

Study of Zooplankton Distribution from Estuarine Area of Bhayander and Naigaon, Thane, Maharashtra, India



Zoology

KEYWORDS : Zooplankton, Estuary, Actes, Lucifer, Zoa, Nauplius.

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ABSTRACT

Zooplanktons occupy an important position in the trophic structure and play the major role in the energy transfer in an aquatic ecosystem. The present study was carried out to reveal distribution of zooplankton in the estuarine waters along the area of Bhayander and Naigaon for a period of one year (June 2008 to May 2009). A Total of 37 species of Zooplankton belonging to 9 classes have been recorded from both the Stations Bhayander and Naigaon. Class Maxillopoda being dominant of all the classes with 17 species. Cypris larvae were the dominant. The present study reveals that the zooplankton population diversity is slightly low in comparison to zooplankton population diversity in other Indian waters. Which may indicates slight water pollution in the estuarine waters of area near Bhayander and Naigaon.

INTRODUCTION

Zooplanktons are small heterotrophic animals inhabiting almost every type of aquatic environment. According to Nair et. al. (1999), the zooplankton community comprises of herbivores, omnivores and carnivores of which generally herbivores form a major fraction. Zooplanktons are primary consumers form a major link in food chain. They constitute a major item for crustaceans, mollusks and fishes. Thus the abundance of zooplankton practically acts as an index to assess the fertility of water mass.

Inshore waters of Mumbai and region around, particularly Versova creek, Mahim creek, Ulhas estuary, Thane creek and Patalganga estuary are the examples of highly degraded environment because of anthropogenic perturbations. Several other inshore waters also reveal varying degrees of ecological deterioration and have drastically reduced the population of plankton and fishes. It has also caused considerable ecological imbalance and resulted in large-scale disappearance of their flora and fauna. Further, introduction of untreated municipal waste-water and industrial effluents into these water bodies leads to serious water pollution including heavy metal pollution, which gets bio-magnified and reaches man through food-chain implications. (S. Baskara Sanjeevi et. al., 2004)

Throughout the history of mankind estuaries have been the sources of food and depository of waste materials. Information on the nature and diversity of primary producers and their influence on production potential are of great importance in view of the urgent need to assess the impact of anthropogenic activities on the estuarine ecosystems. Several phytoplankton species have served as bioindicators and it is a well suited tool for understanding water pollution studies. If the phytoplankton population of the estuarine ecosystem is harmed because of any anthropogenic activity then directly the zooplankton population of the same estuarine ecosystem will also be at risk because the phytoplankton are a source of food for the zooplankton. (Ritakumari S. D. et. al., 2007)

Many zooplankton species are used as indicators of water quality and pollution (Mishra and Panigrahy, 1999). In recognition to this view the zooplankton have been extensively studied. The zooplankton studies in Indian waters are reported by Desai et. al., (1983), Madhupratap (1987), Lodh (1990), Srinivasan and Santhanam (1991), Patil et. al., (2008).

The present study was carried out to reveal the species diversity of zooplankton in the estuarine waters along the area of Bhayander and Naigaon.

MATERIAL AND METHODS

The collection was done monthly from June 2008 to May 2009 during high tide. Zooplanktons were collected every month using 30 number plankton net with a mesh size of 0.2mm (41 micron mesh size). The tidal water at High Level water Mark (HLWM) i.e. within mangroves was filtered of known quantity (100L) through the zooplankton net. The filtered zooplankton samples were collected and preserved in 4 - 5% formaldehyde (formalin) solution prepared in filtered estuarine water and the species diversity of Zooplanktons was studied in the laboratory. (Krishna Pillai N., 1986)

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.

RESULT AND DISCUSSION

Name of the Species	Status at Station No.1 Bhayander	Status at Station No.1 Naigaon
Class:- Maxillopoda		
<i>Acartia plumose</i>	+	+
<i>Acartia southwelli</i>	+	+
<i>Acartia danae</i>	+	+
<i>Acrocalanus gracilis</i>	+	+
<i>Euterpina acutifrons</i>	++	+
<i>Heliodiaptomus cinctus</i>	+	++
<i>Nitocra spinipes</i>	+	++
<i>Oithona rigida</i>	+	+
<i>Paracalanus parvus</i>	+	+
<i>Canthocalanus pauper</i>	+	+
<i>Eucalanus subcrassus</i>	+	+
<i>Pseudodiaptomus aurivilli</i>	+	+
<i>Bestiolina similis</i>	+	+
<i>Oithona similis</i>	+	+
<i>Pseudodiaptomus ardjuna</i>	+	+++
<i>Tortanus forcipatus</i>	+	+

Cypris larvae	+++	+++
Class:- Malacostraca		
<i>Acetes sibogae</i>	+++	+++
<i>Lucifer hansenii</i>	+++	+++
Zoea larvae	++	+++
Nauplius larvae	++	+++
Megalopa larvae	+++	+++
Name of the Species		
Class:- Branchiopoda		
<i>Evadne tergestina</i>	+	+
Class:- Foraminifera		
<i>Globigerina bulloides</i>	++	++
Class:- Hydroidomedusae		
<i>Eirene viridula</i>	++	+
Class:- Spirotrichea		
<i>Tintinnopsis radix</i>	+	+
<i>Tintinnopsis butschii</i>	+	+
<i>Tintinnopsis kofoidi</i>	+	+
<i>Tintinnopsis mortensenii</i>	+	+
Class:- Appendicularia		
<i>Oikopleura dioica</i>	+	+
Class:- Sagittoidea		
<i>Sagitta elegans</i>	++	++
<i>Sagitta bedoti</i>	++	+++
Class:- Monogononta		
<i>Brachionus plicatilis</i>	+	+
<i>Brachionus calyciflorus</i>	+	+
<i>Platytias quadricornis</i>	+	+
<i>Platytias patulu</i>	+	+
<i>Monostyla lunaris</i>	+	+
Fish Eggs	+++	+++

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

In the present investigation, a total of 37 species of zooplankton belong to 9 classes along with fish eggs were observed at both the station Bhayander and Naigaon. Different types of eggs were observed at both the stations. Similar observations were also made by Mishra (2002) in Ulhas estuary. The other zooplanktons noted at both the stations were mainly Cypris, Pseudodiaptomus, Acetes, Lucifer, Nauplius, Zoea and Sagitta. Class Maxillopoda being dominant of all the classes with 17 species. Cypris larvae were abundant at both the stations, whereas Pseudodiaptomus were abundant at Station 2. The next important class was Malacostraca in which Acetes, Lucifer, Nauplius and Megalopa were abundant at both the stations whereas, Zoea was abundant only at station 2. Among Foraminifera, Globigerina was found to be moderate at both the stations *Sagitta bedoti* was abundant at station 2 and was moderate at station 1. *Sagitta elegans* was moderate at both the stations. *Acartia* species, Oithona, Paracalanus, Eucalanus of Maxillopoda class were rare. Class Branchiopoda, Spirotrichea and Monogononta were also rare. The zooplankton studies in Indian waters were mainly reported by Madhupratap (1987), Lodh N. M. (1990), L. R. Tiwari et. al. (2002) and Heiner et. al. (2005), Rajan et. al., (2008). The present study reveals that the zooplankton species diversity is slightly low in comparison to zooplankton species diversity in other Indian waters. Which may indicates slight water pollution in the estuarine waters of area near Bhayander and Naigaon.

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