

MACROBENTHIC PRODUCTION IN VEMBANAD LAKE

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ABSTRACT

The macrobenthic fauna in the Vembanad lake is mainly composed of polychaetes, bivalves, decapods and amphipods. There is a progressive decrease in the animal population from lower part of the backwater towards the upper reaches which has low salinity. Of the environmental parameters that affect the distribution of benthic fauna, the most significant seem to be salinity and the nature of the substratum. The faunal assemblage exhibited a relationship with a particular type of substratum.

Vembanad lake forms a part of the Kerala backwaters lying between latitudes $9^{\circ} 30'$ and $9^{\circ} 58'$ N and longitudes $76^{\circ} 15'$ and $76^{\circ} 30'$ E. The area studied is stretched to about 60 km. The depth in the backwater varies from 3 to 5 metres. The hydrological conditions differ from one region to the other of the backwater. In this communication, an attempt has been made to obtain a picture of the bottom fauna of the lake.

Benthic samples were collected from six stations in the Vembanad lake at monthly interval from September 1973 to June 1974. A van Veen grab giving a substrate coverage of 0.04 m^2 and a naturalist's dredge were used for the collection of bottom fauna. The samples were washed through a sieve of 0.5 mm mesh and the animals were sorted, counted and weighed in the laboratory. Their biomass is expressed as wet weight excluding hard parts. The sediments were analysed for their characteristics.

Measurement of physical parameters were also made at each station.

Physical and biological parameters at stations 1-6 have been given in Table I. No significant difference was found in the bottom temperature from station 1 to 6. It ranged between 27.8 and 32.0°C . In general the bottom temperature was high in the pre-monsoon month (April). A slight decrease in the bottom temperature was noticed in June with the onset of monsoon. The seasonal fluctuation in the bottom temperature at a particular station varied from 2 to 5°C .

Unlike temperature, the salinity changes were considerable in the backwater. During the pre-monsoon period the high saline water ($28-30\text{‰}$) occupied the lake. As the monsoon started, salinity decreased quickly and became as low as 1.72‰ in the bottom water

TABLE I
Variations in physical and biological parameters at stations 1-6

Station No.	Depth (m)	Temperature (°C)	Salinity (‰)	Dissolved oxygen (ml/l)	Substratum	Population (No/m ²)	Biomass (g/m ²)
1	4	27.8-32.0	8.52-28.4	2.49-4.30	Clayey sand	480-1100	37.3-221.6
2	3.5	28.1-30.8	4.34-28.8	2.04-4.92	Clayey silt	316-992	74.5-102.3
3	4	29.0-31.2	2.43-30.8	2.21-5.22	Sand	82-694	29.2-62.6
4	3	28.4-31.2	2.42-30.20	2.40-3.72	Silty sand	272-734	138.6-369.2
5	3	28.2-30.6	1.87-29.6	2.90-3.94	Silty sand	213-785	105.4-418.3
6	3.5	27.8-30.5	1.74-25.44	2.96-3.91	Clayey silt	55-639	22.6-88.5

due to the influx of freshwater. Seasonal variation in the salinity was high in the backwater. Such a variation in the salinity has been attributed earlier as a major factor in limiting the distribution of benthos in coastal waters (Seshappa, 1953; Kurian, 1972).

The dissolved oxygen varied from 2.19 to 4.97 ml/l in the lake, the highest value being at station 4. Owing to the shallow nature of the backwater and mixing of the water at the bottom, there is enrichment of oxygen and hence the fauna do not seem to be affected by the distribution of oxygen.

The substratum can be characterised into four different types of bottom deposits viz sand, clayey sand, silty sand and clayey silt possessing varying grain size component in the backwater. The nature of deposit has a close relation with the structure and distribution of benthic communities (Sanders, 1958). Polychaetes are restricted to the fine deposit of sand, silt and clay at stations 1, 2 and 6. In the sandy bottom at stations 4 and 5, the bivalves abound and surpass other forms in weight and numbers. The occurrence of crustaceans at all the stations revealed their epifaunal nature having no substratum preference. Such a relationship has been reported earlier by Parulekar and Dwivedi (1973) in the estuarine complex of Goa.

Regarding the total intensity of fauna, the maximum number (1100/m²) occurred at station 1 which is situated in the lower reaches of the backwater. The average number varied from 347 to 793/m². The

main group of organisms present were polychaetes, bivalves, decapods, amphipods and gastropods. A progressive decrease in the animal population was noticed in the upstream direction. There was a tendency towards decline in the density of benthic animals at the commencement of monsoon which probably may be due to the fall in salinity.

These observations on the benthic biomass give a diversified picture of the distribution of benthic fauna in the Vembanad lake. The average value varied from 50.5 to 311.8 g/m². High values of 369.2 and 418.3 g/m² were observed at stations 4 and 5 respectively. This increase in biomass was contributed mainly due to the presence of large sized bivalves. The benthic biomass was considerably high in the lower part of the lake. Devassy and Gopinathan (1970) have reported an increase in the benthic biomass from marine to freshwater region during monsoon in the Vembanad lake which they attributed to the disappearance of transition from marine to freshwater condition. The total organic production in the Vembanad lake has been estimated at 100,000 tonnes of carbon (Ramachandran Nair *et. al.*, 1975). This probably may contribute to a greater benthic biomass found in the lake.

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