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STUDIES ON THE ECOLOGY AND DISTRIBUTION OF ZOOPLANKTON COMPOSITION IN ADIRAMPATTINAM MANGROVE REGION, TAMIL NADU INDIA,

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ABSTRACT

In the present study area total number of 100 species of Zooplanktons was recorded in the Adirampattinam mangrove water and Adirampattinam coastal waters. The percentage composition of each group of Zooplankton in mangrove water (St.I) was in decreasing order - Rotifers 18% > Copepoda 18% > Larva form 16% Foraminifera 10% > Ostracods 8% > Cladocera 7% > Protozoa 7% > Insects 5% > Coelentrate 4% > Cyclopodia 4% > and Herpatcticoidea 3%. The percentage composition of each group of Zooplankton in coastal water (Station II) was in decreasing orders Rotifers 22% > Copepoda 20% > Larva form 15% > Foraminifera 9% > Protozoa 8% > Cladocera 7% > Ostracods 7% > Insects 5% > Coelentrate 3% > Cyclopodia 2% > Herpatcticoidea 2%. Overall average percentage composition of each group of Zooplankton in both stations (St.I and St.II) in the decreasing order in Rotifers 20%> Copepoda 19% > Larva form 15% > Foraminifera 10% > Ostracods 8% > Protozoa 7% > Cladocera 7% > Insects 5% > Coelentrate 4% > Cyclopodia 3% > Herpatcticoidea 2%. The Zooplankton percentage composition exhibited very high in mangrove water (Station I) and very low in coastal water (Station II), because of the high productivity due to mangrove litter fall that supports a host of dexterous feeding animals such as Amphiods, Harpacticoids larvae and fishes.

INTRODUCTION

Zooplankton is considered as the most important grazers of the phytoplankton. They are generally able to maintain themselves in a preferred depth or in some cases to perform vertical migration from a near surface position at night to deeper water in the day time they are the small heterotrophic animals inhabiting the oceans of all depth and occupy almost every type of ecological environment. The rate of zooplankton production can be used to estimate the exploitable fish stock of an area (Tiwari and Nair, 1991). Tropical aquatic ecosystems are the most productive area in zooplankton. High zooplankton biomass productivity may be related to the input of energy and organic matter from coastal waters.

Planktons are very sensitive to the environment they live in any alteration in the environment leads to the change in the plankton communities in terms of tolerance ascendance, diversity and dominance in the habitat. Therefore, plankton population observation may be used as a reliable too for bio monitoring studied sot assess the pollution status of aquatic bodies (Mathivanan, 1995). The study of plankton as an index of water quality with respect to industrial, municipal and domestic pollution has been reported earlier. (Acharjee, et al., 1995).

Zooplanktons, which are ubiquitous in distribution form a vital link for turnover of organic matter and transfer from primary producers like diatoms to secondary consumers like fishes. Zooplankton is a group of heterophic organisms capable of synthesizing organic matter produced by autotrophy. In India zooplankton studies have done by Godhanadaraman, (2002). In addition to zooplankton is also an important intermediate component in aquatic food webs and acts as a tropic link between small parotids (E.g. detritus and micro-organisms) and planktonivorus fishes. These ecosystems have an outstanding directed Socio-economic importance for many tropical Coastal regions. (Prabhahar *et al.,* 2011).

Studies on zooplankton communities especially copepods are very important in assessing the health of coastal ecosystems. Information on species diversity, richness, evenness and dominance evaluation on the biological components of the ecosystem in essential to understand detrimental changes in environments (Ashok Prabu *et al.*, 2005). The Central West Coast (CWC) of India sustains relatively better mangrove formation measuring 235km of mangroves area. Manori Creek though one of the highly stressed creek sustain better mangrove formation close vicinity of Mumbai (Anon, 2007). Ajithkumar *et al.* (1999) have carried out such studies in the Pichavaram

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and Muthupettai mangrove environment. Blasco and Azipuru, (2002) have reported that the entire spectral reflectance at the mangroves in induced by chlorophyll concentration. (SAC, 2003) attempted to establish set of standard reflectance characters for distinguishing major mangrove communities of India.

MATERIALS AND METHODS

Zooplankton samples were collected at monthly intervals from the waters of the study area by towing a plankton net (0.35 ↘m mouth diameter) made up of bolting silk and (No. 10, mesh size 158 ↘m, respectively for zooplankton) for half an hour. These samples were preserved in 4% neutralized formalin and used for qualitative analysis. Zooplanktons were identified by adopting the standard procedures given by APHA, (2000).For the sake of convenience, the phytoplankton and zooplankton were assigned to some major groups *viz.* Protozoa, Rotifers, Copepoda, Cladocelera, Ostracods, Coelentrate, Cyclopoida, Herpacticoidea, Ciliata, Insects and larval forms for Zooplankton

RESULTS

A total number of 100 species of zooplankton and 7 species of insects were recorded at both the stations during the study period (Table.1). Of these, *Arella discoidaea, A. vulgaris, Diffugia sps, Euglypha sps, Vorticella sps, Anuracopris fissa, Brachionus Calciflorus, B. rubens, Cupeopasis vorax, Filinia longiseta, Kerafella cochlearis, Keratella ochlearis, Lecane bullet, L. luna, Lepadella Patella, Monostyla bulla, Mytilina sp, Philodina flaviceps, Tapetorama selenura, Acartia dance, Accrocalanus gibber, Calanoid sp, Centropages furcatus, Cyclops sps, Eucalanus elongates, Euchaeta marina, Eucyclops sp, Nanocalanus parvus, Oithona brevicornis, O. linearis, O. rigida, O. simplex, Temora discaudata, T. turbinate, Alona quadrangularis , Bosmina longirostris, Daphnia carinata, Moina brachiata, Moina micrura, Penilia sp., Cypris protubera, Cypris sp, Eucypris bispinosa, Hetero cypric, Oncocypris pustulosa, Pareacope muellari, Philomedes globosa, Stenocypris malcolmsoni, Aurelia aurtia, Bougainvillea sp., Diphy sp., Diphysis sp., Obelia sp, Porpita porpita, Carycaeus catus, Coryeaeus catus, C. danae, Oithona brevicornis, O. rigida, Oncaea venusta, Euterpina acutifrons, Macrosetella gracilis, M. norvegica, Miracia efferala, Codonellopsis Ostenfeldi, Dictyocysta seshayai, Favela brevis, F. phillippiensis, Globigerina rubescens, G. bulloides, G. opima, Rhabdonella lohman, Tintinnopsis minute, T. beroidea, T. brindle, T. butchi, T. Tocantins, Carixa Sps, Cluex sps, Helocharas lividus, Lycosa Sps, Marpissa Sps, Neoscona sps, Tipula sps, Alma larvae, Bipinnarie larvae, Bivalve veliger, Branacli navplii, Copepod larvae, Crabzoea, Crustaceam naupli, Cyphonautes larvae, Fish eggs, Fish larvae, Megalopa larvae, Mysis larvae, Ophiopluteus larvae, Phyllosoma larvae, Polychaete larvae and Shrimp zoea.*

Table 1 Check list of Zooplankton groups in Adirampattinam Mangrove water and Adirampattinam Coastal water (st-I and st-*II*) at Adirampattinam during the period July 2010 - June 2011.

Sl. No.	ZOOPLANKTON SPECIES	Stations	
		Mangrove water St-I	Coastal water St-II
	PROTOZOA		
1	*Vorticella sp.*	+	+
2	*Diffuguia sp,*	+	+
3	*Arella discoidea*	+	+
4	*Euglypha sp.*	+	-
5	*Arcella vulgaris*	+	+
	ROTIFERS		
6	*Europris fissa*	+	+
7	*Philodina flaviceps*	+	-
8	*Branchionus rubens*	+	+
9	*Lepadella Patella*	-	+
10	*Branchionus Calciflorus*	+	+
11	*Cupeopasis vorax*	+	+
12	*Filinia longiseta*	+	+
13	*Tapetorama pselenura*	+	+
14	*Lecane bullet*	+	-
15	*Keratella cochlearis*	+	+
16	*Monostyla bulla*	+	+
17	*Lecane luna*	+	+
18	*Mytilina sp.*	+	+
19	*Keratella tropica*	+	+
	COPEPODA		
20	*Eucalanus elongates*	+	+
21	*Euchaeta marina*	+	+
22	*Oithona rigida*	+	+
23	*Nanocalanus parvus*	-	+
24	*Temora turbinate*	+	-
25	*Temora discaudata*	+	+
26	*Acartia dance*	+	+
27	*Accrocalanus gibber*	+	+
28	*Centrobages furcatus*	+	+
29	*Oithona linearis*	+	+
30	*Cyclops sp.*	-	+
31	*Oithoma brevicornis*	+	+
32	*Calanoid sp.*	+	+
33	*Oithoma simplex*	+	+
34	*Eucyclops sp.*	+	-
	CLADOCELERA		
35	*Penilia sps.*	+	+
36	*Bosmina longirostris*	+	+
37	*Moina brachiata*	+	+
38	*Daphnia carinata*	+	-
39	*Alona quadr angularis*	-	+
40	*Moina micrura*	+	-
	OSTRACODS		
41	*Hetero cypric*	+	-
43	*Philomedes globosa*	+	+
44	*Cyprus sp.*	+	-
45	*Cypris protubera*	+	+
46	*Pareacope muellari*	-	+
47	*Eucypris bispinosa*	+	-

48	*Stenocypris malcolmsoni*	+	+
	COELENTRATE		
49	*Diphysis sp.*	+	+
50	*Obelia sp.*	+	+
51	*Porpita porpita*	-	+
52	*Brugainvilas sp.*	+	-
53	*Diphy sp.*	+	+
54	*Aurelia autia*	+	-
	CYCLOPOIDA		
55	*Oncaea venusta*	+	+
56	*Corycaeus Catus*	+	-
57	*Oithona brevicornis*	+	+
58	*Oithona rigida*	-	+
59	*Coryeasus danae*	+	+
60	*Carycaeus catus*	+	-
	HERPACTICOIDEA		
61	*Miracia efferala*	+	+
62	*Microsetella norvegica*	-	-
63	*Euterpina acutifrons*	+	+
64	*Macrosetella gracilis*	+	-
	FORAMINIFERA (Ciliata)		
65	*Globigerina bulloides*	+	+
66	*Globigerina opima*	+	+
67	*Tirtinnopsis Tocantins*	+	+
68	*Tintinnopsis beroidea*	+	+
69	*Tintinnopsis butchi*	+	+
70	*Favela brevis*	+	-
71	*F. phillippiensis*	+	+
72	*Globigerima rubescens*	+	+
73	*Rhabdonella lohman*	+	+
74	*Codonellopsis ostenfeldi*	+	+
75	*Dictyocysta seshayai*	-	+
76	*Tintinnopsis brindle*	+	-
77	*Tintinnopsis minute*	+	+
	INSECTS		
78	*Lycosa Sps*	+	-
79	*Carixa Sps*	+	+
80	*Neoscona sps*	+	+
81	*Helocharas lividus*	+	-
82	*Marpissa Sps*	-	+
83	*Cluex sps*	+	+
84	*Tipula sps*	+	+
	LARVA FORM		
85	*Crabzoea*	+	-
86	*Alma larvae*	+	+
87	*Bivalve veliger*	+	+
88	*Fish eggs*	+	+
89	*Fish larvae*	+	+
90	*Bipinnarie larvae*	+	+
91	*Polychacte larvae*	+	-
92	*Megolopa larvae*	+	+
93	*Phyllosoma larvae*	-	+
94	*Cyphonautes larvae*	+	+
95	*Ophiopluteus larvae*	+	+
96	*Crustacean naupli*	+	+
97	*Mysis larvae*	+	+
98	*Shrimp zoea*	+	+
99	*Copepod larvae*	+	+
100	*Barnacle nauplii*	+	+

+ = present , - = absent

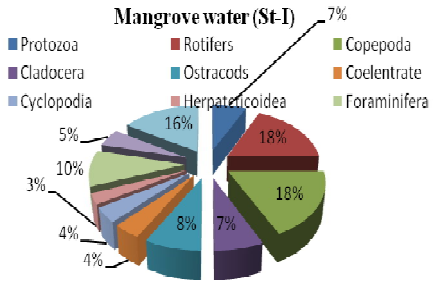

Fig. 1 Percentage composition of different zooplankton groups in Mangrove water (St -I) from July 2010 – June 2011

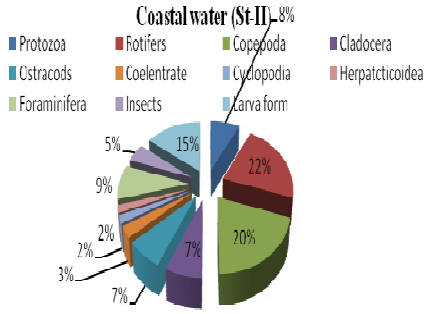

Fig. 2 Percentage composition of different zooplankton groups in Coastal water (St -II) from July 2010 – June 2011

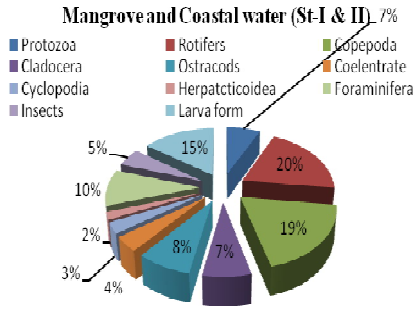

Fig. 3 Average percentage composition of different zooplankton groups in Mangrove water and Coastal water (St-I and St -II) from July 2010 – June 2011

DISCUSSION

Zooplankton functions as intermediate link in the pelagic food web they transfer energy derived from the phytoplankton to the higher tropical levels. In the present study maximum and minimum zooplankton composition were observed during monsoon season and summer season. Maximum was observed in Adirampattinam Mangrove water (station I) where as minimum was observed in Adirampattinam coastal water (Station II) Similar observation were also made by Mishra and Panigrahy, (1995) from Bahuda estuary. In both station Rotifers in the dominant species 18 in Mangrove (Station I) and 22 in coastal (Station II). In addition temperature, pH, DO, phytoplankton density and gross primary productivity also exhibited a positive correlation with the zooplankton population density in both stations. Zooplanktons play a major role in maintaining the tropic level in the aquatic ecosystem through there remineraliation which leads to nutrients recycling and thereby regulating phytoplankton population density. Some reports suggested that the zooplankton release some

quantities of organic nutrients which in turn utilized by phytoplankton for their blooms. Zooplankton productivity in the fresh water bodies is influenced by various physico – chemical parameters (Agarwal, 2005).

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