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Soil algal flora of Rice field of Igatpuri tehsil of Nashik District in Maharashtra

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Abstract
The economy of soil is significantly influenced by algae. According to a review of the literature, most studies on algae focus on their morphology and life history, with little attention paid to the interactions between soil bacteria like algae and plant roots. The majority of the Rice fields in the Igatpuri tehsil of Nashik District in Maharashtra's, are submerged during the rainy season, which runs from August to October. From October to December, it turns swampy. The soil gets more dry and becomes damp between December and February. Under a binocular microscope, rhizosphere and non-rhizosperhic algal cultures were cultivated, and the flora was identified.Subcultures were created using identified algae; a small number of cells were extracted using a fine pipette, cleaned in sterile water, and then put into petridishes and test tubes in 1.5% De's modified Beneck's medium with agar. One liter of De's modified Beneck's medium was combined with 15 grams of agarin to create a 1.5% agar media. Overuse of inorganic fertilizers prevents the growth of soil microflora, particularly cyanobacteria and algae. As a result, less rice is produced and the soil becomes nonfertile.

Key words:Rice field, Rhizosphere, Nonrhizosperhic, De’s modified Beneck’s medium

Introduction: The economy of soil is significantly influenced by algae. According to a review of the literature, most studies on algae focus on their morphology and life history, with little attention paid to the interactions between soil bacteria like algae and plant roots. Investigations on soil microorganisms other than algae discovered that various plants attracted specific groups or species of organisms (Katznelson et al., 1948) and in 1960 Gonzalves and Yalavigi undertook experiments on rhizosphere algae of some crop plants and According to research on the soil algal of Rice fields in the Igatpuri tehsil of Nashik District in Maharashtra's, live plants provide their rhizosphere with more favorable conditions for the establishment and development of algae.Rice field of Igatpuri Taluka of Nashik district shows different stages of crop growth.
The majority of the rise fields in Igatpuri Taluka of Nashik district are submerged during the rainy season, which runs from August to October. From October to December, it turns swampy. The soil gets more dry and becomes damp between December and February. The soil completely dries up throughout the summer, which runs from February to June, and algae vegetative phases are typically not visible. This environmental variation may be much more pronounced at other field locations. Different algae will be able to develop in different types of habitat at different seasons. Studies on both collection and culture were carried out to prevent the eradication of any algal member. While soil samples were taken during dry seasons, algal collections were made during various seasons.

Materials and Methods:

Non- rhizosphere soil
samples:For each rice variety, soil samples were taken from a similar depth (as that of the rhizosphere) away f rom the plant roots, and these samples were inoculated into the culture media. In order to rule out the possibili ty of an alga missing from the observation, the same sample was cultured multiple times in different media.

Collection of algae from fields:We were able to harvest as many algae as possible by visiting rice fields frequently during the winter and wet seasons. Using a scalpel, forceps, and sieves, these new collections were created and gathered in polythene bags. These were taken to the lab, where they were identified and live cultures were created.

Algal Cultures

1. Culture Vessels: The cultures were conducted in petri plates, flat bottles, and conical flasks. Vim powder was used to thoroughly clean these glasses, followed by two rounds of tap water washing. After that, these were rinsed three or four times with powerful sulfuric acid before being cleaned with distilled water. The bottles and flask were then sealed with non-absorbent cotton plugs, while the petri dishes were sealed with their matching petri plates.
2. 2.Culture Media: To examine the soil algae and fresh collections, two kinds of cultures—liquid and moist—were made. While the wet cultures were kept on petri plates, the liquid cultures were kept in bottles and conical flasks. Before inoculation, the culture media-filled culturing vessels were autoclaved for 20 minutes at 2 pounds of pressure. For culturing, nine distinct culture mediums were used.

They are as follows:

Chu. No.10 (Modified) medium (Cerloff et al., 1950) :

$Ca(NO_3)_2$ - 0.04 gm.
K_2HPO_4 - 0.01 gm.
$MgSO_4 \cdot 7H_2O$ - 0.025 gm.
Na_2SiO_3 - 0.020 gm.
Ferric Citrate - 0.025 gm.
Citric acid - 0.003 gm
A5 solution - 1.0 ml
Distilled water - 1000 ml

A5 trace element stock solution:

H_3BO_3 - 2.86 gm
$MnCl_2 \cdot 4H_2O$ - 1.81 gm
$ZnSO_4 \cdot 7H_2O$ - 0.222 gm
MoO_3 (85%) - 0.0177 gm
$CuSO_4 \cdot 5H_2O$ - 0.07 gm
Distilled water - 1000 ml

Unialgal cultures: To create subcultures, a small number of cells were extracted using a delicate pipette, cleaned in sterile water, and then put into petridishes and test tubes containing 1.5% De's modified Beneck's medium with agar. One liter of De's modified Beneck's medium was combined with 15 grams of agarin to create a 1.5% agar media. After autoclaving, this solution was aseptically transferred into test tubes and petri plates.

Results and A discussion:A total of 166 algal forms were found in the soils of Igatpuri tehsil in the current study; 91 of them belong to the cyanophyceae, 65 to the chlorophyceae, and 10 to the Bacillariophyta. There are 27 genera in the 166 forms of the Cynophyceae family, 26 genera in the Chlorophyceae family, and 10 genera in the Bacillariophyceae family. The findings concur with those of Reddy, K.V.S. (1979) and John, R.P. (1942).This indicates that the cultivated fields are dominated by cynophycean members. Thirty-one species of cynophycean members are nitrogen-fixing forms among the 166 species of algae. In fields of sugarcane that were routinely cultivated, only 26 species were discovered. Three Bacillariophycean members, five Chlorophycean members, and eighteen Cynophycean individuals made up the 26. There were just three species of n2 fixing forms in Rice areas that were consistently cultivated. Though the actual Rice field's outcome is completely unsatisfactory, the state of soil algae in Igatpuri tehsil is very excellent, particularly the number of N2 fixing forms in the surrounding areas. It may be one of the primary reasons for decreased crop productivity.

Table 1: Soil Algae of Rice fields of IgatpuriTaluka

Sr. No.	Class of algae	Total species
1	Cyanophyceae	91
2	Chlorophyceae	65
3	Bacillariophyceae	10

Conclusion:

In order to increase agricultural production in this area, farmers frequently apply significant amounts of inorganic fertilizers. The growth of soil microorganisms is inhibited by increasing doses of inorganic fertilizers. The current study's findings indicate that the percentage of microorganisms in cultivated soil has decreased. This is explained by the cultivation technique. Overuse of inorganic fertilizers prevents the growth of soil microflora, particularly cyanobacteria and algae. As a result, less sugarcane is produced and the soil becomes nonfertile.This lowers the output of Rice and renders the soil infertile.

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