ABSTRACT

Relationship of copepods with physicochemical parameters of water was studied during September 2013 to August 2014 at Safari Zoo Lake located near Rawind Road Lahore. The lake is roughly oval in shape and it was divided into four different sites named as Northern site (SS1), Western site (SS2), Southern site (SS3) and Eastern site (SS4). Water samples from the lake were collected in the last week of every month. Different physicochemical parameters including air temperature (AT), water temperature (WT), dissolved oxygen (DO), turbidity (Tur), pH, transparency (T), oxygen saturation (OS), salinity (S) and electrical conductivity (EC) were observed during the study period.

Water samples were taken monthly from the lake to study the population diversity and density of copepods. Copepods were counted in a Sedgewick-Rafter chamber or cell using an inverted OLYMPUS microscope at 60-100 x magnification. Photographs of copepods were taken by LEICA HC 50/50 microscope with 5.0 megapixel Cannon camera fitted on it. The copepods were identified to species level, on the basis of their behavior, body shape, particularly caudal ramii and antennae.

In the present study, 12 species of copepods belonging to two different orders (cyclopoida and calanoida) and 11 different genera were identified. *Diacyclops thomasi* was dominant species in all months.

Analysis of Variance of physico-chemical parameters showed that the air and water temperature, dissolved oxygen, Oxygen saturation pH, electrical conductivity, turbidity and transparency were statistically significant as the value of P was less than 0.05. Copepods diversity was found maximum in the month of June and July and minimum in September and October. Pearson correlation was calculated between copepods and physicochemical parameters. Water temperature (0.224), dissolved oxygen (0.444), oxygen saturation (0.360) and electrical conductivity (0.437) showed positive correlation while pH (-0.086), turbidity (-0.240), salinity (-0.050) and transparency (-0.183) showed negative correlation.

Shannon Weaver Index (H) ranged from 1.75 to 2.90 representing moderate diversity of copepods. Simpson Index of Dominance (D) ranged from 0.093 to 0.9932 and strengthened the

results of Shannon -Weaver Index. Simpson Index of Diversity (1-D) ranged from 0.6514 to 0.9906 showing moderate diversity of copepods. Species Evenness (E) value showed variation from 0.8433 to 1.1035 with small difference in all months. This shows low diversity of copepods with respect to different species. Species richness (SR) minimum value is 0.3142 and maximum 1.4771. This represents moderate diversity of copepods.

Species abundance curve revealed highest and lowest copepods abundance in all months. *Diacyclops thomasi* was at the highest peak point and *Calanus austrilis* was present at least spot. Cluster Analysis (Dendrogram) was plotted for 12 different identified species for their comparative study. It showed 3 groups of different species. First group cpmprised *Mesocyclops* sp. and *Diacyclops bicupidatus,* Group II consist of *Eucyclops agilis, Ectocyclops phaleratus, Onychodiaptomus sanguineus* and *Macrocyclops albidus. Acanthodiaptomus pacificus, Macrocyclops fuscus, Calanus australis, Eucyclops agilis* and *Acanthocyclops viridis comprise* group III. *Diacyclops thomasi* show separate line.

PCA was plotted between copepod species and months. Bipolt of PCA showed positive relationship of copepods with all months except December.