BLUE GREEM ALGAL POTENTIAL FROM PADDY FIELDS OF DHULE DISTRICT (MAHARASHTRA)

M. R. Kumavat

P.G. Dept. of Botany,

S. S. V. P. S. 's L K. Dr. P. R. Ghogery Science College, Dhule. 424005 (M.S.)

mrk7869@gmail.com

Abstract:

Now a days intensive chemical fertilizers are used in agriculture, but fertilizers are not only in short supply but they are expensive. There fore to explore the possibility of supplementing chemical fertilizers with organic biofertilizers of microbial origin. The Cyanobacterial inoculation can replace the use of fertilizer in paddy fields. The nitrogen fixed by algae become available for the growth of the associated plants. Definite proof of a nitrogen transfer to higher plants has been obtained (Mayland & McIntosh, 1966). The preliminary survey of Cyanobacteria were carried to obtain that local strains of blue green algae having more powerful nitrogen fixing properties should be sought. Present study 14 genera including 36 species of Cyanobacteria were found.

Keywords: Paddy Fields, Cyanobacteria, Diversity.

Introduction

Taxonomic study of blue green algae from rice fields is basic aspects and need for using indigenous organism as biofertilizers. The rice fields promotes vigorous growth of BGA due to water logging. The BGA fixes atmospheric nitrogen and makes available to the rice crop. In spite of providing nitrogen BGA also adds various organic acids, growth promoting hormones and organic matter in soil. Which increase fertility and porosity of soils. A perusal of literature on the blue green flora of rice fields of India shows that there is enormous information about the north and south Indian rice fields. Studies on blue green algae of rice fields and soils of Dhule District of North Maharashtra region has been very much restricted with certain reports (Marathe, 1966; Kottawar et al, 1983; Nandan, 2004 Chudhari et al, 2007). So it was thought worth to study the Cyanophyceae diversity from paddy fields and soils of Dhule district.

Material and Methods

Dhule is the one of the leading North western District of Maharashtra former it was known as West Khandesh. It is located in northern side of Maharashtra state spread between Latitude 20° 38' to 21° 61' N and Longitude 73° 50' to 75° 11' E. It covers an area of 8061 Sq. Km. The District is bounded in the north by Satpuda Hill ranges. Climate of the district is hot and dry. The average rainfall 592 mm

Naturally occurring algal samples were collected from surface layers of soil from different paddy fields localities of Sakri and Shirpur tehsil in the months of monsoon of

2008 and 2009. Collected algal forms were preserved in 4% formalin for further taxonomical study. Algal forms observed, line drawing were made with camera lucida. Identified by relevant monographs (Desikachary, 1959; N Anand, 1989; Mahajan 1983)

SYSTEMATIC ENUMERATION

1) *Microcystis elabens* Kutz

Colonies flat and expanding blue green cells oblong 2 - 4.5 μ broad, 4 - 7 μ long.

Plate – I Fig - 1

2) *Microcystis marginata* (menegh.) Kutz.

Colonies irregularly flattened simple mucilage distinct on margins cells 3 – 6 μ in diameter closely arrange

Plate – I Fig - 2

3) *Chroococcus coharens* (Breb.) Nag. Thallus slimy and gelatinous blue to dark green, cells single or group without envelope 2 - 7 μ .

Plate – I Fig - 3

4) *Chroococcus minor* (Kutz.) Nag.

Thallus slimy gelatinous, dark green cells spherical 3- 4 μ Singly sheath colourless.

Plate – I Fig - 4

5) *Chroococcus minimus* (Keissl.) Lemm.

Thallus mucilaginous cells spherical to ellipsoid in two without sheath 2 - 3 μ

Plate – I Fig - 5

6) *Chroococcus montanus* (Hans.)

Thallus brownish to blackish brown cells 4.5 - 6 μ

Plate – I Fig - 6

7) *Gloeocapsa calcarea* Tilden

Thallus with calcium incrustation cells with or without individual sheath 6 - 9 μ diam.

; Plate – I Fig - 7

8) ***Gloeocapsa magma*** (Breb.) Kütz.

Colonies spherical irregularly arranged colourless or brown thick cuticle like sheath cells spherical to angular 3-7 μ diam.

; **Plate – I Fig - 8**9) ***Gloeocapsa decorticans*** (A.) Br.

Cells spherical to ovals blue green single or 2-4 single cells with 19-21 μ without sheath 6-8 μ in diam.

Plate – I Fig - 910) ***Synechococcus eruginosus*** Nag.

Cells cylindrical 4.5-16 μ broad single or 2-4 together pale blue colour

Plate – I Fig - 1011) ***Merismopedia tenuissimum*** Lemm.

Cells closely packed in colonies of 16-100 cells subspherical 1.3-2 μ broad pale blue green

; **Plate – I Fig - 11**12) ***Merismopedia punctata*** Meyen

Small colonies 4-64 cells 60 μ cells spherical to ovoid 2.5-4 μ broad pale blue green

Plate – I Fig - 1213) ***Spirulina meneghiniana*** Zanard. ex Gom.

Trichome 1.2-1.8 μ broad irregularly spirally coiled bright green spirals 3.2-5 μ broad and 3-5 μ distance from each other.

Plate – I Fig - 1314) ***Spirulina major*** Kütz. ex Gom.

On moist soils trichome 1.2-1.7 μ broad regularly spirally coiled spirals 2.5-4 μ broad and 2.7-5 μ distance.

Plate – I Fig - 1415) ***Oscillatoria ornate*** Kütz. ex Gom.

Thallus spirally coiled at the end constricted at the cross walls 9-11 μ broad cells long slender

Plate – I Fig - 1516) ***Oscillatoria limosa*** Ag. ex Gom.

End cell flatly rounded with slightly thickened membrane thallus dark blue green to brown Trichomes more or less straight commonly 13-16 μ broad cells as long as broad 2-5 μ long.

Plate – I Fig - 1617) ***Oscillatoria perornata*** Skuja

Trichomes erect apices briefly attenuated and curved 13-15 μ broad 2.5-6.5 μ long end cell hemispherical

Plate – I Fig - 1718) ***Oscillatoria princeps*** Vau. ex Gom.

Trichomes blue green to brownish or reddish straight 16-60 μ broad commonly 25-50 μ cells as broad as long 3.5-7 μ long end cells flatly rounded

Plate – I Fig - 18

19) ***Oscillatoria raoi*** De Toni. j. Thallus straight uniform thickness lightly tapering at the end trichome 5.5-6 μ broad 2.5-6 μ long

Plate – I Fig - 1920) ***Phormidium fragie*** (Mene.) Gom.

Thallus yellowish to brownish, trichome elongated attenuated at the end 1.2-2.3 μ broad and 1.2-3 μ long end cells acute conical.

Plate – II Fig - 2021) ***Phormidium tenue*** (Mene.) Gom.

Thallus pale blue green thin 1-2 μ broad cells 3 times longer than broad, 2.5-5 μ long end cell acute conical.

Plate – I Fig - 2122) ***Phormidium roteanum*** Itzi.

Thallus thin dark blue green, trichome at the end attenuated 8-11 μ broad, cells much shorter than broad 2.7-4 μ long, end cells obtuse conical.

Plate – II Fig - 2223) ***Lyngbya allorgei*** Fre.

Filament solitary, elongate, sheath very thin, colourless, 3.5-4 μ broad, cells quadrate end cell round, calyptra absent.

Plate – II Fig - 2324) ***Lyngbya ceylanica*** Wille

Thallus olive green filaments 10-14 μ broad, cells 8-12 μ broad, cells quadrate, end cell round, without calyptra.

Plate – II Fig - 2425) ***Nostoc ellipsosporum*** (Desm) Rab. Ex Born. et Flah.

Thallus gelatinous, filament flexuous, trichome 4.5 μ broad; light blue green, cells cylindrical, 6 μ long, heterocyst oblong, 6 μ broad and 7.5 μ long

Plate – II Fig - 2526) ***Nostoc muscorum*** Ag. Ex Born. Et Flah.

Thallus gelatinous, trichome 4-4.5 μ broad, cells cylindrical, 8-9 μ long, blue green, heterocysts spherical, 7.5 μ broad, spores oblong, many in series, 5-7 μ broad 9-10 μ long, pore smooth and yellow

Plate – II Fig - 2627) ***Nostoc punctiforme*** (Kütz.) Hariot

Thallus sub globose 2mm diam; trichome 3-4 μ broad, cells short barrel shaped, blue green heterocysts 4-6.5 μ broad, pores sub perical oblong 5-6 μ broad, 5-8 μ long

Plate – II Fig - 2728) ***Nostoc calcicola*** Breb. ex Born. et Flah.

Thallus mucilaginous, blue green up to 5 cm. sheath mostly distinct trichome 2.5 μ broad cells barrel shaped, heterocysts subspherical 4 μ broad, spores subspherical 4-5 broad.

Plate – II Fig - 28

29) *Anabena fuellebornii* Schm.

Trichome mucilaginous, stright, blue green, cells cylindrical with rounded ends, cylindrical with rounded ends, 7.5 μ broad, nd 12 μ long spore on one side of the heterocysts single ellipsoidal about 9.5 μ broad nd 31 μ long.

Plate – II Fig - 2930) *Anabena volzii* Lem.

Trichome single curved 6 μ broad cells cylindrical, 7.5 μ long end cell round heterocysts cylindrical 7.5 μ broad 10.5 μ long spore single ellipsoidal on one side of the heterocysts 16.5 μ broad and 32.5 μ long

Plate – II Fig - 3031) *Cylindrospermum mjus* Kutz. ex Bron. Et Flah.

Thallus expanded, mucilaginous, blackish green, trichome 3-4.5 μ broad, constricted at the walls light blue green cells cylindrical 3-4.5 μ long heterocysts borader than the trichome 4.5-5.5 μ broad nd 6 μ long spore ellipsoidal 10.5-21 μ broad 16.5-30 μ long

Plate – II Fig - 3132) *Cylindrospermum musicola* Kutz. ex Born. et Flah

Thallus expanded mucilaginous bluish green trichome 4.5 μ brod constricted at cross walls lght blue green cells 4.5-6 μ long cylindrical heterocysts 6 μ broad long spore oval 6 μ broad 8-9 μ long

Plate – II Fig - 3233) *Cylindrospermum indicum* Rao, C. B.

Trichome single with constricted at the joints 3-7.5 μ broad dark blue green cells quadrate and barrel shaped 3.5-4.5 μ long heterocysts one at each end 4.5-5.5 μ broad and 4-7.5 μ long spore ellipsoidal

Plate – II Fig - 3334) *Cylindrospermum michaelovskense* Een.

Trichome ple bue green straight cells quadrate constricted at walls 3.5-7.5 μ broad 7-7.5 μ long heterocysts oblong 4.5-5.5 μ broad 6-7.5 μ long spore single 6-8 broad 12-18 μ long

Plate – II Fig - 3435) *Rivularia beccariana* (De. Not.) Born. et Flah.

Thallu hemiperical, hard 1mm thick seldom up to 3.5mm high filament 7-9 μ broad trichome 3-7 μ broad cells at the base longer than broad above as long as broad.

Plate – II Fig - 3536) *Gloeotrichia pilgeri* Sch.

Thallu hemiperical, 200-300 μ diam filament 150 μ long base with 2-3 heterocysts trichome 8 μ broad ending in long hair heterocysts basal

Plate – II Fig - 36

- 1) *Microcystis elabens* Kutz, 2) *Microcystis marginata* (menegh.), Kutz .3) *Chroococcus coharens* (Breb.) Nag., 4) *Chroococcus minor* (Kutz.)Nag, 5) *Chroococcus minimus* (Keissl.) Lemm., 6) *Chroococcus montanus* (Hans.), 7) *Gloeocapsa calcarea* Tilden, 8) *Gloeocapsa magma* (Breb.)kutz., 9) *Gloeocapsa decorticans* (A.) Br., 10) *Synechococcus eruginosus* Nag., 11) *Merismopedia tenuissium* Lemm., 12) *Merismopedia punctata* Meyen, 13) *Spirulina meneghiniana* Zanard. ex Gom., 14) *Spirulina major* Kutz.ex Gom., 15) *Oscillatoria ornate* Kutz. ex Gom., 16) *Oscillatoria limosa* Ag. ex. Gom., 17) *Oscillatoria perornata* Skuja, 18) *Oscillatoria princeps* Vau.ex Gom., 19) *Oscillatoria raoi* De Toni.j.

- 20) *Phormidium fragie* (Mene.) Gom., 21) *Phormidium tenue* (Mene.) Gom., 22) *Phormidium roteanum* Itzi, 23) *Lyngbya allorgei* Fre., 24) *Lyngbya ceylanica* Wille, 25) *Nostoc ellipsosporum* (Desm) Rab. Ex Born. et Flah, 26) *Nostoc muscorum* Ag. Ex Born. Et Flap, 27) *Nostoc punctiforme* (Kutz.) Hariot, 28) *Nostoc calcicola* Breb. ex Bom. et Flah., 29) *Anabena fuellebornii* Schm., 30) *Anabena volzii* Lem, 31) *Cylindrospermum mjus* Kutz. ex Bron. Et Flah, 32) *Cylindrospermum musicola* Kutz. ex Bom. et Flah, 33) *Cylindrospermum indicum* Rao, C. B, 34) *Cylindrospermum michaelovskense* Een., 35) *Rivularia beccariana* (De. Not.) Bom. et Flah., 36) *Gloeotrichia pilgeri* Sch.

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