

FACTORS GOVERNING POLYCHAETE BIOMASS IN THANE CREEK, MAHARASHTRA STATE, INDIA

Athalye, R.P., S.S.Tandel, M.K.Pejaver and K.S. Gokhale,
Department of Zoology,
B.N.Bandodkar College of Science,
Thane – 400 601 Maharashtra, India.

Key words: Thane Creek, Polychaete biomass, Predatory fishes, water and sediment quality.

Abstract :

Thane creek near Mumbai (Maharashtra) is a tide-dominated creek experiencing low salinity only during monsoon season. It receives large volumes of domestic sewage and industrial effluents. The creek has mangrove (mainly *Avicennia marina*) mudflats on its banks. The mudflats are dominated by polychaetes making up 44% of the total macrobenthos biomass ranging from 12 to 100 gm/m². Water quality parameters like dissolved oxygen, suspended solids, B.O.D, NO₃-N, PO₄-P and sediment parameters like texture and organic carbon do not show significant correlation with the polychaetes biomass. Low and intermediate salinity in monsoon and early postmonsoon respectively, were found to favour growth of polychaetes. The dominant fish species, *Mystus.gulio*, *Mugil cephalus* and *Metapenaeus monoceros* mainly fed on polychaetes, however, a definite predator-prey relationship was not observed. The results indicate that the polychaete biomass is not fully exploited by the fishes due to hostile environmental conditions in the creek.

Introduction:

Thane creek (Lat 19° 15'N and Long 72° 55' to 73° 00' E) extends northwards from Mumbai harbour and has a minor connection with the Ulhas river near Thane city. The creek is tide dominated and is recipient of domestic sewage and industrial effluents from Mumbai-Thane industrial area.

The present investigation was conducted from June 1984 to May 1985 in a part of the creek near Thane city, Maharashtra (Fig.1), which is dominated by the mangrove species, *Avicennia marin*. The polychaetes were collected twice a month from two selected stations, one on the west bank and the other about 700m upstream on the opposite bank, having predominance of soft sediment.

Materials and method:

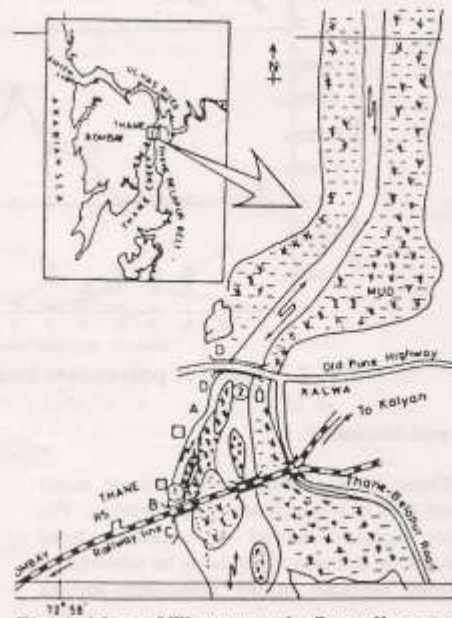


Fig. 1. Map of Thane creek; Sampling stations

The sediment samples were collected with a shovel taking proper precautions and sieved through 1mm mesh metal sieve in the creek water to separate the macrobenthos.

The monthly data on fishery of the creek was collected during the same period from the commercial netting operation. The gut contents of important fish species were studied and the results were correlated with the polychaete biomass, from the habitat.

Concurrently a number of water parameters were analysed during high tide using Standard Methods' (APHA, 1981). The sediment texture and organic carbon were studied by Beaker method (Piper, 1942) and rapid titration Method (Walkley and Black, 1934) respectively.

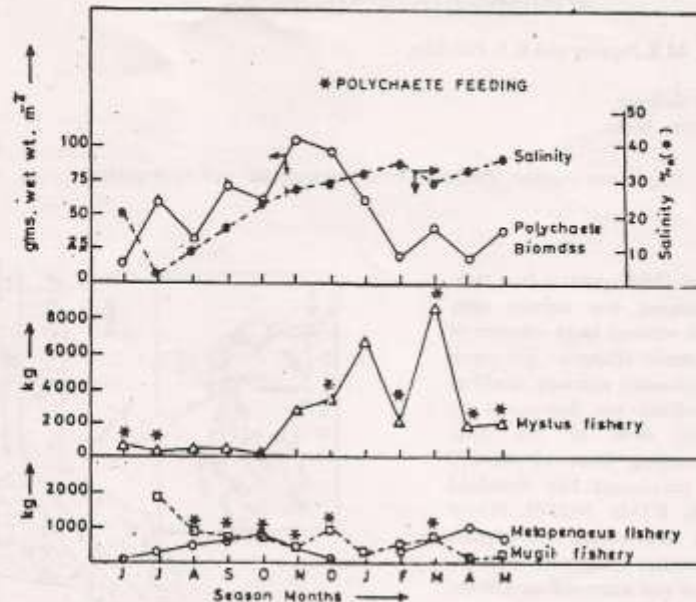


Fig. 2. Trends of polychaete biomass and important fishery.

Results and discussion:

In the Thane creek polychaetes formed the major constituent 44% of soft sediment macrobenthos. The polychaete biomass showed an increasing trend during monsoon and post monsoon to be followed by a significant decrease in the subsequent months (Fig.2).

The main fishery of this region was supported by *Mystus gulto* during non-monsoon period and *Mugil cephalus* during monsoon period when the polychaetes formed the main constituent of their diet. The prawn *Metapenaeus monoceros* fed on polychaetes throughout the year and their biomass observed two peaks, one in post-monsoon and the other in summer. The prawn fishery and the polychaete biomass showed a positive correlation during monsoon months and negative during non-monsoon months. Thus their correlation was variable.

Mugil fishery also failed to show any definite correlation with the polychaete biomass, even though decrease in their biomass was associated with an increase in the polychaete biomass during monsoon and post-monsoon seasons. *Mystus gulto* exhibited a positive correlation with polychaete biomass during

summer and did not show significant predator-prey relationship. January was marked by absence of polychaetes in the diet of fishes, in spite of this the polychaete biomass had a sharp decline during the period. Thus predatory fishery had variable relationship with the polychaetes.

Table 1. Water and sediment quality in Thane creek, Maharashtra, India.

Parameter	Range	Mean ± SD
Water		
Temp°C	22 - 33	28.14 ± 3.38
Salinity ‰	1.4 - 33.8	21.42 ± 10.84
Suspended solids ppm	60 - 2380	1188 ± 904.33
DO ppm	1.9 - 6.0	3.56 ± 0.96
PO ₄ -P ppm	0.124 - 0.295	0.175 ± 0.041
NO ₃ -N ppm	0.24 - 3.99	1.747 ± 1.207
Sediment		
Organic carbon %	1.95 - 4.08	2.85 ± 0.87
Coarse sand %	0.29 - 3.64	1.27 ± 1.126
Fine sand %	4.82 - 14.55	8.39 ± 3.243
Silt %	20.66 - 24.75	22.51 ± 1.189
Clay %	61.06 - 73.17	67.84 ± 4.42

Water parameters (Table 1) such as dissolved oxygen (DO), suspended solids (SS), biochemical oxygen demand (BOD), nitrates, phosphates and sediment texture & organic carbon did not show significant correlation with the biomass of polychaetes. However, during low saline regime (Monsoon) and recovery period (early post-monsoon) a substantial increase in the polychaete biomass was discernible despite of predatory pressure (Fig.2).

Conclusion :

It can be concluded that the polychaete biomass of the soft sediments of Thane creek was favoured by low and intermediate salinity conditions. The influence of predatory fishery was not significant, as

the polychaete biomass was not fully exploited. This could be due to the polluted waters of the creek that repelled the fishery.

References:

- APHA, AWWA and WPCF (1981) International standard methods for the examinations of water and waste water, 15th edition 1134 pp
- Piper, C.S. (1942) Mechanical analysis by beaker method. In soil and plant analysis Hans Publishers, Bombay, 75 pp.
- Walkley, A and I.A.Black (1934) The determination of organic carbon by rapid titration method 'Soil Science' 37:29-38