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The impact of physico-chemical factors on the freshwater phytoplankton in Wadali Lakes.

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Abstract:

Water is an essential element for all living forms. The surface area of the Earth is 50 billion hectares; 20 percent of this area is made up of land, and the remaining 80 percent is marine. Water is necessary for all life on Earth. The average daily intake of water for an individual is approximately two liters. The human body is made up of water to the tune of over 70%. In addition to industrial waste, sewage, and a variety of synthetic chemical additions, man has contaminated a large portion of this finite supply of water. An effort was made to track the physical and chemical characteristics of the water in the current study in order to demonstrate how they relate to phytoplankton biodiversity.

introduction:

The study of water's biota is fascinating and unique because water is the most vital biotic factor. As a solvent for a wide range of inorganic, organic, and gaseous substances, water exists on Earth in three different states: solid, liquid, and gaseous. It turns into a mixture and acts as a limiting factor in precipitation, regulating biomass energy marital cycle, biotic diversity, tropic levels, and the rate of succession. Water also contains biodiversity of aquatic flora and fauna. Aquatic habitats' key biotic components, phytoplankton and zooplankton, have an impact on the cyclic function of these environments. Aquatic ecosystems are known to support a wide range of organisms, among which are zooplanktons, which are microscopic animals that float freely in the water. They recycle that energy within the specific environment. Since they are sources of food, zooplanktons are significant to fish. Cladocera, copepods, rotifers, and ostracod are the different groups into which zooplankton are divided. (8) A lot of researchers, both domestically and internationally, have examined the zooplankton in freshwater environments. Naturally occurring zooplanktons and phytoplankton have rich biodiversity, and they are important for biomonitoring water pollution.

A large portion of the biodiversity on Earth depends on freshwater as a resource for life. Many bodies of fresh water, such as rivers and streams, are its primary habitat. It also affects the earth's climate. Phytoplankton is a ubiquitous unicellular microscopic life form found in aquatic environments. It is responsible for approximately half of Earth's primary producers. Researchers in India have reported on studies on the distribution of phytoplankton and its availability of light physical, chemical, and biological qualities in freshwater lakes. However, India's freshwater lakes are facing significant ecological stress due to rising pollution levels

from rapid industrialization. Most research on phytoplankton is being done with respect to lotic ecosystems. A lot of literature on lethal environments, like the ones mentioned above, is also available; however, plankton research needs to focus more on lethal environments in semi-arid regions where human habitation is predominant. The majority of the parameters in this study are observed within the guidelines set by the WHO and IS. According to this initial investigation, the lake is a good source of water for drinking and for creating a heathery habitat that supports phytoplankton biodiversity.

Materials and Method: The research area concerns the freshwater Wadali Lake in Amravati city. Finding the different kinds of fish in the surrounding reservoirs required a survey of the many freshwater bodies close to Amravati. In January, February, March, and April of 2016, the survey was conducted during the first week. The present study of the freshwater phytoplankton species has chosen Wadali Lake as its study area following the survey. Suggested Site: The sampling station was positioned to accurately represent the complex environmental conditions that exist today. Situated in the eastern region of Amravati city is the Wadali Lake. Over the course of two distinct regions and seasons, a random sampling technique was employed to collect samples from the chosen site. January - 02 - 03 - April 2016. A simple bottle method and a zooplankton mesh net made of a cylindrical tube were used to gather the samples in the first instance. Through two methods, water samples were taken up to three or four times a month. It is possible to gather samples of the entire water from the location that include every size class of phytoplankton and zooplankton. Following their separation into different sizes and categories, the phytoplankton and zooplankton samples were presented using the Formalin method. The entire water sample was filtered to obtain a final 5 ml sample that could be used for additional research. Once the sample has been collected 20gm of sodium borate Na2B2O4 was added along with formaldehyde.

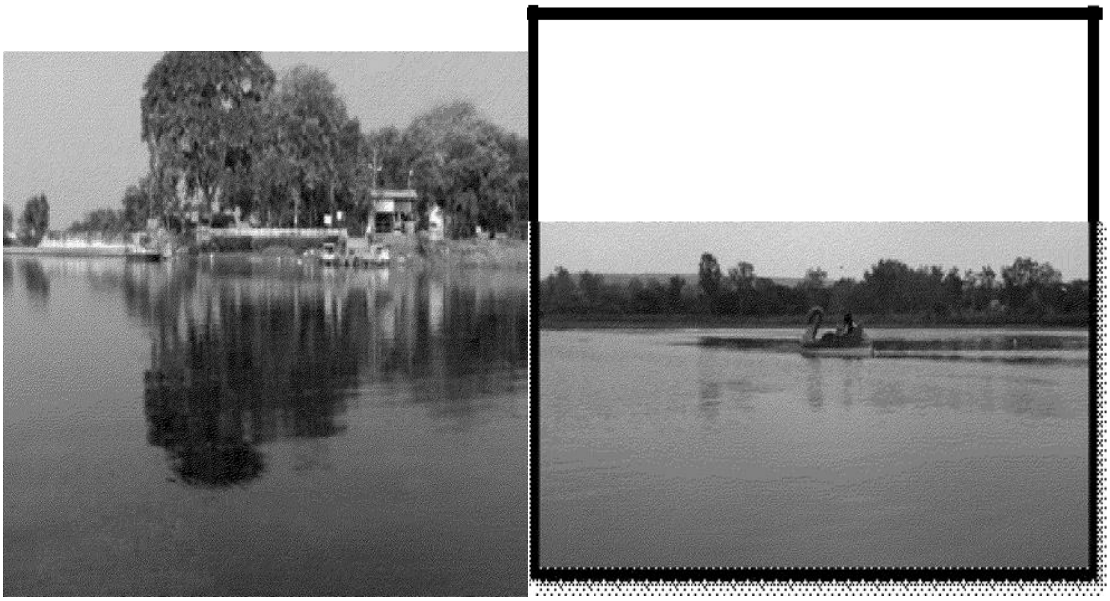

Fig 1: Wadali lake

Collection of water sample for physico-chemical parameter:

Using 1000 ml polythene bottles, water samples were taken from the Wadali station or the lake. Previously, the bottles were thoroughly cleaned with distilled water after being immersed in 2 percent HNO3 for an entire night. The information such as the date, time, sample number, source, and location of the sampling station was labeled on the polythene bottles once the water samples were collected. With caution and no shaking, the water samples were transported to the lab for chemical analysis in sanitized polythene bottles with appropriate labeling. Using digital thermometry, pH meters, conductivity bridges, and standard techniques provided by APHA (1985), the parameters, including taste, odor,

temperature, pH, dissolved oxygen (DO), biological oxygen demand (BOD), and chemical oxygen demand (COD), were measured on-site. The APHA standard (1985) techniques were employed to analyze the physico-chemical parameters of water quality. Such chemical parameters include total alkalinity, calcium, conductivity, free carbon dioxide, phosphate, sulphate, nitrates, and chlorides. within four hours on the same day, were estimated in the laboratory.

Results and Discussion: Fig. shows the outcome of the water quality status. 1, 2, and 3. The water's temperature varied in this study from 27 to 33 degrees centigrade. according to Hough J.'s report. l. 1958. Surface water absorbs heat primarily from solar radiation and conduction from the atmosphere during the summer months of the year. January 2016 saw a minimum temperature of 27°C, while April 2016 saw a maximum temperature of 33°C. The study found that the pH value varied between 7 and 92 points. It was maximum 7.92 in the month of February 2016 and it was minimum in March 2016 is 7.82. Water had no color, no smell, and no taste for the entire month. In January 2016, the maximum conductivity measured in this investigation was 70µm, and in March 2016, the minimum conductivity measured was 62µm. A strong, positive correlation was observed between water temperature and electric conductivity. Recorded results were comparable in nature. Within the current study, the highest level of transparency was observed in January at 115, while the lowest level of conductivity was observed in April 2016, at 82. During the current investigation, the lowest recorded dissolved oxygen at NTP in April was 1.40 mg/11 hr, while the maximum dissolved oxygen in freshwater was found to be 1.6 mg/11 hr at NTP. Water in Wadali Lake had a maximum hardness of 479 mg/l in April 2016 and a minimum hardness of 470 mg/l in January 2016, according to the current investigation

Phytoplanton

Phytoplankton plays a key role in the ecology. The name "phytoplankton" consists of two Greek words meaning "plant" [phyto] and "wanderer "[plankton]. There are two major group of phytoplankton. 1. Fast growing diatoms.2. Flagellates and dinoflagellates, which can migrate vertically in the water column in response to light. Each group exhibits a tremendous variety of cell shapes many with intricate designs and ornamentations. The phytoplankton's of wadali lake belongs to the order such as Volocace,, odogoniace and nostocaces and the number of genus and species observed during the experimental period was Anabaena flos-aquae, Anabaena spiroides ,N. azollae ,N. comminutum ,Macrandous Species 0. fragile Volvox barberi, Volvox globator and Nannandrous Species. In January 2016 the Anabaena flos- aquae ,Anabaena spiroides ,N. azollae ,Macrandous Species 0. fragile Volvox barberi, Volvox globator and Nannandrous Species was observed except the was N. comminutum .In the month ofF ebruary 2016 the Volvox barberi, Volvox globator, Nannandrous Species and Anabaena was observed, whereas the anabenas flos-aquae, Macrandous fragile , N azollae and N . communutum. Was abundant and during the month of April 2016 the Anabeans and the Nannandrous was not observed there is fluctuation in the number of species in every month this might be due the availability of the favorable water parameter during the Jan- feb and march months 2016. As the physico chemical parameter shows fluctuation the growth of phytoplankton's does showed a decline in the growth of these planktons.

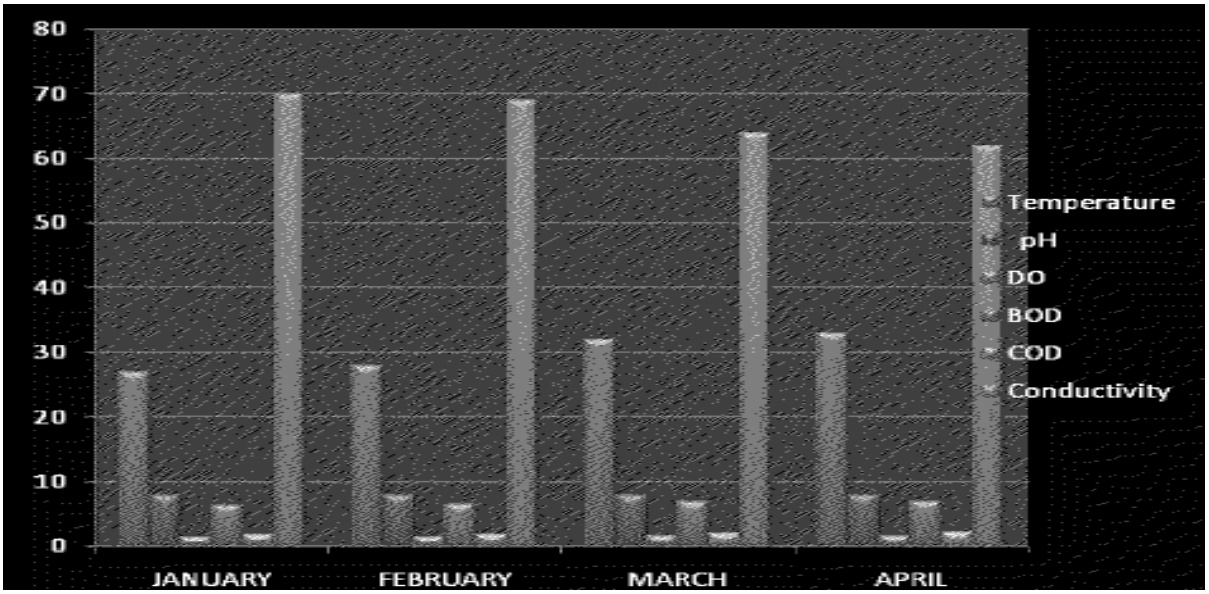

Fig.2-physico-chemical parameter of freshwater ofWadali Lake. Amravati District.

Fig 3: Phytoplankton from water ofWadali Lake.

Sr. No.	Order	Family	Genus	Species	January 2016	February 2016	March 2016	April 2016
I	Volvocales	Volvocaceae	*Volvox*	Volvox barberi	+	+	+	+
				Volvox globator	+	+	-	+
2	Nostocales	Nostocaceae	*Anabaena*	Anabaena flos-aquae	+	+	+	-
				Anabaena spiroides	+	-	-	+
3	Nostocales	Nostocaceae	*Nostoc*	N. azollae	+	-	+	+
				N. comminutum	-	-	+	+
4	Oedogoniales	Odogoniace	*Oedogo-nium*	Macrandous Species 0. fragile	+	+	+	+
				Nannandrous Species	+	+	-	-

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