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Study On Fungal Diversity In Different Pond Water Of Durg, Chhattisgarh, India

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Abstract

Water is an essential part of all living. Water is used in daily life, household works, and many people depend on open-source water like a pond, tube wells, municipal water supply, etc. Globalizations increase the industries which increase pollution level and also increase microbial contamination of water sources, which cause different types of infectious diseases. Fungus is the main agent of water contamination. Fungal species are diversified and grow in any substrate. A few experiments focus on calculating the world's most respected species. There are millions of wide fungal species widely distributed throughout the world. India has always been an independent destination for this growth. Fungal biotechnology has developed as an essential part of human well-being. In the present study, the discovery and distribution of fungal species in different lake waters highlight the magnitude of their diversity and the uniqueness of their habitats. Water sample was collected from five ponds like Kachandur, Bhilai 3 Sitla Talab, Kurud, Junwani and Dhour located in different areas of Bhiali Durg City in Durg district of Chhattisgarh. The water sample was collected in March, April, July, August, November and December 2019. The water sample was analyzed for fungal diversity by the plating method of culturing potato dextrose agar media (PDA). The fungus isolated from the pond water sample includes species of *Aspergillus (A. niger, A. fumigatus, A. oryzae) Penicillium species (P. notatum, P. chrysogenum) and also find out Rhizopus.).*
Types of fungi are usually tiny; their appearance in water and unique methods are needed to assess their diversity, population structure, and environmental performance.

Keywords: Pond water, Fungal Diversity, Microscopic & planting method

Introduction

Fungal species are diverse, occurring throughout the aerobic environment. They colonize a wide variety of substrates and perform various capacities. Many fungal species are cosmopolitan, yet some are experts discovered just in limited substrates or living habitats. (1) This is evident in the

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investigation of who collected the data on the techniques used for mould making in various habitats. The most reliable and fundamental component that preserves various fungal taxa is Air, Water, and Soil. Unexplored and strange natural surroundings may be considered adverse to fungal development. [2] They are eukaryotic species and heterotrophic organisms, including single-celled yeasts and multicellular filamentous fungi. They function primarily as biological stimulants. Numerous fungal species can make due in oligotrophic conditions by searching for supplements from the substrate they colonize or the air or water in which they live. [3] They are presenting hyphae, and scattering is through spores. Fungal species deliver auxiliary metabolites, some of which are poisons. Part of the fungal types and metabolites they make are pathogens or allergens. (4)

The development of fungi has been accounted for 1800 million years ago. Fungi have a place with the superkingdom Eukaryote. Fungus compounds are highly biologically active and occupy non-renewable components in the industry, agriculture, pharmaceuticals, biogeochemical cycles, and many different methods, apart from their use in industry, agriculture, medicine, the feed industry, materials, bioremediation, biogeochemical cycling reuse of additives and degradation of dead natural matter such as biofertilizers and many different methods.[6]

In the present investigation pond water sample was collected from five selected areas in Durg city in the March-April month of summer, July august month of rainy, and November -December month of winter in the year of 2019. Collected pond water samples were transferred in MATS University lab for fungal culture.

Material and Method

After surveying Durg City, five ponds were selected and the selection was made keeping in mind the ponds near around the industrial area and the place with a rich population.

The study of fungal diversity, water sample were collected in sterile plastic bottles from five different selected ponds located in Bhiali Durg city; Kachandur pond Bhiali 3 Shitla pond, kurud pond, Junwani pond & Dhaur pond in the March-April month of summer, July august month of rainy, and November -December month of winter in the year of 2019. (Fig no 2) Samples were examined of the overall diversity among different taxonomic groups of fungus present, as well as their occurrence, frequency, and contribution of the fungal species in the surface water. The qualitative fungal composition was surveyed. The surface water sample was spread over a pre-sterilized and solidified potato dextrose agar medium and incubated for 3-4 days. (7) (Fig. no 3) After the incubation period at 28°C, a single colony per propagation was selected for observation. Separated fungal colonies were stained with Lactophenol cotton blue stain and contagious slide culture process. The standard plate count method for enumerating the fungal species. (Fig. no 4) Identifying the highly purified fungus with an immediate increase from the culture and its slide is considered with the help of a water fungus manual. [5]

Result and Discussion

The investigation highlighted fungi's presence and ecological roles in ponds water and aimed to stimulate study in aquatic mycology. In the study, aquatic fungi are common in various lentic habitats. [8] . This field is a neglected subject and, whenever considered by any means, has frequently been confined to explicit gatherings of fungi, like yeasts, filamentous fungi. They assume

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possibly vital parts in supplement and carbon cycling and associate with different organisms, impacting food web elements. During the present investigation, the sample was collected seasonally- in summer, March, and April, in the rainy season, July, August, and winter, November, and December. The different genera of fungi were identified from five pond surface water samples, shown in table no 1 and fig no 2. A species in different genera were observed. A comparatively high number of fungal species colonies were observed in the summer season.[9]

Conclusion

Fungal habitats in pond ecosystems are numerous, varied, and often hidden. Not only fungal differences but also important energy conversion processes associated with fungal functions must be scientifically tested. Although emerging macrophytes have been well studied in terms of fungal species, many potential fungal areas and processes have not yet been identified. The richest specimens of the fungus species are collected in the pond water environments with low or medium temperatures, as well as a complete comparison of organic matter and dissolved oxygen. A comparatively high number of fungal species colonies were observed in the summer season

This is in agreement with our present investigation, and the species identified are *Aspergillus niger, Rhizopus Aspergillus Orazae, Penicilliumcrysogenum, Penicilliumnotatumand P. Fumigatus.*

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ISSN PRINT 2319 1775 Online 2320 7876

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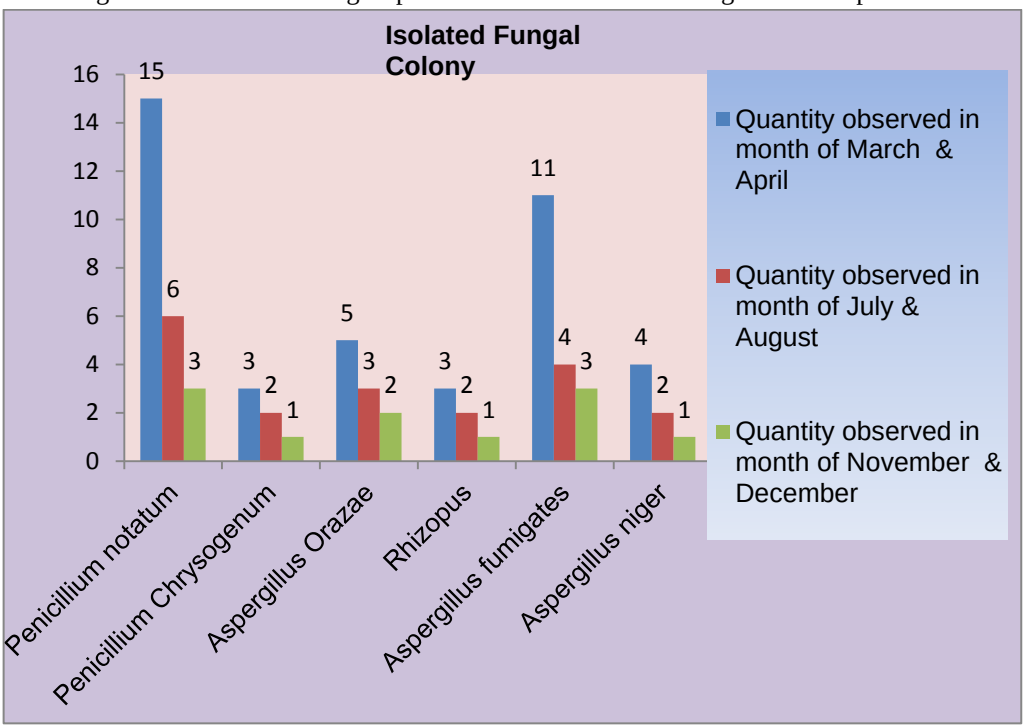
Table 1: Isolated Fungal Colony

Sr. No	Isolated Fungal Species	Quantity observed in the month of March & April	Quantity observed in the month of July & August	Quantity observed in the month of November & December
1	*Penicillium notatum*	15	6	3
2	*Penicillium Chrysogenum*	3	2	1
3	*Aspergillus Orazae*	5	3	2
4	*Rhizopus*	3	2	1
5	*Aspergillus fumigates*	11	4	3
6	*Aspergillus niger*	4	2	1

Fig No. 1 Isolation of fungal species of 5 Pond Water in Durg March – April 2019



a. **b.**

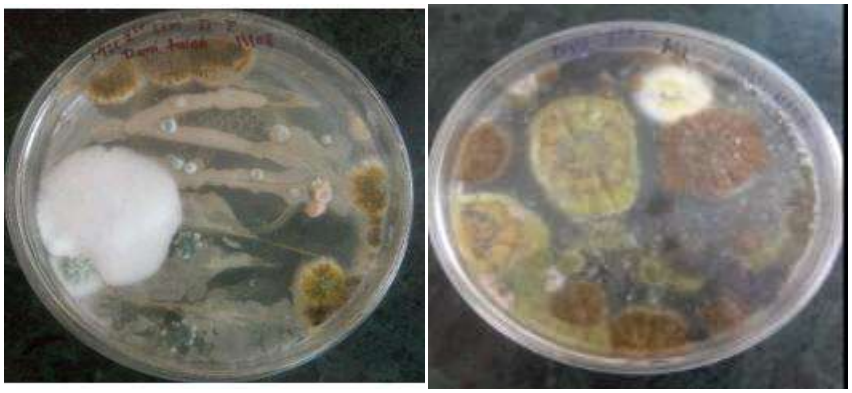
ISSN PRINT 2319 1775 Online 2320 7876

 Journal Volume 11,S.Iss 05, 2022

c **d.**

e.

Fig. 2: Sample Collection Sites: - a. Kachandurpond, b. Shitla pond, c. kurud, d. Junwani, e. Dhaur



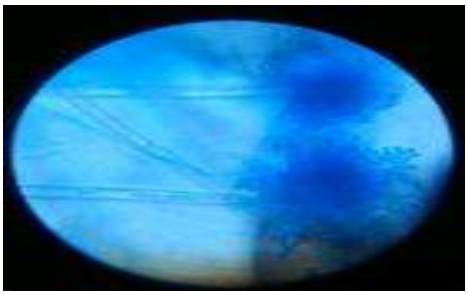
a. **b.**

ISSN PRINT 2319 1775 Online 2320 7876

 Journal Volume 11,S.Iss 05, 2022

c.

Fig 3: Culture Plate of Fungal Species: - a. ***Penicillium notatum, b. Rhizopus, c. Aspergillus Fumigatus***



a. b.

c.

Fig 4: Staining of Fungal Species: - a. ***Penicilliumnotatum, b. Rhizopus, c. Aspergillus Fumigatus***