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Zooplankton Diversity of Madavarvalagam Temple Pond, Srivilliputhur, Virudhunagar District, Tamil Nadu

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Abstract

The study was aimed to estimate the current status of physico- chemical characteristic of Madavarvalagam tank (Srivilliputhur) located in Virudhunagar District, Tamil Nadu. Monthly changes in physico- chemical parameters such as temperature, $p^{H,}$ dissolved oxygen, free CO_2, total alkalinity, chlorinity, salinity, total hardness was analysed. The present study, observed that 9 species of zooplankton belonging to four major groups i.e. Rotifera (3 species), Cladocera (1 species), Copepod (4 species) and Ostracoda (1 species).

Keywords: Zooplankton, Bioindicator, Water quality, Physico-chemical parameters

Introduction

Water resources are of critically importance for natural ecosystem and human development. It is essential for agriculture, industry and human existence. The healthy aquatic ecosystem is depended on the physicochemical and biological characteristics. The quality of water in any ecosystem provides significant information about the available resources for supporting life in that ecosystem. Good quality of water resources depends on a large number of physicochemical parameters and biological characteristics. To asses that monitoring of these parameters is essential to identify magnitude and source of any pollution load. These characteristics can identify certain condition for the ecology of living organisms and suggest appropriate conservation and management strategies (Damotharan *et al*., 2010; Prasanna and Ranjan, 2010).

The plankton constitutes the basic food sources of any aquatic ecosystem, which supports fish and other aquatic animals. Zooplankton diversity is one of the most important ecological parameters in water quality assessment. Zooplankton is good indicator of the changes in water quality because they are strongly affected by environmental conditions and respond quickly to changes in water quality. Water quality regulates biotic diversity and tropic level of an ecosystem. The aim of the present study, analysis of physicochemical parameters and zooplankton diversity of temple pond in Srivilliputhur, Viruthunagar District, Tamil Nadu.

Materials and Methods

Study Area

The study is temple pond of Madavarvalagam, Srivilliputhur, Viruthunagar District, Tamil Nadu.

Collection of water sampling

Surface water sample was collected from the pond from October 2016 to December,2016. The water samples were collected using one litre container for the estimation of water quality parameters. The collected samples were immediately taken to the laboratory analysis for according to Kumar and Kakrani, (2000) method. Zooplankton samples were collected by filtering 200 litres of water from the surface of the water body through plankton net (40µm mesh size) and was fixed immediately with 5% formalin. Identification of zooplankton was made by using standard keys (Dhanapathi, 2000 and Altaff, 2004).

Results and Discussion

The results of three months observation of physicochemical parameters of the temple pond of Srivilliputur are represented in the table-1. Nine species of zooplankton are identified in temple ponds of Srivilliputur (Table-2). The seasonal variations in water quality parameters of the pond have a marked influence on the numerical abundance of zooplankton seen in table-3. A total of 9 species of zooplankton have been reported that belongs to 4 major groups. They were included as follows, Rotifera - 4 species, Cladocera - 3 species, Copepoda - 1 species and Ostracoda - 1 species.

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Table -1: Monthly variations in the physico chemical parameters of the Temple ponds

Parameter	October 2016	November 2016	December 2016
Temperature	38	35	32
Water	28	26	25
pH	7.2	7.1	6.95
Total hardness (ppm)	121	61	112
Dissolved oxygen (mg/L)	3.4	2.5	1.5
Free CO_2 (mg/L)	4.5	3.8	3.9
Total alkalinity (ppm)	162	85	96
Salinity (ppm)	313	334.3	322.2
Chlorinity (ppm)	173.4	185.2	178.5
Phosphate (mg/L)	0.09	2.07	2.32

Table-2: Identification zooplankton diversity of temple ponds of Srivilliputur

Sl.No.	Species Name
1.	*Brachionus bidentata*
2.	*Branchionus calyciflorus*
3.	*Branchionus sp*
4.	*Diaptomoid nauplius*
5.	*Stenocypris major*
6.	*Mesocyclops hyalinus*
7.	*Mesocyclops aspericornis*
8.	*Mesocyclops sp*
9.	*Heliodiaptomus viduus*

Table -3. Monthly variations of Zooplankton diversity in Temple pond of Srivilliputur

Sl. No	Zooplankton	October 2016	November 2016	December 2016
1.	Rotifera *Brachionus bidentata*	3	5	4
2.	*Brachionus calyciflorus*	Nil	3	1
3.	*Brachionus sp*	Nil	1	2
4.	Cladocera *Diaptomoid nauplius*	2	4	1
5.	Copepoda *Mesocyclops hyalinus*	5	8	4
6.	*Mesocyclops aspericornis*	4	6	5
7.	*Mesocyclops sp*	3	4	2
8.	*Heliodiaptomus viduus*	3	Nil	Nil
9.	Ostracoda *Stenocypris major*	2	Nil	2
Total no of individuals		22	31	21

In the present study, *B. calyciflorus* was found to be more in number during the month of November 2016 and other species were recorded in less number. The abundance of rotifers and their community characteristics are used as effective indicators of environmental changes such as acidity, food level and humidity etc. (Attayade and Boryelli, 1998). The minimum number of Cladocerans were recorded in during the study period. *Mesocyclops aspericornis* was observed minimum in the month of December 2016. Kumar, (1999) reported that Cyclops serve as the most suitable pollution tolerant indicator. *Heliodiaptomus viduus* was found in October 2016. The Ostracod was represented by only 1 species, *Stenocypris major* was observed in all months except October 2016. Earlier study, Jeppesen *et al.,* (2002) reported that abundance and diversity of zooplankton vary according to limnological features and the trophic state of freshwater bodies. The management of any aquatic ecosystem is a means of conservation of fresh water habitat with an aim to maintain the water quality or to rehabilitate the physico-chemical and biological settling of water (Ravikumar *et al*., 2005). Different environmental factors that determine the characteristics of water have great importance upon the growth and the abundance of zooplankton (Thirumala *et al*., 2007). Water quality is major factor in determining the welfare of the society (Neelima and Kumar, 2005; Dwivedi and Pathak, 2000). It also plays a vital role in governing the production of planktonic biomass. A regular monitoring of water bodies with required number of parameters, not only prevents outbreak of diseases and occurrence of other hazards but also checks the water from further deterioration (Kakati and Sharma, 2003). Conclusion of the present investigation involves the analysis of physico-chemical and biological parameters which reflect an abiotic status of an ecosystem. This is in turn, helps in planning exploitation, antipollution or conservation strategies.

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