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ZOOPLANKTON OF PORTO NOVO COASTAL ZONE WITH SPECIAL REFERENCE TO INVERTEBRATE LARVAE*

B. SRIKRISHNADHAS**, V. SUNDARARAJ** AND K. RAMAMOORTHI

C. A. S. in Marine Biology, Parangipettai-608 502

ABSTRACT

Quantitative plankton samples were collected from the nearshore waters of Porto Novo and from three stations in Vellar Estuary. The environmental factors which influenced the zooplankton biomass in the coastal zone have been discussed. The total zooplankton biomass (by number) was between 1950 and 739190/m³ during the two years of study. The invertebrate larval contribution ranged from 455 to 373070/m³. In the nearshore waters, in the two years, an average of 23.84% of the zooplankton were of invertebrate larvae and the maximum recorded was 75.95%. In the Vellar Estuary, the contribution of invertebrate larvae was higher than in the nearshore waters. The average contributions ranged from 29.07 to 37.23% in the different locations of the estuary and the maximum was 93.08%. The reasons for higher production of invertebrate larvae in the estuary are traced and the larval resource utilisation in the natural systems are discussed.

INTRODUCTION

THE ZOOPLANKTON of coastal waters of Porto Novo and the Vellar Estuary have been studied by several authors (Subbaraju and Krihnamurthy, 1972; Santhanam *et al.*, 1975; Srikrishnadhas *et al.*, 1975). However, the contribution of invertebrate larvae towards the total zooplankton production is little known. Hence an attempt has been made to assess the zooplankton of the nearshore waters and Vellar Estuary with special reference to the contribution of invertebrate larvae towards the secondary production.

MATERIAL AND METHODS

The material for the present study has been collected from the nearshore waters (20 m depth line) of Porto Novo (Stn. 1) and the marine, gradient and tidal zones (Stns. 2 to 4 respectively) of the Vellar Estuary (Fig. 1) for a period of two years. Surface plankton samples were collected every week between 6 and 9 A.M. using a No. 20 bolting silk net bag. 100 litres of water was bucketed out and filtered through the net bag. The content was preserved in 5% formalin and the number of zooplankton was enumerated under a binocular microscope and the biomass by number was calculated per cubic metre of water. The numbr of invertebrate larvae was computed separately to study their contribution. The environmental parameters such as salinity and temperature were also recorded.

RESULTS AND DISCUSSION

The total zooplankton production was more in the Vellar Estuary than in the nearshore waters at most of the times. The zooplankton number increased gradually in the estuary from stations 2 to 4 respectively, marine zone,

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** *Present address*: Fisheries College and Research Institute, Tuticorin-628 008, Tamil Nadu.

gradient and tidal zone. This high production of zooplankton was due to the contribution of invertebrate larvae. In the estuarine stations the invertebrate larval population was equal or even exceeded other zooplankton during April and May (Fig. 2). In the sea, the number of zooplankton ranged from 3,560 to 119,720 No/m^3. Of this, the invertebrate larvae constituted 680 to 47,855 No/m^3. In the estuary, the

The invertebrate larval contribution to the zooplankton production reached a maximum of 79.59% with an average of 23.84% in the nearshore waters. In the Vellar Estuary the invertebrate larval contribution was higher than in the nearshore waters. The average contribution ranged from 29.07 to 37.23% in the different zones of the estuary and the maximum was 93.08%.

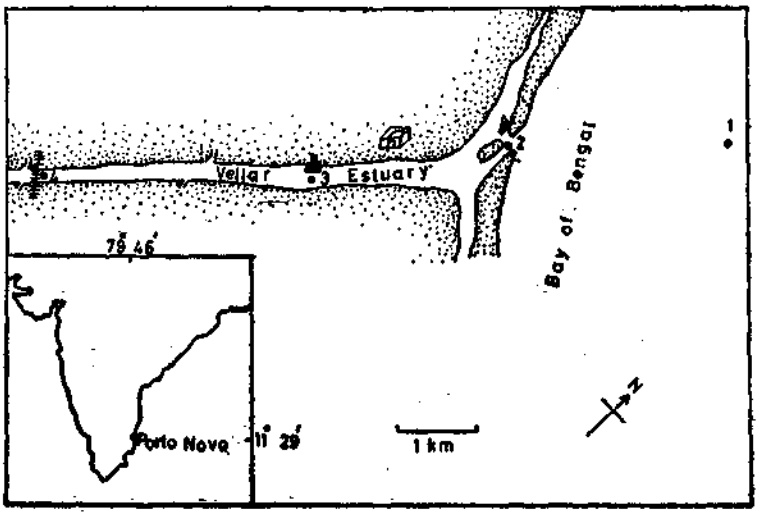

Fig. 1. The location of stations in the Vellar Estuary.

number of zooplankton ranged from 5652 to 148,592 No/m^3, 10,900 to 291,470 No/m^3 and 13,687 to 399,727 No/m^3 respectively in the marine, gradient and tidal zones. In these zones the larval population ranged from 1679 to 38,510 No/m^3, 5,060 to 1.98.410 No/m^3 and 4,897 to 198,680 No/m^3 in the respective stations. The highest number of zooplankton recorded was 739,190 No/m^3 in the tidal zone during the premonsoon season. The invertebrate larval contribution reached a maximum of 373,070 No/m^3 in the gradient zone of the estuary during the summer season.

The zooplakton production was generally higher in the premonsoon months in all the zones and the production was very low during the monsoon months (Fig. 2). The invertebrate larval prduction contributed significantly to the zooplankton production during summer and postmonsoon months (Fig. 3). During the monsoon months (October, November and December) both the invertebrate larvae and other zooplankton were less. It was mainly due to the drop in salinity in the estuary due to monsoonal floods. The low salinity affected the benthic organisms. Their reproduction was also suspended during this unfavour-

able season. This greatly reflected in the larval population in the estuary. However, during the low saline periods, zoea of *Macrobrachium* spp. were common.

more. Larvae of benthic organisms such as polychaetes, copepods, *Balanus*, bivalves and gastropods were very much abundant and they boosted up the invertebrate larval

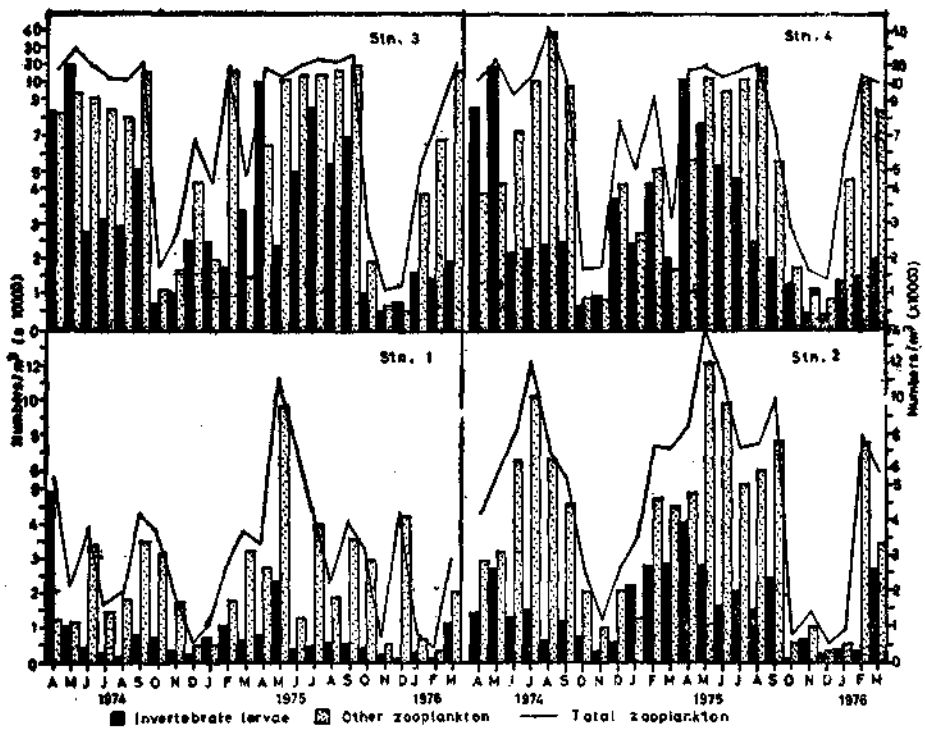

Fig. 2. Monthly mean (in number) of invertebrate larvae, other zooplankton and total zooplankton in Stations 1 to 4.

The higher production of zooplankton in the Vellar Estuary was mainly due to the higher rate of invertebrate larval production. Both pelagic and benthic organisms contributed to the larval stock. Among them, the contribution by the pelagic organisms was less, whereas the contribution by the benthic organisms was

production leading to the increased production of zooplankton in the estuary. This is evidenced by the studies of Balasubramanian (1960, 1964), Srikrishnadhas *et al.* (1981), Thangaraj *et al.* (1979), Chandran *et al.* (1982) that benthic animls are abundant in the environments of Vellar Estuary. Copepod nauplii

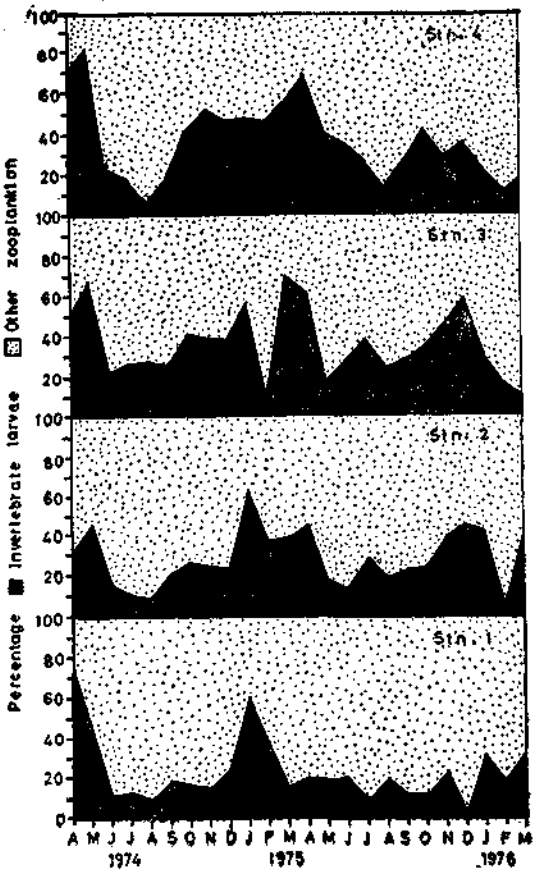

Fig. 3. Monthly mean (in %) of invertebrate larvae and other zooplankton in the total zooplankton in Stations 1 to 4.

and *Lucifer* protozoea were the dominant form of pelagic origin.

The invertebrate larval resources available in the estuary along with other zooplankton is utilized by the secondary consumers which form the estuary more productive. In addition to this, larvae of commercially important invertebrates such as the clams, osyters and shrimps increse the spat fall and the recruitsa ment in the estuary. The invertebrate larval production serve a great deal in the seed resource of the estuary also. As the dispersal of the larvae is very slow, the spat fall within the estuary is enormous. So, a large number of seeds can be collected from the estuary without affecting the population in the estuary. On the other hand, if the seeds are not removed sufficiently, there will be over crowding and it may affect the growth of the individuals. The seeds may be taken for culturing in farms or they can be transplanted in other areas and by that the natural production of the environment could be increased.

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