Chapter 4

MATERIALS AND METHODS

The present study on the hydrography and the biotic factors of Kuttanad was based on the monthly samples from station I to VIII located along the entire length of Kuttanad (Map). Quantitative samples were taken before 10th of every month from February 1997 to January 1998. All necessary precautions were made during sampling, transportation and analysis of water samples. The hydrographic data were collected regularly from eight stations during the period of study. Water samples for the qualitative analysis were collected using a Dussart flask sampler with a slight modification to suit local conditions. Atmospheric temperature and water temperature were recorded with the help of mercury in glass thermometer read to 0.1°C. Transparency of water was measured by a seechi disc and extinction coefficient was calculated using the formula (Michael, 1984)

$$\text{Extinction coefficient} = \frac{1.7}{\text{depth in meters}}$$

Water samples collected were analysed to record dissolved oxygen, salinity, hydrogen ion concentration (pH) and nutrients (NO$_2$ – N, NO$_3$ – N, PO$_4$ – P, SiO$_3$ – Si).

The water sample for determining dissolved oxygen was fixed at the site itself, and the estimation was done by Winkler method as suggested by Strickland and Parsons (1972). Salinity was obtained by Mohr–Knudsen method. The halides present in the water sample were treated with a standard solution of silver nitrate using potassium chromate as indicator.
Hydrogen ion concentration (pH) was obtained using a pH meter (Systronics digital pH meter 335). The samples for nutrient estimation were fixed with 1 ml of chloroform at the time of collection (Jones, 1968). Samples were collected in polyethylene bottles. Nitrite was determined by treating the water sample with a solution of sulphanilamide; the resultant diazonium ion is coupled with N–1 naphthyl ethylene diamine dihydrochloride to give an intensely pink azodye, the absorbance of which was measured at 543 nm (Stickland and Parsons, 1972). Nitrate was determined by reducing it to nitrite by treating the sample with a reducing agent. The colour absorbance was measured at 543 nm with spectrophotometer. (Elico SL 171 spec) (Stickland and Parsons, 1972). The determination of phosphate was carried out by treatment of an aliquot of the sample with an acidic molybdate reagent containing ascorbic acid and a small proportion of potassium antimonyl tartarate. (Murphy and Riley, 1962). Phosphate yields a blue purple complex, the absorbance of which was measured at 883 nm with spectrophotometer. Silicate was determined by treating the sample with acidic molybdic reagent. This makes the formation of silicomolybdic acid and since this is unstable, and has only low absorbance, it is reduced to stable and more absorbent molybdenum complex with the help of a reducing agent, metol sulphite. The colour developed was measured spectrophotometrically at 812 nm (Stickland and Parsons, 1972).

Plankton samples were collected from all the 8 stations using standard plankton net. The net was towed 15 mts to and fro.
concentrated. The samples for phytoplankton estimation were fixed using Lugole’s iodine. The samples for zooplankton analysis were preserved by 5% formalin. Group wise analysis of phytoplankton and species wise analysis of zooplankton were done by keys and monographs. The quantitative estimation of planktons was done by a Sedgwick – Rafter cell.

Fishes were collected every month from the six stations located along Kuttanad after a preliminary survey. The preliminary survey was conducted to fix the commercially important fishes in the local markets of Kuttanad. The collections were made using various nets like gill nets, cast nets and scoop nets and methods like ottal and koodu were employed locally with the help of local fishermen.

The fishes were identified using standard literature (Day, 1958; Talwar and Jhingran, 1991; Jayaram, 1999). Photographs of all the fishes identified were made using a Nikon D 70 camera. The plates were prepared using Adobe Photoshop (7)

The data on hydrography and plankton were subjected to relevant statistical techniques like ANOVA and Correlation.