

## COMPARATIVE STUDY OF PHYTOPLANKTONS AT BHATYE AND ALAWA BEACHES OF RATNAGIRI, MAHARASHTRA INDIA

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### ABSTRACT

The Phytoplankton's are playing a important role in aquatic ecosystems they are primarily producers in aquatic food chain. The Phytoplankton assumes a great ecological significance in aquatic ecosystem. The present study of planktons collected from water samples, preserved and brought to laboratory for the study. The water samples were observed under the microscope to ascertain the species of phytoplankton's and the checklist have been prepared. Plankton net: Water from selected sampling sites filtered by the help of plankton net (mesh size 25 to 50 µm) for the study of phytoplankton from the study area. Sampling bottles: Water samples from the field were collected and brought to laboratories in sampling bottles for the assessment of micro flora. Electron microscope: Water samples brought to laboratories and observed under the microscope to ascertain the species of phytoplankton's.

**KEYWORDS:** Planktons, Sampling bottles, Electron microscope, Plankton net & Estuary etc.

### INTRODUCTION

The India has 7516.6 km costal line lengths ([iced.cag.gov.in](http://iced.cag.gov.in)). These coastal ecosystems involved the mud flats, mangroves, coral reefs, marshes, lagoons, sea grass bed, sandy and Rocky breaches. They are mainly known for their high biological productivity and provide a wide range of habitat for a multitude of marine flora and fauna. Over 13000 species are estimated to be in the costal and marine ecosystems (Ref).

Konkan is the rugged section of the mid-western coastline of the Indian Subcontinent, the coastal hinterland of Konkan comprises of numerous riverine islands, river valleys, and the hilly slopes of the Western Ghats, that lead up into the tablelands of the Deccan region. Ratnagiri is situated on Konkan coast, west coast of India. Hence the minute attention has been devoted to the scientific studies along this coastal area. It is also known as heaven of Maharashtra. A symbolic

factor of the diversity of coastal habits is distinguished by a variety of landforms like beaches, estuaries, Islands etc. This coastal region fulfilled with lot of diversity in micro to macro flora and fauna.

Marine planktons play a critical role in maintaining the health and balance of the Ocean. They provide food for extensive range of sea creatures which requires inorganic nutrients like nitrites, sulfur, phosphate that converted into carbohydrates, fats and proteins.

Phytoplankton's are critical to Ocean biogeochemical cycles, as well to fresh waters. They take up, transform, and recycle elements needed by other organisms, and help cycle the elements between species in the ocean. Some Phytoplankton's have a direct impact on humans and other animals.

They are the base of food chain in aquatic ecosystem. Hence, the damage to phytoplankton productivity will have remarkable effects on the biodiversity, fisheries and the human food supply and the step of global warming.

Number of studies or researches have indicated that UV-B radiation affect the growth, survival and distribution of phytoplankton's. So many human activities have negative effects on phytoplankton species. Many species are in threat to become very low in abundance due to all activities throughout the world.

The present study area is also visited by many tourist and local people. The developmental activities surrounding to the area also have posed the serious effects over the quality of sea water which ultimately have affected the different composition of oceanic ecosystem. The phytoplanktons are very sensitive to the physical, chemical and biological changes in to waters. Hence, in the present research we have focused on monitoring the phytoplankton species from the study area during study period.

## OBJECTIVES

1. Collection of water samples at monthly interval from the study area and microscopic assessment of water samples to ascertain the phytoplankton species.
2. Comparison of phytoplankton species from Bhatye and Alawa beaches.

## MATERIALS AND METHODS

### Materials

1. **Plankton net:** Water from selected sampling sites filtered by the help of plankton net (mesh size 25 to 50  $\mu\text{m}$ ) for the study of phytoplankton from the study area.
2. **Sampling bottles:** Water samples from the field were collected and brought to laboratories in sampling bottles for the assessment of micro flora.
3. **Electron microscope:** Water samples brought to laboratories and observed under the microscope to ascertain the species of phytoplanktons.

### Methods

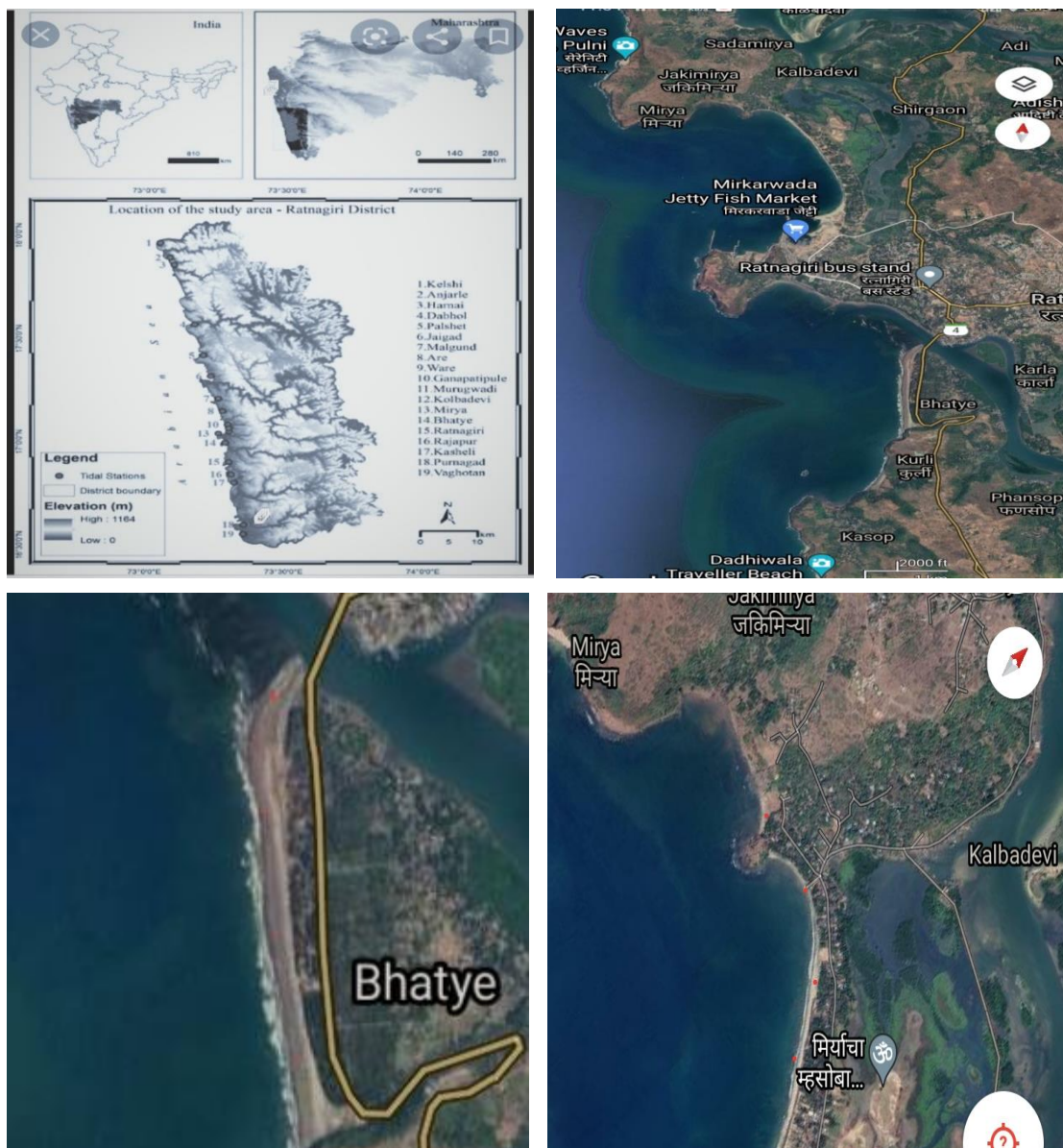
1. The plankton samples have been collected at monthly interval during low tide from intertidal zone of study area (March to May, 2022).
2. The phytoplankton samples have been collected by using the plankton net.
3. A total 100 liters of water filtered and preserved in 4% neutralized formaldehyde solution for qualitative analysis.

4. The observations have done along the different stations of both study areas (Bhatye and Alawa beaches).
5. The major taxonomic groups of phytoplanktons have been determined under the electronic microscope with magnification of 40 X.
6. The identification of Phytoplanktons carried out on the basis of available literatures in the form of books and research papers.

### Sampling

The microflora samples were collected at monthly intervals from March to May, 2022. The water samples were collected during low tide from intertidal zone of study area. The plankton samples were collected by using plankton net. The net mesh size between 25 to 50  $\mu\text{m}$  was used to filter the water. A total of 100 litres of water was filtered in 100 ml from each site of study area and later it was preserved in 4% neutralized formaldehyde solution and brought to laboratory for qualitative analysis.

### Study area



Map 1: Sampling sites at Bhatye beach & Alawa (Jakimiriya) beach, Ratnagiri.

### 1. Bhatye beach

Bhatye beach is situated at Ratnagiri Coast and their GPS coordinates is start 16°575301 North, 73°173760 East and End 16°585689 North, 73°174158 East. The habitat type of shore is marine, intertidal and sandy shore. The sandy shore is dissipative. The shore is about 2 km long and intertidal area is 100-200m broad. The shore is situated at the mouth of Bhatye estuary. The beach is sheltered type. The sand is medium coarse and somewhere fine. Shell sand also present at some zone. Sand color is gray to black. Wave action is of medium energy.

### 2. Alawa beach

Alawa beach is also situated at Ratnagiri coast and their GPS coordinates starts 17°023611 North, 73°2732222 East and end is 17°023583 North, 73°270389 East. The habitat type of shore is marine, intertidal, rocky shore. Intertidal area is wide and dominated by boulder field. Rock pools are few and far dispersed. The rate of siltation is more due to the runoff from the hilly terrain to nearby shore.

### Study Sites

The present study was carried out at the Bhatye and Alawa (Jakimirya) beaches of Ratnagiri.

The water samples were collected for microflora study from four stations at each beach, and the distance between two stations was kept 500 meters.

### RESULT AND DISCUSSION

The Phytoplankton's are playing a important role in aquatic ecosystems they are primarily producers in aquatic food chain. The Phytoplankton assumes a great ecological significance in aquatic ecosystem. During the present study we have collected water samples, preserved and brought to laboratory for the study of phytoplankton's. Water samples were observed under the microscope to ascertain the species of phytoplankton's and the checklist have been prepared.

The checklist of phytoplankton species at Bhatye is shown in table no. 1. A total of 27 species distributed among 24 genera belonging to three classes were recorded at Bhatye, Ratnagiri during study period. The Bacillariophyceae members were dominant (24) while that of Dinophyceae were observed with minimum (4) species. Among them the Cyanophyceae members were observed at all sites of Bhatye beach.

The checklist of phytoplankton species at Alawa is shown in table no. 2 A total of 31 species distributed among 26 genera belonging to three classes were recorded at Alawa, Ratnagiri during study period. Here also the Bacillariophyceae members were maximum (25) while that of Dinophyceae minimum (4). Cyanophyceae members were observed at all sites.

Some common species which were found at both the study areas were *coscinodiscus sp.*, *Pleurosigma sp.*, *Nitzschia sp.*, *Bacillaria sp.*, *Skeletonema sp.*, *Licmophora sp.*, *Microcystis sp.* with dominance. But *Cylindrotheca closterium*, *Leptocylindrus danicus* were only observed at Bhatye sites. *Biddhulphia sp.*, *Alexandrium sp.*, *Cocconeis sp.*, were found only at the study sites of Alawa beach Apte (2012) reported 27 sp. of algae.

Table no 1: Checklist of phytoplankton at Bhatye beach Ratnagiri.

Sr. No.	Class	Order	Family	Genus/Species
1	Bacillariophyceae	Coscinodiscales	Coscinodiscaeae	<i>Coscinodiscus spp</i>
2	Bacillariophyceae	Biddulphiales	Coscinodiscaceae	<i>Coscinodiscus radiates</i>
3	Bacillariophyceae	Bacillariales	Bacillariaceae	<i>Nitzschia spp</i>
4		Bacillariophycidae.	Bacillariaceae	<i>Bacillaria spp</i>
5	Bacillariophyceae	Bacillariales	Bacillariaceae	<i>Cylindrotheca closterium</i>
6		Thalassionematales	Thalassionemataceae	<i>Thalassionema spp</i>
7		Bacillariales.	Thalassionemataceae	<i>Lioloma spp</i>
8		Thalassiosirales	Stephanodiscaceae	<i>Planktoniella sol</i>
9			Thalassiosiraceae	<i>Thalassiosira spp</i>
10			Skeletonemataceae	<i>Skeletonema spp</i>
11		Naviculales	Pleurosigmataceae	<i>Pleurosigma spp. I</i>
12	Bacillariophyceae	Naviculales	<u>Pleurosigmataceae</u>	<i>Pleurosigma spp. II</i>
13			Naviculaceae	<i>Navicula spp.</i>
14		Lithodesmiales	Lithodeniaceae	<i>Ditylum brighwelli</i>
15		Chaetocerotales	Chaetocerataceae	<i>Chaetoceros spp.I</i>
16	Bacillariophyceae	Incertae sedis	Chaetocerataceae	<i>Chaetoceros spp.II</i>
17		Thalassiophysales	Catenalaceae	<i>Amphora spp.</i>
18		Rhizosoleniales	Rhizosoleniaceae	<i>Rhizosolenia spp.</i>
19		Rhizosoleniales		<i>Guinarida spp.</i>
20		Leptocylindricales	Leptocylindraceae	<i>Leptocylindrus spp.</i>
21		Licmophorales	Licmophoraceae	<i>Licmophora spp.</i>
22				<i>Asteromphalas spp.</i>
23		Fragillariales	Fragilariaceae	<i>Fragilaria spp.</i>
24		Paraliales	Paraliaceae	<i>Paralia spp.</i>
25	Dinophyceae	Gonyaulaeales	Ceratiaceae	<i>Ceretium furca</i>
26				<i>Ceretium ozoricum</i>
27				<i>Ceretium macroceros</i>
28		Pyrocystales	Pyrocystaceae	<i>Pyrocystis spp.</i>
29	Cynophyceae	Chroococcales	Microcystaceae	<i>Microcystis spp.</i>

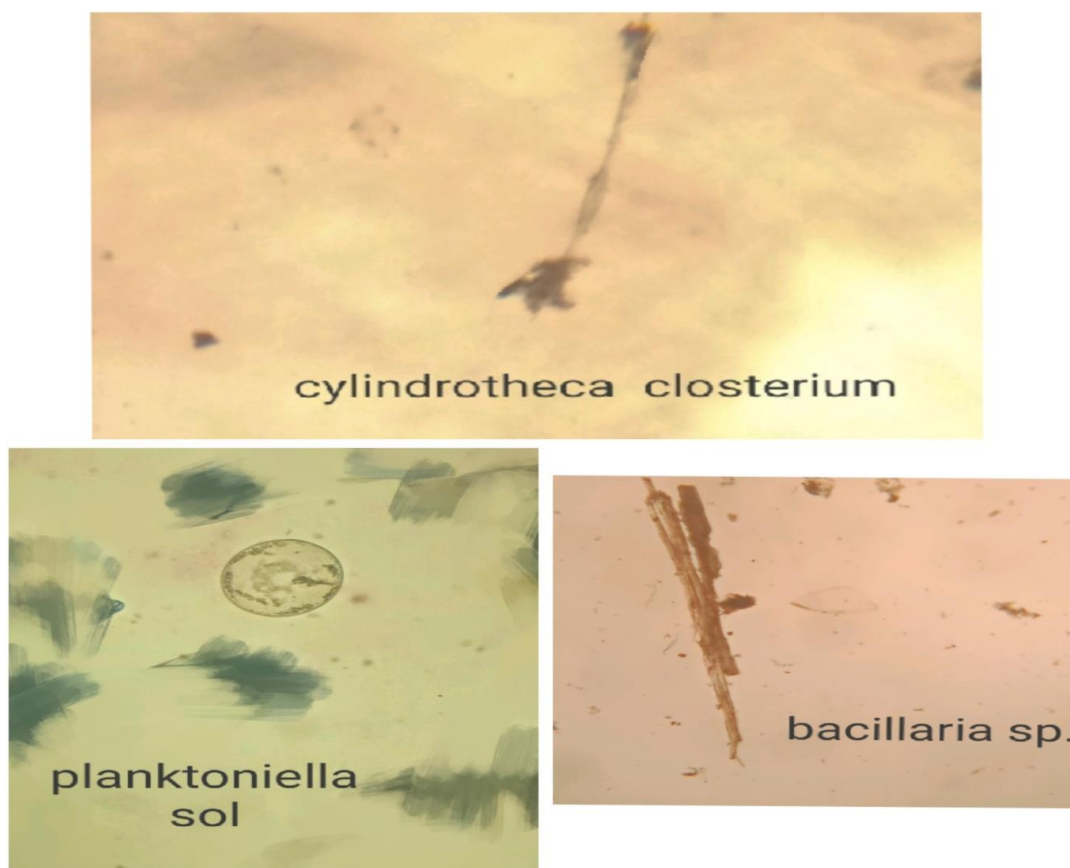
Table No. 2: Checklist of phytoplankton at Alawa beach, Ratnagiri.

Sr. No.	Class	Order	Family	Genus/Species
1	Bacillariophyceae	Coscinodiscales	Coscinodiscaeae	<i>Coscinodiscus sp.</i>
2		Biddulphiales	Biddulphiaceae	<i>Biddulphia sp.</i>
3		Bacillariales	Bacillariaceae	<i>Nitzschia spp.</i>
4	Bacillariophyceae	Bacillariales	Bacillariaceae	<i>Bacillaria spp.</i>
5				<i>Cylindrotheca Closterium</i>
6		Thalassionematales	Thalassionemataceae	<i>Thalassionema spp</i>
7				<i>Lioloma spp.</i>
8		Thalassiosirales	Stephanodiscaceae	<i>Planktoniella sol</i>
9			Thalassiosiraceae	<i>Thalassiosira sp.</i>
10			Skeletonemataceae	<i>Skeletonema sp.</i>
11		Naviculales	Peurosigmataceae	<i>Pleurosigma sp-I</i>
12				<i>Pleurosigma sp.-II</i>
13			Naviculaceae	<i>Navicula sp.</i>
14		Lithodesmiales	Lithodeniaceae	<i>Ditylum brighwelli</i>
15		Chaetocerotales	Chaetocerataceae	<i>Chaetoceros sp- I</i>
16				<i>Chaetoceros sp- II</i>
17		Thalassiophysales	Catenalaceae	<i>Amphora sp.</i>
18		Rhizosoleniales	Rhizosoleniaceae	<i>Rhizosolenia sp.- I</i>
19				<i>Rhizosolenia sp.- II</i>
20	Coscinodiscophyceae	Rhizosoleniales	Rhizosoleniaceae	<i>Guinorida sp.</i>
21		Achnanthes	Cocconeidaceae	<i>Cocconels sp.</i>
22		Licmophorales	Licmophoraceae	<i>Licmophora spp.</i>
23				<i>Asteromphalas sp.</i>



24		Fragillariales	Fragillariaceae	<i>Fragillaria sp.</i>
25		Thalassionematales	Thalassionemataceae	<i>Thalassiothrix sp.</i>
26	Dinophyceae	Gonyaulacales	Ceratiaceae	<i>Ceretium furca</i>
27				<i>Ceretium furcoides</i>
28				<i>Ceretium macroceros</i>
29			Goniodomataceae	<i>Alexandrium sp.</i>
30		Pyrocystales	Pyrocystaceae	<i>Pyrocystis sp.</i>
31	Cynophyceae	Chroococcales	Microcystaceae	<i>Microcystis sp.</i>





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