

# Study of Zooplankton diversity in Bhatye Estuary, Ratnagiri, Maharashtra

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**Abstract-** The study area, Ratnagiri is situated at 170North and 730East and having an area of about 50,209 sq miles. The coastline of Ratnagiri district is 250 miles long and marked with several islands, which is a result of drowned topography. Ratnagiri coast has been blessed with luxuriant, thick mangrove vegetation with patches of other associated flora and fauna. Bhatye estuary is situated at 73015' East and 16051' North near Ratnagiri and known for the mangroves on the mud flats. Zooplankton samples were collected by surface hauling by using conical plankton net (80  $\mu$ m bolting nylon). The zooplankton samples were then sorted out making sub-samples. The zooplanktons are the secondary producers and the first level converters of plant matter into animal substances and thus they occupy an important place in the food web of aquatic environments like mangroves. The zooplankton assume a great ecological significance in mangrove ecosystems as this ecosystem is the feeding, breeding and nursery grounds for many fin and shell fishes; and the young fin and shell fishes (meroplankton/larvae) spend most of their live times in the brackish waters, and after becoming adult they move over to sea. Hence, zooplankton determine the quantum of fish stock. The zooplankton species like Acrocalanus species, Eucalanus pileatus, Lucicutia flavicornis, Mesocyclops species and Pontellina plumata dominated the estuarine region.

**Index Terms-** Zooplankton, Eucalanus pileatus, Lucicutia flavicornis, Mesocyclops etc.

## I. INTRODUCTION

Ratnagiri is located on the western coast of Maharashtra and seems to be economically backward area in Maharashtra. Hence, very little attention has been paid to the scientific studies along this coast. Further, it is also known as paradise of Maharashtra and very popular for its scenic beauty and land of sun and sand and off course travelers' delight. Being a coastal district, Ratnagiri enjoys a unique combination of nature's endowment, a significant component of which is the diversity of its coastal habitats characterized by a variety of landforms like beaches, estuaries, island's etc. At Bhatye, river Kajali meets the Arabian Sea and forms an estuarine zone. Various mangrove species along with their associated flora form characteristic vegetation in Bhatye estuarine region. Bhatye Estuary happens to be one of the most important estuarine region (*extends to almost 25 Km inside the coast up to Hattis*) along the Ratnagiri Coast and is breeding ground for most of the commercially important fish species like elasmobranchs, eels, cat fishes, *Chirocentrus* species, sardines, clupeids, *Horpodon nehereus*,

pomfrets, mackerels, seer fishes, tunas, prawns, lobsters and cuttle fishes. The fishery economics of Ratnagiri largely depends on Bhatye Estuary and the favorable area for carrying out fishing activities is 530 ha. Hence this particular area is important from the biodiversity and economics point of view.

Zooplanktons are tiny animals found in all aquatic ecosystems, particularly the pelagic and littoral zones in the ocean. They are one of the primary consumers of the ocean and grazes on the phytoplankton. They themselves are an important food source for large animals (Day *et al.*, 1989) and are important in the remineralization and transport of nutrients (Harris E., 1959) which is very important in the conservation of modern oceanic food webs (Perumal *et al.*, 1999 and Rajasagar *et al.*, 2000). The species diversity and abundance of the community structure of the zooplankton is necessary to assess the potential fishery resource of a place (Varadharajan *et al.*, 2009). Zooplankton provides an important food source for larval vertebrates and invertebrates in natural waters and in aquaculture ponds. It has been reported that in many countries the failure of fishing is attributed to the reduced zooplankton (Rajasagar *et al.*, 2000; Robertson and Blabber, 1992). Present study was undertaken in the mangrove habitats of Bhatye estuary, Ratnagiri. By considering the growing importance of this ecosystem, harboring large faunal communities and highly rich fishing zone, so far no attempt has been made on the biotic community of this was undertaken. Keeping all these facts & figures in view, the present study was focused mainly on the zooplankton diversity of this ecosystem.

## II. MATERIAL AND METHODS

The present study was carried out in the Bhatye estuary, Ratnagiri. Six stations were selected within a stretch of about 25 Km. Three zones were selected for sampling, considering the nature of study area. Zone-I include Station-1 and 2, which is a marine zone. Zone- II as middle zone occupies Mangroves Island (Station- 3 and 4), while Zone- III was riverine zone includes Station-5 and 6. Depth of the water column varied from 3-15 m. Sampling was done from January 2011 to January 2012, fortnightly covering intermediate phase of the tide to avoid tidal effect, if any. Diesel engine boat was used to reach different stations.

Zooplankton samples were collected by surface hauling by using conical plankton net (80  $\mu$ m bolting nylon). A total 50 litres of water was filtered and then transferred in 100ml plastic bottle and later it was preserved in 5 % neutralised formaldehyde solution. The zooplankton samples were then sorted out making sub-samples. Zooplanktons were then identified by using

available literature (Kasturirangan, 1963, Dumont and Tundisi, 1984, Zheng Zhong *et al*, 1989, Santhanam and Srinivasan, 1994, Perumal *et al*, 1999 and Conway and White, 2003). Qualitative and quantitative analysis of zooplankton was carried out by using (Omori and Ikeda, 1984).

### III. RESULTS AND DISCUSSION

The checklist for zooplankton species is shown in Table 1. From this table it is clear that zooplankton species like *Acrocalanus* species, *Eucalanus pileatus*, *Lucicutia flavicornis*, *Mesocyclops* species and *Pontellina plumata* dominated the

estuarine region. The zooplankton are the secondary producers and the first level converters of plant matter into animal substances and thus they occupy an important place in the food web of aquatic environments like mangroves. The zooplankton assume a great ecological significance in mangrove ecosystems as this ecosystem is the feeding, breeding and nursery grounds for many fin and shell fishes; and the young fin and shell fishes (meroplankton/larvae) spend most of their live times in the brackish waters, and after becoming adult they move over to sea. Hence, zooplankton determine the quantum of fish stock.

**Table 1 : Checklist of zooplankton species of Bhatye Estuary, Ratnagiri**

Zooplankton species	Zone I		Zone II		Zone III	
	Stn. I	Stn. II	Stn. III	Stn. IV	Stn. V	Stn. VI
<i>Acrocalanus species</i>	+	+	+	+	+	
<i>Ascolethrix danae</i>	+		+		+	
<i>Calanopia minor</i>		+				+
<i>Calonopia elliptica</i>						
<i>Centropages dorisipinatus</i>						
<i>Codonellopsis ostefeldii</i>	+		+		+	
<i>Cypris subglobosa (Ostracod)</i>		+		+		
<i>Eucalanus crassus</i>						
<i>Eucalanus pileatus</i>	+	+	+	+	+	+
<i>Eucalanus subcrassus</i>	+		+		+	
<i>Eucyclops species</i>						+
<i>Euterpina species</i>						
<i>Favella brevis</i>	+	+	+	+	+	
<i>Favella philipiensis</i>						
<i>Isias tropica</i>						
<i>copepodid of Cyclopoida</i>						+
<i>Larva of Penaid prawn</i>	+		+		+	
<i>Longipedia coronata</i>						
<i>Longipedia webri</i>		+				
<i>Lucicutia flavicornis</i>	+		+		+	+
<i>Mesocyclops species</i>	+	+	+	+	+	+
<i>Metacalanus aurivilli</i>						
<i>Metis jousseaumei</i>	+		+		+	
<i>Microsetella rosea</i>		+		+		
<i>Nauplius of balanus</i>						
<i>Oithona brevicornis</i>		+		+		+
<i>Oithona species</i>						
<i>Oncaea media</i>		+		+		
<i>Oncaea venusta</i>						
<i>Pontellina plumata</i>	+	+	+	+	+	
<i>Pontellopsis macronyx</i>						
<i>Sapphirina auronitens</i>						
<i>Sapphirina species</i>						
<i>Scolecithrix danae</i>		+		+		
<i>Setella gracilis</i>						
<i>Nauplius of Calanoida</i>	+		+		+	+
<i>Phylodiaptomus blanci</i>						
<i>Heliodiaptomus cinctus</i>		+	+		+	

<i>Heliodiaptomus vidus</i>						
<i>Harpacticoid nauplii</i>						

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