

## Diversity of Intertidal Meiobenthos from Estuary of Bhayander and Naigaon, Thane, Maharashtra, India



### Zoology

**KEYWORDS :** Meiobenthos, Elphidium, Bhayander, Naigaon.

**Dr. Devdatta Lad**

Department of Zoology, Wilson College, Chowpatty, Mumbai - 400 007

**Dr. Shashikant Patil**

Department of Zoology, Mithibai College of Arts, Chauhan Institute of Science, Amrutben Jivanlal College of Commerce and Economics. Vile Parle (West), Mumbai 400 056.

### ABSTRACT

*The diversity of intertidal Meiobenthos from estuary of Bhayander and Naigaon of Thane district were investigated from May 2008 to June 2009. Twenty three species belonging to 8 Phylum were identified. The Meiobenthos groups recorded are Foraminifera, Cnidaria, Turbellaria, Nematoda, Cephalorhynca, Gastrotricha, Archiannelida, Polychaeta, Harpacticoida, Isopoda. Both the stations showed similar diversity with regards to the major Meiobenthos group viz Harpacticoida, Isopoda, Archiannelida, Cephalorhynca and Foraminiferida.*

### INTRODUCTION

The studies of benthic animals and communities have gained importance with the increasing realization of the significant role they play in the trophic cycle. (Pillai 1977) The term benthos is widely referred to flora and fauna which are intimately associated with sediments in an aquatic environment. They support a rich variety of floral and faunal assemblage of marine bottom communities, viz., bacteria to vertebrates. Their distribution in the marine environment starts from intertidal zone to deep sea. The benthos are mainly divided into 1) Macrobenthos and 2) Meiobenthos. The Macrobenthos comprises the larger, more visible, benthic organisms that are greater than 1 mm in size. While Meiobenthos comprises tiny benthic organisms that are less than 1 mm but greater than 0.1 mm in size. Benthos plays a vital role in the marine food chain and in the recycling of essential life sustaining elements like Carbon, Nitrogen and Phosphorus in the marine ecosystem. (Pillai 1977)

Estuarine intertidal habitat harbour rich meiofaunal communities which in turn serve as live food for higher trophic levels. (Ingole et. al., 1998) Meiobenthos are known to be sensitive indicators of environmental perturbation. Because of their large numbers, relatively stationary life habits, short generation times and intimate association with sediments they are known to accumulate various contaminants. (Wells et. al., 1981)

Diversity studies on meiofauna indicated occurrence of 40,000 species. (Giere, 2009) Based on the nature of sand and other physicochemical factors (Gray, 2002) variations are observed in the meiofaunal composition in different beaches. (Rodriguez et. al., 2003) In India, published reports on Meiobenthos diversity are limited and available studies are either from west coast (Ingole et. al., 1990, Ansari and Gauns, 1996) Lakshadweep islands (Rao and Misra, 1983), Andaman and Nicobar. (Rao, 1993) Such studies on the east coast of India are comparatively less.

Since such studies are not available in India, the present investigation was undertaken with the objectives of understanding diversity of intertidal Meiobenthos of Bhayander and Naigaon estuary.

### MATERIAL AND METHODS

Surface soil samples (10cm depth) was collected every month from below the mangrove tree at High Level Water mark (HLWM) using a metal scoop (10cm x 10cm) corer and was fixed in 1:500 Rose Bengal formalin and was

preserved in a plastic container. The sample was passed through two sieves, first through 0.5mm followed by 62 micrometer sieve so as to separate the macrobenthos and then to collect the meiobenthos. The meiobenthos collected was preserved in 10% formalin and was observed under microscope and then the groupwise sorting and counting of meiofauna was done. (Giere Olav 2009), (Higgins R. P. et. al., 1988)

### Study Area

The present study was carried out at two stations Bhayander and Naigaon respectively.

Station 1: The first station at Bhayander is located 19° 19' N and 72° 51' E. (Google Earth 2008) The Bhayander is geographically surrounded by sea from the West side, by the estuary from the north side and by open and occupied land from the south and east side. The estuarine water is mainly from the buffering of Ulhas River with the Arabian sea which amalgamates its water in the Thane creek and Vasai creek.

Station 2: The second station Naigaon is located 19° 20' N and 72° 51' E. (Google Earth 2008) Naigaon is a small town in the Thane District of the Maharashtra state and situated diagonally opposite to Bhayander on the another side of the estuary. The approximate distance between Bhayander and Naigaon is about 5 Km.

### RESULTS

**Table No. 1 Diversity of Meiobenthos in estuary of Bhayander and Naigaon stations of Thane, Maharashtra, India.**

| Name of the Species              | Station 1: Bhayander | Station 2: Naigaon |
|----------------------------------|----------------------|--------------------|
| <b>Phylum: - Protozoa</b>        |                      |                    |
| <b>Order: - Foraminiferida</b>   |                      |                    |
| <i>Elphidium aculeatum.</i>      | +++                  | +++                |
| <b>Phylum: - Cnidaria</b>        |                      |                    |
| <i>Halammohydra sagarensis.</i>  | +                    | +                  |
| <b>Phylum: - Platyhelminthes</b> |                      |                    |
| <b>Class: - Turbellaria</b>      |                      |                    |
| <i>Macrostomum orthostylum.</i>  | +++                  | +                  |
| <b>Phylum: - Aschelminthes</b>   |                      |                    |
| <b>Class: - Nematoda</b>         |                      |                    |
| <i>Halalaimus setosus.</i>       | +++                  | ++                 |
| <i>Desmodora sp.</i>             | +++                  | ++                 |
| <i>Chromadora sp.</i>            | +++                  | ++                 |
| <i>Steineria sp.</i>             | ++                   | +++                |
| <b>Phylum: - Cephalorhyncha</b>  |                      |                    |
| <b>Class: - Kinorhyncha</b>      |                      |                    |
| <i>Cateria gerlachi</i>          | +++                  | +++                |

|  |     |     |
|--|-----|-----|
| Phylum: - Gastrotricha<br><i>Chaetonotus trianguliforme</i>                    | ++  | ++  |
| Phylum: - Annelida<br>Order:- Archiannelida<br><i>Polygordius madrasensis.</i> | +++ | +++ |
| <i>Saccocirrus minor.</i>  | +++ | +++ |
| Class: - Polychaeta<br><i>Prionospio pinnata</i>                               | +++ | +++ |
| <i>Hesionides arenaria</i>   | +   | +++ |
| Phylum: - Arthropoda<br>Order: - Isopoda<br><i>Angelieta phreaticola.</i>      | +++ | +++ |
| Order: - Harpacticoida<br><i>Arenostella indica.</i>                           | +++ | +++ |
| <i>Psammastacus acuticaudatus.</i>   | ++  | ++  |
| <i>Leptastacus euryhalinus.</i>  | +++ | ++  |
| <i>Emertonia minuta.</i>   | +++ | +++ |
| <i>Sewellina reductus.</i>   | +++ | ++  |
| <i>Scottolana longipes.</i>  | +++ | ++  |
| <i>Scottolana bulbosa.</i>   | +++ | +++ |
| <i>Halectinosoma curticornae</i>   | +++ | +++ |
| Family: - Halacaridae<br><i>Halacarus sp.</i>                                  | +++ | +++ |

+++ Abundant, ++ Moderate, + Rare.

## DISCUSSION

Meiofauna are one of the widely studied animal assemblages due to their representation from entire spectrum of invertebrates. The benthic ecosystem of coral reefs, mangroves and intertidal beach and mud flats serves as a good feeding, breeding, spawning and nursery grounds for many marine organisms of economical importance, variety of migratory birds, fishes, sea mammals and reptiles. Benthos due to their differential tolerance has been considered as the best indicator organisms of environmental stress or aquatic pollution.

During the present study 23 species of Meiobenthos belonging to 8 Phylum were recorded from both the Station No. 1 Bhayander and Station No. 2 Naigaon. (Table No. 1) The Meiobenthos groups Foraminifera, Isopoda, Harpacticoida, Archiannelida, Polychaeta and Cephalorhyncha occurred throughout the study period on both the stations. Phylum Arthropoda, Annelida and Protozoa were significantly dominant on both the stations. Table No. 1 illustrates that from order Isopoda genus *Angelieta* and in order Harpacticoida genus *Arenostella*, *Emertonia* found to be abundant at both the stations i.e. Bhayander and Naigaon whereas genus *Halectinosoma*, *Leptastacus* and *Sewellina* were abundant only at Bhayander. Among the other genus *Psammastacus* constituted moderate group of Meiofauna of Bhayander and Naigaon.

Among 8 Harpacticoida species recorded *Leptastacus euryhalinus*, *Sewellina reductus* and *Scottolana longipes* were found to be moderate at Naigaon station. Next to phylum Arthropoda, phylum Aschelminthes and Annelida were significant with 4 genus of each group. Genus *Halalaimus*, *Desmodora* and *Chromadora* of class Nematoda were significantly dominant at Station No. 1 i.e. Bhayander whereas genus *Steineria* was found to be abundant at station No. 2 i.e. Naigaon and rare at Station No. 1 i.e. Bhayander. Among phylum Annelida both Archiannelida and Polychaeta had significantly contributed. Genus *Polygordius*, *Saccocirrus* and *Prionospio* were abundant at both the stations. Phylum Protozoa constituted only one genus *Elphidium* which were abundant at Bhayander as well as Naigaon stations.

Compared to the diversity of Lakshadweep islands (Rao and Misra, 1983) and Andaman islands (Rao, 1993), less number of Meiofaunal species were recorded in the present study. This variation might be due to lesser an-

thropogenic disturbances in the islands compared to the Mumbai coast line.

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