

Diversity of copepoda at sodalaipuri estuary, Puducherry (U.T.) India

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SUMMARY

Seasonal qualitative and quantitative study of zooplankton copepoda in the Sodalaipuri estuary, U.T of Puducherry was undertaken from September 2006 to August 2007. The Copepod population consisted of 13 species revealing two peaks one in summer and other in pre-monsoon season

Key words :

Diversity,
Copepoda,
Zooplankton,
Sodalaipuri,
Estuary

Ketchum (1951) defined an estuary as a body of water in which the river water mixes with and measurably dilutes sea water. The estuaries are areas of great natural variations in environmental conditions and their flora and fauna are selected and restricted in its variety by the need to tolerate or regulate variable conditions. The estuarine circulation not only supplies nutrients to the euphotic layer but also transports plankton between the straits, causing a symmetrical distribution of plankton biomass in the estuary (Li *et al.*, 2000). The ebb and flow of the tides in an estuary affect not only the hydrographical conditions but also to marked extent in the abundance of zooplankton population (Satyanarayana Rao, 1972). In India, notable contributions on the fluctuations of planktonic organisms, their ecology and behaviour were made by Ganapati (1943). Zooplankters are small heterotrophic animals inhabiting the oceans at all depths and occupy almost every type of ecological environments. A bibliography of plankton of the Indian Ocean was prepared by Prasad (1964). Studies on the ecology of secondary producers from the east coast were made by Subramanian (1987). Copepods occupy a strategic position in the pelagic food web because of their sheer abundance and diversity. Moreover, they play a major role in the energy transfer of any aquatic ecosystem. Much work has been done relating to the systematic and ecology of

copepods in estuaries of India (Godhantaraman, 2001). In the Cooum and Adyar estuarine waters, the total abundance of copepod was highest in summer, and southwest monsoon (pre-monsoon) than the other seasons, as commonly observed in many marine coastal and estuarine waters (Padmavati and Goswami, 1996). Raguprasad (1956) observed the distribution of crustacean naupli round the year with two peaks, one during January and February and another in October and December at Gulf of Mannar and June and December at Palk Bay. The present study was made to evaluate the characteristics indicator species among the plankton to determine the tropic nature of the estuary.

MATERIALS AND METHODS

The study area Sodalaipuri estuary is located between latitude 11°49' 60N, and longitude 79°49' 0E southern region of Puducherry and 175 km south from Chennai (Fig.1) form a long narrow estuary. The estuary flows eastwards and empties into the Bay of Bengal at Nallavadu, south east coast of India The study was carried out from September 2006 to August 2007. In the present investigation, plankton was collected by towing through a standard plankton net made up of bottling silk (Number 10 ie., mesh size 158 µm). The whole material was preserved in 4% formalin for long time preservation.

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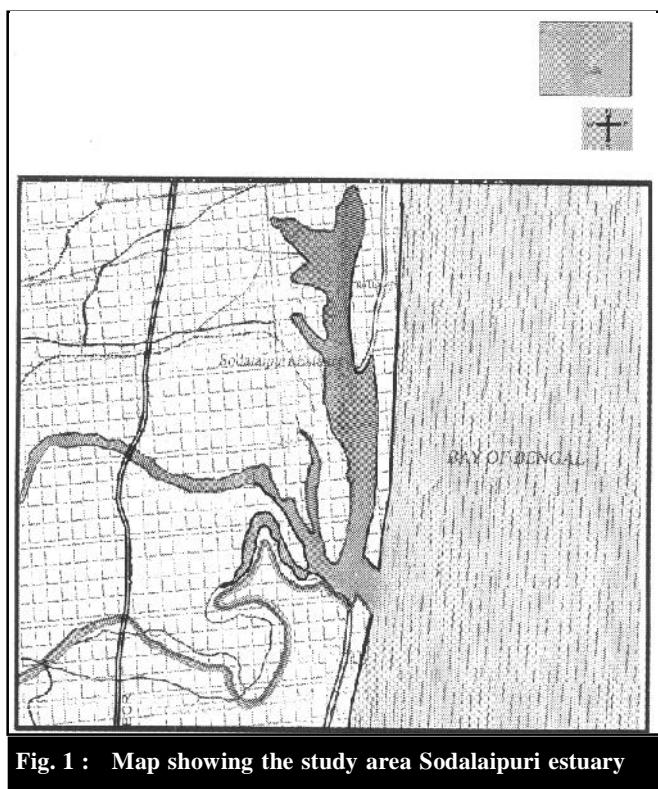


Fig. 1 : Map showing the study area Sodalaipuri estuary

Zooplankton population has been enumerated as number of individuals per m^3 by Sedgwick-Rafter cell method. Standard keys Kasturingan, 1963 were used for the identification of copepods.

RESULTS AND DISCUSSION

In the present study 13 species of copepod zooplankters were identified such as *Balanus*

balanoides-nauplii, *Calanus finmarchicus*, *Calanus finmarchicus-metanauplii*, *Centropagus typicus*, *Cyclopina longicornis*, *Eucalanus elongatus*, *Isias clavipes*, *Meganyctiphanes norvegica*, *Metridia lucens*, *Microsetella norvegica*, *Paracalanus parvus*, *Parapontella brevicornis* and *Parathalestris croni*. Maximum copepod diversity and density was recorded in summer season followed by pre-monsoon season and minimum was recorded during monsoon season (Table 1). The present investigation reveals a bimodal cycle in the distribution of zooplankton with one peak during summer (May) and other in pre-monsoon (June). Similar reports on the bimodal (two peaks) abundance and distribution are stated by Prasad (1964). High plankton standing stock is encountered during summer and pre-monsoon seasons than the other times of the year. Bimodal pattern of annual cycle with low production during rainy season is a common feature of estuarine, lagoon and near shore environments along Indian coast (Misra and Panigrahy, 1999). Copepods are the dominant components of zooplankton populations from the estuarine system. The copepod species are highly adapted (euryhaline) to the fluctuating estuarine conditions. Copepod predominance is a common event in the Indian estuaries. The copepods are the dominant group throughout the study period, which may be due to their continuous breeding and high reproductive capacity. Maximum numerical counts of copepod population have been reported when the temperature and salinity were high in the environment (Rajasegar, 1998). In the Cooum and Adyar estuarine waters the total abundance of copepods were highest in summer and southeast monsoon

Table 1 : Diversity of copepoda (Individuals per m^3) at Sodalaipuri estuary, Puducherry

Sr. No.	Seasons Species	Monsoon			Post-monsoon			Summer			Pre-monsoon		
		Sept. 2006	Oct.	Nov.	Dec.	Jan. 2007	Feb.	Mar.	April	May	June	July	Aug. 2007
1.	<i>Balanus balanoides nauplii</i>	148	62	120	242	392	480	895	801	902	561	382	202
2.	<i>Calanus finmarchicus</i>	184	-	63	200	301	321	594	682	801	600	300	281
3.	<i>Calanus finmarchicus- matanauplii</i>	128	40	121	101	290	302	343	403	480	281	202	160
4.	<i>Centropagus typicus</i>	7	-	22	23	62	80	100	40	122	83	41	20
5.	<i>Cyclopina longicornis</i>	68	-	-	-	20	21	-	140	181	262	242	102
6.	<i>Eucalanus elongates</i>	82	-	-	100	175	122	337	341	460	240	200	121
7.	<i>Isias clavipes</i>	12	-	-	-	31	40	119	82	142	101	63	20
8.	<i>Meganyctiphanes norvegica</i>	-	-	-	22	-	-	51	61	43	20	42	-
9.	<i>Metridia lucens</i>	-	-	-	21	97	163	276	440	400	282	281	-
10.	<i>Microsetella norvegica</i>	64	-	60	82	169	200	468	481	562	503	300	101
11.	<i>Paracalanus parvus</i>	168	81	23	100	165	201	410	423	501	400	360	282
12.	<i>Parapontella brevicornis</i>	-	-	-	-	-	-	-	-	142	-	-	-
13.	<i>Parathalestris croni</i>	45	20	-	-	61	102	367	400	400	202	-	80

(pre-monsoon) than the other seasons as commonly observed in many marine coastal and estuarine waters (Goswami, 1982). High proliferation of copepods in summer season might be attributed to high temperature and phytoplankton abundance, which is often considered as the most important favourable factor for copepods.

The abundance of copepods was lowest during monsoon season, when the water column was markedly stratified to a large extent because of high rainfall. Moreover, many copepod species disappeared during monsoon and species composition also changed, since they are mostly stenohaline. Smaller diversity and abundance during monsoon season is attributed to their less tolerance and growth rate with low salinity and oxygen consumption. The present result falls in line with the study of Miliou (1996). *Paracalanus parvus*, *Balanus balanoides naupli*, *Calanus finmarchicus metanauplii* are abundant throughout the season. Almost all the species were recorded during summer followed by pre-monsoon and post-monsoon seasons. It may be attributed towards their high tolerance for salinity and favourable alkalinity. When salinity is high in the environment the copepod population is also more in number whereas, other factors such as dissolved oxygen and pH had less impact on the planktonic population (Padmavati and Goswami, 1996). Copepods serve as an indicator species among the zooplankters to determine the health status of the estuary.

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