



## Full Length Research Article

### STUDY THE DISTRIBUTION OF ZOOPLANKTON POPULATION IN THE ESTUARINE ENVIRONMENT OF MANAKUDY

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#### ABSTRACT

The present study was carried out in Manakudy estuary over a period of one year May 2014 - April 2015. The collection was made on every month in the morning 7-9 a.m at regular intervals from the selected six stations. In each station, three spots were randomly fixed. Identified zooplankton species are grouped into Copepod, Rotifer, Cladocera, and Protozoa. The total number of 25 species were reported. Among these, 12 species belonged to Copepod, 5 species belonged to Rotifer, 2 species belonged to Cladocera and 6 species belonged to Protozoa. Copepod was found to be the dominant. The aim of the study is to monitoring the water quality to increase the zooplankton species and production of fish.

#### INTRODUCTION

The zooplankton play an important role in marine and freshwater food webs, the high sensitivity of zooplankton assemblages to physical and chemical variations can be manifested as changes in abundance and community structure (Porri *et al.*, 2007). Studies by several authors have revealed that zooplankton differs both in quality and quantity from place to place and from time to time (Kumari and Goswami, 1993). Zooplankton depends on phytoplankton for food and naturally some relationship is to be expected between them and their respective distribution. The zooplankton density tended to increase gradually with the increase of the phytoplankton density. The organism inhabit the estuary can be expected to react and adapt to physical and chemical changes of the environment in Hoogly estuary (Kundu *et al.*, 1987). The ambient chemical condition and physical changes in the water are known to be responsible for the temporal distribution of zooplankton (Madupratap and Haridas, 1975). FAO (2006) had earlier reported that distribution of zooplankton vary from place to place and year to year due to the dynamic nature of aquatic systems.

#### MATERIALS AND METHODS

The study was conducted in six stations of Manakudy estuary. The surface water was filtered by the No.10 plankton net (mesh size 158  $\mu$ ) and collected in polythene can (2 litre) from the sampling stations. Immediately after the collection, the zooplankton samples were fixed with a few drops of 5% neutral formalin. They were identified by light microscope (COSLAB). Identified zooplankton species are grouped into Copepods, Rotifers, Cladocerans, and other Protozoans.

#### RESULT AND DISCUSSION

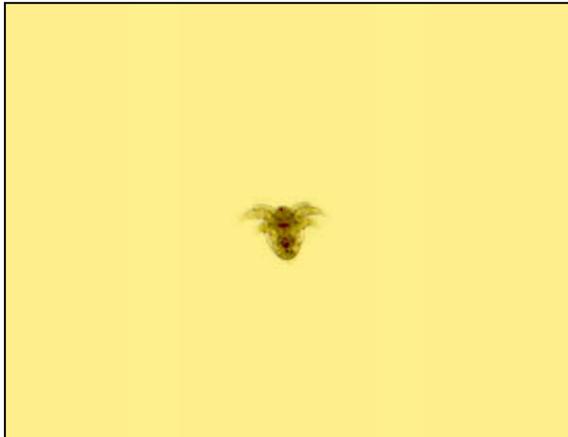
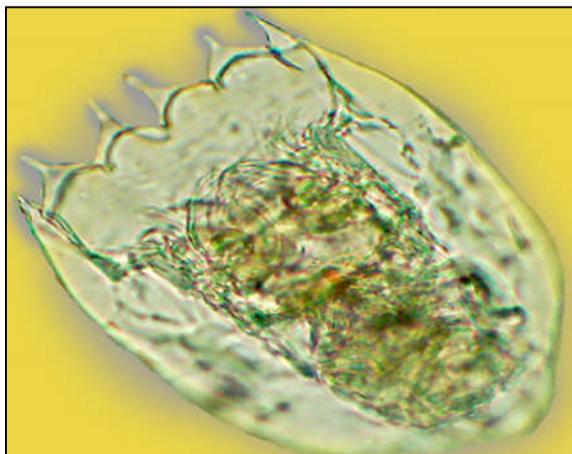
In the sampling station of Manakudy estuary in the year 2014 - 2015, a total number of 25 species were reported. Among these, 12 species belonging to Copepod, 5 species belonging to Rotifer, 2 species belonging to Cladocera and 6 species belonging to Protozoa (Table 1). Plankton particularly zooplankton, is considered to be a good indicators of environmental changes (Bonnet and Frid, 2004). Zooplankton provides an important food source for larval fish and shrimp in natural waters and in aquaculture ponds. The zooplankton species include *Copepod nauplii*, *Eucalanus monachus*, *Paracalanus aculeatus*, *Temora turbinata*, *Calanus sp.*, *Harpacticoid sp.*, *Acartia spinicauda*, *Acrocalanus gracilis*, *Pseudodiaptomus sericaudatus*, *Corycaeus speciosus*, *Cyclopoid sp.*, *Acartia sp.*, *Paracalanus aculeatus*, *Colurella*

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**Table 1. Check list of zooplankton species distribution recorded at Manakudy estuary during May 2014 – April 2015 in the sampling stations**

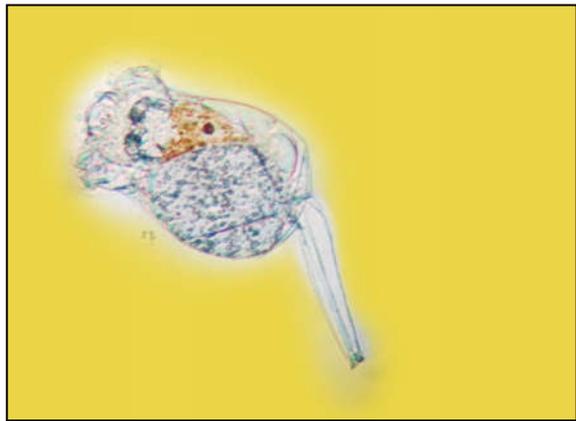
Sl. No.	COPEPOD						
	Taxonomic species	ST-1	ST-2	ST-3	ST-4	ST-5	ST-6
1	<i>Copepod nauplii</i>	+	+	+	+	+	+
2	<i>Eucalanus monachus</i>	+	+	+	-	-	+
3	<i>Paracalanus aculeatus</i>	+	-	+	-	-	+
4	<i>Harpacticoid</i> sp.	+	-	+	-	+	+
5	<i>Acartia spinicauda</i>	+	-	-	-	-	-
6	<i>Acrocalanus gracilis</i>	+	-	-	-	-	-
7	<i>Pseudodiaptomus sericaudatus</i>	+	-	-	-	-	-
8	<i>Temora turbinata</i>	+	+	-	+	+	+
9	<i>Calanus</i> sp.	+	+	-	+	+	+
10	<i>Corycaeus speciosus</i>	+	+	-	+	+	-
11	<i>Cyclopoid</i> sp.	+	+	+	+	+	-
12	<i>Acartia</i> sp.	+	-	+	-	+	-
	ROTIFER						
13	<i>Brachionus rotundiformis</i>	+	+	+	+	+	+
14	<i>Brachionus plicatilis</i>	+	+	+	+	+	+
15	<i>Colurella</i> sp.	+	+	+	+	+	+
16	<i>Brachionus calyciflorus</i>	+	+	+	+	+	+
17	<i>Bdelloid</i> sp.	+	+	+	+	-	-
	CLADOCERA						
18	<i>Daphnia</i> sp.	+	+	+	+	+	+
19	<i>Bosmina</i> sp.	+	+	+	+	+	+
	PROTOZOA						
20	<i>Polychaete larvae</i>	+	+	+	+	+	+
21	<i>Paramecium</i> sp.	+	+	+	+	+	+
22	<i>Megalopa larvae</i>	+	+	-	-	+	+
23	<i>Barnacle nauplii</i>	+	+	+	+	+	+
24	<i>Glochidium larvae</i>	+	-	+	+	-	-
25	<i>Barnacle</i> sp.	+	-	+	+	+	-

Presence = +  
Absence = -

*Copepod nauplii**Temora turbinata**Brachionus rotundiformis**Brachionus plicatilis*



*Colurella* sp.



*Brachionus calyciflorus*



*Bdelloid* sp.



*Daphnia* sp.



*Bosmina* sp.



*Moina* sp.



*Polychaeta* larva



*Paramecium* sp.

*Megalopa larva**Barnacle nauplii**Glochidium larvae**Barnacle sp.***Fig. 1. Photo showing the identified Zooplankton**

sp., *Brachionus rotundiformis*, *Brachionus calyciflorus*, *Brachionus plicatilis*, *Bdelloid* sp., *Daphnia* sp., *Bosmina* sp., *Moina* sp., *Penilia avirostris*, *Glochidium larvae*, *Polychaete larvae*, *Paramaecium* sp., *Megalopa larva*, *Barnacle nauplius* and *Barnacle* sp. were identified in the Manakudy estuary (Fig 1). Copepod was dominant in all the six stations. The presence and dominance of marine copepod supports to use of copepods as an indicators of the movement of water masses (Dur *et al.*, 2007). It is concluded that in Manakudy estuary copepod community is the biological indicator of water quality. According to Vasantha (2004), the contribution of copepod was very high (46-54%) in the Thengapatanam estuary and they were dominant throughout the study period. Similar observations were made by Goswami and Singpal (1974) in Mandovi and Zuari estuaries. The zooplankton organisms are fundamental to the transfer of energy from the primary producers to the higher trophic levels (Belgrano *et al.*, 2005). It has been reported that in many countries the failure of fishery was attributed to the reduced zooplankton especially copepod population. Copepods and Cladocerans are larger zooplankton and members of the class crustacean. Copepods are the most diverse group of crustaceans. Rotifers tend to be the smallest, despite of their small size, they are important in the aquatic food web because of their abundance, distribution and wide range of feeding habitats. *Daphnia* the common water flea is probably the most recognizable zooplankton.

Okogwu, 2010 reported that by grazing on phytoplankton and bacteria zooplankton help in improving water quality. Zooplanktons are considered indicators of water quality.

### Conclusion

Estuarine ecosystems are very dynamic systems where water circulation and terrestrial influences of river and sewage influxes induce high variabilities in the distributions and structures of planktonic populations. Pollutants reduce species diversity and cause episodic pulses in the zooplanktonic community. Zooplanktons are of great importance in bio-monitoring of pollution. The rate of zooplankton production can be used as a tool to estimate the exploitable fish stock of an area. It is evident that the Manakudy estuary rich in fish production because of the dominance of Copepod species.

### REFERENCES

- Belgrano, A., Scharler, U., Dunne, J. and Ulanowics, R.E. 2005. *Aquatic food webs, an ecosystem approach*. Oxford UK: Oxford University Press. 262p.
- Bonnet, D. and Frid C. L. J. 2004. Seven copepod species considered as indicators of water-mass influence and changes : results from a Northumberland coastal station. *ICES Journal of Marine Science*. 61:485-491
- Dur, G.J.S., Hwang, S., Souissi, L.C., Tseng, C.H., Wu, S.H., Hsiao, Q.C. and Chen. 2007. An overview of the influence

- of hydrodynamics on the spatial and temporal patterns of calanoid copepod communities around Taiwan. *J. Plankton Res.* 29: i97- i116.
- Food and Agriculture Organisation, (FAO). 2006. Interrelationship between fish and Plankton in Inland Water.
- Goswami, S. C. and Singbal, S. Y. S. 1974. Ecology of Mandovi and Zuari estuaries Plankton community in relation to hydrographic conditions during monsoon months, 1972. *Indian J. Mar. Sci.* 3: 1974; 51-57.
- Kumari, L.K. and Goswami, S.C. 1993. Biomass and biochemical composition of zooplankton from northwest Bay of Bengal. *Ind. J. Mar. Sci.* 22: 143-145.
- Kundu, S. K., Sarkar, S. K. and Choudhury, A. 1987. Studies on epipelagic zooplankton with special reference to copepods in Hooghly and Saptamukhi river waters, West Bengal, India. *Proc. Natn. Sem. Estuarine Management, Trivandrum* : 323-326.
- Madhuratap, M. and Haridas, P. 1975. Composition and variations in zooplankton abundance in the backwaters from Cochin to Alleppey. *Indian Journal of Marine Sciences.* 4: 77 - 85.
- Okogwu, I.O. 2010. Seasonal variations of species composition and abundance of zooplankton in eboma lake, a Floodplain Lake in Nigeria. *Rev. Biol .Trop.* 58 (1): 171-182.
- Porri, F., Mcquaid, C.D. and Froneman, P. 2007. Spatio temporal variability of small copepods especially Oithona plumifera in shallow nearshore waters off the south coast of South Africa. *Estuarine, Coastal and Shelf Science.* 72 : 711-720.
- Vasantha, R. 2004. Studies on the Physico-Chemical and biological characteristics of Thengapattanam estuary along the southwest coast of India. Ph.D Thesis, University of Kerala.

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