

ZOOPLANKTON BIOMASS ALONG THE WEST COAST OF INDIA AND ITS EFFECT ON THE FISHERY

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ABSTRACT

The coastal zone along the west coast of India is very productive with a mean secondary production rate of 5.89 mg C/m³/day. Statewise, maximum zooplankton standing stock was observed off Maharashtra. The existing yield of fishery from the surveyed region has been compared with the estimated sustainable fishery potential.

Importance of zooplankton production to the pelagic fishery potential of an area has already been emphasized (Nair, 1982) and this has given an upsurge in the estimation of exploitable fishery of a region from the rates of plankton productivity. Eventhough each method for the estimation of tertiary production has got its own limitations, the one considered from zooplankton standing stock presents a fairly reliable picture on the biological production potential of the given area. In this communication the zooplankton samples collected during the different cruises of R.V. *Gaveshani* along the west coast of India has been considered for evaluating the production potential of the area.

Zooplankton samples were collected during the following cruises of R. V. *Gaveshani* of the National Institute of Oceanography.

1. The Xth and XIIth cruises covered stations from the southwest to northwest extending upto Maharashtra. A total of 83 samples were collected during October to November 1976. (Nair *et al.*, 1978). An Indian Ocean standard net having a mouth area of 1 m² and mesh size of 0.3 mm was used for the collection.
2. During the XIIIth cruise in December 1976 stratified zooplankton samples were taken between Mormugao to Cape Comorin using an Indian Ocean Standard net (Peter & Nair, 1978). Altogether fifty samples were collected.

3. Sampling was made at 47 stations during the XVIIth cruise exclusively within the shelf waters off the west coast of India (Nair & Peter, 1980). The study period was in March 1977. An HT net having a mouth area of 0.25 m^2 and mesh size of 0.3 mm attached with a flow meter was used for the collection.

Distribution charts (Figs. 1-3) for zooplankton biomass for the west coast were prepared based on the above data. Whenever duplicate samples were taken from a station average values were considered.

During October/November period zooplankton biomass varied from 1.0 to $124.0 \text{ ml}/100 \text{ m}^3$ (av. $18.6 \text{ ml}/100 \text{ m}^3$) along the coast between Cochin and Bombay (Fig. 1). Maximum biomass was observed off Maharashtra. In general, high

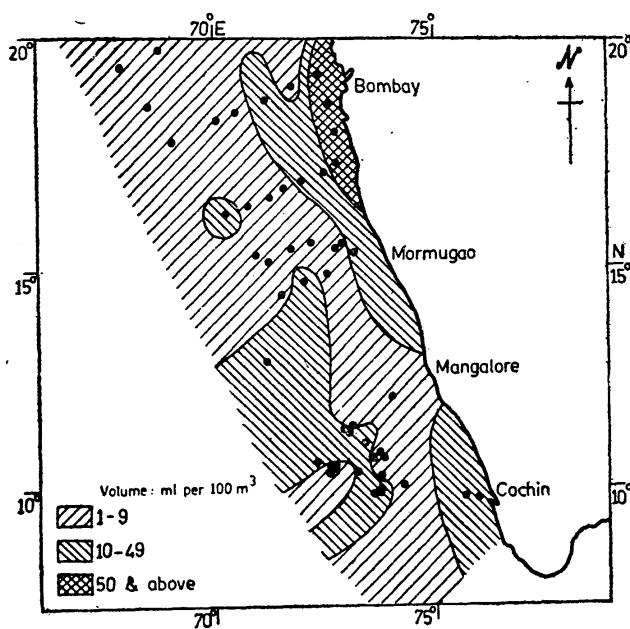


Fig. 1.—Distribution of zooplankton biomass during October to November 1976.

standing stock of zooplankton was observed all along the inshore area studied with a conspicuous patch off Karnataka. Statewise mean values of zooplankton biomass off Kerala, Karnataka, Goa and Maharashtra were respectively 6.96, 37.0, 6.71 and $24.2 \text{ ml}/100 \text{ m}^3$.

Variation in zooplankton biomass in December was at a rate of 1.0 to $72.6 \text{ ml}/100 \text{ m}^3$ (av. $12.74 \text{ ml}/100 \text{ m}^3$). Maximum standing stock of zooplankton was observed off Kerala coast (Fig. 2). High biomass was confined exclusively to south of 11°N . Mean values of zooplankton biomass for Kerala and Karnataka were respectively 16.42 and $9.05 \text{ ml}/100 \text{ m}^3$.

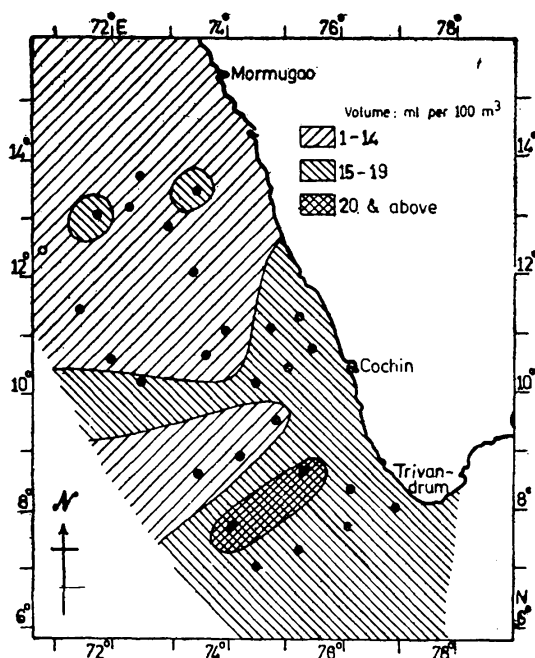


Fig. 2.—Distribution of zooplankton biomass during December 1976

In March volume of zooplankton varied at a rate of 1.0 to 213.0 ml/100 m³ (av. 21.44 ml/100 m³). Maximum values were observed between Ratnagiri and Vengurla along with a few isolated patches scattered along the coast. In general, high biomass was spread over to off northern Kerala and Maharashtra coast. Mean values for Kerala, Karnataka, Goa and Maharashtra were respectively 18.17, 18.38, 18.60 and 30.61 ml/100 m³.

In general, the biomass values obtained during October-December were fluctuating from place to place. In March the variations were limited probably because the entire sampling was done within the shelf waters. The average standing stocks of zooplankton for the October to March period along the Kerala, Karnataka, Goa and Maharashtra coast were respectively 13.85, 21.48, 12.66 and 27.41 ml/100 m³. The mean biomass (October-March) for the entire area of the present investigation was 17.59 ml/100 m³. When carbon equivalent for this is calculated considering the conversion factors (Nair, 1980) the average rate of secondary production for the entire area of study amounts to 5.89 mg C/m³/day.

The rate of secondary production obtained from the present study can be used to estimate the production potential of the coastal area. Fishing along the coastal waters is mainly confined to the area within the 60 m depth and hence the tertiary potential of this shelf area covering 42 x 10³ km² (area covered by the stations as in Fig. 3) was estimated to be 2.2 x 10⁶ tonnes of live weight/year. If we take 40%

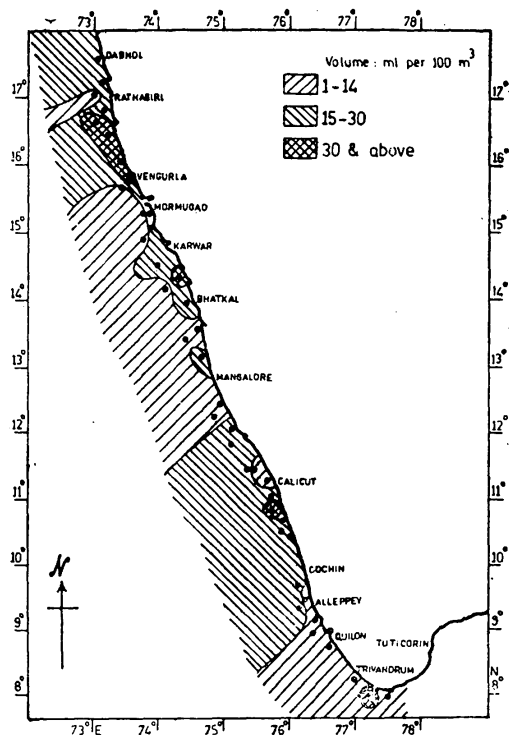


Fig. 3.—Distribution of zooplankton biomass during March 1977.

of the standing stock as the sustainable yield it would amount to 0.88×10^6 tonnes/year. Pelagic fish landings in Maharashtra, Goa, Karnataka and Kerala were reported to be respectively 36.55, 62.35, 77.45 and 69.07% of the total fish landings (CMFRI, 1980) and accordingly the pelagic fish landing was calculated (Table).

Table : Fish landing data (in tonnes) for the west coast covering Kerala, Karnataka, Goa and Maharashtra.

Year	Pelagic fish landings	Total fish landings
1976	4,31,563	7,54,899
1977	4,25,637	7,31,372
1978	4,97,049	8,37,554
1979	4,49,205	7,75,607

If the sustainable yield is compared with the pelagic fish landings it appears that much more can be expected from the coastal waters. However, if correlation is made with the total landings it suggests that the sustainable yield has attained a saturation point and emphasis has to be given for offshore fishing beyond the 60 m depth.

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