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A Study on the Zooplankton of the Burhabalanga Estuary, Orissa Coast

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Annual variations in the zooplankton biomass and composition during 1991-92 were studied from the inshore, mouth and upstream regions of the Burhabalanga estuary located in the Orissa coast. Zooplankton biomass was maximum at all the stations during October 1991 as a result of a mysid swarm. Copepoda was generally the most abundant group. The copepods *Pseudodiaptomus bowmani*, *P. sewelli*, *Acartia tropica* and *A. bowmani* are recorded for the first time from the east coast of India.

Key Words: Zooplankton biomass, Composition, Burhabalanga estuary

Introduction

Composition of zooplankton from the estuaries along the west coast of India is fairly well known (Madhupratap 1987). On the contrary, very little information of the zooplankton is available from the east coast estuaries. This is compounded by the fact that there have been many misidentifications of copepod species from this area (Madhupratap 1987). This paper briefly describes the zooplankton of the Burhabalanga estuary situated along the Orissa coast and elaborates the copepod species composition.

Materials and Methods

Zooplankton was sampled from October 1991 to August 1992 in Burhabalanga estuary (21°27'N, 87°04'E) approximately on a bimonthly basis from 3 stations (figure 1). Samples were collected around midnight in subsurface hauls using a square net (mouth area 0.25m^2; mesh width 300 μm) equipped with flow meter. Biomass was estimated as

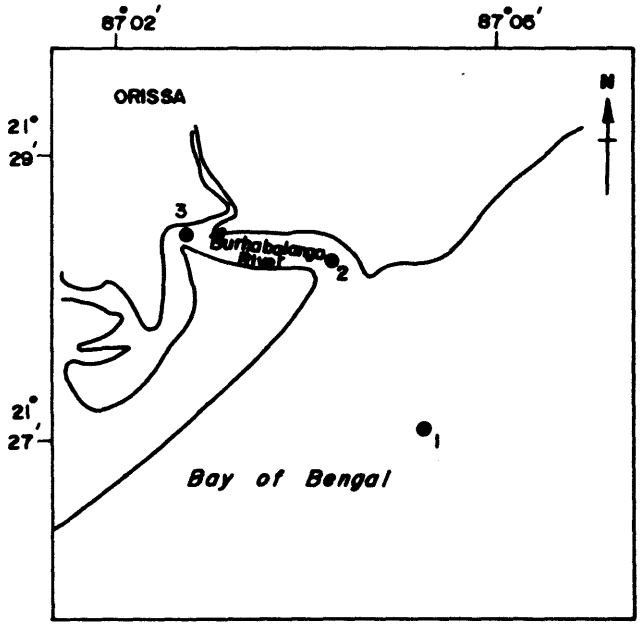

Figure 1 Station locations

displacement volume after filtering the samples and draining off excess water on absorbent paper. Station 1 (depth - 6m) was chosen in the inshore waters of the Bay of Bengal opposite the river mouth in order to find out the spatial variations in distribution of both estuarine and marine zooplankton. Station 2 (depth - 4.5m) was located at the mouth of the estuary and Station 3 (depth - 2m) 2 km upstream. Maximum densities observed for various taxa are given in parentheses in the text. Salinity of all the stations was measured following the method described by Parsons et al. (1984).

Results

Salinity in the Burhabalanga estuary was reduced to medium levels (11-14‰) in October due to rains during the north-east monsoon (figure 2), and started increasing by December (20.2‰), attained peak values by April-July (35.6‰) and again decreased in August (21.2‰) as a result of south-west monsoon. At the upstream station, salinity recovery was slower as compared to the mouth area.

Zooplankton biomass (figure 3) was highest during October at all stations and this was resultant of a mysid (*Mesopodopsis zeylanica*) swarm (70 to 130m^{-3}). Biomass did not vary significantly (at 5% level of significance) for the rest of the months within each station. However, low biomass was recorded in August when the salinity decreased considerably. Copepods usually outnumbered other faunal elements (figure 4) except in July at station 1 and 3 when decapod larvae occurred in higher numbers (29m^{-3} and 31m^{-3} respectively). Apart from the 3 groups mentioned above, others occurred sporadically and in very low numbers (chaetognaths represented by *Sagitta enflata* and *S. bedoti*, amphipods, polychaete larvae, hydromedusae and fish larvae). In general, zooplankton biomass and abundance were very low (latter showed a maximum 400m^{-3} at station 3 in February, figure 4).

Calanoids dominated the copepod composition. *Bestiola similis* (commonly referred to as *Acrocalanus similis*) was the commonest copepod (222m^{-3}) during most months (except July and August) at all 3 stations. *Pseudodiaptomus sewelli* was the

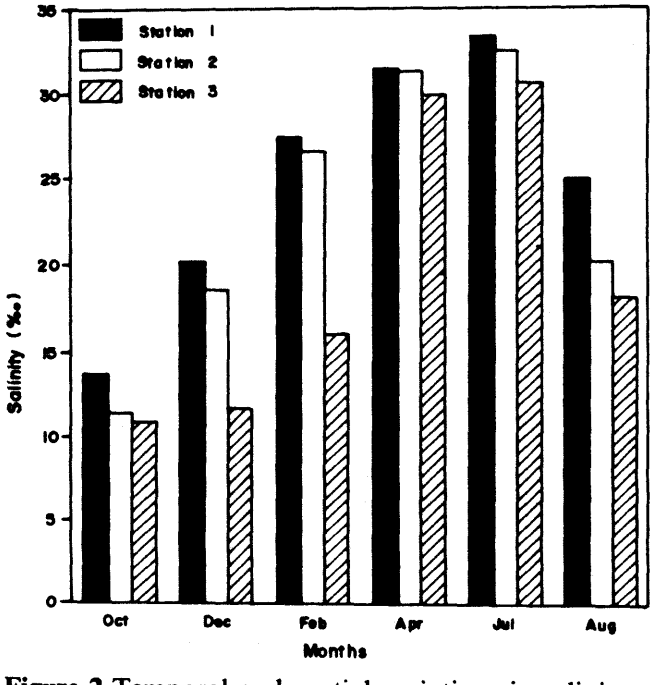

Figure 2 Temporal and spatial variations in salinity

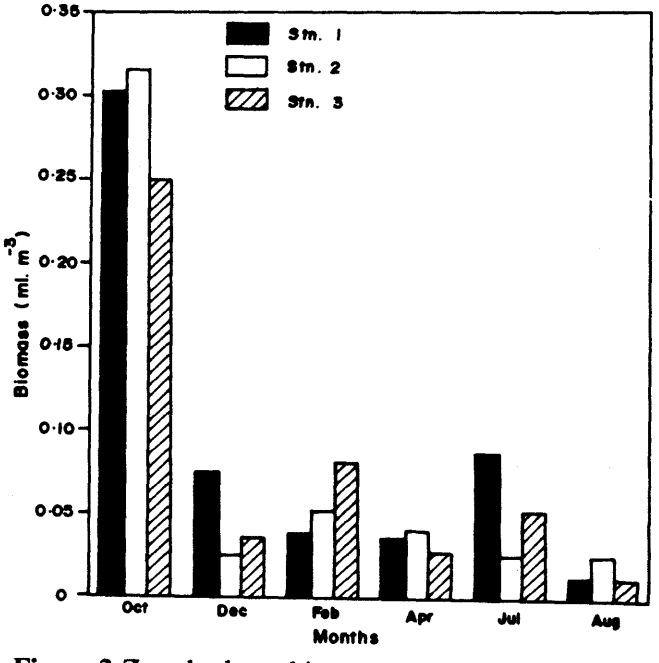

Figure 3 Zooplankton biomass at the three stations

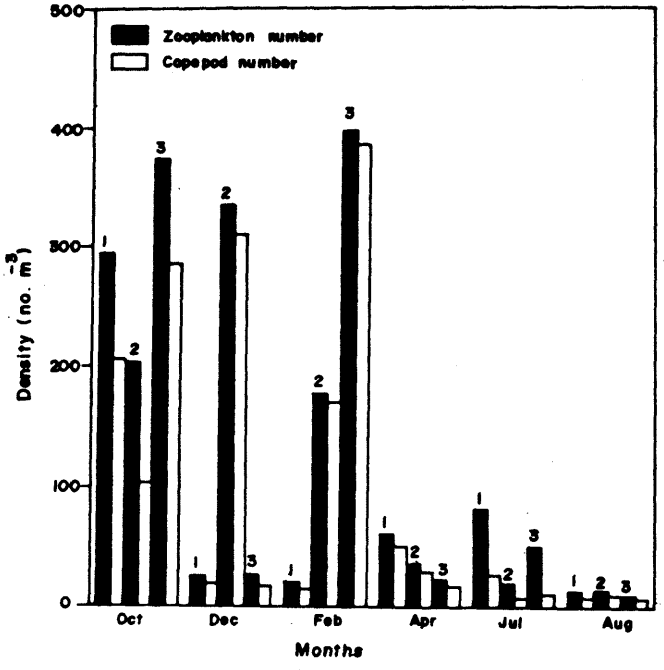

Figure 4 Total zooplankton and copepod numbers in the study areas. Station numbers are indicated on top of the bars

next most abundant ($97m^{-3}$) copepod and occurred when the salinity values were relatively high during high saline months at stations 2 and 3. *Acartia spinicauda* was less abundant ($18m^{-3}$) and showed a similar distribution. *Acartia tropica*, a medium saline species was present at all stations in October ($19m^{-3}$) and occurred up to February at station 3. *Acartiella keralensis* and *Pseudodiaptomus hickmani*, two other species belonging to this category were similarly distributed ($21m^{-3}$ each). *Pseudodiaptomus bowmani, Acartia bowmani* and *Tortanus barbatus* were the other high saline estuarine species recorded (usually $< 5m^{-3}$) in the estuary. A few poecillostomatoids (*Corycaeus* and *Oncaea*) and the harpacticoid *Longipedia* formed the rest of the copepod composition.

Low saline forms were common in October and August at station 3 and did not occur at other stations. They were *Pseudodiaptomus annandalei, P. binghami, P. ardjuna, Heliodiaptomus vidudus, H. cinctus, H. contortus, H. pulcher, Phyllodiaptomus blanci* and *Neodiaptomus schmackeri*. These occurred in very low numbers ($< 2m^{-3}$) except *P. binghami* ($60m^{-3}$ in October at station 3).

A large number of neritic copepods were recorded from station 1. Prominent among them were *Canthocalanus pauper, Labidocera* spp., *Eucalanus crassus, Centropages* spp., and *Temora turbinata*. Among them, a few such as *Labidocera pectinata, L. pavo, Centropages alcocki, C. dorsispinatus, C. furcatus, C. orsinii* and *C. tenuiremis* were often found at the mouth area also in lesser numbers from December to April. They very rarely occurred at the upstream stations.

Discussion

The river Burhabalanga joins the Bay of Bengal at Balramgari where the collection of the samples was made. As a consequence of the river discharge, salinity of the estuary varies seasonally and the lowest salinity was recorded during the north-east monsoon. Salinity is a key factor affecting the abundances and distribution of estuarine zooplankton (Madhupratap 1987). In the present investigation all the samples were collected in the midnight as it is now well known that daytime subsurface hauls do not give a true picture of abundances because of zooplankton vertical migration. In shallow waters many epibenthic forms emerge into the water column only during night (Madhupratap et al. 1991).

The zooplankton composition of the Burhabalanga estuary shows that there is fairly a good penetration of high saline estuarine species into the inshore waters especially when salinity was low. Low saline forms are generally restricted to the interior region of the estuary and most of the marine forms are limited to the mouth region of the estuary probably because of the shallowness upstream. Similar, low values in the zooplankton biomass have been reported from shallow estuaries of the west coast (Haridas 1982). However, higher values were recorded from the Vellar and Hooghly estu-

aries of the east coast (Subbaraju & Krishnamurthy 1972, Sarkar et al. 1986). However, the number of species is low compared to those recorded from the Cochin backwaters (Madhupratap & Haridas 1975) and west coast estuaries (Madhupratap 1987).

Pseudodiaptomus sewelli, P. bowmani, Acartia tropica and *A. bowmani*, all estuarine species, are recorded for the first time from the east coast of India. These species tolerate salinity ranging from 5 to 35‰ (Madhupratap 1987). The low saline diaptomid species *Heliodiaptomus vidudus, H. contortus, H. pulcher, Phyllodiaptomus blanci* and *Neodiaptomus schmackeri* appear to be not recorded so far from estuaries of the west coast of India.

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