Surface Temperature profile of Ennore Estuary (in earlier studies and present study) (yellow boxes indicate temperature peaks)

	TEMPERATURE (°C)		
	1960-1961 (Chacko and Rajagopal, 1962)	2009 (data collected at CMFRI, Chennai)	2011-2012 (present study)
FEBRUARY	28	29	28
MARCH	29	28	29
APRIL	28.5	30	30
MAY	31	30.5	30.1
JUNE	31.25	30	30
JULY	30.5	26.5	28.5
AUGUST	30.5	30	29
SEPTEMBER	28.5	30	30.5
OCTOBER	30	29	30
NOVEMBER	27	27.5	27.5
DECEMBER	26.5	28.4	28
JANUARY	27.7	26.4	28
AVG	29.0	28.8	29.1

While earlier reports indicate high annual salinity fluctuation in Ennore Estuary during 1960-'61, observations made in the present study show that the average salinity is higher at present (32.38 ppt) than about fifty years ago (29.05 ppt). There

is a perceptible increase in salinity maxima from 1960-'61 to 2011-'12 (Fig. 3).

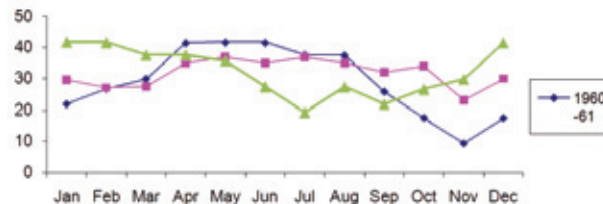


Fig. 3. Annual salinity profile in Ennore estuary - a comparison between 1960-'61 and 2009

Although a relation between spawning activity and salinity fluctuations could not be established, and the influence of rainfall anomalies need to be assessed, this study indicates the resilience of these mussels to variations in the natural environment. In the light of growing concern over negative impacts of climate change on the existence of several aquatic resources, the persistence of the green mussel in Pulicat and Ennore waters is a positive indication of the ability of the species to survive transient habitat conditions. Further studies are being carried out on the performance of other physico-chemical parameters and biological associations between these mussels and other fauna and flora present in the two ecosystems.