



Study of Physicochemical Parameters and the diversity of Zooplanktons in Chickan Lake, Sindh, Pakistan

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Abstract: Zooplankton is a vital component of aquatic ecosystems and has become a significant aspect of research in estuarine areas or brackish water or freshwater. In the present study, the diversity of zooplankton was correlated with Physico-chemical characteristics brackish water at Chickan nearly 25 km in the north of Dadu City. Zooplanktons are important for the secondary types of animals. The selected area of water is very important to the community in the sense of fishing Chickan is a good feeding ground of important local and migratory birds. The study was carried out from January 2018 to 2018 December. During the study, period variations were observed in the content physicochemical parameters of the saline lake. Thus such variations in physicochemical parameters of the water may have adverse effects on the lower level creature. A large number of zooplankton such as rotifer recorded 58%, protozoan 28%, copepods found 36% and cladoceran were 6%. The maximum and minimum quantitative ranges are described. The highest temperature recorded is 36°C and the lowest 14°C in winter. The pH was recorded from 12.6 to 7.2. Transparency. Was 94 to 44 Hardness was found 190 to 325. And salinity was found 20.525% to 11.5%. TDS were from 1248 to 1027 Dissolved Oxygen was 8.8 to 6.1

Keywords: Zooplankton, Variations, Richness, Climate, Multidimensional

1. INTRODUCTION

Chickan Lake is one of the largest lakes in Dadu. The length of the lake is about 1.4 square kilometers, which is counted as the longest lake in the Dadu. (Palh, *et al* 2019) The chickan lake is economically important in the city and is 12 to 7 feet deep or even shallow stretches of water occupying the area. (Palh, *et al* 2016) It is observed during research work that the salinity range arrived at the maximum in the dry climate (May to June). The purpose of the current research is to make available in sequence about the zooplanktons in the study area and physicochemical changes in that water. The diffusion area of the lake varies from season to season. Water is multidimensional, contains a variety of plankton useful for biological monitoring (Akhtar, *et al* 1976). Plankton is a small organism that performs a vital responsibility inside the lake and food chain ecosystem. The plankton are an important component of the aquatic food chain that greatly contributes to food development for new species that live in the lake's environment (Bell, *et al*, 1970).

Zooplankton plays a significant role in water decontamination and serves as bio-indicators of water quality. Zooplankton is a vital component of plankton that not only supports the feeding resources to higher

consumers (Mathivanan, *et al.*, 2007). Zooplankton is very essential in the dynamics of the water environment, due to the essential role in the food chain of the aquatic environment (ZanTen and Dijk, 1995). Zooplankton is known as a crucial portion of web food in the majority of freshwater and marine ecosystems. Therefore, the fisheries resources are directly connected with the zooplankton's species (Thomson and Ware, 2005). Zooplanktons such as rotifers, cladocerans, and copepods based on the little Caribbean are probably mainly remained under the studies on the component of geographical-plankton based researches (Frey, 1982; Dussart *et al.* 1984; Collado *et al.*, 1984). They transfer energy from the producers towards potential customers i.e. the crustaceans, invertebrates, and the fishes. The rotifers are mainly considered as the major indicators living in the lakes and freshwaters. The current study has been significantly recorded the rotifers mainly happening at the various stages which were further studies as tropical and salinity.

The purpose of this study was to record, document the occurrence of different species of zooplankton in the study areas. The richness of the various species of zooplankton can be high or low in the different qualities of water. The level of richness is expected at a low elevation. The present study mainly supports to

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characterize the zooplanktons dynamics in the lake, especially in Chickan lake.

2. MATERIAL AND METHODS

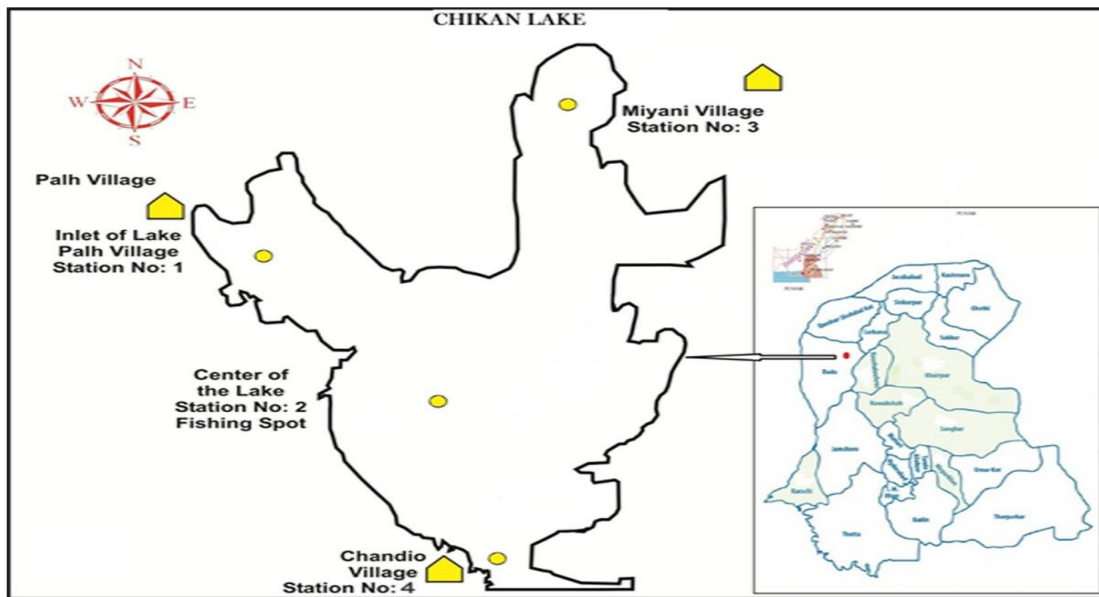
Study area

Specimens were formed by horizontal towing with the aid of a net of 55um mesh. In the 5% formalin solution, the collected specimens were fixed. The features based on ecological samples of various bodies of water in this

Sampling Stations

study are properly précised in table number one. The water samples from four stations are collected regularly each month for the analysis of water quality parameters at Chickan Lake. Water samples were collected in plastic bottles from side to side and placed into an icebox to protect the parameters directly. The test protocol was added to normal APHA (1992) methods in the laboratory. Water temperature, pH, DO, TDS, and salinity have been checked using digital meters on-site.

Site Code	Site Name	Description
S1	Palh Village	This site is the entry point of Lake
S2	Center Point	It is the major population of lake
S3	Miyani Village	This is a place where there are many population by the bank and it reflects the impact of faucal discharge
S4	Chandia Village	It is the exit point of the lake



MAP OF CHIKAN LAKE

3. RESULTS AND DISCUSSIONS

A large number of zooplankton such as rotifer recorded 58%, protozoan 28%, copepods found 36% cladoceran was 6%. A total of three taxa of Zooplankton was collected from the lake. (Graph 1) Rotifers are a dominant community among the three taxa consisting of 22 species. Copepods consist of ten species and two species from the cladocera taxa. Four species of cyclopoids were identified. Only one species of calanoid and harpacticoid was recorded. Apocyclops species were recorded abundantly from June to December. *Mesocyclopsleuckarti* species was recorded in May. Among the rotifers, *BrachionusPlicatilis* was dominant in March and April and were absent in October. *Brachyonusrubens* were rare in September and July and abundant in Feb and March and were not found in July and August. Zooplankton *mytilinas* species was recorded from Sep to Feb and were rare in Dec and March. The present study suggested that there is a need for continuous studies throughout the year and during the monsoon season/flood period order to elaborate the real picture of the zooplankton community that exists inside the studied areas. The work was carried out to show the key physicochemical features of water and contamination in reservoirs where the study was carried out..

Table Water quality parameters, units, and methods used for Chickan lake

Parameters	Abbrevia	Method	Units
pH	-	pH meter	-
Temperature	-	Thermometer	°C
Transparency		Secchi disk	ml L ⁻¹
Dissolved Oxygen	DO	Dissolved Oxygen meter	mg/l
Total dissolved solids	TDS	Gravimetric analysis and Filtration	mg/l
Salinity	PSU	Salinity metter	%
Hardness	HRC	Titration	ml L ⁻¹

Temperature

The temperature of the water has importance regarding its effects on aquatic life. During my research, the maximum temperatures recorded in lake 36⁰c, the highest temperature range in the village station of Chandia was recorded in June and July.

pH

Scientific Orion 5 star pH meter was used to measure pH. Before use, it was calculated by the manufacturer's instruction physical. The pH meter electrode is immersed in the water and reading on-site was obtained while the meter was steady. In the present study minimum value of pH was 10 in December, and the maximum was 8.8 in January at the stations Miyani village.

TDS (Total Dissolved Solids)

TDS which found in water has significantly varied so much due to extended. During the studied periods at the stations of Palh village, the highest value of total dissolved solids was noted 387 mg/ L in. Whereas the lowest range of TDS was noted 260 mg /L in October.

Salinity:

The salt mixture commonly present in water contains very high amounts of sodium chloride (NaCl) or even table salt. The ocean usually contains 35 grams of seawater per KG. Salinity was noted, at the studied stations of the Centre point 20 ppt. while it was noted highest in the range.

Dissolved oxygen (DO)

The lakes' aquatic ecosystem is one of the key criteria. The oxygen meter (jenway model 9071) has been used to assess it.

Hardness

The lowest range of hardness was noted 125mg /L1 in January, the highest range from 325 mg/L in October at Station Palh village.

Alkalinity

Alkalinity recorded 50 mg /L1 in December while, it was noted highest in the range from 91 mg/L in November at Station of Chandio village.

Measurement of Transparency

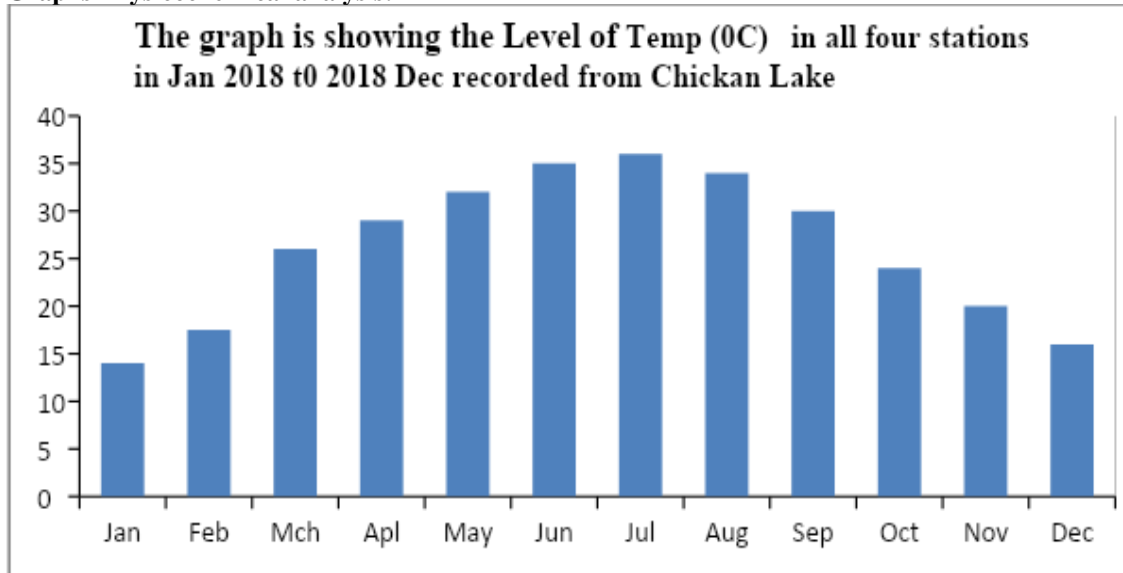
Water transparency was measured by a 20 cm diameter sachhi disk with four alternate black and white quadrates, and transparency measured, and slowly decreased to vapor, where water was free from currents or disturbances. A spot between presence and absence was located in the water depth. The (X1) shows a fall in the water and (X2) shows the reconsideration on the upper surface of the water.

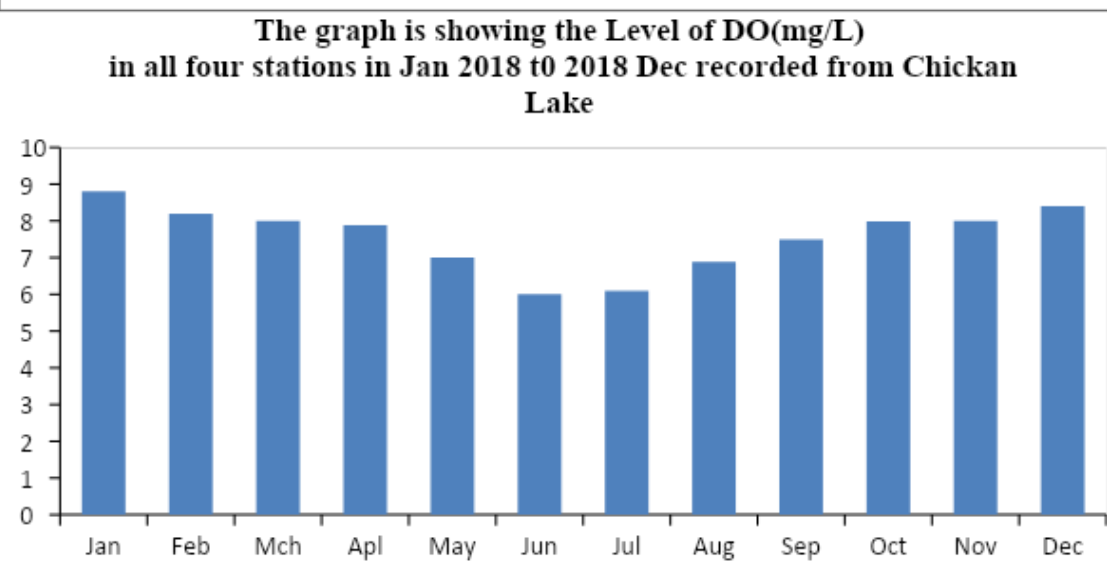
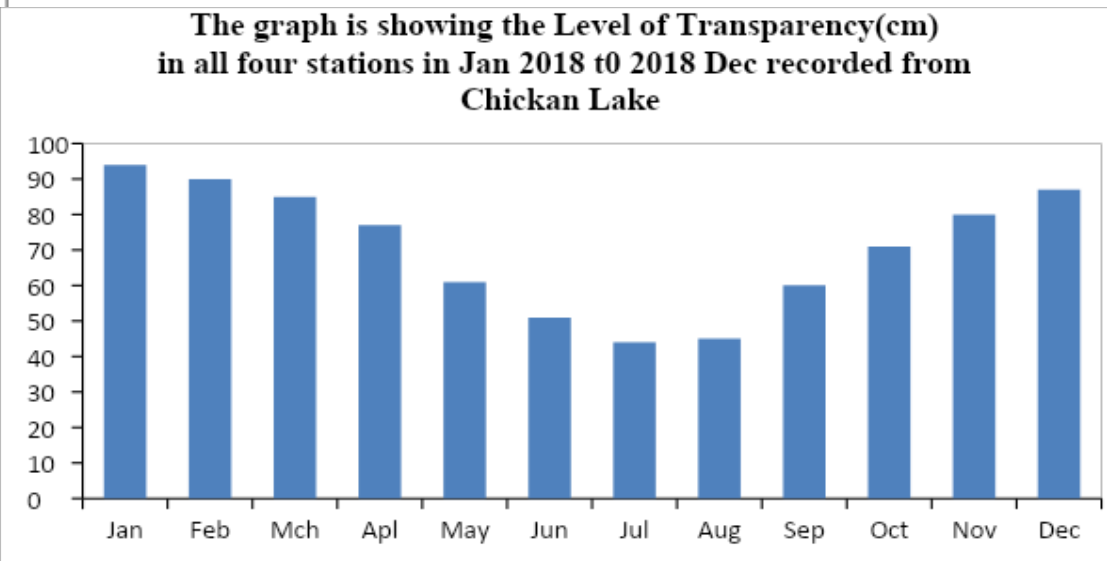
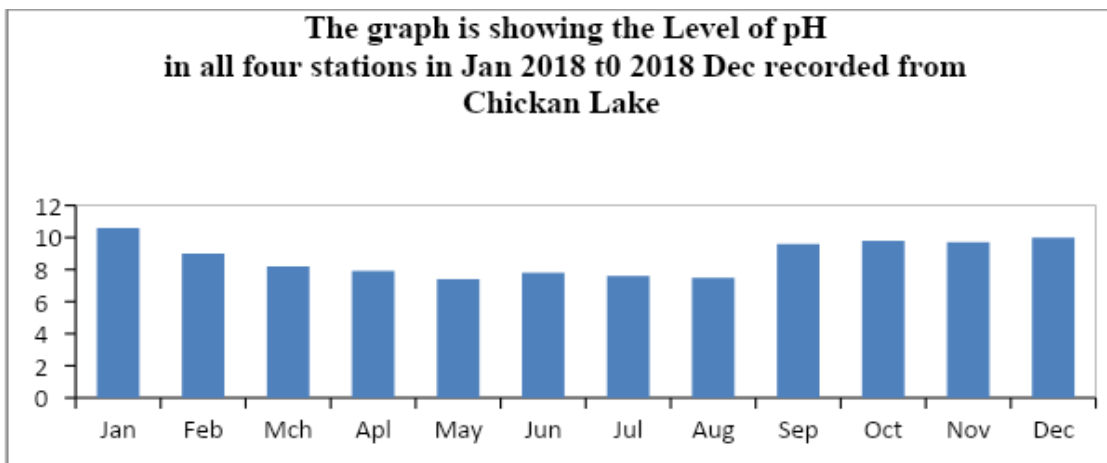
Transperency (Secchi Disc Transperency) $(x1 + X2)/2$ During: X1 water depth at sachhi disappears and X2 water depth at sachhi reapers.

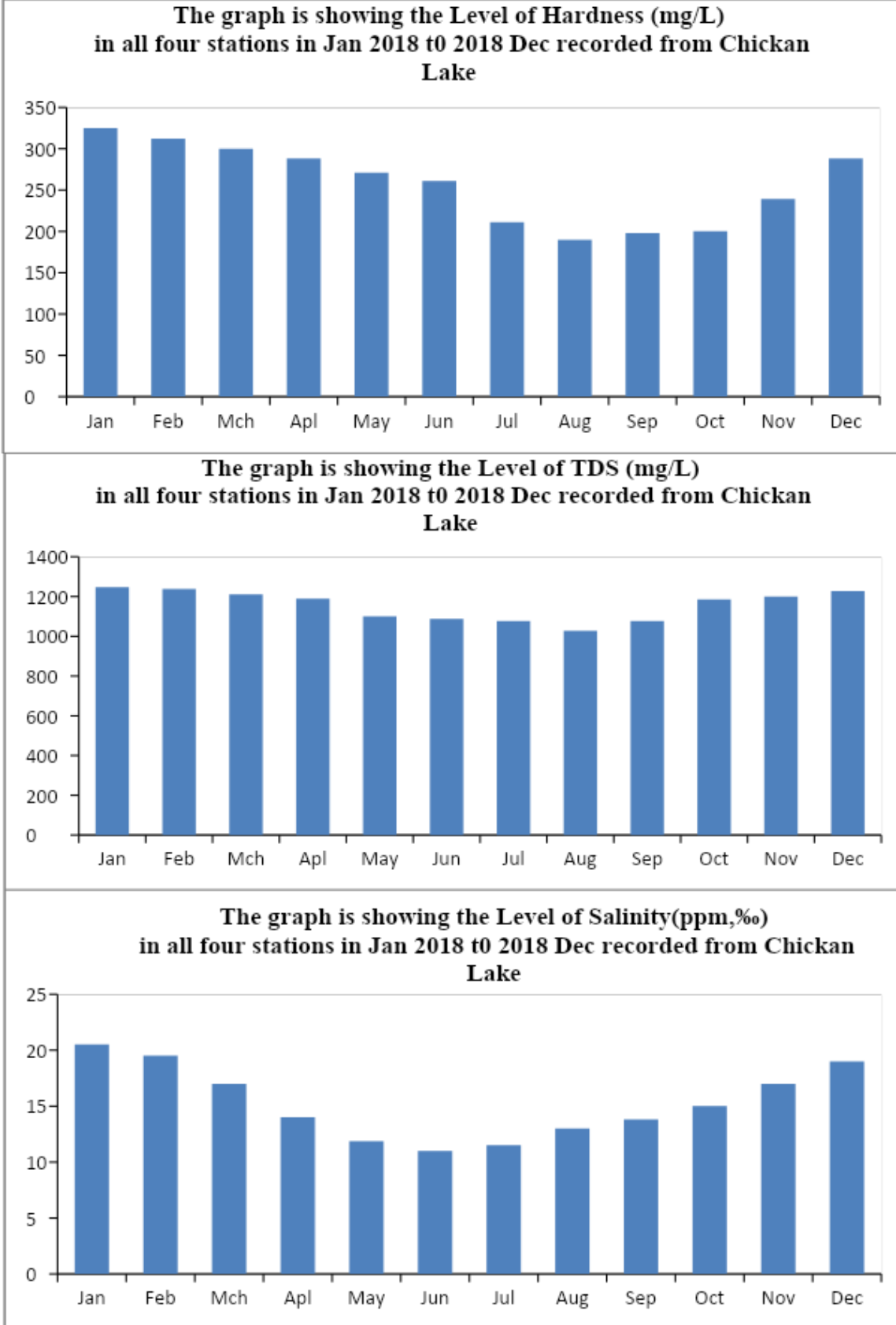
List of Zooplankton occurring in Chickan Lake.

Groups Rotifers	Winter	Spring	Summer	Autumn
<i>Diurella</i>	+++	+	++	+
<i>Lecanelasma</i>	+	+++	+	+++
<i>Platylaspatulis</i>	++	+++	+++	+++
<i>Lecanluna</i>	++	++	+	+++
<i>Hexathramira</i>	++	+++	++	+
<i>Testudinella patina</i>	-	+	++	++
<i>Mytilinaventrilis</i>	+++	+	+	+
<i>Asplancha</i>	-	++	-	++
Protozoans				
<i>Amoeba</i>	++	-	++	+
<i>Paramecium</i>	-	+	-	+++
<i>Euglena</i>	+++	+++	+	++
<i>Syphoderia</i>	-	+	-	++
<i>Actinophyrus</i>	++	+	+	+
<i>Verticella</i>	-	-	+	+
Cladocerans				
<i>Daphnia</i>	+	++	+	++
Copepods				
<i>Cyclopoid copepod</i>	+++	+++	+++	++
<i>Nauplius Larvae</i>	+++	+	+++	+++
<i>Diatoms</i>	+	+++	+++	+
<i>Cyclops</i>	+	+++	+	+

Graphs Physicochemical analysis:







4. CONCLUSION

The major conclusions, than can be drawn from my research is: zooplanktons are occurring in the lakeital belonging 3 taxa. The dominant species were found rotifers, occurring in saline water,as well asmethod of eutrophication is prevailing in the studies area, however, the study site is retaining place of mesotrophic for a longer period. Therefore, the occurrence and distributions of rotifer species were found abundantly at the site of Centre point Station as compare to Chandia village Station in exit point. Throughout the study period, rotifers were found abundantly than other taxa.

From the current research, it is evident that the lake composition is continuous in species. During the current research, salinity is the principal source of improvements in the Lake zooplankton community. Littoral zooplankton in the salt or eutrophic water bodies is the creatures belonging to the rotors found in hypersaline water.

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