Limnological Studies of Two Ponds at a Riverine Island: Nayachar, East Midnapore, West Bengal

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Abstract

The study was carried out in two ponds at Nayachar Island. These ponds are used for natural fish production, which enter from the Hooghly river. Various physico-chemical parameters and their fluctuation were observed throughout a year. The water quality of the ponds ranged: Dissolved oxygen – 3.8-6.6 mg/l; Temp. –15.5-26.2 °C; Total Solid (TDS+TSS) –170-405 NTU/lit; Total Alkalinity – 20-46mg/l; pH – 6.9-8.2. In planktons, total 7 species were identified and their population fluctuations observed. Some floating and submerged types of vegetation were observed. The study indicates variability of plankton population with the physico-chemical factors of the river water at different times.

Pond limnological studies reveal information on the best possible mode of exploitation of their water resources, from pisciculture point of view. Water plays an important role in the ecological relationship of aquatec plants and animals. The richness in the productivity of the aquatic ecosystem is due to the presence of organic nutrients (Michael, 1969). Planktons are basic food for fishes. The population of fish stock is directly related to qualitative and quantitative abundance of plankton population. Planktons of many aquatic bodies have been studied earlier in India (Nasar, 1977; Shashis & Kachroo, 1973; Murugan, 1989; Sharma & Pant, 1984). The growth and development of aquatic flora and fauna are dependent on several physiographical factors and also on the adaptive relationship of organisms with their environment. The present study reports the seasonal variations in physico-chemical parameters and planktons in Nayachar Island (East Midnapore Distt., West Bengal).

Study Area

Two ponds are situated in the Nayachar Island, in front of Mangrove Interpretation Center station. The island lies in the river Hooghly, opposite to the port of Haldia (West Bengal). The island is spindle shaped with total area of about 29.38 sq. km. It is flat with an average height of about 3' to 5' from riverbed. The formation of the island is the outcome of high tide and low tide action of the river water, since about 1945. Between 1967 and 1997, the island progressively enlarged. The climate in this island is of subtropical type. The core mangrove species belong to *Rhizophora apiculata*, which was first planted, followed by *R. mucronata, Bruguiera gymnorrhiza* and *Heritiera fomes*, which were planted in 1991-1992. Both ponds are directly connected to the river by two channels. During full tide, the river water enters forcefully into the ponds. Rest of the period water level remains same as that of river.

Material and methods

Water samples were collected from the ponds for a period of one year (January to December 2003), with intervals of one month. The ponds are shallow with an average depth of 3.5 meters. It is almost full of water during rainy season and high tide, but its level is decreased to 1–1.5 meter in summer. The water samples were carried in sterilized glass bottles for studying the physico-chemical parameters, viz. Salinity, Alkalinity and Total solid (TSS+TDS) by using standard methods (APHA, 1998). Other parameters, such as D.O., pH, and water temperature were measured by water quality checker kit. The results are expressed in mg/litre, except temperature, pH, and Total solid (TSS+TDS). The 500 ml of water sample was filtered by plankton net (pore size 60mm) for study of zooplanktons which were brought to the laboratory by adding 4% formalin as preservative. The zooplanktons were counted (using counter plate) under compound microscope and are expressed as numbers per litre. Abundance is in %.

Results and Discussion

The metabolic activities of organisms depend on the physico-chemical factors of the aquatic environment. These factors play important role in the quantitative distribution of organisms during various seasons. The pond-1 and pond -2 water temperature were more or less same. Highest temperature was recorded in March and lowest was recorded in January (Table 1). The trends of salinity level fluctuation show that the salinity levels are high when the river water enters into the pond, while the salinity level is comparatively low during the rest of the period. In the months of January, May and September salinity was maximum. The pH of both ponds varied from 6.8 to 7.82. Highest value of total solid were observed in May, while the lowest value