

Spring Zooplankton Composition of Rawal Lake, Islamabad

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Abstract

Species composition of zooplankton in Rawal Lake was analyzed during mid spring (April, 2004). Lake water was alkaline (pH 7.7) and TDS value was 288 mg/l. Zooplankton community was dominated by rotifers, represented by 10 species. Among these *Pompholyx complanta* was most abundant. Other common rotifers were *Filinia longiseta*, *Brachyonus calyciflorus* f. *amphiceros*, *Polyarthra trigla* and *Asplanchna priodonta*. 3 species of cladocerans were recorded namely, *Bosmina longirostris*, *Ceriodaphnia cornuta* and *Alona rectangula*. Among copepods only nauplii and copepodid stages were observed and no adult was seen, hence identification could not be made.

From the zooplankton composition of Rawal Lake, it can be concluded that it is a mesotrophic lake, gradually changing to eutrophic state.

Keywords: Zooplankton, diversity, Rawal Lake.

Introduction

Rawal lake is a man made water reservoir, located across Korang river at a distance of about 10 km from Rawalpindi. The lake is formed by a dam and is situated at latitude 33°42' N, longitude 73°07' E at an altitude of 1800m (Leghari *et al.*, 2004). The surface area of lake is about 5 km² (Ahmed *et al.*, 1985). This lake serves as a source of drinking water for twin cities of Rawalpindi and Islamabad. It is therefore very important to keep the quality of water good for human consumption.

Zooplankton play an important role in any aquatic ecosystem. They not only transfer energy from primary producers to higher order consumers like macro crustaceans, insects and small fish, but some species are considered good indicators of trophic status of water bodies. No work on zooplankton community of Rawal lake has so far been done. However, some notable work on freshwater

zooplankton in Pakistan was done by Baqai *et al.*, (1974), Akhtar and Ali (1976), Iqbal and Kazmi (1990), Mahar *et al.*, (2000), Baloch (2000), Baloch and Soomro (2004) and Baloch *et al.*, (2004).

The present study primarily aims to document the zooplankton species composition of Rawal lake especially in early spring season.

Materials and Methods

Samples for water quality and zooplankton were collected in April 2004, from surface area at different locations. All the samples were collected using plankton net having a mesh size of 55 μ . The samples were preserved on the spot with 5% formalin and were pooled in one sample. All the zooplankton were identified up to species or genera level, using keys and illustrations given by Ward and Whipple (1959), Mizuno (1964), Mizuno and Takahashi (1991) and Battish (1992).

Water quality parameters such as temperature, pH, TDS, electric conductivity and salinity were measured using digital meters. Temperature, electric conductivity and salinity were recorded using a portable digital conductivity meter (Cond 315i/SET, WTW), while pH was measured using digital pH meter (Ecoscan pH5).

Results and Discussion

The lake water was slightly alkaline (pH 7.7). According to Previous studies, pH value does not increase more than 8.5 (Ahmed *et al.*, 1985; Leghari *et al.*, 2004). The total dissolved solids (TDS) were recorded as 288 mg/l and electric conductivity was 383 $\mu\text{S}/\text{cm}$ (Table 1). Water quality indicated that this lake is in early stage of eutrophication (Ahmed *et al.*, 1985). Salinity was found to be 0.1 ppt.

A total of 13 zooplankton species were identified. These included 10 species of rotifera and 3 species of cladocera (Table 2). Among rotifers *Pompholyx complanta* was most abundant, while *Keratella valga tropica* secondly dominated in the community. The other common rotifer species were *B. calyciflorus* f. *amphiceros*, *Filinia longiseta*, *Polyarthra trigla* and *Asplanchna priodonta*. However, *Keratella cochlearis* var. *tecta*, *Diurella* sp. *Brachionus calyciflorus* f. *dorcas* contributed very low populations.

Apart from rotifera, three species of cladocerans were also present in the lake, these included *Bosmina longirostris*, that contributed with higher population. *Alona rectangulara* and *Ceriodaphnia cornuta* were also

present with low populations. The naupliar and copepodid stages of copepods were also observed but adult population was not seen.

The community structure of zooplankton showed a mixed composition of mesotrophic to eutrophic species. Species like *F. longiseta* and *K. cochlearis* var. *tecta* are considered to be indicator of eutrophication (Pejler, 1957; Baloch *et al.*, 2000). Mostly the *Brachionous* species are also found in eutrophic environments (Hakkari, 1978; Gannon and Stemberger, 1978; Maemets, 1983; Baloch *et al.*, 2004). On the other hand species like *K. valga tropica* and *P. complanta* are usually found in mesotrophic environments, the former being abundant in riverine systems (Beach, 1960; Baloch, 2000; Baloch and Soomro, 2004).

Abundance of mesotrophic species, *K. valga tropica* revealed that the lake is not yet completely eutrophic. However, presence of eutrophic indicator species, *K. cochlearis* var. *tecta* and *F. longiseta* indicated that the trend is going from mesotrophic to eutrophic. Previous studies (Ahmed *et al.*, 1985) also showed that the higher quantities of phosphate are being added to lake through catchments area during rainy season, resulting into phytoplankton blooms. Such type of temporary eutrophication, sometimes occur in lakes surrounded by agricultural lands, as it was observed in a Japanese caldera lake (Baloch, 1998).

Phosphorous is considered to be limiting factor for phytoplankton in natural environments. Sufficient quantities of phosphorous are present throughout the year in lake (Ahmed *et al.*, 1985). Among Cladocerans,

B. longirostris and *Ceriodaphnia cornuta* are lacustrine species, former occurs usually in mesotrophic to eutrophic environments (Swar and Fernando, 1980), while *C. cornuta* is a softwater, oligotrophic species. Another cladoceran *Alona rectangula* is a creeping species usually occurring in shallow and weedy areas.

From the zooplankton community structure of Rawal lake it can be concluded that it is a mesotrophic lake gradually changing to eutrophic stage. Further studies of zooplankton on seasonal basis are required for better understanding of the lake environment

Table 1: Some physico-chemical parameters of Rawal lake.

Water quality parameters	
Water temperature	20°C
pH	7.7
TDS	288mg/l
Electrical Conductivity	383 μ S/cm
Salinity	0.1ppt

Table 2: Zooplankton species and their occurrence.

S. No.	ZOOPLANKTON	OCCURRENCE
	Rotifera	
1	<i>Asplanchna priodonta</i>	++
2	<i>Brachionus calyciflorus</i> f. <i>amphiceros</i>	++
3	<i>Brachionus calyciflorus</i> f. <i>dorcas</i>	+
4	<i>Conochiloides</i> sp.	+
5	<i>Diurella</i> sp.	+
6	<i>Filinia longiseta</i>	++
7	<i>Keratella cochlearis</i> var. <i>tecta</i>	+
8	<i>Keratella valga tropica</i>	+++
9	<i>Polyarthra trigla</i>	++
10	<i>Pompholyx coplanta</i>	++++
	Cladocera	
11	<i>Alona rectangula</i>	+
12	<i>Bosmina longirostris</i>	++
13	<i>Ceriodaphnia carnuta</i>	+
	Copepoda	
	Nauplii and Copepodid stages	++

++++ abundant +++ fairly present ++ common + rare

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