

(RESEARCH ARTICLE)



Biodiversity of algae in Sapan River of Achalpur at the Foot of Melghat Region

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Abstract

Algae live in a wide range of aquatic environment and are a natural component of the most aquatic ecosystems. In the present study we collected water samples from the Sapan River of four different sites. These samples were collected in rainy season forty-five different algae were recorded from these sites. From the data obtained algal biodiversity were identified from tropic status of lentic water bodies. About nine members belongs to Cyanophyceae group, twenty-two members belongs to Chlorophyceae group, thirteen members belongs to Bacillariophyceae group, and one member belongs to Xanthophyceae group. These diversity are studied for the scientific purpose so that further research can be extended on these algae and how these can be utilized economically, and medicinally.

Key words: Cyanophyceae; Chlorophyceae; Bacillariophyceae; Xanthophyceae; Sapan River.

1. Introduction

Algae are large autotrophs, cosmopolitan and plays a vital role as pioneers leading to the establishment of higher plant community. They are large and diverse group of simple, ranging from unicellular to multicellular forms. They have a tremendous potential to trap atmospheric carbon dioxide and nitrogen. Approximately 40 % of atmospheric CO₂ & equally good amount of nitrogen fixed annually on the plant is fixed by them (Goyal 1997). Studies on planktonic composition and physicochemical characteristics of water are necessary to acquire basic knowledge on the biodiversity status of a water body.

These algal flora varies from season to season different alga were present on different sites, their availability is in accordance with their favourable condition at that place. These algae plays a crucial role in the aquatic ecosystem to absorb nutrients, toxic materials, heavy metals and convert it into simplest form. They occur in the lentic (standing water) as well as lotic water (running water). Some algae have an economic importance because they are a source of carotene, glycerol, and alginates and can be converted into a food source for aquaculture. The present study is a preliminary attempt to explore the algal biodiversity of Sapan River in Achalpur region. Achalpur and Paratwada is known as a twin city. This twin city is surrounded by a river named 'Sapan' there is a hilly area that acts like a fence to this city. This city is at the boundary of Maharashtra and Madhya Pradesh. The river Sapan flows from the center of the Achalpur city.

Sapan River project consist of an earthen dam across which there is a village Wazzar in Achalpur Tahsil of Amravati District. Sapan river is a right bank tributary of Purna river in Tapi basin. Amravati district, particularly the Purna basin is having deposits of rich soils. At present, orange, cotton and chillies are the major crops grown in this region. To increase the production of the crops various irrigation projects are being investigated. Sapan river project is one of these projects. Many of the small villages are situated at the banks of this river. It is one of the water supply sources to the Achalpur city.

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2. Material and Method

The study was undertaken on Sapan River of Achalpur taluka belonging to Amravati District. The analysis of the samples collected from different sites was carried out at Department of Botany Jagadamba Mahavidyalaya Achalpur. Sapan dam was constructed as a part of irrigation project from where this Sapan River impounds. The samples were collected from depth more than one feet with the help of sterilized forceps and collected in glass bottles or polythene bags. These samples were washed with 2-3 % Acetic acid in order to clear algal material from organic matter and debris. Then it was preserved in 3-4 % formalin in conical flask, common method of serial dilution was used. To identify the algal material, it was stained with 1% iodine solution and observed under microscope. The photograph was made with the help of micro image projection system (MIPS) and the collected samples were identified with the help of standard keys given by cyanophyta (Desikacharya 1959) and also textbook on algae (Kamat 1975), Handbook of algae (Forest 1954). The Fresh water algae (Prescot 1954).

The Identified algae are listed in the following table belonging to algal groups Cyanophyceae, Chlorophyceae, Bacillariophyceae, Xanthophyceae.



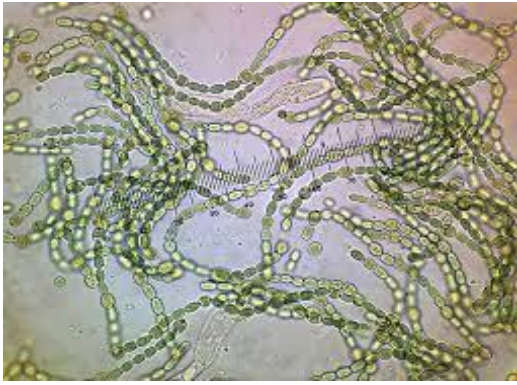
Figure 1 Algae samples collected from four sites of Sapan River

Table 1 Algal community of Sapan River of four different sites

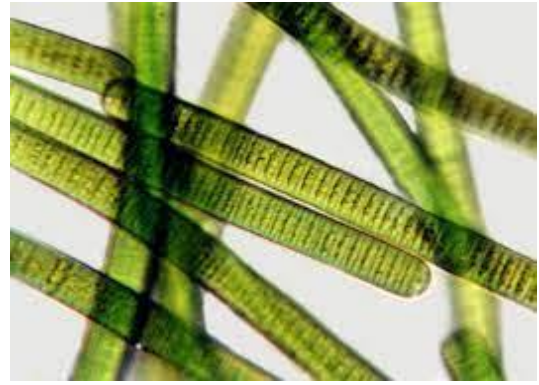
Algae	Site 1	Site 2	Site 3	Site 4
Cyanophyceae				
<i>Anabena</i>	++	+++	++	+++
<i>Nostoc</i>	++	++	++	++
<i>Oscillatoria tenuis</i>	++	++	+	+++
<i>Oscillatoria curviceps</i>	++	++	+	+
<i>Microcystis</i>	+++	++	++	+
<i>Lyngbya</i>	++	+	+	+
<i>Spirulina</i>	++++	++++	++	+++
<i>Oscillatoria princeps</i>	++++	++++	++	+++
<i>Oscillatoria limosa</i>	+++	++	++	++
Chlorophyceae				
<i>Hydrodictyon</i>	+++++	+++++	++	+++++
<i>Spirogyra</i>	+++++	+++++	++	+++++
<i>Cosmarium moniliforme</i>	++	++	+	---

<i>Cosmarium reniformae</i>	+++	++	++	+++
<i>Chlorella</i>	+	+	+	+
<i>Cosmarium botrytis</i>	+++	++	++	+++
<i>Stigeoclonium tenue</i>	++	++	+	---
<i>Pediastrum simplex</i>	---	---	+	++
<i>Cosmarium supergranatum</i>	++	++	++	++
<i>Cosmarium turpinii</i>	++	++	++	++
<i>Oedogonium</i>	++++	++++	++	+++
<i>Pithophora</i>	+++	+++	+	++
<i>Volvox</i>	++	++	+	+++
<i>Eudorina</i>	++	+++	++	+++
<i>Scenedesmus obliquus</i>	++	++	---	---
<i>Scenedesmus acuminata</i>	++	---	----	----
<i>Scenedesmus dimorphus</i>	++	---	---	---
<i>Scenedesmus opoliensis</i>	++	----	---	++
<i>Closterium galeria</i>	+++	----	++	+
<i>Closterium acutum</i>	++	---	++	+
<i>Closterium pronum</i>	----	----	----	----
Bacillariophyceae				
<i>Navicula radiosa</i>	++	++	---	----
<i>Navicula rhyncephala</i>	+	+++	++	---
<i>Navicula cryptocephala</i>	+	--	--	++
<i>Navicula gregaria</i>	++	+++	--	++
<i>Pinnularia major</i>	++	+++	++	++
<i>Pinnularia nobilis</i>	+	++	++	---
<i>Pinnularia interrupta</i>	++	+++	---	---
<i>Pinnularia trevelyana</i>	+++	+	++	+
<i>Diatom</i>	+	---	+	---
<i>Cyclotella meneghiniana</i>	+	----	+	---
<i>Gomphonema lanceolatum</i>	++	+	+	+
<i>Nitzschia palea</i>	--	----	++	++
<i>Synedra ulna</i>	+	---	+	++
Xanthophyceae				
<i>Chlorobotrys regularis</i>	++	---	----	+

From the above table it was observed that in Sapan river there was a great diversity of algal flora 9 members of cyanophycean group, 21 member of Chlorophyceae, 13 members of Bacillariophyceae, and 1 member of xanthophyceae.



Anabena



Oscillatoria



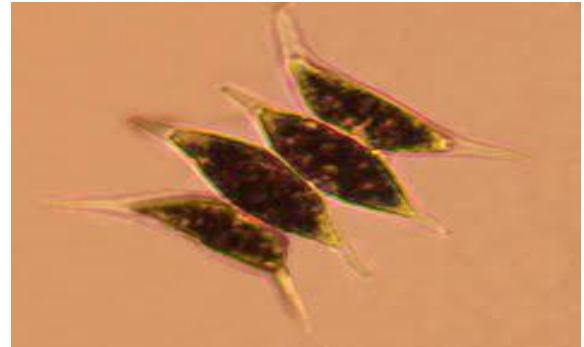
Spirulina



Hydrodictyon



Cosmarium



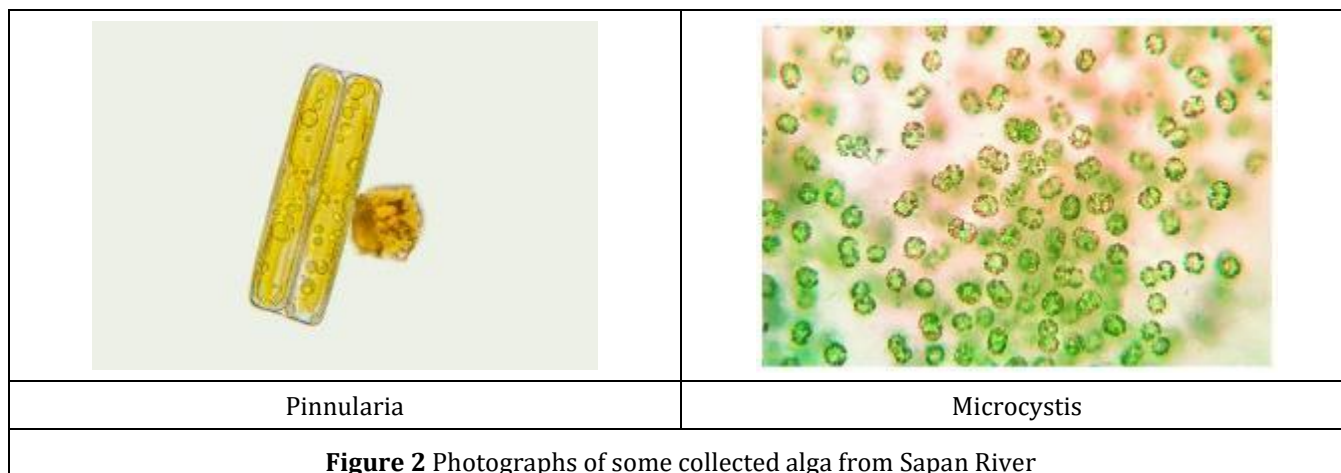
Scenedesmus



Closterium



Navicula



3. Result and Discussion

As the algae for the identification was collected from different sites in order to compare the species and flora exploration according to the environmental factors available there, as many of the environmental factors are responsible for the algal growth such as sunlight, rate of precipitation, sediment characteristics, physiography, soil, depth of water as Palmer (1980) opined that size, shape, depth & sediment have pronounced effect on their growth and development in waters.

From the above table 44 different types of alga were isolated from 4 different sites of these Cyanophyceae (9), Chlorophyceae (22) Bacillariophyceae (13) and Xanthophyceae (1). As after observation it was seen that flora of *Hydrodictyon* and *Spirogyra* was found to be in abundant quantity in all the four sites. Cyanobacterial bloom mainly composed *Anacystis nidulans* followed by *Anabena* as a chief contributor to the algal flora. Van Oye (1937) attributed paucity of desmids to eutrophic nature of water. After comparative study it was observed that from all the four sites in site 3 algal flora was seen in very frequent number due to domestic waste was mixed in high quantity in water. Both the algae are well documented pollution tolerant forms with reported dominance in sewage contaminated waters. (Palmer 1969, Rai & Kumar 1979, Tiwari et al 1996) Many of the floras are also extinct due to polluted water. High water temperature high organic matter and low DO influence the periodicity of cyanophyceae (Venkateswarlu 1970).

4. Conclusion

From the above identification, it was observed that the Sapan river of Achalpur in Amravati district consist of diversified flora of different algal forms in which 9 members of Cyanophyceae, 22 members of Chlorophyceae, 13 members of Bacillariophyceae, 01 member of Xanthophyceae. As Xanthophyceae members are frequently observed. And from the complete observation, it was observed that *Hydrodictyon retinaculum* was found abundantly in the river.

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