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An Investigation of an Ecological study of Phytoplankton of Chickan Lake District Dadu, Sindh, Pakistan

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Abstract: Chickan Lake is famous historical lake located at Palh village 26º 57'33.94 N, 67º 51' 06. 10 E in the province of Sindh, 28 km North of Dadu city and Present investigation of an ecological studies of phytoplankton of Chickan Lake during January 20016 to December 2016. In this study there were four sampling station selected for sampling purpose at the commanding area of lake? The research work is concerned the assessment of different water quality parameters and determinations of planktons, which is essential for investigation and productivity of lake. To assess the hydrological parameters of lake i.e.: Temperature, Transparency, pH, TSS, TDS, Salinity, Hardness, Chlorides, Dissolve Oxygen, the analysis of biological parameters indicates the presence of Plankton population which belongs to different groups such as Cynophayta, Chlorophyta, Euglenophyta and Bacillariophyta, the population of phytoplankton belongs to different groups were dominant as compare to the zooplankton. The water quality is being changed due to seasonal variation which impact on plankton flora and fauna resulting in seasonal variation in their numbers and composition.

Keywords: Chickan lake, Investigation, Phytoplankton, Wildlife Sanctuary

1. INTRODUCTION

The lake covers an area of 345 acres (140 ha) with the length of about 1,4km and depth is 12 meters. It is semi natural wetland and saline lake with extensive marsh land which support rich and diverse aquatic vegetation. (Palh *et al.*, 2016). Monsoon rain is the main source of water supply for chickan lake also various small water courses joins it through the east.

The chickan lake was avowed a Wildlife Sanctuary in accordance with Section 14 of the Sindh Wildlife Protection ordinance of wild life Department in October 1972, (Palh *et al.*, 2016), As a result, fishing, hunting, agriculture and crops were severely forbidden. The chief purpose of the monitoring of the lake is to assess the ecological status of plankton diverse life forms of aquatic flora species, their composition, abundance and water quality in order to check the level of contamination and current status of water quality and their natural status. (Lashari *et al.*, 2014). The quality of water changes time to time and varies its quality due to the influx of various sources of pollution with the inferences of human activities (anthropogenic) and naturally induced factor. Therefore, depth assessment and analysis of water quality of lake is being carried out in order to provide the preliminary condition for the evaluation of contamination and quality of water.(Lashari *et al.*, 2014).

2. MATERIAL AND METHODS

The present study entailed from four selected sampling locations of Chickan lake which are: Station # 1 Palh village, Station # 2 Center point, Station # 3 Miyani village and Station # 4 Chandio village. The periodically monthly sampling was carried out of water quality parameters, phytoplankton, zooplankton, during the research period January 20016 to December 2016, in order to analyses the water quality of lake and the present status of biota respectively. (Palh *et al.*, 2018) For analysis of water quality parameters of Chickan lake, the water samples from four stations were collected regularly on monthly basis. To sanctuary the parameters, water samples were collected through a standard water sampler poured into a PET bottle and instantly placed in an ice box. The procedure of the examination was carried out in the research laboratory rendering to the APHA standard method (1992). Water temperature, DO, pH, Salinity and TDS were scrutinized on the survey locations by using digital meter.

3. RESULTS AND DISCUSSION

Water Quality Parameters

The Water temperature of lake plays pivotal role in the growth of plankton which contributed the blooms formation in water. Transparency is considered to be one of the drivers of water quality of the lake,

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suggesting the existence of plankton community and other floating matter. The range of transparency was said to be low during the summer due to influxes of fresh water and contained the large quantity of suspended particles and water is highly turbid in nature while higher range was found in winter at all sampling location and it gradually increased in the month of November till early February. pH ranges were found higher in summer and in alkaline nature thought the study period at all respective station and slightly decreased and variation occurred in winter season while no any major change was detected in water quality of lake. TDS ranges were found to be within permissible range of National Environmental Quality Standards (NEQS) for in land water as accordance PEP, ACT, 1997 but it beyond the limits of National Standards for Drinking Water Quality (NSDWQ) and World Health Organization (WHO) was observed. The variation among TDS and chlorides was recorded during spring and winter seasons at all sampling locations. Though, any chemical changes in the described parameters may lead to changes in other physico-chemical parameters of the water quality of the lake, the possibility that small effects may occur in various aquatic organism. The concentration of excessive hardness affects the water quality of the lake in winter, which in turn has a direct influence on the various biotas that exist there. Higher hardness values were recorded in winter and were minimal in summer. The maximum value of dissolved oxygen was minimized in the winter because of change in temperature and low was in summer. Reducing dissolved oxygen in water during summer season due to the addition of agricultural effluents containing rich chemical fertilizer and supported by eutrophication. The findings of excess amount of BOD in the water of lake is indicated that the water contain the organic pollutants which favoured the growth of plankton resulting reduce the oxygen level in the water. Apart from this, changes in water quality parameters also bring about dense growth of lake plankton water of the lake. Reason behind the change in chemical and physical nature of water quality of lake is due to mixing of drain water and agricultural runoff and it produce a impact on the composition of various plankton, and other biota and thus findings showed that water quality of lake having test, foul, unpleasant odorous, salty and unfit water for living organism. The phytoplankton populace has a place with 4 gatherings of Cyanophyta, algae, Euglenophyta, Chlorophyta and Bacillariophyta. When all is said in done, blue green algae were seen as an overwhelming group over different sorts of algae.229 types of phytoplankton have been distinguished in this research study.

These include filamentous, colonials as well as unicellular forms. The 68 species of Cyanophyta has the largest number, while Chlorophyta was represented by 59 species, followed by Euglenophyta as the 48 species and the 54 species belonging to Bacillariophyta were recorded from Chickan Lake.

4. CONCLUSION

On the basis of above findings with detailed investigation it is revealed that the hydrological parameter and biological characteristics including plankton composition and natural productivity of the lake which shows that lake is at eutrophic stage. So, there is a urgent need to restore, conserve, preserve and control the environmental degradation and improve the ecological balance for the sustainability of lake for enhance their production. Current assessment of environmental parameters viz Transparency, TDS, TSS Temperature, pH, Salt concentration, Hardness and Chloride concentration are explicated about the effect of water quality and quantity on the growth of aquatic organisms. According to the analysis of the water quality parameters directly affecting the aquatic biota that dominates the lake ecosystems, As Goldman (1983) reported that any change in water quality parameters causes a change in the growth of aquatic life.

Phytoplankton Graph

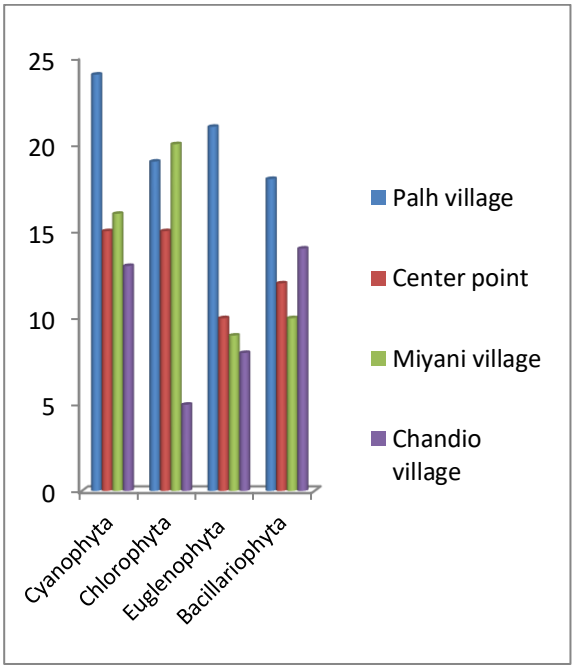


Fig 1: The graph shoes Station wise summary of phytoplankton counts 2016

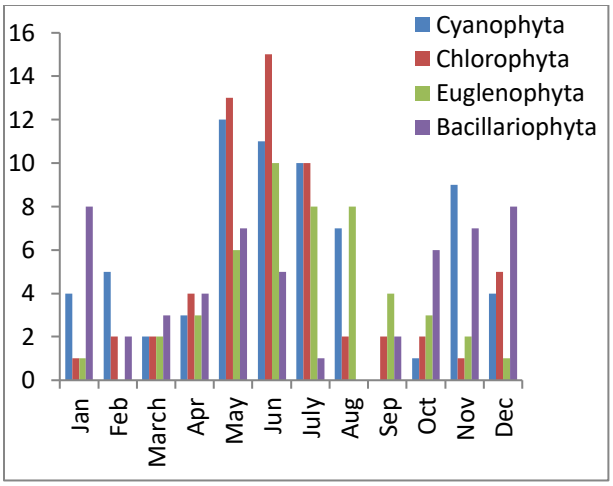
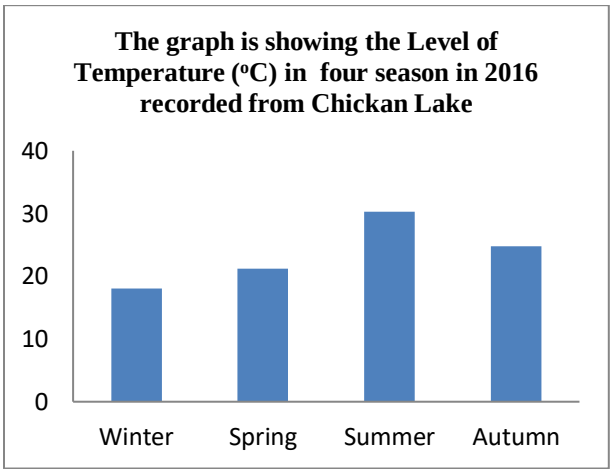
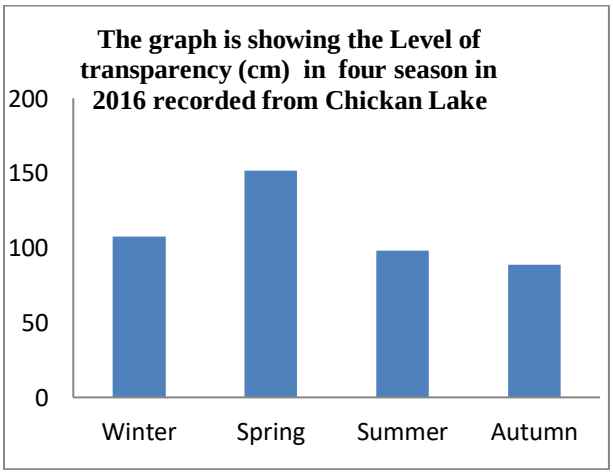
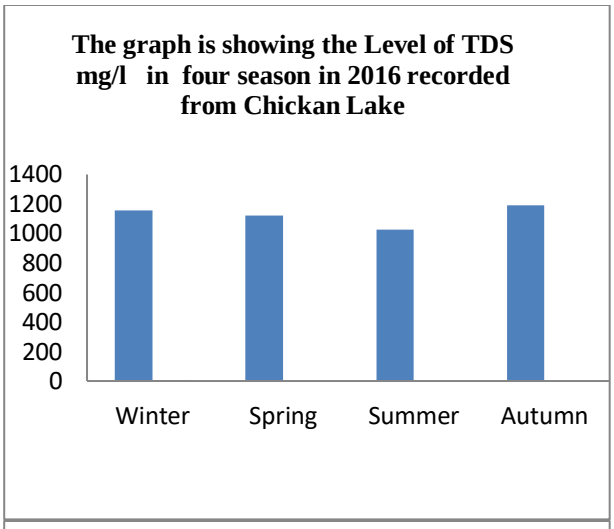


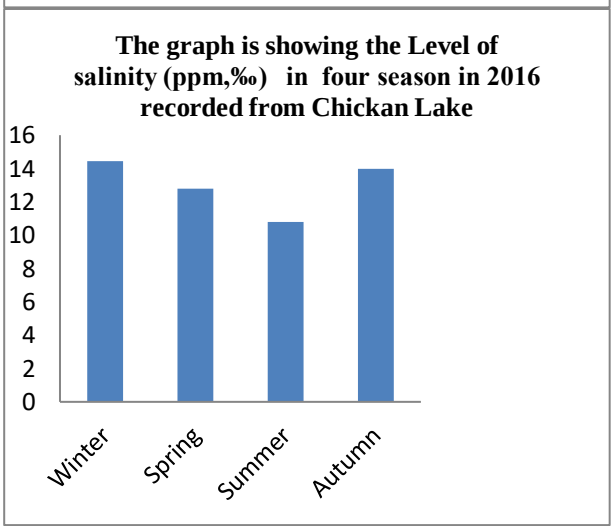
Fig. 2: The graph shoes Months wise summary of phytoplankton counts 2016

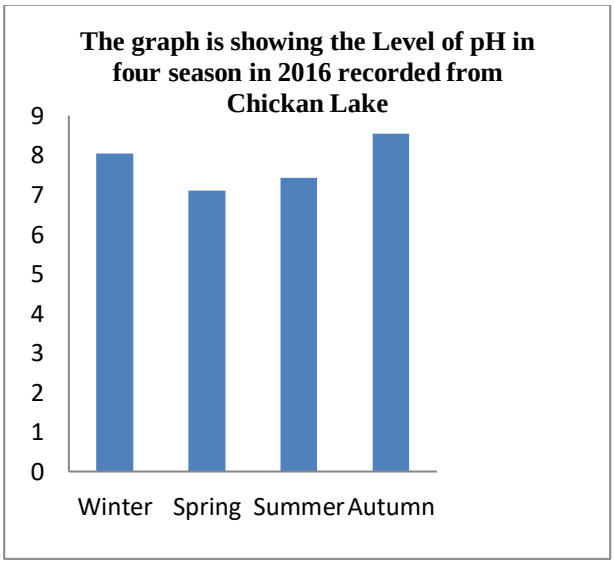
Graph 3. Physico-chemical analyses of Chickan lake (2016)

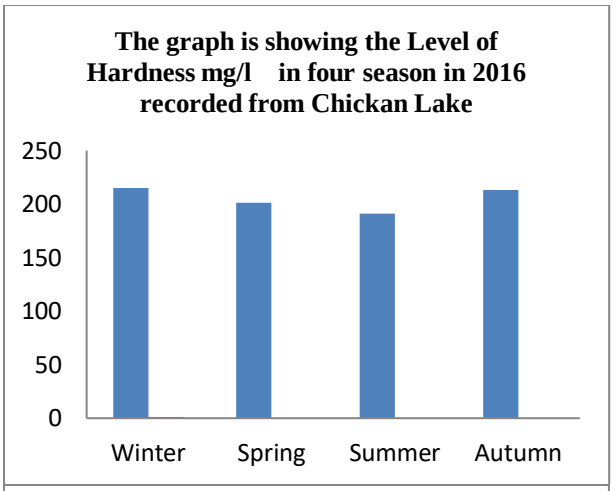


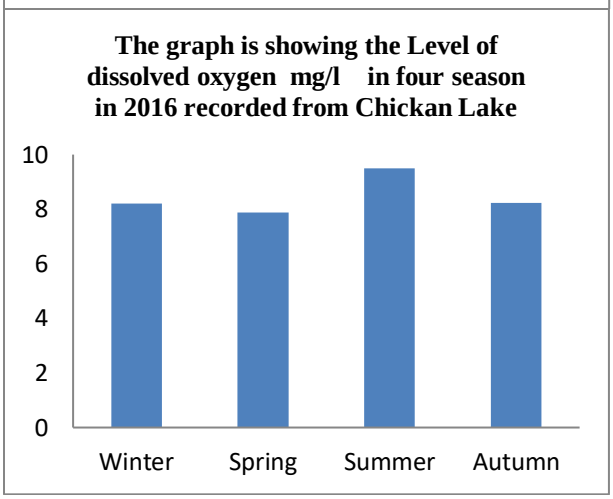












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