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Diatoms of Pochampadu Reservoir in Nizamabad District of Telangana State

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Abstract
The aquatic diatomic algae were collected from Pochampadu reservoir from September 2020 to January 2021. Three sampling stations (SRS-1, SRS-II and SRS-III) were chosen in the reservoir. Some physical and chemical parameters (water temperature, total hardness,nitrate, nitrite, phosphate and pH) of water samples were measured.The total 7 Genera 16 species could be recorded in Pochampadu Reservoir of Nizamabad District in Telangana State.These species, including Rhopalodia 2 Species, Cymbella 4 Species, Navicula 4 species, Gomphonema 4 Species Melosira 1 species and Synedra1 species showed the highest species richness.
Mainly the present study had been made to know the diversity and distribution of diatoms. These algae were identified based on their internal and external morphological characters. Almost all species were first new records for Pochampadu Reservoir, the present study could provide evaluating the impacts of diatomic algae resources caused by infrastructures in the future.
Keywords: *Investigation, Morphological characters, Pochampadu, New record, and Diatoms*

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I. Introduction:

Algae that forms source of food and oxygen for heterotroph organisms in aquatic habitats affect directly primary productivity by forming first circle of food chain. And also it's reported that the algae have a role in determining water pollution and cleaning waste water (Çolak and Kaya, 1988). In recent years algal indicators are effective in checking and observing tools. If the chemical monitoring is limited, the use of diatoms in monitoring would be valuable in remote locations subject to the pronounced change (Jüttner*et. al.,* 1996)

Algae are a large and diverse group of simple, typically autotrophic organisms, ranging from unicellular to multicellular forms. In aquatic ecosystems phytoplankton play an important role in the ecology of rivers through primary production. Studies on planktonic composition and physicochemical characteristics of water are necessary to acquire basic knowledge on the biodiversity status of a water body. Algal flora varies from season to season and an important feature of freshwater algal flora is cosmopolitanism. The phytoplanktonic study is a very useful tool for the assessment of water quality in any type of water body and also contributes to understanding of the basic nature of lake (Pawar*et al.* 2006). The necessity of using phytoplankton as effective and appropriate method of bio monitoring for evaluation of river water quality has been emphasized (AnnalakshmiandAmsath 2012).

Pochampad Project, also known as Sri Rama Sagar Project, is a flood-control project on the Godavari River in India that was completed in 2008. A three-kilometer stretch of National Highway 44 separates the project from its surroundings in the Nizamabad area. According to The Hindu, it serves as a "lifeline for a major portion of Telangana." Sriramsagar is an irrigation project in Telangana that spans the Godavari River to service the irrigation demands of the Karimnagar, Warangal, Adilabad, Nalgonda, and Khammam districts. It was completed in 2008. It also serves as a source of drinking water for the city of Warangal. At the dam site, there is a hydroelectric facility that operates with four turbines, each with a capacity of 9 MW, and generates 36 MW. The late Jawaharlal Nehru, India's first Prime Minister, lay the foundation stone for the building on July 26, 1963. The SriramSagar Reservoir has a capacity of 75 billion cubic feet and has 42 floodgates, making it the largest reservoir in the world. It also comprises the 284-kilometer-long Kakatiya Canal, the Laxmi Canal, the Sarswati Canal, and the Flood Flow Canal.

This dam is located in the Nizamabad district, downstream of the confluence of the Manjira and Godavari rivers. Stage 1 of this project will see the construction of an irrigation facility covering almost 1 million acres (4,000 km2) that will use 140TMC water. Stage II of this project, which will irrigate 440,000 acres (1,800 km2) with 25 TMC water, is currently in the advanced stages of construction. The flood flow canal project, which will irrigate 200,000 acres, is also currently under construction.

Our research attempted to investigate the diatoms of the Pochampadu ecosystem in order to develop a database of pochampadu algae as a potential bio resource, along with their respective habitat and taxonomic data. The investigation was largely focused on the collection, preservation, identification, and strain maintenance of the algal flora obtained from various locations across Pochampadu, as well as the preservation of germplasm.

II. Materials and Methods

Sampling sites

The study area lies between 21º31´ to 22º53´N and 88º37´ to 89 º 09´E of the south-eastern part of Telangana state. The study area covers 4 hotspot with dense mangrove forest and inner island area.

Collection of algal samples:

Samples of algae were collected every month from the four airtight bottle sampling sites and polythene bags from September 2019 to August 2020 using the plankton net of bolting silk (No. 25). The samples collected were investigated as fresh as feasible and further retained separately for comprehensive analysis in and 4% formaldehyde solution. Appropriate and readily available literature was used to identify algal types, notably in Desikachary (1959), Randhawa (1959), Prescott (1961, 1970), Edmondson and Anand (1998). Photomicrographs have been performed using a photographic camera coupled to Metzer microscope.

III. Results and Discussion

Preparation of Semi-permanent Slides

For diatoms Algae a drop of glycerin formalin mount and (6 ml glycerin 10 ml of 40% formaldehyde + 84 ml of distilled water) was taken on slide, to which a drop of concentrated preserved sample was added and was covered by a cover slip of suitable size.

A total of 16 taxa was found in the three stations of Pochampad Projectduring the study period. September 2020 to January 2021.Especially reported Bacillariophyta algal members were the richest taxonomic group with 7 Genera 16 species taxa

List of algae present in the phytoplankton and their occurrence at stations were given in **Table1 (Table-2) (Fig-I,II,III,IV and V)**.Total organism numbers have almost show similar seasonal variations at SRS-1, SRS-II and SRS-III.

Table- 1 Range of physicochemical parameters recorded in the three stations; average of air temperatures (Av. A. Temp, average of air temperature (Av. A. temp.), average of water temperature (Av. W. temp.), pH, total hardness (German degree d°) (T. H.), nitrate(NO_3) and nitrite (NO_2).

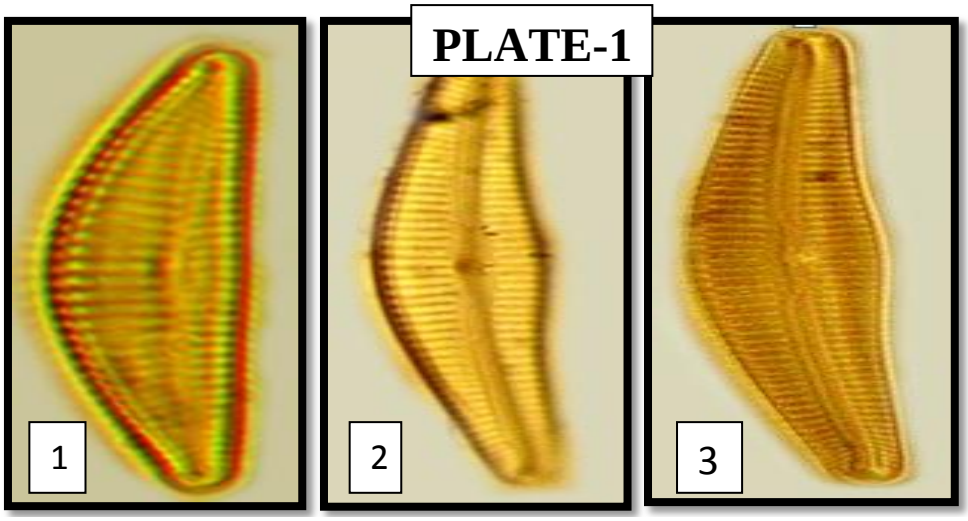
Stations	Av. A. Temp.	PH	NO_2 mg/l	NO_3 mg/l	Ca,	Mg,	SO_4,	Sio_2,
SRS-1,	17.0	7.5-8	2	0.5	2.3	3.4	4.5	5.0
SRS-II	17.5	7.5-8	2.5	0.2	2.5	3.2	4.0	5.3
SRS-III	17.6	7.5-8	2.3	0.3	2.0	3.0	4.3	5.3

Table- 2 Diatom algal species diversity recorded in the three stations of Sriramsagar Project Nizamabad District.

Sl. No	Name of the Genera	Name of the Species
1	*Rhopalodia*	*gibba var. ventricosa (Her) Grun*(X400)
2		*gibba (Ehr.) O.Mull*(X400).
	Cymbella	*asperaEhern.* (X400)
		affinis (Kutz) (x400)
		cymbiformis (Grun) (x400)
		rigidan.sp(x 400)
3	*Navicula*	*radiosa (Kutz) var. acuta*(x200)
		viridula (Kutz) var.minor(x200)
		cryptocephala Kg. (x200)
		cuspidate Kutz. (X400)
4	*Gomphonema*	*montanum var. cuspidate Kutz.* (X400)
		lanceolatumEhr. var. genuinum A.CI (X200)
		lanceolatumEhr. Her (100)
		*IntricatumKutz.(*X400)
5	*Melosira*	*granulate (Ehrenberg) Ralfs*(X400)
6	*Synedra*	*ulna (Nitzsch)* (X200)

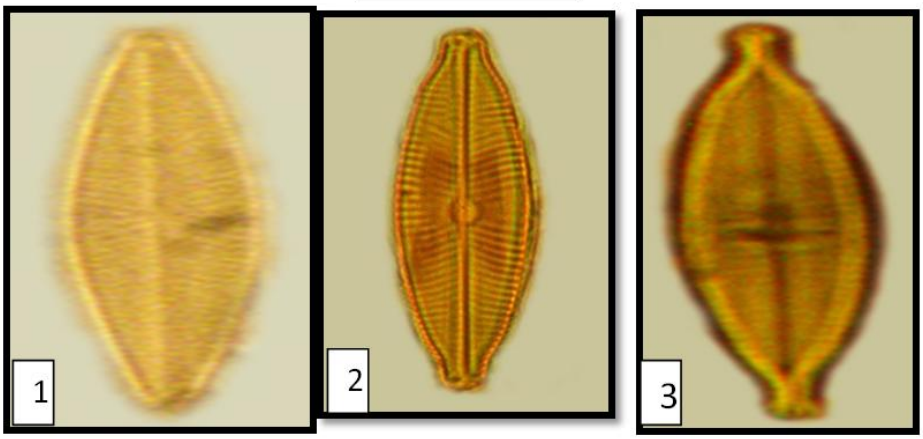
Fig-I Investigation on aquatic diatoms of Pochampadu reservoir .Somealgal species diversity recorded in the view of Three Stations (A,B and C) along with Project View (D)

Fig-II Investigation on aquatic diatoms of Pochampadu reservoir .Some diatom algal species diversity recorded.



1) *CymbellaaffinisKz.* 2) *C.cymbiformis* 3) ***Cymbellarigidan.sp***

PLATE-2



1. *N.radiosaK*zvar. *acuta 2) Naviculaviridula*Kz. var.*minor*
3)*N. cryptocephala Kg.*

PLATE-3

1) *Gomphonemamontanum*var. *acuminatum*Mayer.
2) *G. lanceolatumEhr.*
3) *MelosiraGranulata*Ralfs

IV. Discussion:

Bacilariophyta dominated in the plankton of the Reservoir of Pochampadu project. Algal numbers were dominant in January and March due to rainfall. *Rhopalodia* 2 Species, *Cymbella* 4 Species, *Navicula* 4 species, *Gomphonema* 4 Species *Melosira* 1 species and S*ynedr*a1 species *Nitzschia*spp was found usually in all stations SRS-1, SRS-II and SRS-III, sometimes inSRS-1. Other *Nitzschia* diatoms were recorded sometimes. *Gomphonema* spp., *Cymbellaaffinis (Kutz*) (x400), *granulate* (Ehrenberg) *Ralfs* (X400),were found to be rare at the sampling stations.

The taxonomic composition of freshwater algae collected from different stations is presented in **(Table 1 and 2**). Out of 7 Genera 16 species identified species, (especially in First station) is greatly influenced by water conditions and physico chemical parameters. Resulted the decline of algal density and physico-chemical parameters. (Rajagopal, 2010; Pundhir and Rana, 2002). According to several previous studies (Wu and Chou, 1999; Richardson *et al*., 2000; Ersanli and Gönülol, 2003; Tyor and Chawla, 2012) the seasonal variations of phytoplankton are related to different environmental factors especially temperature (water and air temperatures) that regulate the growth and distribution of these organisms (Thebault and Rabouille, 2003).Rajyalaxmi and Aruna (2016) investigated studies on diversity and Seasonal variation of diatoms of Chandrugonda area of Khammam district in Telangana State. The study revealed that diatom species showed maximum count in summer and rainy seasons , minimum in winter season . Shailaja and Aruna (2018) surveyed studies on Physico-

chemical parameters of Pochampad dam in Telangana and encountered many species of diatoms to its record.Srinivas and Aruna (2018) reported abundance of desmids from lakes of Telangana

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