

**M.S.81. SARALA DEVI, K.—Effect of Industrial Pollution on the Benthic Communities of a Tropical Estuary—1987—
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Cochin backwaters, a tropical barbuilt estuary is well known for its prawn, molluscan and demersal fisheries. Also it formed the dumping area for sewage,

retting of husks and discharge of effluents from industries located on either side of it. As a result the fishery is being gradually dwindled year after year due to the lowering of the water quality. The effect of industrial pollution on the benthic community of this tropical estuary was worked out. An area extending over 21 km from the mouth of the estuary to upstream of industrial belt was selected. Temporal and spatial variations of 16 environmental parameters at 9 stations along the area were monitored monthly during 1981. Benthic fauna of these 9 stations consisted of amphipods, polychaetes, isopods, tanaidaceans, molluscs and other crustaceans (Decapods, Acetes, Alpheids, Balanus, insect larvae, chironomid larvae, cumacea and some fresh water forms). Apart from these, sea anemone, flat worms, nematodes, sipunculoids, echinoderms and fishes were also encountered. 75 species belonging to 31 faunal groups were identified. Of these 31 groups, amphipods, polychaetes, isopods, tanaidaceans and molluscs were numerically abundant. Rest of the 26 groups (including 13 riverine forms) were found less significant due to their rare occurrence/low numerical abundance. Polychaetes and molluscs were the only major groups present at all the stations. Amphipods ranked 3rd in occurrence being present at Stations 1-7. *Paraheteromastus tenuis* (Capitellidae) a limivorous polychaete species very common in the retting yard was recorded from most of the stations. The spionid worm *Prionospio polybranchiata* a selective deposit feeder recognized as an indicator of organic pollution due to retting was recorded in low densities at Stations 2-7 indicating resilience to industrial pollution also. *Capitella capitata* constituting 98.8% of benthic population at Station 7 (immediately down stream of effluent discharge site) is proposed as an indicator of industrial pollution too. *Dendronereis aestuarina* present at all stations and at high densities at Stations 5, 6 and 8 can be considered as a pollution resistant species. *Lycastis indica*, *Paraheteromastus tenuis*, *Taleshapia annandalei*, Chironomid larvae and the molluscan *Pendora fluxosa* can be listed as pollution tolerant species.

The qualitative and quantitative distribution of benthic fauna was found to have a direct relationship with the type of the bottom and its physical nature. Distribution of species was examined using index of diversity (Fishers' Diversity index α and its variance $V(\alpha)$ and Shannon-Wiener diversity function $H(s)$ and MacAuthers coefficient of equitability. Cluster analysis showed with maximum affinity at 5% level at Stations 1 and 2 gradually reducing to effluent discharge point and an increase at Station 9 (Ref. Stn.).

The physico-chemical aspects deal with the spatial and temporal variations of the 16 environmental parameters studied viz. salinity, temperature, dissolved oxygen, BOD₅, COD, alkalinity, pH, ammonia, inorganic phosphate, nitrate, nitrite, suspended solids, particulate organic carbon, 'k' value, sediment characteristics and organic carbon. As these parameters could not predict the abundance of benthos independently interaction effects of parameter cluster were studied. In general the order of importance reduced from salinity, temperature, dissolved oxygen, BOD₅, nitrate and K. factor. Remaining parameters were of low significance.

Measurements of 12 parameters made at distances 10 m away down stream of the effluent discharge points showed considerable fall on values for all effluent characteristics. The results of studies on the water characteristics of the area indicated continuous changes as a result of large scale movements of the estuarine water under the influence of tidal forces, monsoon and land runoff coupled with its heterogeneous nature owing to the effluent discharged from the

industries.

Studies on the impact of environmental parameters on the distribution of macrobenthos revealed the quantum of endurance warranted by the infauna to tide over the wide range of environmental stress. Low diversity and lower number of benthic fauna at the effluent discharge site may be due to the stress caused by the cumulative toxic effect of the effluents.