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Studies on physicochemical variations of Budharam Lake in relation to seasonal variations and its productivity

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Abstract
Water parameters and plankton diversity are very important for determining of fish production. The specific status of limnological characteristics and diversity of plankton in lake Budhram lake have been studied through seasonal surveys in two annual cycles 2015 - 16 and 2016 – 17. In the present study, water samples were collected from different locations of Lake Budhram, Mulugu district Telangana state, for physico- chemical analysis. The laboratory test of the collected water samples were performed for analysis of various parameters such as pH, Temperature, Total dissolved solids, Dissolved oxygen, Alkalinity, Total hardness, Chloride, phosphorus, BOD and COD the methods employed for the analysis as per standard methods recommended by APHA, WHO, ICMR. The obtained values are compared with the standard limits. The present study was intended to evaluate the seasonal variation on physico-chemical parameter and their relationship with plankton community of Budhram Lake. The nutrients dynamic of Budharam Lake exhibit considerable seasonal variation due to the rainfall and nutrient utilization of autotrophs. The phytoplankton groups are Chlorophyceae, Cyanophyceae, and Euglenophyceae. The highest plankton density was recorded during summer season while lower in monsoon season. The zooplankton groups are Rorifera, Cladocera, Copepoda, Ostracoda. Chlorophyceae appeared as the dominant group of phytoplankton in Lake Budharam during both the study years. During the first year of study period this group exhibited maximum density of (3221 org/L) followed by Bacillariophycea (2664 org/ L) Cyanophyceae (1435 org/ l) and Euglenophyceae (216 org/ l). Similarly chlorophyceae also registered maximum density of (3325 org/l) during second year period followed by Bacillariophyceae (2806org/L) Cyanophycea (1520 org/ l), and Euglenophyceae (227 org/ l). Annual densities of zooplanktons during the first year Rotifera appeared as dominant group of zooplanktons with higher density (1283 org/ l) during the second year of the study period followed by cladocera (579org/ l) copepoda (602 org/ l) and ostracoda (268org/l). During the first year of the study period Rotifera again contributed maximum density (1270 org/l) followed by copepod (539 org/ l) cladocera (485 org/L) and ostracoda (161org/L). The minimum number of zoo planktons and was recorded in the rainy. Phytoplankton and zooplanktons have a nominal positive relationship. Phytoplankton was increased or decreased with the relation with zooplanktons.

Keywords: Lake Budharam, physico-chemical parameters, zooplanktons, phytoplanktons

Introduction

Water quality is very important in fish farming as poor quality water can affect the health and growth of the fish. It is most important that farmers pay attention to the water chemical and physical factors. Water may be considered as a Binder or matrix in which the dissolved gases inorganic substances minerals as well as organic matter prevails. In addition to dissolve substance the water matrix gives support to microorganism, plants and animal life forms and provides, a medium for a chemical exchange among these populations. The maintenance of good water quality is essential for both survival and optimum growth of culture organisms. The levels of metabolites in pond water that can have an adverse effect on growth or generally and order of magnitude lower than those tolerated by Fishes /prawns/shrimps for survival. Good water quality is characterized by adequate. Oxygen and Limited levels of metabolites each water quality parameters interacts with the influences other parameters, sometimes in complex ways. Concentration of any one parameter that would be harmless in one situation can be toxic in another. For example when aeriation. and the gas degassing problems occur carbon dioxide levels will generally become high while at the same time dissolved oxygen levels become low the result of this particular situation is that not only is there less oxygen available to the fish that fish are less able to use the oxygen and that is available the high carbon dioxide level of the water affects the fishes blood capacity to transport oxygen, aggravating the the stress imposed by low dissolved oxygen levels. Another excellent example of the complex interaction among water quality element is the relationship between the pH and toxicity of ammonia. The relationship between water quality factors and their effect on fish growth rate and helps is complicated for example, fish lack the means to control their body temperature and maintain it is independent of the environment. Environmental temperature changes affect the fishes rate of biochemical reactions, which leads to different metabolic and oxygen consumption rates. At the lower ranges of the species tolerable temperature range these rates decrease. As water temperature increase, fish became more active and consume more dissolved oxygen, while simultaneously

producing more carbon dioxide and other excretory products, such as ammonia. These increasing rates of consumption of necessary elements and production of determined elements can have a direct effect on overall fish health and survival if these parameters are allowed to exceed normal values. The culture organisms, algae and microorganisms such as bacteria produce metabolites in a pond. The major source of nutrients in aquaculture is the feeds because a large quantities of feed are loaded in ponds, excess feed, fecal matter and other metabolites become available in large quantities for the growth of algae and microorganisms. The aquatic environment is totally alien to air breathers and thus some form of water quality monitoring and Measurement is extremely critical to any successful operation. The critical parameters, in order of importance, are the dissolved oxygen concentration, temperature, PH, un-ionized ammonia concentration, CO2, nitrite, suspended solids, and alkalinity. Although each individual parameter is important, it is the aggregate and interrelationship of all the parameters that influence the health and growth rate of fish. Each water quality parameter interacts with the influence other parameter sometimes in complex ways. Concentrations of any one parameter that would be harmless in one situation can be toxic in another.

Materials and Methods

Study Area

Budharam Lake situated in Budharam village in Ghanpur (Mulugu) Mandal in Mulugu district of Telangana state at latitude 18.73and longitude 79.8. It is located the altitude 227 metres above sea level. The water spread area of the lake 1.12 kilometre square the total catchment area of 276acres. Budharam Lake is surrounded by Regonda Mandal towards west, (mulugu) Mandal towards south, venkatapur Mandal towards East, Bhupalpally mandal towards North.

Fig 1: Shows Budharam lake satellite image.

Sampling Program

The studies were carried out for 24 months from June 2015 - May 2016 and June 2016 - May 2017 during different Seasons at three different sites. The Seasons defined as monsoon (June – September) and winter (October - January) and summer (February – May).

The sampling sites S1, S2 and S3 of rural Lake Budharam presented in photoplate II and III. The main aim of present study is to investigate the physic - chemical and biological characteristics of water. Sampling sites were chosen from the lake keeping in view the accessible area of the lake. Sampling sites were selected at suitable points of the lake and samples were collected from sites between 8:30 a.m. to 10:30 a.m. in the morning hours.

Sampling procedure: Sampling program for present study started from June 2015 and completed in the month of May 2017. water samples were physico chemical analyses were collected from 3 sites in 5 litre plastic cans during 8.30 am- 10:30 a.m. sample for dissolved oxygen determination was collected in 300 ml capacity BOD bottle from just below the surface slowly to avoid any air bubble entering into the bottle and fixed by Winkler's A and Winkler's B solution at the site. The parameters like atmospheric temperature, water temperature, PH and conductivity for analyzed with the help of thermometer and water analysis kits developed by EIPRO DU TS, (Mode-161 –E). Measurement of transparency was done by Secchi disc. For the analysis of chemical parameters the samples were collected in plastic cans and transported to the laboratory. Physico- chemical parameters were analysed with the help of procedures given in APHA (1985) [1] Khanna (2004)

Results and Discussions

Table 1: Shows the monthly variations in the physico chemical parameters of Budharam Lake water during 2015-16

S. no.	Parameters	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1	Temperature	32.10	29.50	29.30	28.20	27.50	26.70	23.20	25.20	30.10	32.50	33.00	34.10

2	Ph	7.80	8.10	8.12	7.50	7.02	7.85	7.10	7.25	7.30	7.45	7.75	8.10
3	Dissolved oxygen	4.75	5.85	5.95	6.30	7.40	7.20	8.50	8.10	6.15	6.90	5.15	4.80
4	Transparency	27.40	28.00	29.25	30.30	37.10	49.20	54.10	58.50	58.00	54.10	50.40	39.00
5	Alkalinity	260	265	269	260	290	241	235	210	185	210	235	250
6	Free carbon dioxide	3.85	3.35	3.60	4.40	3.15	3.75	2.90	2.15	3.91	3.82	3.15	4.30
7	Hardness	125	110	115	120	115	100	90	85	84	95	101	110
8	TDS	485	510	320	339	350	415	445	350	345	385	375	410
9	Chlorides	75.20	85.50	81.20	81.50	96.50	99.00	112.10	116.2	110.75	109.5	105.2	118.0
10	Nitrates	0.800	0.870	1.100	0.860	0.750	0.650	0.540	0.500	0.350	0.380	0.485	0.350
11	Phosphates	0.550	0.250	0.250	0.360	0.420	0.325	0.275	0.260	0.370	0.390	0.510	0.600
12	BOD	6.90	7.50	8.40	8.80	9.45	11.30	8.50	7.40	7.72	7.33	7.10	5.30
13	COD	5.50	6.50	7.40	8.00	8.50	9.30	8.30	7.00	6.50	6.40	6.50	4.90

Table 2: Shows the monthly variations in the physico chemical parameters of Budharam Lake water during 2016-17.

S. no.	Parameters	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1	Temperature	32.10	30.10	29.80	27.85	27.10	23.75	23.40	25.80	31.20	33.10	33.90	33.40
2	Ph	7.90	8.15	8.15	8.14	7.80	7.00	7.50	7.40	7.45	7.25	7.80	8.01
3	Dissolved oxygen	4.90	5.80	5.90	6.80	7.60	8.00	9.10	10.10	6.15	6.00	5.90	4.90
4	Transparency	38.50	28.90	26.00	28.50	37.00	51.00	59.00	71.00	67.50	52.50	52.00	40.50
5	Alkalinity	245	250	250	245	275	240	235	210	165	200	220	239
6	Free carbon dioxide	4.15	3.15	3.65	4.10	3.30	3.75	2.65	2.50	3.70	3.85	3.90	4.15
7	Hardness	128	115	113	120	112	96	94	84	94	106	120	123
8	TDS	445	335	325	327	330	400	410	405	340	380	390	400
9	Chlorides	80.20	90.10	80.20	80.50	95.50	98.00	110.10	108.25	110.60	109.00	105.20	112.50
10	Nitrates	0.870	0.800	1.100	0.910	0.770	0.650	0.500	0.520	0.240	0.370	0.385	0.485
11	Phosphates	0.520	0.220	0.229	0.300	0.320	0.380	0.250	0.260	0.270	0.370	0.490	0.600
12	BOD	6.80	7.40	8.30	8.50	9.40	10.80	8.50	7.50	7.50	7.40	7.10	6.10
13	COD	5.60	6.60	7.50	7.80	8.10	8.50	8.00	7.00	6.25	6.20	6.30	5.00

Temperature

Water temperature can affect fish and shrimp metabolism, feeding rates and the degree of ammonia toxicity. Temperature also has a direct impact on biota respiration oxygen consumption rates and influences the solubility of oxygen (warmer water holds less oxygen than cooler water). Temperature cannot obviously be controlled in a pond. Aquatic animals modify their body temperature to the environment and are sensitive to rapid temperature variations.

The data obtained on the temperature content of water samples from Budharam Lake during the year from June 2015 -May 2017 are presented in the table no (1 and 2). The data pertaining to temperature C^0 of Budharam Lake during the month of May in the year 2015-16 was observed as highest temperature 34.10 whereas lowest temperature 23.20 was observed during the year 2015-16-in the month of Dec. Temperature controls the rate of all chemical reactions, and affects fish growth and their reproduction. Drastic change in temperature can be fatal to fish. In the present investigation the water temperature ranged from 18.9 to 42.3 which is found suitable for both carps and air breathing fishes.

PH

Water quality pH is a measure of acidity (hydrogen ions) or alkalinity of the water. Optimal pH levels in the aquaculture system should be in the range of 6.0-9. It is important to maintain a stable pH at a safe range because it is affects the metabolism and other physiological process of fish and shrimp. Values outside of that range can create stress, production levels and cause poor growth and even death.

In the present investigation pH value ranges from 7.00 to 8.15 (table- 1) and (table -2).The highest pH value was observed during winter 8.15 in the month of July 2016-17, appear to be influenced by large number of phytoplanktons, whereas the lowest pH recorded 7.0 in the month of December 2015 - 16. According to Benerjee and Ghosh (1967) 6.5 -7.8 pH water range is most favourable for the fish production and 7.5 to 8.5 for average fish production. Thus the present value of pH of water may be considered suitable for the fish production.

Transperancy

The term transparency indicates the water content suspended material which interference with the passage of light. In fish ponds, turbidity which results from planktonic organism, is a desirable trait, where are the caused by suspended clay particles is undesirable. Even with the latter condition the clay particles are seldom abundant enough in water to directly harm fish. If the pond receives run of which carries heavy loads of silt and clay, the silt settles over the pond bottom and smoothers fish eggs and fish food organisms. The clay particles which remain in suspension restrict light and penetration limit the growth of plants. A persistent clay turbidity which restricts visibility in the water to 30 cm or less may prevent development of plankton blooms. Cause poor water quality. The Transperancy data recorded at Budharam Lake maximum recorded 59.00 in the month of December 2016- 17 minimum 26.00 in the month of Aug 2016 – 17.

Dissolved Oxygen

Dissolved oxygen is one of the most important parameters in aquaculture maintaining good levels of dissolved oxygen in the water is essential for successful production since oxygen has a direct influence on feed intake, disease resistance and metabolism. A sub optimal level of dissolved oxygen is very

stressful for fish and shrimp. Lower levels for example 3 PPM of dissolved oxygen result in slower growth and decreased immune responses and levels below 1 PPM can be Lethal.

It is therefore important to keep dissolved oxygen levels in aquaculture system above 4 parts per million. Dissolved oxygen in water comes from atmospheric Oxygen and photosynthesis. The atmospheric oxygen diffuses and dissolves in the water. But the diffusion and its subsequent dissolves into water is a slow process. The major source of dissolved oxygen in ponds is photosynthesis. However this process depends on the amount of light available to the aquatic plants in the water.

The solubility of dissolved oxygen in winter is increased with decrease in water temperature the present investigation the dissolved oxygen was maximum recorded 9.10mg/l in the month of December in 2016-17, whereas the low levels was observed 4.75 mg/l in the month of June 2015 – 16. The present study does not support this view, as there were several factors are responsible for reduction of dissolved oxygen contents are decomposition of the organic matters of the bottom, agetation of water during fishing activities and also due to excessive human influences.

Alkalinity and Hardness

Alkalinity is the buffering capacity of water and represents its amount of carbonates and bicarbonates. Hardness refers to the concentration of calcium and magnesium in water. Alkalinity can affect the potential for primary productivity and also the water Ph. Optimum hardness and alkalinity levels for aquaculture are in the range of 50 - 300 ppm caco3, which provide a good stabilizing effect to ph swings. Generally alkalinity varies from side to side. In seawater, alkalinity is normally higher than 100 ppm but in freshwater areas, alkalinity is often low, particularly during the rainy season. Low alkalinity in freshwater or in low salinity areas will affect the survival rate and molting of shrimp. Values of 50-100 ppm caco3, are generally considered moderate for freshwater farming. To keep a balance shrimp farming system, alkalinity values are recommended to be above 100 mg per litre. Total alkalinity has been traditionally expressed as mg per litre ppm of equivalent calcium carbonate. The normal range of alkalinity is 100 - 125 mg/l. In the present investigation as maximum alkalinity was recorded 290 in the month of Oct 2015 - 16 where are the lowest recorded 165 in the month of February 2016 - 17. So the ranges of alkalinity in Budharam Lake are suitable for fish growth.

Hard water have the ability to buffer the effects of heavy metals such as zinc or copper which are toxic to fresh and shrimp Thus, hardness is a crucial parameter in maintaining good pond balance at. Water alkalinity and hardness can be enhanced by liming ponds. Lime can be used to reduce acidity in water. In case the water pH fluctuates greatly during the day. Lime can also be used to increase alkalinity in the water to stabilize the water pH. However there is no practical way to reduce alkalinity and hardness.

The total hardness was maximum recorded 128 in the month of June 2016 – 17. Whereas minimum recorded 84 in the month of Jan 2016 -17. The Higher Total hardness value in summer was also reported by Devi, (1985 and 1977). The total hardness more than 300 mg/l is generally uncongenial for fish production because of higher pH. Optimum total hardness for fish culture has been found to be around 75 - 150 mg/l (Das, 1996) [4] sugunan (1990) [11]. The total hardness above 70 ppm is indicator of the better productivity.

Chloride

Chlorides constitute approximately 0.05% of earth's crust. Chloride concentration of between 1 and 100 ppm are normal in fresh water. Chloride ions come into solution in water in underground aquifers, geological formations that contain groundwater. Natural spikes in chloride concentration can occur during summer' low flow' periods when evaporation exceeds precipitation. However recent, increase in chloride concentration nationwide are thought to be due to anthropogenic, or human-caused, factors such as a road salt, sewage contamination, and water softness.

The chloride data recorded at Budharam Lake maximum recorded 118.00 in the month of May 2015- - 16 minimum 81.50 in the month of Sep 2015 – 16. High values of chlorides in summer could be due to their concentration as a result of evaporative water loss lower values in rainy could attributed to dilution effect and renewal of water mass after summer stagnation.

Phosphorus

Phosphorus is a common constituent of Agricultural fertilizers, manure, and organic waste water and sewage and industrial effluent. It is an essential element for plant life, but when there is too much of IT in water it can speed up eutrophication (a reduction in dissolved oxygen in water bodies caused by an increase of mineral and organic nutrients) of rivers and lakes. soil erosion is a major contributor of phosphorus to streams. Bank erosion occurring during floods can transport a lot of phosphorus from the river band adjacentt land intoa stream, lake, or other water body.

The amount of phosphate was high during summer in a month of May 0.600 µ g/l. In 2016-17 and the minimum values during winter in 0.260 µ g/ in the month of Dec in 2016-17. The high value recorded during summer months may be due to decomposing plant materials and its subsequent. The low value of phosphates during winter may be due to abundance of phytoplankton which utilizes it.

Nitrites

Nitrite is another form of nitrogenous compounds that result from feeding and can be toxic to shrimp and fish. Ntrite is an immediate product of the transformation of ammonia into nitrate (nitrification) and nitrate into Nitrogen gas (denitrification) by bacterial Activity. The observed nitrites from the gut bind to heamoglobin and reduce its ability to carry oxygen.

The amount of Nitrate was high during summer in a month of June 0.870µ g/l. In 2016-17 and the minimum values during rainy in 0.100 µ g/ in the month of Aug in 2015-16 and 2016-17. The high value recorded during rainy months may be due to decomposing plant materials and its subsequent. The low value of phosphates during winter may be due to abundance of phytoplankton which utilizes it.

BOD

Biochemical oxygen demand is the amount of dissolved oxygen (DO) needed (i.edemanded) by aerobic biological organisms to break down organic material present in a given water sample at

certain temperature over a specific time period. The BOD value is most commonly expressed in mg of oxygen consumed per litre. BOD directly affect the amount of dissolved oxygen in rivers and streams. The greater the BOD, the more rapidly oxygen is depleted in the stream. This means less oxygen is available to higher forms of Aquatic life. The consequences of High BOD are the same as those for low dissolved oxygen, aquatic organisms becomes stressed, suffocate, and die.

In the present investigation in Budharam Lake the BOD is maximum recorded 11.30 during in the month of Nov in 2015-16 and minimum was observed 5.30 in the month of May in 2015 - 17. BOD is maximum in winter season may be due to organic pollution. The increasing oxygen consumed in the decomposition process robs other aquatic organisms of the oxygen they need to live.

COD

COD in environmental Chemistry, the chemical oxygen demand (COD) is on indicative measure of the amount of oxygen that can be consumed by reactions in a measured solution. It is commonly expressed is of oxygen consumed over volume of solution which in SI units in mg per litre. A COD test can be used to easily quantify the amount of organisms in water. The most application of COD is in quantifying the amount of oxidizable pollutants found in surface water for (e.g lakes and rivers) or wastewater. COD is useful in terms of water quality by providing a metric to determine the effects an effulent will have on the receiving body, much like biochemical oxygen demand.

Cod is maximum observed in winter season 8.50 in the month Nov 2016 – 17. Whereas low value observed 4.90 in the month of May in 2015 – 16. COD is increased in summer season due to aquatic pollution.

Plankton

Plankton is comprised of all the microscopic organisms which are suspended in water and includes, small plants (phytoplankton), small animals (zooplanktons) and bacteria when there is enough plankton in the water to dis colour it and make it appear turbid, that the water is said to contain, a plankton" bloom ".The phytoplankton uses inorganic salts, carbon dioxide, water, and sunlight to produce its own food. The zooplanktons feeds on living or dead plankton and other particles of organic matter in the water for food. In fish culture systems where fish are not provided supplemental feed, plankton forms the most abundant base of the food web. Pankton is at the base of food web there is a close relationship between plant and abundance and fish production. In addition to encouraging fish growth, plankton makes water turbid and prevents the growth of undesirable aquatic weeds through shading. Despite the benefits of plankton blooms in fish ponds, more plankton can sometimes be produced than can be utilised by the fish for growth. Heavy plankton blooms usually contain large numbers of blue-green algae which can form scums at the surface. These scums absorb heat during the day and cause shallow thermal stratification.

Zooplanktons consists of protozoas, cladocera, coepod, rotifers, etc. which may serve as indicators of water quality. Temperature directly affects plankton population during summer the temperature is high the plankton population is also reach to maximum and when the temperature is low during winter the plankton population is also reach to the minimum. In the present investigation zooplanktons are highest recorded in the summer season. The annual densities of zooplanktons Rotifera, are appeared as a dominant group of zoo planktons with higher density of 1283 org/l in 2016 -17. Lowest total density of zooplanktons group was observed Ostrcoda 167 org/l in 2015-16.

Table 3: Shows seasonal variations in the of zooplankton population of Budharam Lake during 2015-2017

Study Period	Planktonic Group	Jun	Jul	Aug	sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-2016	*Rotifera*	52	40	65	128	125	140	150	124	94	130	132	90
	Cladodera	34	28	24	25	50	64	66	48	32	30	39	45
	Copepoda	28	10	25	60	55	50	45	44	42	60	55	65
	Ostracoda	20	6	12	0	0	0	0	9	25	24	29	36
2016-2017	*Rotifera*	54	45	68	130	115	135	140	120	96	135	145	100
	Cladodera	40	32	25	32	65	68	76	56	48	35	46	56
	Copepoda	32	15	28	64	58	55	50	45	48	65	70	72

Table 4: Shows percentage of zooplankton of Budharam Lake during 2015-2016

	Total Density of Planktonic Group in 2015-2016	Percentages of Planktonic Group 2015-2016	Total Density of Planktonic Group in 2016-2017	Percentages of Planktonic Group 2016-2017
Rotifera	1270	52%	1283	47%
Cladocera	485	20%	579	21%
Copepoda	539	22%	602	22%
Ostracoda	161	6%	268	10%

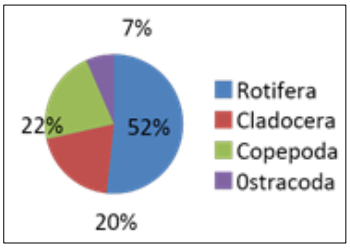

Fig 1: Shows variations zooplankton composition of Budharam Lake (org/lit) during 2015-16

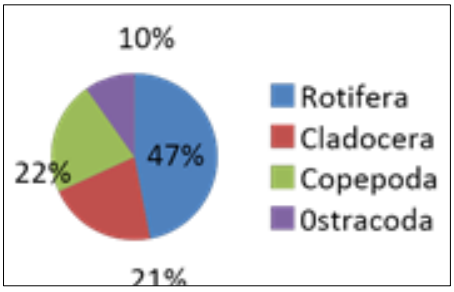

Fig 2: Shows variations zooplankton composition of Budharam Lake (org/lit) during 2016-17

Phytoplankton

The bulk of primary producers and on the base of change in any water body the phytoplankton community of water body during the present study was represented by four groups namely chlorophyceae, Cyanophycea, bacillariophycea, and euglenophycea. Population density of phytoplankton was higher during summer months minimum recorded in the rainy.Annual total densities of phytoplanktons glorify Chlorophycea as a dominant group 3325 no/l in 2016 - 17 and lowest total density of phytoplanktons group euglenacea 216 no/l in 2016 - 17. The plankton abundance and taxonomic Diversity depend upon the supply of nutrients in natural water.

Table 5: Shows seasonal variation in phytoplanktons of Budharam Lake during 2015-17

Study Period	Planktonic Group	Jun	Jul	Aug	sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
2015-2016	*Chlorophyceae*	160	95	136	250	278	320	370	372	283	332	375	250
	Cyanophyceae	213	105	76	136	100	56	39	28	120	173	189	200
	Bacillariophycea	168	44	39	48	228	326	355	280	278	296	300	302
	Euglenophycea	26	6	14	24	17	25	19	18	23	12	11	21
2016-2017	*Chlorophyceae*	170	100	140	260	275	330	380	365	290	335	380	300
	Cyanophyceae	220	115	78	140	112	60	40	30	130	180	195	220
	Bacillariophycea	170	45	50	54	232	350	365	295	260	310	325	350
	Euglenophycea	25	5	15	5	0	0	15	25	30	32	35	40

Table 6: Shows percentage of phytoplankton of Budharam Lake during 2015-2017

Plankton Group	Total Density of Planktonic Group in 2015-2016	Percentages of Planktonic Group 2015-2016	Total Density of Planktonic Group in 2016-2017	Percentages of Planktonic Group 2016-2017
Chlorophycea	3221	43%	3325	42%
Cyanophyceae	1435	19%	1520	19%
Bacillariophyceae	2664	35%	2806	36%
Euglenophyceae	216	3%	227	3%

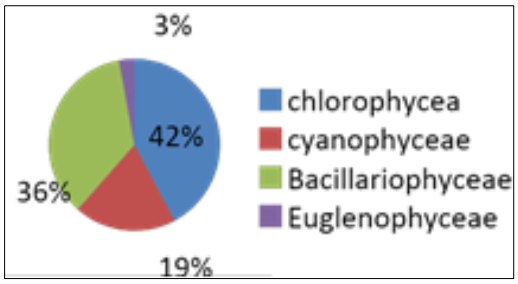

Fig 3: Shows variations phytoplankton composition of Budharam Lake (org/lit) during 2016-17

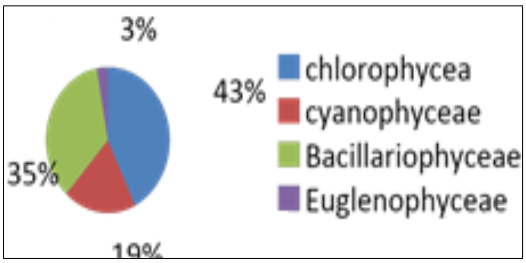

Fig 4: Shows variations phytoplankton composition of Budharam Lake (org/lit) during 2015-16

Conclusion

The present study examines a seasonal variation in physico - chemical parameters on phytoplankton community at Budharam Lake. The correlation results proved that the physico-chemical parameters are important for distribution, abundance and occurrence of phytoplankton species with esteemed to seasonal changes in Environmental parameters. Based on the present Observation Lake Budharam is in rich in species diversity and composition and the nutrients status is high enough to support the plankton community.

The water temperature is always found to be less than atmosphere temperature it is suitable for fish growth. pH was almost alkaline and suitable for fish growth.

Higher value of oxygen during some months may be due to increased photosynthetic activity while lower may be due to its utilisation during decomposition of organic matter and respiration by micro and macro organisms Higher value of nitrates and phosphates during the study period was due to incoming agriculture due to run off.

On the basis of studied parameters in the lake Budharam water appears to be moderate for all trophic levels.

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