STUDIES ON THE

BENTHIC ENVIRONMENT. BENTHIC SEDIMENTS

AND BENTHOS

OF COLOMBO (BEIRA) LAKE

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The present work deals with the environmental conditions of the water overlying the benthic sediments, the physico-chemical characteristics of the benthic sediments and the population of the benthic invertebrates in Colombo (Beira) Lake. Bottom samples were taken monthly at 10 stations covering the entire lake and was studied over a period of 13 months (December 1978 to December 1979). The study showed that the fauna comprised mainly of oligochaetes, molluscs, chironomids, conchostracans and other insect larvae.

The monthly analysis of the benthic productivity pattern showed a variability in production in the different sections of the lake. The organisms were concentrated virtually in the upper few centimetres of the sediments. The bottom sediments of the major part of the lake are composed of organic rich fine silty clayey material mixed with large quantities of organic debris. The sediments in S.W. Lake and West Lake were composed mainly of clay, silt and coarse sand whereas in East Lake the sediments were composed of very fine sand, silt, clay and fine sand. Oligochaetes formed the dominant group of benthic fauna in areas where the bottom sediments were clayey (stations 1 to 3 - S.W. Lake and stations 4 & 5 - West Lake) whereas molluscs the next largest group were concentrated in the sandy soil (Stations 6 to 9 - East Lake).

Nutrient analysis of sediments carried out from samples showed a certain amount of accumulation of nutrients in sediments. Nitrogen content in the sediment was very high and varied from 17.28 to 51.36%. The phosphorous content ranged between 4.8 and 6.3%. The carbon content of the lake appear to be low (3.6% to 6.8%).

Production was highest in May for most parts of the lake reaching 5575 ind/m^2 in some areas of S.W. Lake (Stations 1 to 3). The lowest density was recorded in December. The largest concentration of animals was at station 1 in S.W. Lake (3764 ind/m^2) and the least at station 10 in Galle Face Lake (58 ind/m^2). Oligochaetes were the dominant organisms and their numbers differed greatly in different sections of the lake. They composed 57.14% and were mainly concentrated in S.W. Lake (Stations 1 to 3) and West Lake (Stations 4 & 5). Molluscs the next largest group of animals were concentrated in East Lake (Stations 6 to 9) and comprised 40.28%. Chironomids were common but conchostracans and other insect larvae were rare. There were marked changes in the bottom fauna since the previous investigations carried out by Mendis (1964) between 1957 and 1963. Two animal groups have increased in abundance which are pollution tolerant, namely oligochaetes and molluscs and most of the other benthic invertebrates were

less abundant in 1978/79 than in 1957/63. Benthic biomass showed the same pattern as density of animals and showed a variable pattern from station to station. The highest biomass was recorded in Stations 6, 7 and 8 in East Lake which ranged between 1.50 to 8.70 g/m^2 and the least at station 10 in Galle Face Lake which ranged between 0.03 to 0.08 g/m^2. The highest weight was recorded in the month of May (8.70 g/m^2) at station 6 were molluscs were the dominant group of animals.

The physical and chemical factors viz. depth, transparency, temperature, pH, dissolved oxygen, salinity, conductivity and dissolved solids that effect the distribution of benthic fauna and their productivity were studied in relation to the distribution of benthic fauna. The bottom water thermal conditions are related to prevailing air temperatures. It appears that temperature does not have a marked effect in the benthic productivity of animals. Rainfall was average during the period of study. Heavy concentration of animals were observed at most of the stations in the months May to September (S.W. Monsoon). The analysis of variance (ANOVA) worked out indicates that rainfall had some effect on benthic productivity.

The pH of water at the bottom ranged between 7.0 and 8.0. Large concentration of animals were observed in the months of April, May, July and August where the pH of the water was also slightly high, Dissolved oxygen of water at the bottom in the freshwater section of the lake (Stations 1 to 3 - S.W. Lake, and stations 6, 7 & 8 - East Lake) ranged between 7.2 and 10.3 mg/l whereas in the brackish water section (Stations 4 & 5 - West Lake and Station 7 - East Lake) it ranged between 4.5 to 5.9 mg/l. Large concentration of animals were observed in the freshwater section where favourable conditions prevailed. The salinity values in S.W. Lake (Stations 1 to 3) and at station 7 in East Lake was low. Station 8 in East Lake and Station 10 in Galle Face Lake showed comparatively high values for salinity. It was observed that the bottom fauna was relatively rich at stations where the salinity values were low except at station 3 in S.W. Lake. The most significant factors that effect the distribution of benthic fauna in this lake seem to be rainfall, pH, dissolved oxygen and salinity. The hypothesis tests carried out indicated that the relationship between the number of animals and these four factors are highly significant.