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Research Paper

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A study on Morphological Identification Wadali Lake Micro-Organisms'

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Abstract

Amravati is a City in the State of Maharashtra, India. It is the seventh most populous metropolitan area in Maharashtra, Amravati district has some lakes and the most popular are Simbhora (Morshi) dam, Pohara Lake (Malkhed), Chatri Lake and Wadali Lake. Our aim is to check the water quality from Wadali Lake. For this study we collect different water sample from Wadali Lake. The experiment was carried out during January 2016 to April 2016 and did the morphological identification of micro-organism. Thus during the study we observed, Volvox, archebacteria, cyanobacteria, and odogonium etc.

Introduction

Amravati is a City in the State of Maharashtra, India. It is the seventh most populous metropolitan area in Maharashtra. It is also the administrative headquarters of the Amravati District. Among the historical landmarks in the city are the temples of Amba, Shri Krishna, Venkateshwara and Maltakdi.

Amravati is located at 20.93 °North and 77.75° East. It has an average elevation of 343 meters (1125 ft). It lies 156 km (97 miles) west of Nagpur and serves as the administrative center of Amravati district. There are two lakes in the Eastern part of the city, Chhatr Talao and Wadali Talao, Pohara and Chirodi Hills are to the East of the city. The Maltakdi Hill is inside the city, it is 60m high.

Amravati has tropical wet and dry climate with hot, dry summers and mild to cool winters. Summers last from March to June, Monsoon season from July to October and winter from November to March. The highest and lowest temperature ever recorded was 47.9°C on 25 May 2013 and 18.8°C on 9 Feb. 1887 respectively.

The freshwater ecosystem is divided into two main types i.e. Lotic and lentic types of freshwater ecosystem. The lotic type of ecosystem is generally concerned with the water bodies which are stagnant one. Among the lotic ecosystem Wadali lake is one of the examples in the Amravati region or city.

There are two primary categories of the freshwater ecosystem: i. e. Freshwater environments of the lentic and lotic types. Static bodies of water are typically of concern to the lotic type of ecosystem. Wadali Lake in the Amravati area is one of the examples of the lotic ecosystem.

Wadali Lake is a well-known reservoir located east of Amravati on the Chandur Railway Road. Wadali Lake has a surface area of two hectares and an approximate mean depth of

seventeen meters. Five is the catchment area. eight square kilometers. Another well-lit feature of this Talao (lake) that attracts lots of kids is its small garden. The garden's area is two. 81 hector, and 20 point 99 hector is beneath the tank. The lake is a popular tourist destination and provides a tranquil entryway from the city. According to past records, migratory birds are the main draw for all life science researchers, and this lake's greater biodiversity of plants and animals draws in young scientists and researchers. Therefore, the goal of the current study is to examine the biodiversity of microorganisms in Wadali Lake, Amravati. The range of organisms known to be supported by aquatic ecosystems includes zooplanktons, which are microscopic, free-floating animals. Fish rely on zooplanktons as food sources, so they are significant. The zooplankton is divided into different groups.

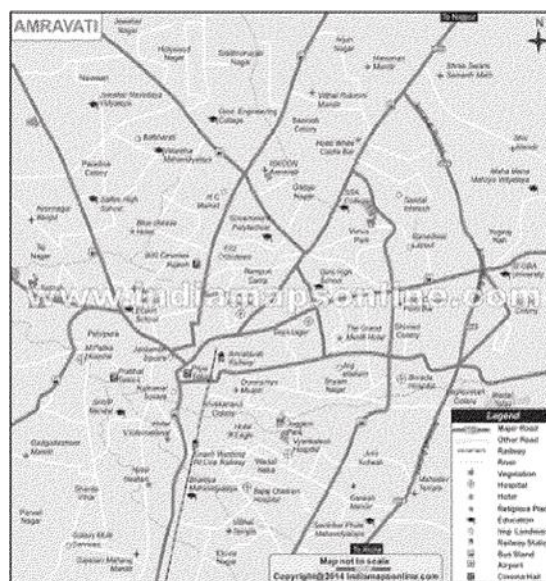


Fig.1. Map of Amravati City

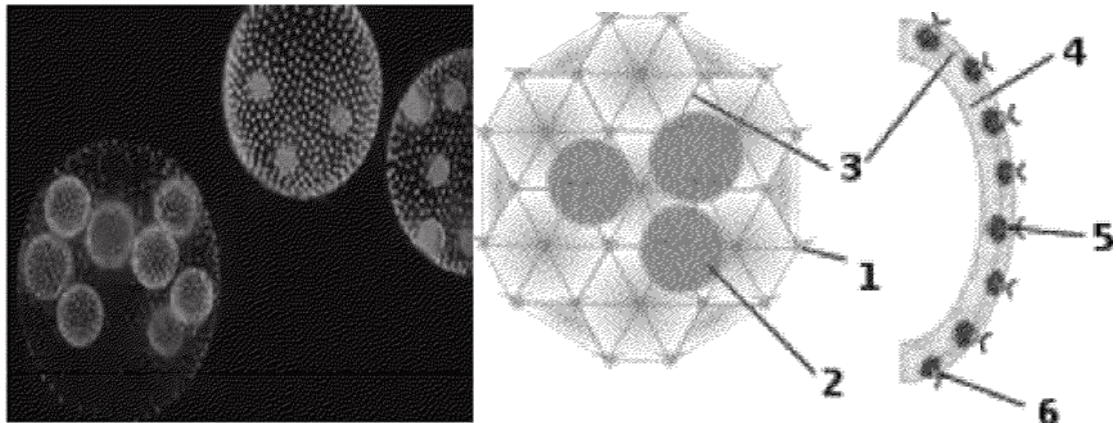
Methods and material Survey

The area of research is Amravati city in relation to the study of fresh water Wadali lake. The survey of the various fresh water bodies near Amravati was undertaken to as to find the various types of fishes in the nearby reservoirs. The survey was conducted during the first week of January, February, March and April 2016. After the survey the Wadali lake has been selected for the present study of identification of microbial species was available during this month for carrying the research work its correlation with the Physico chemical parameter of wadali lake. The microorganism was observed under scientific Lobos microscope with higher magnification and the photographs has been taken.

Result and Discussion

The morphological identification of the few microorganisms observed during the research are as follows.

NO 1 : VOLVOX



Volvox colony: 1) Chlamydomonas-like cell, 2) Daughter colony, 3) Cytoplasmic bridges, 4) Intercellular gel,

5) Reproductive cell, 6) Somatic cell.

Scientific Classification

Kingdom :Phytoplanton.

Division: Chlorophyta

Class: Chlorophyceae

Order: Volvocales

Family :Volvocaceae

Genus : Volvox

1) Colonial free swimming spherical or ovat colony of 500to 50,000 cells arranged in a hollow sphere.

2) Hollow sphere at the periphery of a common gelatinous mucilage.

3) Protoplasmic colony are frequently seen.

4) Cells are ovoid having a parietal incomplete shaped

5) In complete shaped containing one pyrenoid, one anteriorly, located eye spot and two flagella with two contractile vacuoles at their bases.

6) 2to5 contractile vacuoles irregularly distributed at the anterior end.

7) A sexual reproduction gives daughter colonies.

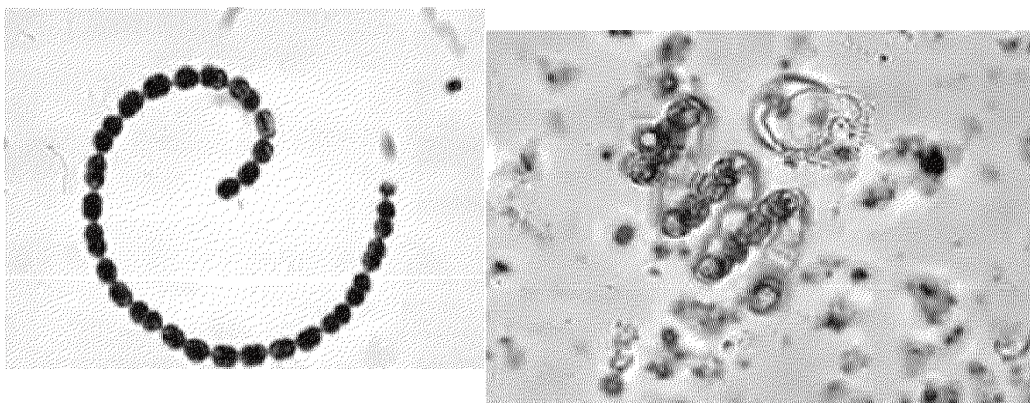
8) Parent sphere, formed by special gonidial cells.

9) Volvox is a genus of freshwater algae found in ponds and ditches, even puddles.

10) According to Charles Joseph Chamberlain, the individual algae in some species and interconnected by thin strands of cytoplasm, called protoplasmates.

Scientific Classification

2) ANABAENA



Kingdom : Bacteria

Phylum :Cyanobacteri

Order :Nostocales

Family :Nostocaceae

Genus : Anabaena Species : Anabaenena

1)The colony is an amorphous of tangled spirical or straight trichomes composed of glob shaped, thread of cylindrical shaped cells

2)The trichomes may or may not be a watery sheath.

3)Trichomes are enclosed in a delicatehyaline mucilaginous colonial mucilage.

4)The interocytes are intercalary, generally solitary and may be {gonidia} are round ovate or cylindrical.

5)The colonial mass has no definite shape and does not retain its shape whene removed from the water.

6)Anabaena is a genus of filamentous cyanobacteria that exists as plankton

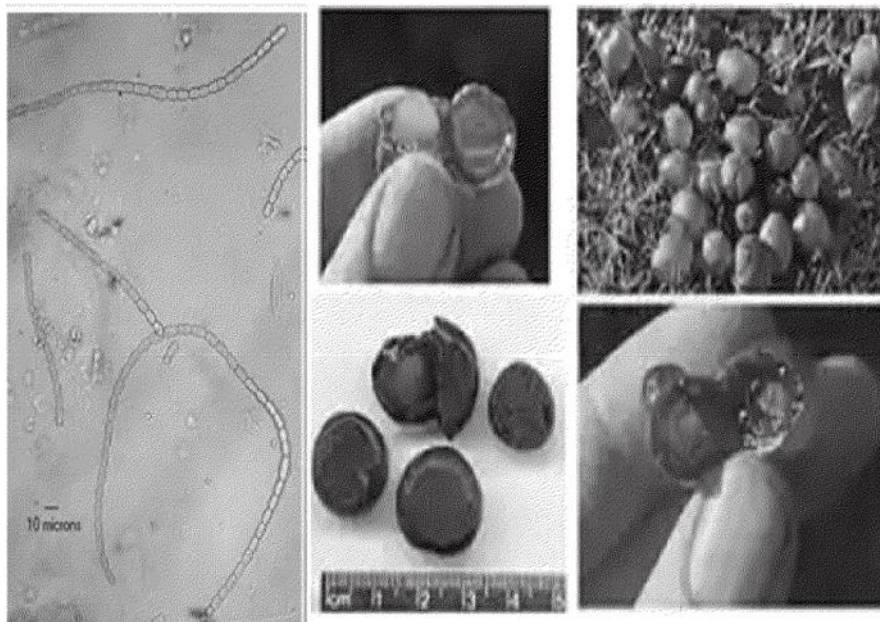
7)Itis known for its nitrogen fixing abilities, and they form symbiotic relationships with certain plants, such as the mosquito fe

8)Production of these neurotoxins

9)vegetative cells differentiate into heterocysts

I 0)Anabaena is used as a model organism to study simple vision

3) NOSTOCK



Scientific Classification

Kingdom : Bacteria

Phylum :Cyanobacter

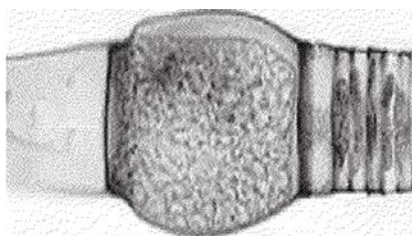
Order :Nostocales

Family :Nostocaceae

Genus : Nostoc Species : Nostock

1)Irregularly shaped is composed of contorted trichomes which are uniseriate unbranched threads of globose, head like barrel shaped or cylindrical shaped cells.

- 2) The trichomes are enclosed in firm mucilaginous sheath which may be obvious, or confluent with the colonial mucilage.
- 3) The heterocysts [reproductive bodies] are intercalary generally solitary in the trichome and of approximately the same size and as a vegetative cells.
- 4) The colonial mass retain its shape when removed from the water
- 5) Nostoc can be found in soil, on moist rocks, at the bottom of lakes and springs (both fresh- and saltwater), and rarely in marine habitats
- 6) It may also grow symbiotically
- 7) providing nitrogen to its host through the action of terminally differentiated cells known as heterocysts.
- 8) These bacteria contain photosynthetic pigments in their cytoplasm to perform photosynthesis.
- 9) Containing protein and vitamin C
- 10) When it is on the ground, a nostoc colony is ordinarily not seen
- 4) Oodogonium



Scientific Classification

Kingdom : Protista

Class : Chlorophyceae

Order : Oodogoniales

Genus : Oodogonium

- 1) Unbranched filaments of cylindrical cell
- 2) Attached by a holdfast cell to the substratum or free floating.
- 3) The cells have transversely straight distal ends resulting from cell division.
- 4) Cells are sometimes slightly enlarged at their distal end.
- 5) Chloroplast reticulate, parietal with many pyrenoids.
- 6) Oodogoniuses are uninucleate
- 7) Oodogonium is a genus of filamentous green algae, with unbranched
- 8) Oodogonium can be free-floating, though it is usually attached to aquatic plants by a holdfast
- 9) Zoospores, which have many flagella
- 10) Appears greenish and inhabits calm, fresh water.

The planktonic protozoa have limited locomotion, but the rotifers, cladoceran and copepod micro crustaceans, and certain immature insect larvae often move extensively in quiescent water. Many pelagic protozoa (5-300 μm) are meroplanktonic. (5) In that only a portion, usually in the summer, of their life cycle is planktonic. These forms spend the rest of their life cycle in the sediments, often encysted throughout the winter period. Many protozoans feed on bacteria sized particles (most cells $<2\mu\text{m}$), and thereby utilize a size class of bacteria and detritus generally not utilized by large zooplankton. (6) Although most rotifers (150 μm -1mm) are sessile and are associated with the littoral zone, some are completely planktonic; these species can form major components of the zooplankton. Most rotifers are non-predatory, and omnivorously feed on bacteria, small algae, and detrital particulate organic matter. Most food particles eaten are small ($<12\mu\text{m}$ in diameter). Most cladoceran zooplankton are small (0.2 to

3.0 mm) and have a distinct head; the body is covered by a bivalve carapace. Locomotion is accomplished mainly by means of the large second antennae. Planktonic copepods (2-4 mm) consist of two major groups, the calanoids and the cyclopoids. These two groups are separated on the basis of body structure, length of antennae, and legs.

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References

- 1) Adoni, AD., Joshi, G, Gosh, K., Chowasia, S.K., Vaishy, AK., Yadav, M., Verma, H.G 1985. Work book on limnology, Prathibha Publishers, Sagar, India
- 2) Annalakshmi, G, Amasth, A 2011. Studies on the hydrobiology of river Cauvery and its Tributaries Sarasalar from Kumbakonam Region, Tamilnadu, with reference to planktons. Int. J. Biol.Pharm. Technol., 3(1): 325-331.
- 3) B. Kay & S. N. Vu. 2005. "New strategy against Aedes aegypti in Vietnam". The Lancet 365 (9459): 613-7.
- 4) Dhembare, AJ. 2011. Diversity and its indices in zooplankton with physicochemical properties of Mula Dam Water Ahmednagar, Maharashtra India. Eur. J.Exp. Biol., 1(4): 98-103.
- 5) Dhert, Phillippe; Geert Rombaut; Gede Suantika; Patrick Sorgeloos. 2001. "Advancement of rotifer culture and manipulation techniques in Europe". Aquaculture 200 (1-2): 129-146.
- 7) J., Shiel, A, Justin, F., Costelloe, B.T., Julian, R.W., Reid, AC., Peter Hudson, A, Pawling, J. 2006. Zooplankton diversity and assemblage in Arid zone river of Lake Eyre Basin, Australia. J. Mar. Freshwater Res., 57: 49-60.
- 8) Maria Holynski & Frank: Fiers. 1994. F. D. Ferrari & B. P. Bradley, ed. Ecology and Morphology of Copepods", 212-420.
- 9) Mishra, Yogesh; Bhargava, Poonam; Chaurasia, Neha; Rai, Lal Chand. 2009. "Proteomic evaluation of the non-survival of Anabaena doliolum (Cyanophyta) at elevated temperatures". European Journal of Phycology 44 (4): 551-65.
- 10) Nordgreen, A; Penglase, S.; Hamre, K. 2013. "Increasing the levels of the essential trace elements Se, Zn, Cu and Mn in rotifers (Brachionus plicatilis) used as live feed". Aquaculture. 380-383: 120-129.
- 11) Penglase, S; Hamre, K.; Sweetman, J.; Nordgreen, A. 2011. "A new method to increase and maintain the concentration of selenium in rotifers (Brachionus spp.)". Aquaculture 315 (1-2): 144-153.
- 12) Purushothama, R., Sayeswara, HA, Goudar, M.A., Harishkumar, K. 2011. Physicochemical profile and zooplankton community composition in Brahmana Kalasi Tank, Sagar, Karnataka, India. Ecoscan., 5(3): 99-103.
- 13) Ramakrishna, S. 2014. Zooplankton seasonal abundance in relation to physicochemical features in Yelahanka Lake, Bangalore. Global J. Res. Anal., 3(6): 218-219.
- 14) Saxena, YR 1994. Copepod, cladocera, diaptomidous guide to the identification of microinvertebrate of the continental water of the world, Vol. 5. SPB Publisher, The Hague, Netherland. Russell, 21: 102-104.
- 15) Scheuerl, T., Riss, S., Stelzer, C.P. 2011. Phenotypic effects of an allele causing obligate parthenogenesis in a rotifer. Journal of Heredity 102(4): 409-415.
- 16) Shivashankar, P., Venkataramana, GV 2013. Zooplankton diversity and their seasonal variation of Bhadra reservoir Karnataka, India. Int. Res. J. Environ. Sci., 2(5): 87-91.

- 17) Singh, R.K., Pandey, M.K., Kumari, R., Ranjan, P. 2012. Study on the diversity and seasonal variation of zooplankton in Mahendra Nath pond, Siwan, Bihar, Int. J. Pharm. Biol. Arch., 3(4): 867-870.
- 18) Thirupathaiah, M., Sammatha, C.H., Sammaiah, C.H. 2011. Diversity of zooplankton in freshwater lake of Kamalapur, Karimnagar District (AP) India. Ecoscan, 5(1-2): 85-87.
- 19) Tyor, A.K., Chopraand, G, Seema Kumari 2014. Zooplankton diversity in Shallow Lake of Sultanpur National Park, Gurgaon Haryana. Int. J. Appl. Biol. Pharm. Technol., 5(1): 35-40. Watkar, A.M., Barbate, M.P. 2013. Studies on Zooplankton Diversity of River Kolar Saoner, Dist- Nagpur, Maharashtra. J. Life Sci. Technol., 1(1): 26-28.