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STUDIES ON THE ALGAL FLORA OF LOWER MANAIR DAM AND KAKATIYA CANAL IN KARIMNAGAR DISTRICT

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ABSTRACT

As part of this investigation, the algal flora of two freshwater streams near Manair dam and Kakatiya canal was analyzed. Over thirty different species of algae, most of which belonged to the cyanobacteria were identified. Among the cyanobacteria, the contribution by N2-fixing species (both heterocystous and unicellular aerobic diazotrophs) was greater than fifty percent, and their distribution was abundant in the middle region of the stream that flows through the Manair dam and the Kakatiya Canal. The composition of the cyan bacteria and algae flora in each stream was unique, and the highest level of species diversity was found in the stream that was home to the greatest number of distinct plant and animal species. There is the potential for streams to be divided into two distinct groups, determined by the species diversity present. The Lower Manair reservoir is one of the most significant reservoirs in the Telangana state, and it is located in the Karimnagar District geological area. Both the Lower Manair dam and the Kakatiya Canal have been chosen as locations for the algal collection in order to facilitate research into the algal biodiversity. From August 2022 through December 2022, monthly samples of algae were collected using bottles that had been washed in acid. Acid-washed collection bottles were used for the collection of the algae samples. Samples of algae were taken from the following states: floating, planktonic, submerged, and attached epiphytic. During the course of this research, a total of fifty species representing fewer than thirty genera were recognized and cataloged. There were members of the Chlorophyceae, Charophyceae, and Cyanophyceae families recorded among the algae. It was discovered that the Chlorophyceae group is the dominant one, followed by the Cyanophyceae and Chophyceae groups. Algal genera such as Spirogyra scendesmus, cosmaria, chromophore Gloecystis, Chlorella, Oscillatoria, Macrocystis, Chlorella, Spirulina, and Lyngubya were found to be the dominant algal flora of two different sites of Lower Manair and Kakatiya canal reservoir. The reservoir is rich and is found in divorce form of algal f.

KEYWORDS: Manair dam, Kakatiya Canal and Algal Flora.

INTRODUCTION

The Lower Manair Dam, also referred to as LMD, was built across the Manair River in the Karimnagar District of the Telangana state in India between the years 1974 and 1985. The site of construction was the Alugunur village of the Thimmapur Mandal. In addition to benefits for drinking water supply and reservoir fisheries, it irrigates a gross command area of 163,000 hectares (400,000 acres). The Lower Manair Dam is situated on the Manair River in the Karimnagar District of the Kakatiya Canal at kilometer 146. Its coordinates are as follows: 18°24' North latitude; 79°20' East longitude. The Manair River is a tributary of the Godavari River, and the dam was constructed across the river at the point where the Mohedamada River and the Manair River meet. The dam has a catchment area that is 6,464 square kilometers large, which is equivalent to 2,496 square miles. Of this area, there are 1,797.46 square kilometers (694.00 sq mi) of the free catchment, and the remaining catchment area is intercepted catchment. The town of Karimanagar is located approximately 6 kilometres (3.7 miles) from the dam.

In light of recent drowning incidents and the insecurity caused by hooligans, additional security measures have been implemented in the area surrounding the LMD, which is the only place of recreation for the people of Karimnagar. The algae are an essential part of the aquatic flora and play an essential part in the upkeep of a healthy balance between the biotic and abiotic aspects of the aquatic ecosystem. Microalgae have a significant amount of commercial and economic potential because they are valuable sources of pharmaceuticals, health foods, carotenoids, and restriction endonucleases, and they are also used in the bioremediation of industrial effluent. In addition, algae are studied for their ability to act as biological indicators of water pollution.

The freshwater biodiversity of Telangana State is not well documented, and the rate of possible biodiversity loss in Telangana has not yet been quantified. Neither of these issues has been adequately addressed. A scant amount of information about flora is known based on the compilation of the bibliography on the Lower Maniar sites in Telangana. In the district of Karimnagar in Telangana, very few limnological investigations related to the biodiversity of algae have been carried out, according to a review of the relevant published research in Telangana. In the Karimnagar district, there was a lack of comprehensive data on biodiversity, particularly with regard to the data on the lower plant groups. In point of fact, there was no clear information available on the algal flora of the Karimnagar district of Telangana. This is due to the fact that the region was neither completely nor partially surveyed, and research into the algae is still ongoing. Due to the fact that almost no previous research has been conducted on the taxonomy, distribution, species diversity, and composition, as well as seasonal and spatial variation of algae in the Lower Manair Dam Reservoir in Telangana, the current study was initiated. More information regarding the diversity of species that can be found in Telangana could be gleaned from the species composition and distribution of algal flora.

A wide variety of plant kingdoms can be categorized as algae. There are many distinct types of freshwater habitats, such as rivers, streams, pools, puddles, ponds, lakes, and dams, in which algae can flourish in large numbers and be found in a variety of morphologies. The Lower Manair reservoir is considered to be one of the most significant reservoirs in the state of Telangana. To identify the species of freshwater algae in the Lower Manair Dam Reservoir and Kakatiya Canal in Karimnagar. To determine the area's algal flora's seasonal and spatial variation and relative abundance. To compare the physicochemical properties of water in the Lower Manair Dam Reservoir and the Kakatiya Canal Reservoir in Karimanagar with the algae in each reservoir. To study the area's community structure, pigment composition, and productivity.

MATERIAL AND METHODS

Seven distinct sites of backwater in the alganoor Thimmapoor area of the Karimnagar district have been chosen for the purpose of researching the algal biodiversity of the Lower Manair reservoir and Kakatiya canal. Algunur and Thimmapur are the locations in question. Samples of algae were taken from these locations on a monthly basis beginning in August 2022 and continuing through December 2022. The collection of algal samples required the use of collection bottles that had been acid washed. Floating, Planktonic Algal samples of both the submerged and attached epiphytic varieties were collected in separate bottles for the collection. samples collected and stored in formalin at a concentration of 4% for subsequent taxonomic research. Under a research microscope, both fresh and preserved forms of algae were scrutinized in great detail, and with the assistance of authoritative literature on algae, they were identified.

RESULTS

The biodiversity of algae from seven different sites of Lower Manair reservoir and Kakatiya Canal is remarkable. In present study a total of 50 species of algae under 30 genera have been identified and recorded. Of these 5 species under the 4 Genera belonged to Bacillariophyceae 18 species under the 10 genera belonged to Cynophyceae, 27 species under the 10 genera belonged to Chlorophyceae (Table 1). Pingle (1981) worked on ecobiodiversity of algae from Poona. Kumawat and Jawale (2004) extensitely studied phytoplanktons of some fish ponds. Magar (2008) worked on diversity of algae of Girna reservoir of Maharashtra. Talekar (2009) Studied algal biodiversity of Manjara River and its reservoirs in Beed district of Maharashtra. During present study Chlorophycean algae were dominant followed by Cyanophyceae, Bacillariophyceae and Charophyceae. Among Chlorophyceae *Spirogyra*, *Scenedesmus*, *Cosmarium*, *Cladophora*, *Gloeocystis and Chlorella* were found dominant. Similar kind of results were obtained by Somani and Pejaver (2003), Mahajan and Nandan (2005) and Nandan and Mahajan (2007).

Systematic Description of Some of Algal taxa

1. *Scenedesmus* Cells 12-13.5 µm long, 6-6.2 µm broad, ovoid or angular, arranged in a double row, forming a curved coenobium with small interstices between cells; cell wall smooth, without spines.

a

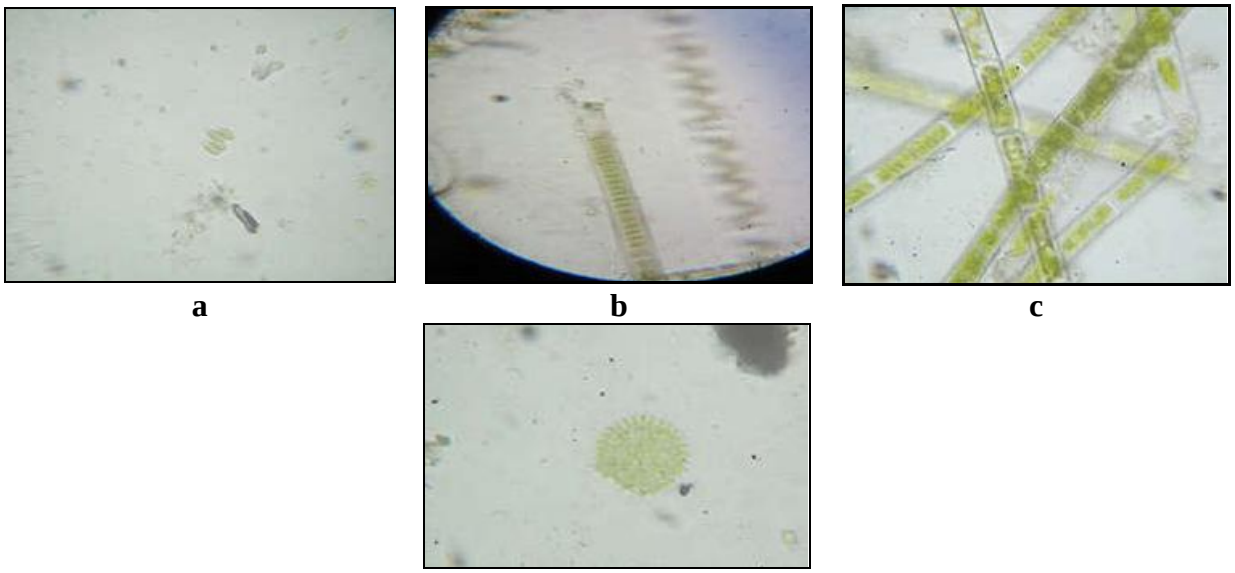
b

c d

Fig-I: a,b,c andd: Samples of algae were taken from Kakatiya Canal and Lower Manair dam, and they are currently being analysed by a group led by Dr. T. Srinivas, head of the Botany Department at the Government Degree College Agraharam.

2. *Scenedesmus bijugatus* (Turp.) Kuetz. Colonies slightly curved 2-4 cells rranged in a single linear series; cells 12.5 µm long, 6.8 µm broad, ellipsoid to ovoid with ends broadly rounded.

3. *Spirogyra*: Vegetative cells 120-132.5 µm long, 46.5 µm broad with plane end walls; chloroplast 4, slightly spiraled, deeply toothed on the margins, making 3-6 turns; conjugation scalariform, ubes formed by both gametangia; zygospores 5-80 µm long, 38-40 µm broad, ellipsoid; pore wall irregularly and coarsely reticulate, brown.



a **b** **c**

d

Fig. II: Identified algal few of a) *Scenedesmus,* b) *Spirogyra*: c) *Ulothrix* d) *Closterium.*

4. *Ulothrix* Vegetative cells 43.8 µm long, 46.9 µm broad,cylindrical or slightly swollen; cell wall thick;chloroplast band shaped, covering mid region with several pyrenoids.

Table 1: List of algae taxa recorded from Lower Maniar Dam and Kakatiya Canal.

Sl. No	Name of Algal Mixture	Name of the Class
1	*Cyclotella meneghiniana*	Bacillariophyceae
2	*Fragillaria brevistriata*	Bacilariophyceae
3	*Synedra ulna (Nitz)*	Bacilariophyceae
4	*Navicula cuspidate Kuetz*	Bacilariophyceae
5	*Navicula aciculars* Kuetz	Bacilariophyceae
6	*Oscillatoria tenuis*	Cynophyceae

7	*Oscillatoria curviceps*	Cynophyceae
8	*Oscillatoria princeps*	Cynophyceae
9	*Oscillatoria limosa*	Cynophyceae
10	*Phormidium luridum*	Cynophyceae
11	*Phormidium inundatum*	Cynophyceae
12	*Phormidium tenue*	Cynophyceae
13	*Artrospira platensis*	Cynophyceae
14	*Lyngbya ceylanica*	Cynophyceae
15	*Synechocystis aqalis saun*	Cynophyceae
16	*Anbaena constricta*	Cynophyceae
17	*Anbaena iyengarii*	Cynophyceae
18	*Anbaena anopsis*	Cynophyceae
19	*Psueanabaenopsis Species*	Cynophyceae
20	*Nostoc shaerium*	Cynophyceae
21	*Nostoc pruniforme*	Cynophyceae
22	*Spirulena major*	Cynophyceae
23	*Chroococcus* Species	Cynophyceae
24	*Chlamydomonas globosa*	Chlorophyceae
25	*Chlamydomonas reinhardi*	Chlorophyceae
26	*Pandorina morum*	Chlorophyceae
27	*Haematococcus lacustris*	Chlorophyceae
28	*Palmella minimata*	Chlorophyceae
29	*Coleochaete suluta*	Chlorophyceae
30	*Chlorococcum humicola*	Chlorophyceae
31	*Chlorella ellipsoidea*	Chlorophyceae
32	*Chlorella vulgaris*	Chlorophyceaev
33	*Westella bortyoides*	Chlorophyceave
34	*Ankistrodesmumus falcatus*	Chlorophyceae
35	*Scenedesmus dimorphus*	Chlorophyceae
36	*Scenedesmus quadricauda*	Chlorophyceae
37	*Pediastrum biradiatum*	Chlorophyceae
38	*Pediastrum biradiatum*	Chlorophyceae
39	*Cladophora glomerata*	Chlorophyceae
40	*Closterium acerosum*	Chlorophyceae
41	*Cosmatium botrytis*	Chlorophyceae
42	*Cosmarium subcostatum*	Chlorophyceae
43	*Spirogyra varianas*	Chlorophyceae
44	*Oedogonium patulum*	Chlorophyceae
45	*Oedogonium capillare*	Chlorophyceae
46	*Tetraedron quadratum*	Chlorophyceae
47	*Chara gladra*	Chlorophyceae
48	*Nitella Specieses*	Chlorophyceae
49	*Zgnema czurda*	Chlorophyceae
50	*Zgnema insigne*	Chlorophyceae

5. *Cladophora glomerata* (Linn.) Kuetz. (Fig. 8) Filaments usually with profuse, y-shaped lateral branching; vegetative cells of main axis 175 µm long, 45 µm broad and of branchlets 180.5 µm long, 35.8 µm broad with thick stratified walls, multinucleate; plant mass light green.

6. *Closterium:* Cells 455-460 µm long, 50 µm broad, slightly curved, narrowly fusiform with outer margin slightly curved and inner margin almost straight, gradually tapering to the narrow and often slightly thickened, rounded truncate apices, apex 4 µm wide; cell wall smooth, colourless with or without a median girdle; chloroplast without ridges, pyrenoids 3-4 in a median series.

7. *Closterium*: long, 50 µm broad, about 5-6 times longer than broad, almost straight, outer margin more or less curved, inner margin slightly tumid in the middle, gradually and gently attenuated to slightly truncate apices, apex 15 µm wide; cell wall smooth; chloroplast with 5 ridges and numerous scattered pyrenoids.

8. *Cosmarium*: broad; semicells broadly truncate exhibiting rather prominently convex side and truncate-

rounded apex; cell wall minutely punctate; isthmus 4 µm wide.

DISCUSSION

Charophyceae is represented by *Chara fragilis.* Ashtekar (1980) Talekar (2009) and yadav (2010) recorded different species of *Chara* from Marthwada region of Maharashtra. Diatoms such as *Fragilaria, Nitzschia* and *Gyrosigma* were dominant. Talekar and Jadhav (2010) reported 21 species of pinnate diatoms from Manjara river of Beed district of Maharashtra. Among Cyanophyceae *Phormidium, Oscillatoria, Aphanothece, Microcoleus, Plectonema, Spirulina, Lyngbya, Gloeothece* and *Synechococcus* were found dominant similar kind of results were recorded by Whitton (1969), Sirasat et. al. Magar (2008) and Yadav (2010). Algal biodiversity study of Ujani reservoir shows interesting seasonal variations throughout the period of study. Chlorophyceae members were found dominant in winter and monsoon season.

Some of the environmental factors can show direct effect on phytoplankton's growth, 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 India several researchers worked on phytoplankton studies are (Ganapati, 1940; Dakshini & Gupta 1979; Jhingran, 1989; Sarwar,1996, Jain Chauhan 2006, Chattopadhyay & Banerjee 2007; Somani *et al*., 2007; Chaudhary & Pillai 2009; Ma Mukherjee *et al*., 2010; Singh & Balasingh 2011; G.

Cyanophyceae members were maximum in summer season. Bacillariophyceae members were found maximum in summer and winter seasons. Charophyte recorded in winter season. Unicellular, colonial and filamentous algal forms were recorded throughout the period of study. The composition of Chlorophyceae was greater in species compostion as compared to other groups of algae Biodiversity of algae in terms of quantity and quality was observed at all the selected sites of Lower Manair reservoir.

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 urbanization 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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