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ALGAL FLORA FROM THE PADDY FIELD AREA OF NAGHBHID TEHSIL CHANDRAPUR DISTRICT, MAHARASHTRA, INDIA

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ABSTRACT:
Thorough studies over four years from four different areas of Nagbhid Taluka revealed 103 species of algal Flora consisting of 43 genera. Nagbhid taluka is flourished with rich algal diversity consisting 65 species of Cyanophyta spread over 19 genera, 23 species of Chlorophyta spread into 16 genera, four species of Euglenophyta in 03 genera and 11 species of Bacillariophyta spread in 05 genera. Maximum occurrence of species of Cyanophyta is reported in this study. Population of Cyanophyta consists of unicellular, non heterocystous and heterocystous forms.

Key words: - ***Paddy field, Diversity, Cyanophyta, Nitrogen, Euglenophyta, Bacillariophyta***

INTRODUCTION:

Nitrogen is the main factor controlling rice production around the world. Blue green algae are known to contribute upto 80 kg N/hectare per season in the rice ecosystem (Kannaiyan et. al 1983). Underwater logged conditions of rice fields blue green algae plays a vital role in maintaining soil fertility and crop yield even in the absence of any added Agrochemicals(Ojha et. al 2018). In recent years algalization has been recognised as an important input in in rice cultivation as it forms a perpetually renewable source of nutrients and improves soil health(Goyal 1993). The nitrogen removed in harvest produce or loss from the system must be replaced by nitrogen fertilizers or through biological nitrogen fixation(BNF). Rice fields provide a very comfortable habitation to different kinds of algae owing to the stagnant water, prevalent high temperature and high humidity in the rice- fields, theblue greens are the most copious inhabitants and far exceedothers in both their number as well as importance. Apart from their uncomplicatedform and fascinating morphology, a lot of themare known to play a very cardinal role in nitrogen economy of paddy. Watanabe (1965), while studying the role of blue-green algae in improving the soil fertility, has stressed extensivesearch to select and isolate blue-green algal strains with better ability to fix atmospheric nitrogen than the known strains available at present.

A literature review of Gonzalves and Gangla (1949), Kamat (1963, 1965, 1968, 1975), Kamat and patel (1973), Freitas and Kamat (1979), Nandan and Patel (1985), Kolte and Goyal (1985), Patil and Satav (1986), Shaji et al(1989), Madane and Shinde (1993), Auti and Pingale (2006), Patil and Chougule (2009), Wadhave and Nandkar (2012), Nikam et al. (2013), Ghadge and Karande (2019) enumerated the paddy field algae of some area of Maharashtra. Algal flora of paddy field in Nagbhid taluka was not yet worked out by any investigator. The present investigation was therefore undertaken for further studies relating

to paddy field algal diversity and its effects on the paddy cropping system of Nagbhid taluka.

Nagbhid taluka is situated in the south east corner of the state Maharashtra lying between the longitude 79°40'0" East and Latitude 20°35'0" North and it is extended over an area 735 sq.km. Paddy is the principal crop of Nagbhidtaluka. Average rainfall of the taluka is 139 cm. the maximum temperature is 125.75° F in summer and minimum is 35°F in winter.

MATERIALS AND METHODS

Study Area:

Mohadi Area which is located 10 km from Nagbhid towards north (Longitude 79°40'0" E and Latitude 20°35'0" N). Talodhi Area is located 15 km from Nagbhid Towards south (Longitude 79°40'0" E and Latitude 20°35'0" N). NavegaonPandav area is located 0.9 km from Nagbhid Towards East (Longitude 79°40'0" E and Latitude 20°35'0" N). Nagbhid area is located 0.2 km from Nagbhid city Towards West (Longitude 79°40'0" E and Latitude 20°35'0" N) of Nagbhid Tehsil Dist. Chandrapur, Maharashtra.

Collection, Preservation and identification of samples:

Samples were collected in Rainy season from 4 different sites of Nagbhid Tehsil, Dist. Chandrapur, Maharashtra. The sampling was done randomly from both soil and water of the paddy fields. The algal samples were preserved in 4% formalin and slides were prepared by staining with methylene blue and mounted in glycerin. Detail studies were made by examining specimens under a binocular microscope. The strains were identified based on their morphological features and cell structures by following the monographs of (Desikachary, 1959 and Prescott, 1951)

RESULT & DISCUSSION:

In present investigation from four different areas of Nagbhid tehshil 103 species of Algal Flora were recorded and these area is flourished with rich algal diversity consisting 65 species of Cyannophyta, 23 species of Chlorophyta, 4 species of Euglenophyta and 11 species of Bacillariophyta as shown in table 1`The results of comparative studies of algal flora seen in paddy fields and soil cultures of Nagbhid taluka shows an abundant presence of various forms like *Nostoc commune, Calothrix clavata, Cylindrospermum licheniformis,* and species of *Phormidium, Lyngbya and Oscillatoria* are present extensively both in cultures as well as the paddy fields of that area. *Scytonematopsisworonichinii* grows extensively both in cultures as well as paddy fields but some other species of *Scytonemamillei* positively grows only in the paddy fields. Other widely seen species in paddy are *Gleortichianatans, Anabaena torulosa, Aphanocapsabiformis, Aphanothecenaegelli, Aulosiralaxa.* It is a significant finding that *Aulosiralaxa, Sytonemamillei and Gleotrichianatans*grew in copious amounts in paddy with and overall negative in soil cultures.

The rice fields of Nagbhid taluka showed the quantitative and qualitative assertion of dominance of the Cyanophycean algal forms over other groups of algae. In comparison with the algal flora of different paddy fields, it shows that majority of the species are common to variety of paddy fields, but there may be a little variation in the subterranean algal species even in different climatic factors. These differences may be a result of variation in soil characteristics such as soil pH, soil texture, mineral elements and organic matter presents the soil. To some extent it may also be due to the use of a variety of fertilizers, pesticides and use of artificial irrigation sources and changing cultivation practices over time.

The dominance of blue-green algae in the paddy fields of Nagbhid taluka stands with the opinion of Subba Raju (1972) who reported that pH was the main influencing factor in the distribution of green and blue-green algae where green favoured acidic pH and blue green favoured alkaline pH.

Ghadage and Karande (2019) observed an abundant growth of Blue green algae in fields with pH ranges from 6.5 to 7.5. In Cultures, optimal pH for growth of cyanobacteria ranges from 7.5 to 10. They found 137 species of BGA in the soil of fields of Patan and Karad tehsils of Satara district, Maharashtra. The dominance of cyanophycean members with nitrogen fixing algae in majority of these fields is consistent with the above observation. The present investigation reveals the alkaline nature of soil is responsible for the thriving population of Cyanophyceaee.

CONCLUSION:

It might be taken into conclusion that the rice fields enhance the impressive species diversity of Blue-green algae amounting to the alkaline pH, low temperature, stagnant water and other factors favourable for the flourishing of the various forms of Cyanobacteria thus providing a comfortable habitat for their growth and in turn enhancing soil fertility which causes increased the crop production.

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Table 1: PADDY FIELD ALGAL FLORA OF NAGBHID TALUKA WITH THEIR STATE OF OCCURRENCE

Sr. No	Name of Algae	Place of occurrence		
		Soil Cultures	Water Bodies	Wet Soil Surfaces
CYANOPHYTA				
01	*Nostoc humifusum*	P	P	-
02	*Nostoc ellipsosporum*	P	P	P
03	*Nostoc linkia*	P	-	P
04	*Nostoc microscopicum*	P	P	-
05	*Nostoc paludosum*	P	-	-
06	*Nostoc spongiaeforme*	P	-	P
07	*Nostoc calcicola*	P	P	-
08	*Nostoc commune*	-	P	-
09	*Anabaena anomola*	P	-	P
10	*Anabaena laxa*	P	P	-
11	*Anabaena bharadwajae*	P	-	P
12	*Anabeana variabilis*	P	P	P
13	*Anabaena torulosa*	-	P	-
14	*Microcystis robusta*	-	-	P
15	*Microcystis Protocystis*	-	-	P
16	*Microcystis marginata*	P	-	P
17	*Microcystis holsatica*	P	P	-
18	*Microcystis elabens*	P	-	-
19	*Microcystis insignis*	-	P	-
20	*Gloeocapsa rupestris*	P	-	-
21	*Gloeocapsa atrata*	P	-	P
22	*Gloeocapsa punctata*	-	-	P
23	*Gloeocapsa stegophila*	P	-	P
24	*Chroococcus micrococcus*	-	-	P
25	*Chroococcus limenticus*	-	P	P
26	*Chroococcus minor*	P	P	-
27	*Chroococcus minutes*	-	P	-
28	*Chroococcus spelaeus*	P	-	-
29	*Chroococcus trugidus*	-	-	P
30	*Chrococcus schizodermaticus*	P	-	P
31	*Gloeocapsa deccorticans*	P	-	P
32	*Aphanocapsa biformis*	P	P	-
33	*Aphanocapsa fonticola*	P	-	P
34	*Aphanothece naegelii*	P	-	P
35	*Phormidium foveolarum*	P	P	-
36	*Phormidium jenkelianum*	P	-	P
37	*Lyngbya attenuate*	P	-	P
38	*Lyngbya corticola*	P	-	-
39	*Lyngbya aerugineocorrulea*	P	-	-

40	*Lyngbya allorgei*	P	-	-
41	*Lyngbya cryptovaginata*	-	-	P
42	*Lyngbya lachneri*	P	-	P
43	*Cylindrospermum licheniforme*	P	-	-
44	*Schizothrix tenus*	P	-	-
45	*Oscillatoria amoena*	P	-	P
46	*Oscillatoria annae*	P	-	P
47	*Oscillatoria sancta*	P	P	-
48	*Oscillatoria curviceps*	P	P	-
49	*Oscillatoria animalis*	P	-	-
50	*Oscillatoria raol*	P	-	-
51	*Oscillatoria Formosa*	-	P	-
52	*Oscillatoria rubescens*	P	-	-
53	*Oscillatoria princeps*	P	-	P
54	*Oscillatoria salina*	P	-	P
55	*Scytonematopsis woronichinii*	P	P	P
56	*Scytonema millei*	-	P	-
57	*Tolypothrix bouteillei*	P	-	P
58	*Calothrix clavata*	P	P	-
59	*Calothrix epiphytica*	P	P	-
60	*Gloeotrichia indica*	-	P	-
61	*Gloeotrichia natans*	-	P	P
62	*Haplosiphon baronii*	-	P	-
63	*Haplosiphon intricatus*	P	P	-
64	*Aulosira laxa*	-	P	-
65	*Synechocystis aquatillis.*	-	P	-
CHLOROPHYTA				
01	*Spirogyra irregularis*	-	P	-
02	*Spirogyra submaxima*	-	P	-
03	*Spirogyra chakiense*	-	P	-
04	*Spirogyra inflate*	-	P	P
05	*Chlamydomonas globosa*	P	P	-
06	*Cartaria klebsii*	P	-	-
07	*Chlorococcum humicolum*	P	-	P
08	*Ankistroesmus falcatus*	-	P	-
09	*Scenedesmus bijugatus*	-	P	-
10	*Ulothrix variabilis*	P	-	P
11	*Selenastrum westii*	-	P	-
12	*Characium ambigum*	P	-	-
13	*Coelastrum microsporum*	-	P	-
14	*Chlorella vulgaris*	-	P	-
15	*Ulothrix zonata*	P	P	-
16	*Protococcus viridis*	P	P	-
17	*Chaetophora pisiformis*	-	P	P
18	*Oedogonium aquaticum*	P	-	P
19	*Closterium acerosum*	-	P	-
20	*Closterium acutum*	P	P	-
21	*Closterium lanceolatum*	P	-	P
22	*Cosmarium granatum*	-	P	-
23	*Cosmarium trilobatum.*	P	-	-
EUGLENOPHYTA				
01	*Euglena fusca*	-	P	-
02	*Phacus longicauda*	-	P	-
03	*Trachelomonas armata Var. Steinii*	-	P	-
04	*Trachelomonas pulcherima.*	-	P	-
BACILLARIOPHYTA				
01	*Navicula grivllei*	P	P	-
02	*Navicula lanceolata*	P	P	P
03	*Navicula gregaria*	P	-	P
04	*Navicula major*	P	P	-

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05	*Synedra affinis*	P	P	-
06	*Achnanthes delicatula*	P	P	-
07	*Achanthes lanceolata*	P	-	P
08	*Pinnularia microstauron*	P	P	-
09	*Cymbella austriaca*	P	P	-
10	*Cymbella cambiformis*	P	P	P
11	*Cymbella ventricosa.*	P	P	-