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ZOOPLANKTON DIVERSITY OF AYIRAMTHENGU MANGROVE REGION KOLLAM (DIST.), KERALA

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ABSTRACT

Ayiramthengu mangrove ($9^0$6 to $9^0$8 N:76.28^0 to 76.29^0 E) is an important part of kayamkulam estuary and it situated about 6 km west of Ochira town and the bank of kayamkulam estuary. Zooplankton diversity is the one of the most important ecological parameter in water quality assessment and it also supports fish and other aquatic animals. Present study is aimed to analyse zooplankton diversity in this mangrove region. Plankton were collected monthly using plankton net(60µ).During the whole study period (Sept 2015 Aug 16) total 50 zooplanktonic fauna were encountered. Out of 50 species 12 species of Protozoans,8 species of Rotifer,8 species of Cladocerans, 15 species of Copepods, 3 species of Chaetognatha and only one species of Nematoda, Ostracoda, Decapoda and Insect larvae. Standard procedures are adopted for determination of physic-chemical parameters of water viz; temperature, salinity, DO, BOD, P^H are found that directly influence the zooplankton diversity.

KEYWORDS: Ayiramthengu, Cladocerans, Nematoda, Ostracoda, Decapoda, Zooplanktonic, Kayamkulam Estuary

Mangrove are specialized ecosystem developed along estuarine sea coasts and river mouths in tropical and subtropical regions of the world. The salt marshes and mangrove forests act like enormous filters. As water flow through this regions filter pollutants such as pesticides and heavy metals out of water as well as excess sediments and nutrients (USEPA,1993). The carbon fixed in mangroves is highly important in the coastal food webs and the liter from mangroves and the subsequent formation of detritus and its tidal export has also profound effect on promoting biodiversity richness.

Zooplankton are tiny animals found in all aquatic ecosystems, particularly the pelagic and littoral zones in ocean. They are one of the primary consumers of aquatic ecosystem. They themselves are an important food source for large animals (Day et al.,1989).zooplankton provides an important food source for larval vertebrates and invertebrates in natural water and aquaculture ponds. It has been reported that in many countries the failure of fishing attributed to the reduced zooplankton (Rajasagar et al.,2000 and Robertson.,1992).

Present study was undertaken in the mangrove habitats of Ayiramthengu, a portion of kayamkulam backwater. The mangrove ecosystem and its biological components are under the influence of both freshwater and marine condition and have developed a set of physiological adaptation to overcome problems of anoxia, salinity and frequent tidal inundations. This has led to the assemblage of a wide variety of plant and animals species of special adaptations suited to the ecosystem. The zooplankton assume a great ecological significance in mangrove ecosystem as this ecosystem is the feeding, breeding and nursery ground of many fin and shell fishes; and the young fin and shell fishes spent most of their life time in brakishwater and after becoming adult they move over to sea so zooplankton determine the quantum of fish stock.

STUDY AREA

Ayiramthengu mangrove ($9^0$6 to $9^0$8 N:76.28^0 to 76.29^0 E) is situated about 6 km west of Ochira town and the bank of kayamkulam estuary. Which is a narrow stretch of tropical backwater on the west coast of peninsular India. The mangrove here covers 20 acre of area. This long chain of mangrove vegetation is the only extensive one left almost touched by man along Kerala coast. The area is mounted on east by kayamkulam estuary on the west by the kollam- Alappuzha water ways connected to Arabian sea on north and south by two canal. The flood water of Pampa and Achankovil rivers flow into the estuary. Ayiramthengu mangrove forest was declared an environmenhot sport after it was ravaged by the Tsunami 2004 and threatened with extinction.

Map shows study area

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STATION INVESTIGATED

The stations selected were having different ecological status

1. Station I is characterised by influx of fresh water into mangrove
2. Station II represent the luxuriant mangrove growth showing entangled the respiratory roots
3. Station III represent open area air tight and waves are predominates

MATERIALS AND METHODS

Hydrography

To study the hydrological parameters water samples were collected monthly from three stations and brought to the laboratory and analysed. Parameters like rainfall, and atmospheric temperature obtained from the central plantation crops research institute kayamkulam. Water temperature, pH, dissolved oxygen, carbon dioxide, salinity, hardness, TDS, BOD were carried out by standard procedure (APHA,2005).

Collection of Zooplankton

The plankton samples collected by filtering 50 liter of water through standard planktonic net (60μ) and concentrated sample were preserved in 5%formalin in 100ml vial and identified with the help of standard keys.

RESULTS AND DISCUSSION

Hydrological state of water is influence the diversity of zooplankton. Many environmental factors provide condition for growth of zooplankton which are the major taxonomic groups of water bodies. (R. Purushothama *et al.,* 2011) The monthly variation on hydrological parameters presented in figures 1-6.

During the study period water temperature varied from 26.5^0c to 29.8^0c .The highest water temperature recorded in the month may and lowest in month September. The pH value in water was ranged 6.4 to 8.2. The highest p^H value recorded in April and low value recorded in September. Such alkaline water is favourable for the healthy existance of aquatic organisams. Level of salinity of water was high in pre monsoon season, February and March. The lowest value was recorded in July. The fluctuation in salinity is probably due to fluctuation in total solids (Boyd and Tucker, 1998). The mangrove region is influenced by influx of freshwater from Achankovil and Pumba rivers during monsoon season and there is high influx of sea water from the Arabian sea at other season. The salinity variation closely related to it.

The carbon dioxide level was ranged from 3 to 8 mg/l. high value of carbon dioxide recorded in March and lowest value recorded in January and October. Dissolved oxygen (DO) was ranged from 3.2 to 5.8 mg/l. The highest value obtained from station III during January and low value obtained in March. For supporting life minimum of 3mg/l DO is required (Tarzwell 1957). The highest BOD obtained from station II during the month march (2.9) and low BOD value obtained January and September.

The physico-chemical parameters of water play significant role in the diversity of zooplankton population. Diversity creates a mechanism within an ecosystem contributing to the stabilization of the system. Therefore it should be conserved which necessitates the knowledge of the diversity of animals and plants, their distribution and status (Easa & shaji,1996).During the study period (Sept 2015 to Aug 16) total 50 zooplanktonic fauna were encountered(table 1).Out of 50 species 12 species of Protozoans,8 species of Rotifer,8 species of Cladocerans ,15 species of Copepods, 3 species of Chaetognatha and only one species of Nematoda ,Ostracoda, Decapoda and Insect larvae were identified.(Table 1)

According to monthly variation of zooplankton Copepods occupied a major portion of the zooplankton population in the present study and similar observation was recorded in Ashtamudi estuary (Divakaran *et al*., 1982) and in Vellar estuary (Subbaraju *et al*.1972). And about 15 different species are identified. Penak (1957) has pointed out that when more than one genus of the same group occur in any water body, genus are more abundant than others. Rotifers and Cladocerans are coming in second and third position in station I and in station II Tintinnids and rotifers come in second and third position. But in station III Cladoceren come in second and rotifers are in third position. Chaetognathas present only in station III. The nematode shows its minimum range in station I and III but in station II Foraminifera shows lowest number on all months. Water was muddy during summer and monsoon and was clear during winter. Plankton shows the variation in their population according to seasonal changes and physical parameters of water are also present in the comparative high organic content coupled with fresh water inflow from canals may be the reason for the moderately high plankton in Ayiramthengu mangroves Higher diversity of major groups was observed during summer in 3 stations. Similar observation was obtained Nirmal et al (2011) .Occurrence of fish and

crustacean larvae in mangrove region shows the importance of mangroves as nursery ground of many fin and shell fishes.

Table 1: List of zooplankton species recorded in Ayiramthengu mangrove (Sept 2015 to Aug 2016)

Taxa	Zooplankton species	Station I	Station II	Station III
protozoa	*Arcella discoides*	*	*	*
	Arcella vulgaris	*	*	*
	Diffugia sps	*	*	*
	Globigerina opima		*	*
	G. parva	*	*	
	Tintinnopsis tubulosa	*	*	
	T. sacculus	*	*	*
	T. sps		*	*
	T. cylindrical		*	*
	T.mortensenii	*		*
	Favella sps.	*		
	Paramecium caudatum	*	*	
Rotifera	*Brchinonus angularis*	*	*	*
	B. plicalilis	*	*	*
	B.caudatus	*	*	*
	B.falcatus		*	*
	B.quadridentatus	*		
	B.calyciflorus	*	*	*
	Keratella tropica	*	*	*
	K.vulga	*	*	*
Cladocera	*Daphnia sp.*	*	*	*
	D. pulex	*		*
	Bosmina longirostris	*		*
	Penilia avirostris		*	
	Diaphanosoma sarsi			*
	Evadne tergestina	*		*
	Moina sps.	*		
	Podon sps.		*	*
cyclopoida	*Mesocyclops leuckarti*	*	*	*
	M. hyalines	*	*	*
	M. aspericornis	*	*	*
	Thermocyclops sps.	*		*
	T.crcessus	*	*	
	Eucyclops agilis	*	*	*
Calanoida	*Acarita centura*		*	*
	A.major	*	*	*
	Diaptomes sps.	*	*	*
	Paraclanus parvus	*	*	*
	Acrocalanus longicornis	*	*	*
	A.gibber	*	*	*
	Pontella danae		*	*
Herpacticoida	*Microsetella rosea*	*	*	*
	Longipedia weberi	*	*	*
Namatoda	*Pasmodora luticola*	*	*	*
Ostracoda	*Cypris sps.*	*	*	*
Decapoda	*Lucifer hanseni*			*
chaetognatha	*Eukrohnia minuta*			*
	Sagitta enflata			*
	Sagitta bedoti			*
Insect larvae	*Chironomus parbitens*	*	*	

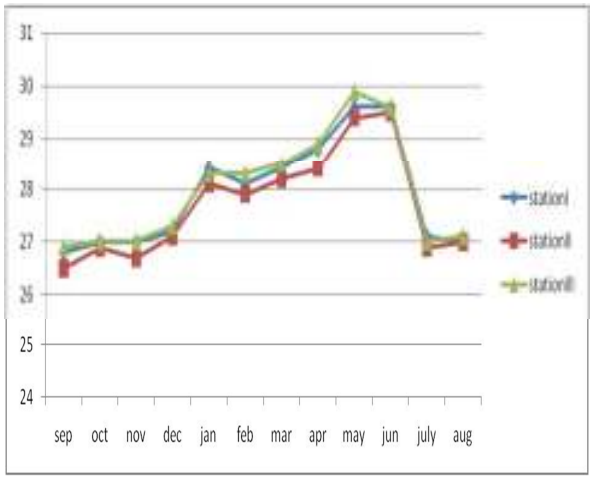

Figure 1: Monthly variation in water temperature

Figure 2: Monthly variation in pH

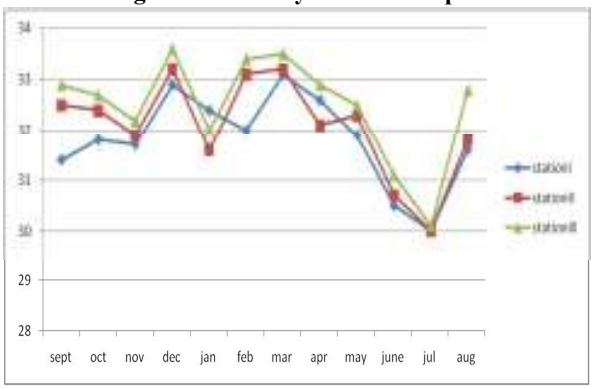

Figure 3: Monthly variation in salinity

Figure 4: Monthly variation in co2

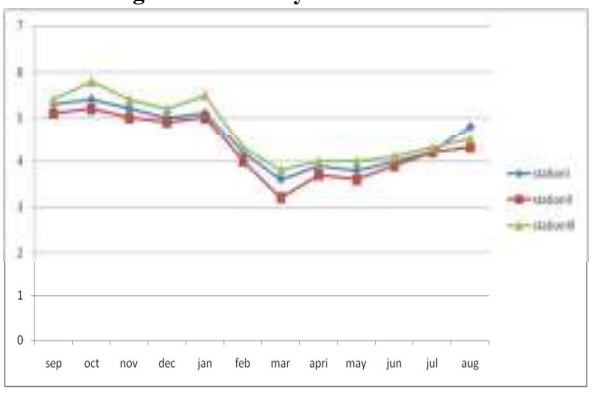

Figure 5: Monthly variation in DO

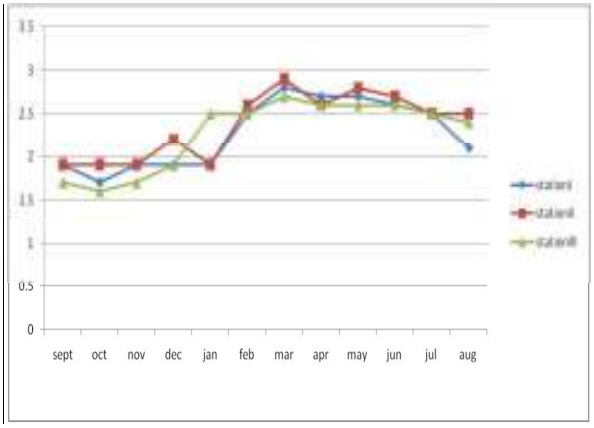

Figure 6: Monthly variation in BOD

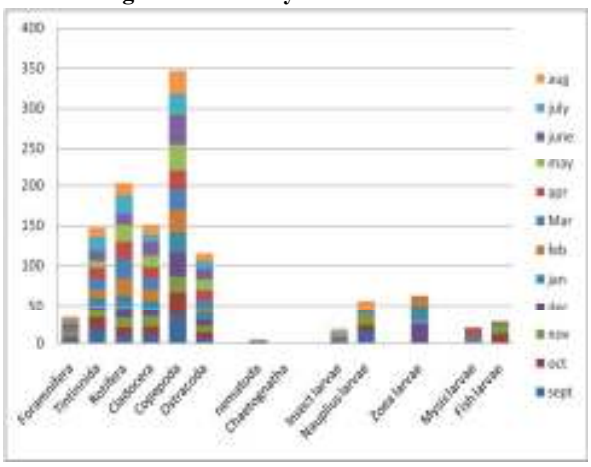

Figure 7: Monthly variation of zooplankton (%) of satation I

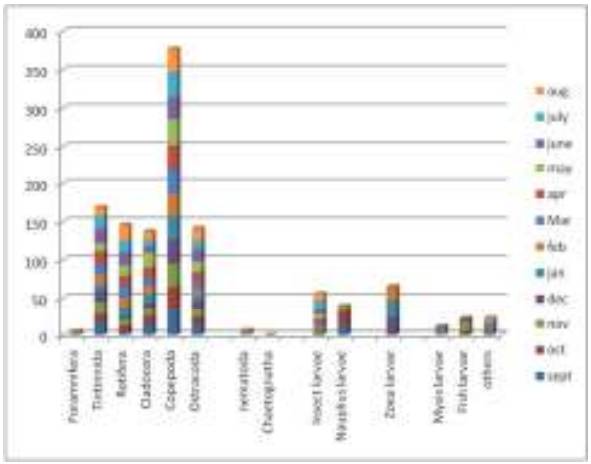

Figure 8: Monthly variation of zooplankton (%) of station II

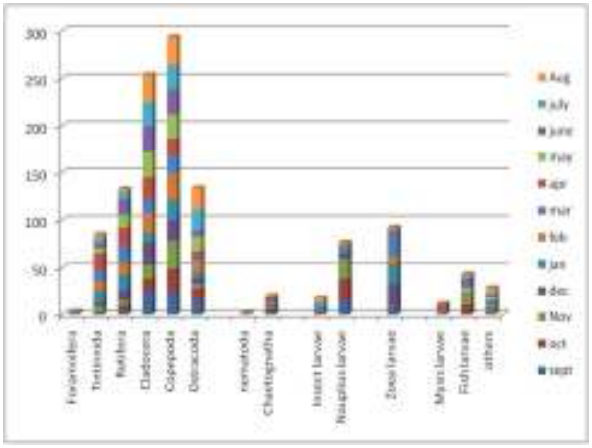

Figure 9: Monthly variation of zooplankton (%) of station III

Water quality regulates biotic diversity and tropic level of an ecosystem. Zooplankton maybe considered bio-indicators of eutrophication as they coupled to environmental factors responding more rapidly to changes than do other aquatic organisms like fishes.(sladecek,1983) The present investigation involves the analysis of physico–chemical and biological parameters which reflect an a biotic status of an ecosystem. This is in turn, helps in planning exploitation, antipollution or conservation strategies.

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