

## PHYTOPLANKTON DIVERSITY OF DHAM RIVER IN WARDHA DISTRICT OF MAHARASHTRA STATE, INDIA

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### ABSTRACT

Phytoplankton diversity of Dham river in Wardha district of Maharashtra state at Pawnar, was analyzed in upstream and downstream stations for a period of one year and a check list of various recorded species was prepared. The biodiversity of phytoplankton analysis showed 36 different species represented by 6 different classes. Maximum, 16 species were represented by Chlorophyceae, while minimum only one was represented by Euglenophyceae, Desmidiaceae and Hydrocharitaceae. Maximum phytoplankton forms were recorded from organically polluted downstream stations only, while comparatively less forms were represented by unpolluted upstream stations. The river Dham is rich in phytoplankton species as evident from the present research work which showed 36 different species in the river water.

**Keywords:** Dham River, Pawnar, Biodiversity, Phytoplankton, Wardha District

### INTRODUCTION

Plankton, is the most sensitive floating community which is the first target of water pollution, thus, any undesirable change in aquatic ecosystem affects diversity as well as biomass of the plankton community (Summarwar, 2012).

Plankton is one of the most important food items of the fishes and many other aquatic organisms. Almost all the fishes, in their larval stages were dependent on it and some of them exclusively feed on plankton. The phytoplankters constitute bulk of primary producers and are the base of food chains in every water body.

Worldwide extensive studies on phytoplankton, are undertaken by researchers such as Mukherjee *et al.*, (2010); Basu and Pick (1996); Rojo and Alvarez (1994); Descy and Gosselain (1994); Zafar (1967); Mishra *et al.*, (2010); Rao and Choubey (1990); Summarwar (2012); Berthon *et al.*, (1996); Biggs (2000); Costelloe *et al.*, (2005); Venkateswarlu (1969); Buric *et al.*, (2007); Stoermer (1977); Sharma *et al.*, (2011); Sarwade and Kamble (2014); Saravanakumar *et al.*, (2008).

As there are no studies reported by any researcher till date on river Dham, we have investigated the algal biodiversity in upstream and downstream stations at Pawnar in Wardha district and a list of recorded algal species is prepared.

### MATERIALS AND METHODS

Sampling spots were located on Dham river at barrage- Upstream in river and after crossing the bridge in downstream station in Wardha district of Maharashtra State. Only accessible sampling spots were used for sampling.

For plankton study the phytoplankton samples were collected from surface water filtering about 100 liter water from upstream and downstream stations during morning hours respectively. The samples were preserved using Lugol Iodine.

In a year in 3 different seasons the samples were collected in summer, winter and monsoon. Identification of phytoplankton was done using Tonapi (1980); Ward and Whipple (1945) and Trivedi and Goel (1986).

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### RESULT AND DISCUSSION

**Table 1: Phytoplankton Biodiversity in Dham River in Wardha District of Maharashtra State**

Sr. No.	Class and Species	Presence Upstream Station (Before Barrage)	Presence Downstream Station (After Bridge)
1.	<b>CHLOROPHYCEAE</b>		
	<i>Netrium sp.</i>	+	-
	<i>Volvox sp.</i>	-	+
	<i>Micractinium sp.</i>	-	+
	<i>Tetraedron sp.</i>	+	-
	<i>Cosmarium sp.</i>	-	+
	<i>Coelastrum sp.</i>	+	-
	<i>Mougeotia sp.</i>	-	+
	<i>Ulothrix sp.</i>	-	+
	<i>Chlamydomonos sp.</i>	-	+
	<i>Scenedesmus sp.</i>	-	+
	<i>Spirogyra sp.</i>	-	+
	<i>Chlorella sp.</i>	-	+
	<i>Ankistrodesmus sp.</i>	-	+
	<i>Pediastrum sp.</i>	-	+
	<i>Nitella sp.</i>	+	-
	<i>Zygnema sp.</i>	+	-
2.	<b>CYANOPHYCEAE</b>		
	<i>Anacystis sp.</i>	-	+
	<i>Gomphosphaeria sp.</i>	-	+
	<i>Botryococcus sp.</i>	-	+
	<i>Phormidium sp.</i>	+	+
	<i>Gloeotrichia sp.</i>	+	-
	<i>Chroccocus sp.</i>	-	+
	<i>Rivularia sp.</i>	-	+
	<i>Synechocystis sp.</i>	+	-
3.	<b>BACILLARIOPHYCEAE</b>		
	<i>Synedra sp.</i>	-	+
	<i>Tabellaria sp.</i>	-	+
	<i>Navicula sp.</i>	-	+
	<i>Diatoms sp.</i>	-	+
	<i>Fragillaria sp.</i>	+	-
	<i>Asterionella sp.</i>	+	-
	<i>Cymbella sp.</i>	-	+
	<i>Cyclotella sp.</i>	-	+
	<i>Stauroneis sp.</i>	-	+
4.	<b>HYDROCHARITACEAE</b>		
	<i>Hydrillas sp.</i>	+	+
5.	<b>DESMIDACEAE</b>		
	<i>Closterium sp.</i>	-	+
6.	<b>EUGLENOPHYCEAE</b>		
	<i>Euglena acus</i>	-	+
	<b>Total Species Present</b>	<b>11</b>	<b>27</b>
	<b>Dham in River Water</b>		

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The results of the present study are summarized in Table 1. The upstream station on river Dham shows 11 different species while downstream station shows in all 27 different species of phytoplankton. So, in the river in all totally 36 different species are present.

Phytoplankton of freshwater systems like green algae, blue green algae, desmids and diatoms are important producers.

They are ecologically significant as they form the primary link in food chain. The chlorophyceae are represented by about 16 different species in Dham river, Cyanophyceae by about 8 different species, Bacillariophyceae by about 9 different species. The presence of euglena in downstream stations is a clear indication of organic enrichment and pollution of river bed of Dham river.

The distribution of algae depends upon many environmental factors, the nutrients, and other organic and inorganic substances in the water and the relative adaptability of different species. The density of phytoplankton is abundant in summers due to prevailing and suitable water conditions in Dham river. In every water body the phytoplankton communities are greatly influenced by various anthropogenic activities in the basin. The water quality parameters have a direct influence upon distribution and ecology of phytoplankton. The distribution patterns of phytoplankton's were strongly correlated with environmental factors.

The plankton communities are a major biotic component of an aquatic ecosystem. The most important effect of organic pollution in a water body is due to enrichment of nutrients and there is a clear correlation between organic pollution and blue green algae and also with certain diatoms like *Melosira sp.* (Palmer, 1969).

During the present study the most pollution tolerant species of Euglena and *Navicula* were recorded in downstream stations of Dham river which is quite polluted due to nirmalya discharge and stagnated water at this point. The anthropogenic activities prevalent of the banks have contributed to this.

Plankton species composition and abundance are functions of interactions with environmental conditions including salinity, temperature, light, nutrients, turbulence and water depth in addition to grazing competition and diseases (Mukherjee *et al.*, 2010).

Venkateswarlu (1969) observed maximum population of Chlorophyceae during winter in Moosi river, Hyderabad.

Thiruganamoorathi and Selaraju (2009) documented abundant count of Bacillariophyceae in monsoon season which was lowered in premonsoon. McHugh (2003) reported Bacillariophyceae as dominant life forms in phytoplankton and largest group of biomass producer on earth.

According to Hutchinson and Bowen (1947), it is a well known fact that the total quantity of plankton present in waters may undergo marked and rapid variation, so that in the course of a year a number of pulses may succeed after each other.

In our present study about 36 different forms are reported in upstream and downstream stations in which only downstream stations show higher forms. This type of study is a baseline study of species which will be useful for future generations, as any loss in species composition will be the effect of increasing man made pollution.

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