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RESEARCH ARTICLE

PHYTOPLANKTONIC STUDIES IN KALVALA RESERVIOUR OF KARIMNAGAR DISTRICT OF TELANGANA, INDIA

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ABSTRACT

Aquatic systems suitable for variety of primary producers, animals, birds, may native or migratory, fishes and all related biotic and abiotic components. They form different food chains, food web and mineral cycling ways as well as responsible several biological products. Phytoplankton species produce above the half of earth's primary productivity. Kalvala reservoir located near to mandal Veena vanka of Karimnagar district, Telangana. 50 algal species occurred, 6 from Bacillariophyceae with 12%of total species contribution, 26 species from chlorophyceae, 18 species from class Cyanophyceae. Filamentous forms contribution to 36%. If diatoms species diversity more it can indicate that the water physico-chemical parameters are so good. Due to the urbanization resulted to pollution, which imbalance the ecosystems Phytoplankton species distribution causes disturbance to reregulated aquatic system.

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INTRODUCTION

Biodiversity refers to variety of plants, animals and micro organisms in particular ecosystem. This refers to grassland, forest, aquatic and even manmade ecosystems like fields of crop plants. Aquatic systems suitable for variety of primary producers, animals, birds, may native or migratory, fishes and all related biotic and abiotic components. They form different food chains, food web and mineral cycling ways as well as responsible several biological products. Biodiversity of lakes or reservoirs along with its conservation status will help in the sustainable utilization of natural aquatic resources. The possible way of prevent degradation of aquatic ecosystems to maintain its biological integrity and health, which possible when the entire components in given ratio and prohibit anthropogenic activities. Phytoplankons are most ubiquitous, and some are microscopic. Phytoplanktons are vary in their habitat and habit, unicellular free floating, form blooms, colonial forms, filamentous with branching or without branching, autotrophic in nature. They always depend on water currents (Millman *et al*., 2005). They are primary producers, also decides the higher level of trophiclevels species.

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Some algal members as bio indicators of that particular ecosystem. Microsystis one of blue green algae, always appear in the polluted water, if the resource is concentrate with pollutants ant nutrients due to eutrophication its appearance high frequent. Bacillariophyceae members are good as bio indicators water purity. Phytoplanktonic species composition, density, operated by several environmental factors, morphometric, physico-chemical properties of water, p^H etc.(Dahl and Wilson 2000). Present work established on dynamic role in trapping solar energy of that region conditions. Production of carbohydrate as result of plants posses' photosynthesis end products, above the half of earth's primary productivity. Some of the environmental factors can show direct effect on phytoplankton's growth, species composition. They are light, and its penetration, temperature nutrient enrichment. Indirect effect always less compare to direct effect but they also changes phytoplankton species composition, which are zooplankton species composition and abundance, herbivores, carnivores, water properties of that habitat. From India several researchers worked on phytoplankton studies are (Ganapati, 1940; Dakshini & Gupta 1979; Mohan, 1987; Jhingran, 1989; Sarwar,1996, Jain *et al*., 1999; Tiwari & Chauhan 2006, Chattopadhyay & Banerjee 2007; Somani *et al*., 2007; Chaudhary & Pillai 2009; Maske *et al*., 2010 Mukherjee *et al*., 2010; Singh & Balasingh 2011; Ghosh *et al*., 2012).

A report spanning a period of 50 years (1947-1998). Indian lakes and fresh water resources face severe stress from the result of industrialisation, urbanisation, domestic water discharge to lakes or rivers across the india. Due to the increasing of human poplation from 1960s to till, the polluted or eutrophication process to fresh water resources.

Study Area

Kalvala reservoir located near to mandal Veena vanka of Karimnagar district, Telangana. It occupy borders with near mandals side by side north and east Veenavanka itself, south Shankarapatnam, west Manakondoor. Villages bordered with Gaddapaka,Kannapu, Kachapur, Rajapur, Brahmanapally, Veenavanka, Ghanmukla. It is occupy nearly 500 ha for present study this reservoir divided into four sites i.e. Site I, east side of the project includes Kalvala village, Site II, Kachapur and Rajapur,Site III, Gaddapaka village and inflow to the project, Site IV, downstream two hume pipes and its canals and downstream to Brahmanapally.

This reservoir main catchment of water from rain and hilly areas water falling to fields and small canals collectively enter to it three main sites. The main ponds above the project are Mutharm, Kachapur, Gaddapaka. Discharged water from this project follow as main flow to combine with Manair River, it is one of the sub river of Godavari.

MATERIALS AND METHODS

Algal samples are collected in free living condition from all the sites of study area. The specimens are divided into two parts of each site in all the collection time. In that first part preserved with 4% formalin (v/v) for further reference and gives them voucher numbers.

Second part of the samplings study the phytoplankton species level identification, by observing under the microscope. If macro algae are found identify with naked eye its species level identity by the observation under microscope. After identification of the algae with the help of monographs, manuals, standard literature and advanced search by internet facility also used. Survey and sampling from 2013 June to 2015 July in every month in two times.

Study area view

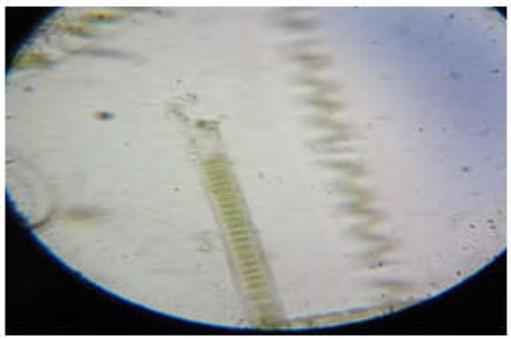
Kalvala Reservoir.Karimnagar

RESULTS AND DISCUSSION

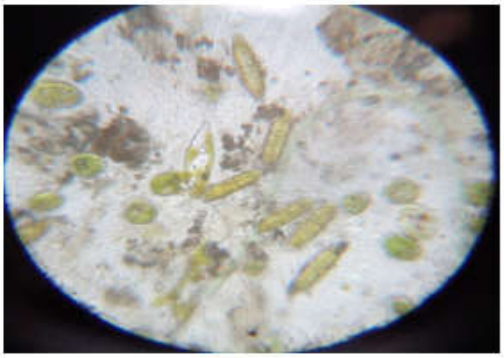
Present work resulted 50 algal species occurred, 6 from Bacillariophyceae with 12%of total species contribution, among them Navicula genera with two species and dominant within Bacillriophyceae class. Cyclotella poor appearance in all sites.18 species from class Cyanophyceae, 11 genera species contribution nearly 36%,among these Oscillatoria genera with four species, followed by

Plate No.1

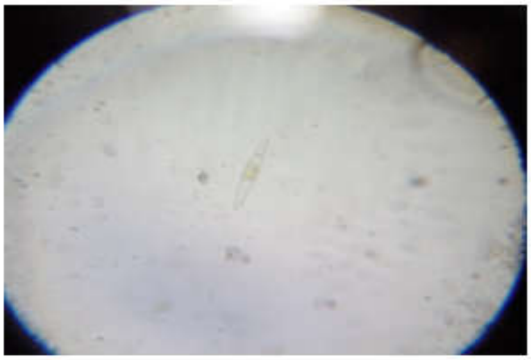
A) *Lyngbya sp.*



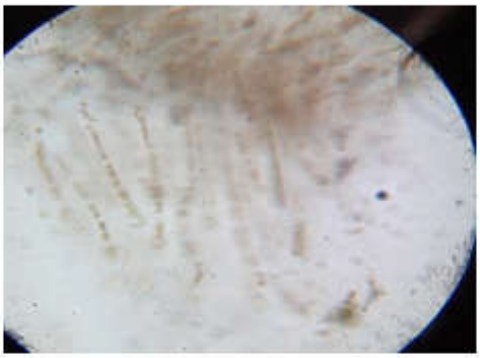
B) Oscillatoria. tenuis



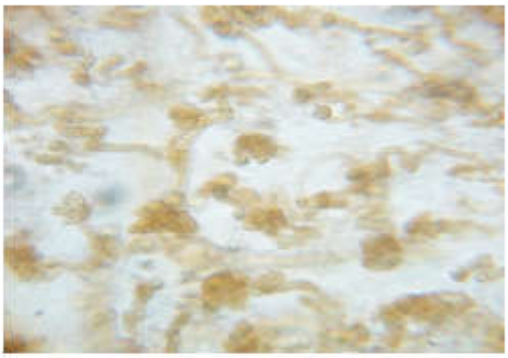
C) Navicula cuspidate Kuetz.



D) Synedra ulna (Nitz)



E) Nostoc sphaerium



F) Anabaenopsis sp

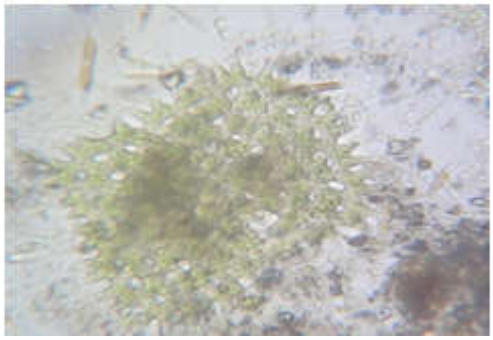
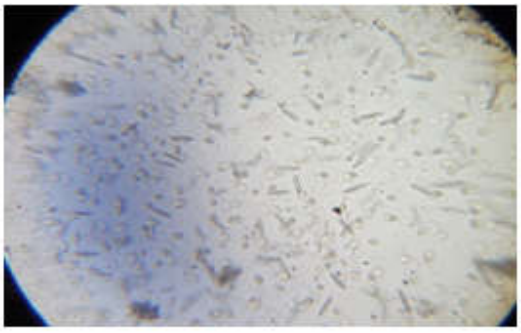


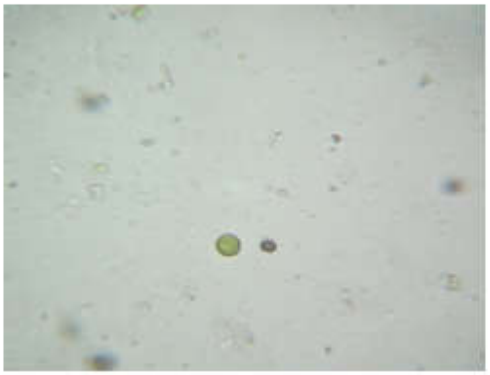
Plate No. 2



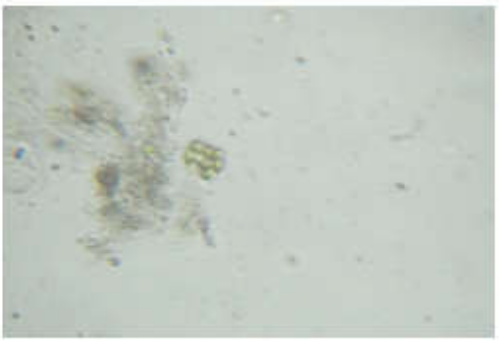
I) Ankistrodesmus falcatus

J) Phormidium luridum

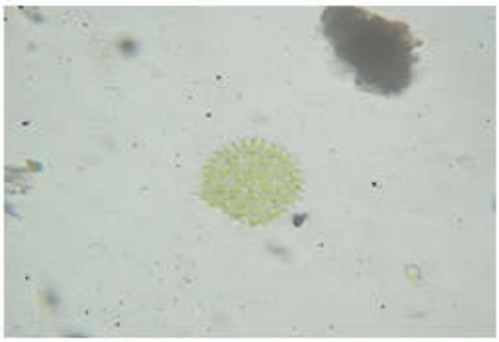
K) Scenedesmus dimorphus



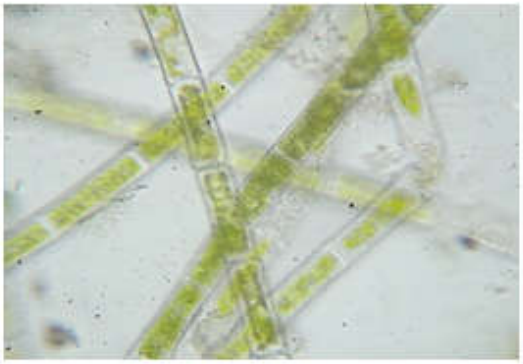
L) Chlamydomonas globosa Snow.



M) Westella botryoides (W. West)



N) Pediastrum biradiatum Presc



O) Cladophora glomerata

P) Arthrospira platensis (Nordst)

Table 1. Documentation of Phytoplankton

S.NO	ALGAL SPECIES	CLASS	SITE I	SITE II	SITE III	SITE IV	TOTAL
1	Cyclotella meneghiniana	Bacillariophyceae	-	*	*	-	2
2	Fragillaria brevistriata Grun	Bacillariophyceae	-	*	*	*	3
3	Synedra ulna (Nitz)	Bacillariophyceae	-	-	*	*	2
4	Navicula cuspidate Kuetz.	Bacillariophyceae	*	**	**	*	4
5	N. acicularis Kuetz	Bacillariophyceae	*	*	*	*	4
6	Pinnularia gibba Ehr.	Bacillariophyceae	-	-	*	*	2
7	Chlamydomonas globosa Snow.	Chlorophyceae	*	*	*	*	4
8	C. reinhardi (Dang)	Chlorophyceae	*	*	-	-	2
9	Pandorina morum Bory	Chlorophyceae	-	-	*	-	1
10	Haematococcus lacustris (Girod.) Rostaf	Chlorophyceae	*	-	*	-	2
11	Palmella miniata Lieb	Chlorophyceae	*	*	*	*	3
12	Coleochaete suluta (Breb.) Pringsheim	Chlorophyceae	*	*	*	-	2
13	Chlorococcum humicola (Naeg.) Rabenh	Chlorophyceae	*	*	*	*	3
14	Chlorella ellipsoidea Gerneck	Chlorophyceae	*	**	**	*	4
15	C. vulgaris Beyernick	Chlorophyceae	*	*	*	*	4
16	Westella botryoides (W. West)	Chlorophyceae	*	-	*	-	2
17	Ankistrodesmus falcatus (Corda) Ralfs	Chlorophyceae	*	*	*	-	3
18	Scenedesmus dimorphus (Turp.) Kuetz	Chlorophyceae	**	**	**	**	4
19	s. quadricauda	Chlorophyceae	*	**	*	*	4
20	Pediastrum biradiatum Presc	Chlorophyceae	**	*	**	**	4
21	P.boryanum (Turp.) Menegh	Chlorophyceae	*	**	*	*	4
22	Cladophora glomerata	Chlorophyceae	*	*	-	*	3
23	Closterium acerosum (Schrank) Ehr.	Chlorophyceae	*	**	**	*	4
24	C. purvulum Nageli	Chlorophyceae	*	*	**	*	4
25	Cosmarium botrytis Menegh	Chlorophyceae	*	**	**	**	4
26	C. subcostatum Nordst	Chlorophyceae	*	*	*	*	4
27	Spirogyra varians	Chlorophyceae	*	**	**	**	4
28	Oedogonium patulum	Chlorophyceae	**	**	**	*	4
29	Tetraedron quadratum	Chlorophyceae	*	-	*	*	3
30	Zygnema czurde	Chlorophyceae	*	*	*	*	4
31	Chara glabra	Chlorophyceae	**	*	**	**	4
32	Nitella sp	Chlorophyceae	*	*	**	*	4
33	Oscillatoria tenuis	Cyanophyceae	**	*	*	**	4
34	O.curviceps Ag. ex Gomont	Cyanophyceae	*	*	*	-	3
35	O.princeps	Cyanophyceae	*	-	*	*	3
36	O.limosa	Cyanophyceae	*	*	*	*	4
37	Phormidium luridum	Cyanophyceae	**	*	**	*	4
38	P.inundatum	Cyanophyceae	**	*	*	*	4
39	P.tenue	Cyanophyceae	-	-	*	*	2
40	Arthrospira platensis (Nordst	Cyanophyceae	*	**	**	*	4
41	Lyngbya ceylanica	Cyanophyceae	*	*	*	-	3
42	Synechocystis aqualis Saun	Cyanophyceae	*	-	*	*	3
43	Anabaena constricta	Cyanophyceae	**	**	*	*	4
44	A. iyengarii	Cyanophyceae	*	*	-	*	3
45	Anabaenopsis sp	Cyanophyceae	*	*	*	-	2
46	Psueanabaenopsis sp	Cyanophyceae	*	*	*	-	2
47	Nostoc sphaerium	Cyanophyceae	**	*	**	*	4
48	N. pruniforme Ag.	Cyanophyceae	*	*	*	-	3
49	Spirulina major (Kütz) Gomont	Cyanophyceae	*	-	*	-	2
50	Chroococcus disperses (V. Keissler) Lemm	Cyanophyceae	*	-	*	-	2
Total			44	39	47	36	

*=presence,- = absence **= dominant

Phormordium, Nostoc, Anabeana. Oscillatoria, Phormordium are dominant over all the sites, followed by Anabeana, Nostoc, Arthospira also observed in sites. Spirulina observed in tiny amount. 26 species from Chlorophyceae, species contribution 52%, with 20 genera Clamydomonas, Chlorella, Scenidesmus, Pediastraum,Closterium, Casmarium show equal species composition with 2 species, in these Spirogyra, Cladphora, Oedogonium, Zygnema, Chlorella, Scenedesmus present in all sites. Westella botroides show poor appearance than others. Over all genera composition of this project are Bacillariophyceae 7% Cyanophyceae, 38% Chlorophyceae 55%.

Filamentous forms contribution to 36%. Phytoplankton species distribution vary from site to site the filamentous forms observed near the banks,edges adjacent of edges at low level of water depth. Higher diversity of phytoplankton species at site III, poor diversity and high cyanophycean members at site I, Bacillariophyceae members appear more at Site II,III,IV. Chlorophyceae members show their apeaerance in all site is a good indicator that aquatic ecosystem. Observation made that, the month of June to September Chlorophyceae members dominant over the other classesin that Pediastraum, Closterium, Casmarium, Scenidesmus, dominant other species. Bacllariophyceae members particularly Navicula appear good

above period, October to March Cyanophyceae show dominance because of the Chlorophyceae depleted from the month ending of September, due to the capability of Chlorophyceae members in cold conditions in winter and summer high temperatue due high intensity of light in late summer, favours the growth of BGA.

In late summer and monsoon season, the production of phytoplankton reduced because of heavy rainfall, high turbidity, reduced salinity, pH, overcast skies and low nutrient concentration along with consumption of phytoplankton by zooplankton and fishes etc. (Saravanakumar *et al*., 2008). The phytoplankton study useful for assessment of water quality in any type of aquatic ecosystem. If the pond or lake or river polluted or eutrophicated show species distribution pattern. The species from BGA, Microcystis grow where the water polluted, and its species diversity also indicates that, the aquatic system damaged by anthropogenic activities.

About the diatoms, if we frequently found them the system with purity. If diatoms species diversity more it can indicate that the water physic-chemical parameters are so good. Due to the urbanisation and usage of cosmetics are like that articles of village people and small town discharge their domestic water into water bodies like ponds then water flows as downstream to lakes or reservoirs. Another possible reason is that in irrigated paddy fields, the farmers protect their fields in crop protection they use organophosphates related pesticides every time. Yearly two times spraying of pesticides moves by flood time to enter reservoir go too polluted. Eutrophication leads to form algal blooms and selective growth of macrophytes it is indirectly select the phytoplankton growth.

Conclusion

The variation in physic-chemical parameters is responsible for fluctuations in the species composition and variation patterns. Which are frequently occurring called as dominant, which are indicators of specific aquatic resource full impact of the habitat. Due to the urbanisation resulted to pollution, which imbalance the ecosystems Phytoplankton species distribution causes disturbance in herbivorous population, then it changes carnivorous population. It will lead to fluctuations and imbalance the food chains, food web.

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