ABSTRACT

This study was carried out to find diversity, density and abundance of zooplanktonic copepods. For the study, Change Managa forest Lahore was selected because no work has been through this lake so far. The entire area was divided into four different sites. The sampling was carried out once in a month from September 2015 to August 2016. Physico-chemical parameters were determined including air temperature, electrical conductivity, pH, water temperature, dissolved oxygen, turbidity, transparency and salinity.

The planktonic samples were preserved and extracted properly. The number of individuals of copepod had been counted by utilizing Sedgewick rafter chamber or crossbeam cells in 60-100x amplification with the help of an altered OLYMPUS magnifying microscope. Photographs were taken by microscope (LEICA HC 50/50) with 5.0 megapixel Cannon camera settled on it. Copepods were identified up to species level on the basis of their shape, morphological features and behaviour.

In total, 26 species were identified belonging to 21 genera. Copepod population was highest in May (9.00±1.47) and lowest in October (0.75±0.65). The dominant genera were in order *Cyclopoida* > *Harpaticoida* > *Calanoida* > Poecilostomatoida The *Ectocyclops phaleratus* was dominant species with mean population density (38.25%).

Analysis of Variance (ANOVA) showed that turbidity, pH, electrical conductivity, salinity, transparency, water temperature and air temperature were statistically significant throughout the period.

Pearson correlation indicated that total dissolved solids, transparency and salinity were negatively correlated with copepod density and diversity. Air temperature, water temperature, turbidity, pH, dissolved oxygen and electrical conductivity were positively correlated with copepod density and diversity.

Shannon-Weaver index was observed low in February (1.30) and high in July (02.46). This showed moderate diversity of copepods throughout the study period. These

Simpson reciprocal index, Simpson index of dominance and Simpson Index of diversity and values also supported those results. Species evenness was lowest in October (0.84) and highest in June (2.484) showing uneven distribution of copepods in some months but even distribution in April and some other months. Species richness ranged from 0.22-1.39 showing a smaller food chain.

Rank abundance curve was plotted between Copepod species and relative abundance of their individual. The species abundance curve showed that *Ectocyclops. phaleratus* was present at rank 1 with abundance (70%), the highest value in the plot. While *Microcyclops rubellus* were present at rank 2 with abundance (54%) . *Paracyclops fambricatus* was present at rank 3 with abundance (47%). *Neutradiaptomus. mariadvigae mariadvigae* and *Tigriopus californicus* were present at the end of the curve with least abundance of (3%). The remaining species lie between these extremes.

Principal Component Analysis (PCA) was applied between Copepod species and months. Biplot graph was bisected by two central lines (one vertical and one horizontal). In biplot graph of PCA I *Cyclops bicuspidatus, Eucyclops serrulutas, Macrocyclops albidis and Paracyclops fambricatus* were present at the upper right side. *Diacyclops bicuspidatus, Ectocyclops pheleratus, Elaphoidella amabilis* and *Microcyclops rubellus* were present at the lower right side. They all showed positive relation with months. *Goniocyclops silvestris* was present at upper left side showed negative relation with months. *Cyclops strennus* were present at lower left side showed strongly negative relation with months.

Eight major Clusters were observed in cluster analysis showing 26 Copepod species. Seven clusters were formed at Euclidean distance 4.7. One cluster was formed at Euclidean distance 2.1. All these clusters were merged at Euclidean distance 5.1 into single cluster.