International Journal of Advance and Applied Research
www.ijaar.co.in
ISSN – 2347-7075 Impact Factor – 7.328
Peer Reviewed Bi-Monthly
Vol.4 No.26 July-Aug 2023

Occurrence of Cyanophyceae, Darna River, Nasik (M.S)

Dr. Yogita S. Patil[1], Dr. H.A. Thakur[2]
[1]M.P.H. **Mahila** Mahavidyalaya, Malegaon Camp, Nasik
[2]HPT Arts & RYK Science College, Nashik
Corresponding Author- Dr. Yogita S. Patil
Email- patilysp@gmail.com

Abstract:
In the research paper, quantitative and qualitative analysis carried out of Cyanophyceae, Darna River water. During present report Cyanophyceae were recorded at maximum number of sites of study area. The 36 algal species of Cyanophyceae have been recorded from selected sampling sites during the study period. The class Cyanophyceae is mainly by the genera with maximum number of species was Oscillatoria, Phormidium, Lyngbya, Spirulia, Chroococcus, Aphanothece, Scytonema and Plectonema during study period. The Cyanophyceae members were found dominant in monsoon and summer season

Keyword: Algal Species**,** Cyanophyceae, Darna River

Introduction

The origin of Darna River on the northern side of the Kullong hill fort about 13 km away from Nashik. The Catchment area of Darna is wide, sandy and is broken by a few little streams. Many of chemicals, pesticides, detergents, fertilizers etc. along with the thermal power generation and automobile industries have been established on or near to the bank of Godavari as well as many of its tributaries like Darna River silts and organic matter that are carried away with water flow are directly discharged and accumulated in the Darna River. Due to the man-made activities added in the river; there may be unwanted growth of algal blooms. Current velocity, geology, nutrient conditions, grazers, temperature, pollutants, and light availability, and their effects on the algae in Rivers; such factors affect algal growth and survival, species composition. The limnological studies involving the bio monitoring or biological studies in assessment of the status of any fresh water bodies. The various phytoplankton groups & especially algae; each algal group show variation of certain genera. Cyanophyceae show their occurrence in the aquatic environments having organic pollution. Most of the members from Cyanopyceae or the blue green algae; grow luxuriantly as scums in the water bodies that are full of decaying organic materials. Thus the Cyanophyceae members can be considered as bioindicators of organic pollutants. Sarles (1961).

Material and methods

The sampling was done at selected six sampling sites; regular monthly intervals in all seasons for the period of 24 months from January 2015 to December 2016; Glass bottles (250 cc) were use for the collecting of water samples of Darna river. Each bottle was numbered numerically and labelled according to the collection site, date of collection etc. algal samples were collected at first week monthly intervals during the study period i.e. January, 2015 to December, 2016. For this purpose; plastic sunpet jars (150ml) were used. Algal samples were kept preserved in 4% formalin for further taxonomic investigations. The water samples from the selected six sampling stations of Darna River were brought to the laboratory for analysis of the biological characteristics, phytoplanktons (mostly algae) were also determined (APHA, 1989; Trivedy et.al. 1998). qualitative analyses for Phytoplanktons, algal species were made for water samples of each station. Collected algal forms were identified and described with the help of standard literature on algae as far as possible to the species level The population of algal species were arranged according to their taxonomic groups. Sarode and Kamat. 1984). A list occurring algal genera was given

below for selected sampling sites of Darna River.

Result and discussion

The present study, Cyanophyceae was found to be most dominant with a total of 36 algal species, The Cyanophyceae members were found to be quite diverse. The class is mainly by the genera with maximum number of species were Oscillatoria, Phormidium, Lyngbya, Spirulia, Chroococcus, Aphanothece, Scytonema and Plectonema. During present investigation Cyanophyceae members were recorded more or less from all the sites of study area. Site S3, S4 and S5 showed more diversity of Cyanophycean algae showing in Table 1. The algal genera like Spirogyra, Navicula, Nitzschia, Euglena, Microcystis, Chroococcus, Spirulina, Oscillatoria, Phormidium, Lyngbya Scenedesmus were found to be dominant during the present study. Month wise occurrence of algal species of class Cyanophyceae at six sampling sites at Darna River during January 2015 to December 2016.

During the present study; the class , Cyanophyceae has been represented by following algal genera and species.

1. **Aphanocapsa pulchera (Kuetz) Rabenhorst** Prescott (1951).

Colonial alga, thallus is gelatinous, homogeneous , blue green, tuberculate, free or attached; cells spherical 2.5-4.2 µ in diameter, Srivastava, 1999

2. **Aphanothece nidulans Richter. Desikachary (1959)**

Thallus is irregularly expanded, plankton forms more or less round; cells cylindrical, straight or slightly bent, 1-1.5 µ broad, up to 3.5 µ long, blue green,

3. **Aphanothece saxicola Nag** Prescott (1951).

Thallus mucilaginous, colourless or yellowish; cells cylindrical, 1-2, single or in pairs, (Mayakkannan, 2010);

4. **Athrospira platensis (Nordst) Gomont.** Prescott (1951).

Thallus is blue green; slightly constricted, not attenuated at the ends, more or less regularly spirally coiled, cells nearly as long as broad, or somewhat shorter than broad, 4-5 µ long,

5. **Chlorogloea microcestoides Geitler** Prescott (1951).

Mucilaginous colonies, spherical to irregular cells, Colonies are usually mucilaginous with markedly limited surface Cells are variable in shape as well spherical to almost irregular, 1–6 µm. They are placed in individual colorless or greenish to reddish envelopes.

6. **Chroococcus minor (Kuetz) Naegeli** Prescott (1951) Desikachary (1959).

Thallus slimy, gelatinous, dirty blue-green in color; cells spherical, without sheath, 3-5 µ in diameter, single or in pair or in group of four cells. Cells are spherical, hemispherical cells, do not reach cell shape after division.(Sanap and Pingle, Ph.D. Thesis, June 2007, Deshmukh and Pingle, 2007).

7. **Chroococcus minutus (Kuetz.) Naegeli.** Desikachary (1959), Agharkar, (1967).

Cells spherical or oblong, single or in groups of 2-4, light blue green, with sheath 6-15 µ diameter and sheath not lamellated, colorless (Andhale and Papdiwal, 2008),

8. **Chroococcus turgidus (Kuetz.) Naegeli.** Prescott (1951), Desikachary (1959).

Cells spherical or ellipsoidal single, or in groups of mostly 2-4, very seldom many, blue green, olive green or yellowish, without sheath 8 – 32 µ, with sheath 13-25 µ diameter, sheath colourless.

9. **Gleothece palea (Kuetz) Rabenh.** Desikachary (1959).

Thallus mucilaginous, mostly blue-green; cells long cylindrical, without envelope 2.5-4.5 µ broad, 1.5-3 times as long as broad, with envelop 8-12 µ broad, blue-green or nearly colorless.

10. **Gleocapsa rupestris Kuetzing.** Desikachary (1959).

Thallus brownish crustaceous; cells without sheath 6-9-11 µ in diameter, blue-green; sheath yellow to brown, outer daughter colonies 15-75 µ diameter, spores with firm thin blackish brown wall more or less 15 µ diam.

11. **Lyngbya aeustuarii Liebm. Ex. Gomont.** Desikachary (1959).

Thallus blue green, expanded; filaments very long, curved or seldom, filaments long, straight forming dark green bundles; sheath thick colourless lamellated dull blue-green,

12. **Lyngbya cryptovaginata Schkorbataw.** Desikachary (1959).

Filaments are long than broad, with a distinct cross wall, straight and rigid, sheath thick, colourless, smooth, unlamellated; outer membrane slightly thickened.

13. **Lyngbya hieronymusii Lemm.** Desikachary (1959).

Filaments blue green; straight,12.5-13.1 µ in diameter, sheath firm, homogenous,

colourless; cells very much broader than short, 10-11.7 μ in diameter.2.8-4 μ long; end cell broadly rounded,

14. **Merismopedia tenuissima Lemm.** Prescott (1951), Desikachary (1959).

Cells pale blue green closely packed in colonies of 16-100 cells, sub-spherical, 1.3-2μ broad, (Andhale and Papdiwal, 2008).

15. **Microcoleus subtorulosus (Breb.) Gomont.** Desikachary (1959)

Thallus bluish, growing extensively on shells, coloured violet 6-10 μ broad distinctly constricted at the cross walls; cells 5-10 μ long, mostly short barrel shaped; end cell not capitates, conical or cylindrical conical.

16. **Microcystis robusta (Clark) Nygarad** Desikachary (1959).

Colonies at first round, later irregularly elongate and clathrate; sheath distinct, later gelatinizing; cells 6-9 μ diameter, spherical

17. **Myxosarcina burmensis Skuja** Desikachary (1959).

Colony small, Spherical, sarcinoid, Sheath indistinct, Cells minute, angular spherical, with rounded corners. Cell divides in both vertical and horizontal directions 2- 4 μ in diameter

18. **Nostoc commune Voucher ex. Born. et flah.** Desikachary (1959).

Filament is colony of small, bluish to olive green in colour forming Cells are about 4.5- 6 μ in diameter

19. **Nostoc punctiformae (Kuetz.) Hariot.** Desikachary (1959).

Thallus sub-globose up to 2 mm diameter, scattered or confluent, attached; filaments flexuous, ellipsoidal, blue-green; heterocyst's 6.5 μbroad; (Mayakkannan, 2010)

20. **Oscillatoria acuta Bruhl.et Biswas** Desikachary (1959).

Trichomes solitary,parallel to each other aggregated into bundles hardy, brittle, not constricted at the cross- walls, 4-6 μ thick,70-400 μ long, straight, narrow or acuminate towards the subobtuse,.

21. **Oscillatoria obscura Bruhl.et Biswas** Desikachary (1959).

Trichomes about 4 μ broad, attenuated at the apex, rounded, slight bent or nearly straight, blue green

22. **Oscillatoria subbrevis Bruhl.et Biswas** Desikachary (1959).

Trichome single, 5-6 μ broad nearly straight not attenuated at the apices; cells 1-2 μ long not granulated at the cross walls; end rounded (Tagad, Pingle and Bhoge, 2012);

23. **Oscillatoria princeps Voucher ex Gomont** Desikachary (1959).

Thallus blue-green, trichome, straight, rigid and fragile, cell 5 μ in length, short, protoplasm granular, apices straight, apical cells slightly convex, calyptra absent.

24. **Phormidium abronema Skuja** Desikachary (1959).

Thallus filamentous, bright blue-green, trichomes slightly constricted at cross-wall, ends not attenuated, 4-6 μ broad; sheath thin, cells are longer than broad.

25. **Phormidium ambigum Gomont.** Desikachary (1959).

Thallus bright blue-green, trichomes slightly constricted at cross-wall, ends not attenuated, 4-6 μbroad; sheath thin, cells shorter than broad;

26. **Phormidium corium (Ag.) Gomont.** Desikachary (1959).

Thallus expanded, membranous, leathery, blackish to brownish green; filaments long, more or less flexuous, densely entangled; sheath thin, gelatinizing or diffluent, colored violet. (Mishra et al, 2001);

27. **Phormidium molle Kuetz Gomont** Desikachary (1959).

Thallus mucilaginous thin trichome straight or nearly straight 2.7-3.3 μ broad, cells quadrate, cylindrical, cell 3–7–8 μ long, end cell rounded calyptra absent.

28. **Phormidium mucosum Garder** Desikachary (1959).

Thallus brownish blue, slimy; trichome brownish blue-green flexuous, broad not attenuated at the ends; cells as long as broad, sheath delicate colourless.

29. **Phormidium subincrustatum Fritsch. et Rich.**

Thallus 2-3mm thick, calcified; filaments more or less parallel, not erect; sheath thin, shiny.

30. **Plectonema gracillimum (Zopt.) Hansgirg.** Desikachary (1959).

Filaments nearly straight or flexuous; false branches sparse, single or geminate; sheath thin colourless, 1-1.5 μ broad and 2-2.5 μ long pale blue-green end cell rounded.

31. **Plectonema puteale (Krichner) Hansgirg.** Desikachary (1959).

Thallus thin filamentous, pale blue- green, yellowish or grey-green, mostly slimy; filaments are thin, longer than broad; filaments single,

32. **Plectonema radiosum (Schiederm) Gomont.** Desikachary (1959).

Filaments flexuous, densely entangled more or less expanded, brownish, branched, sheath

thick, lamellated, trichome generally constricted at the cross-walls, cells 1/2-1/6 as long as broad.

33. Scytonema bohneri Schmidle Desikachry (1959).

Stratum filaments, blakish green; filaments partly creeping, filaments10-12 µ broad, branches mostly single..

34. Scytonema schmidtii Gomont. Desikachary (1959)

Thallus attached to tree trunk or leaves, irregularly blush or violet, rarely greenish; filaments parallel 6 µ broad (Tagad, Pingle and Bhoge,2012);

35. Spirulina labyrinthiformis (Menegh) Gomont. Desikachary (1959).

Trichome 1 µ broad green very regularly coiled forming a dirty, dark green thallus; spiral close to each other, spirals 2 – 2.7 µ broad.

36. Spirulina major Kuetzing ex Gomont. Prescott (1951) Desikachary (1959).

Trichome 1.2-1.7(-2) µ broad, regularly spirally coiled, blue green spirals 2.54 µ broad and 2.7-5 µ distant. Marathe and Santakke, (1977)

Table 1: Average month wise occurrence of total algal species of class Cyanophyceae at six sampling sites at Darna River during January 2015 to December 2016.

Month	January 2015 to December 2015						January 2016 to December 20156					
	S1	S2	S3	S4	S5	S6	S1	S2	S3	S4	S5	S6
January	-	3	--	2	1	4	-	-	-	1	-	-
February	4	2	4	1	4	5	2	--	2	2	5	4
March	3	--	3	4	2	3	1	3	-	3	--	3
April	4	2	2	3	3	4	2	4	4	4	3	5
May	2	--	--	-	4	2	1	1	5	5	4	6
June	1	3	3	5	--	3	2	3	2	--	2	3
July	2	2	4	2	3	--	3	3	3	4	3	1
August	--	4	3	3	4	5	2	2	4	1	4	5
September	1	3	5	4	5	3	2	1	3	3	6	--
October	--	2	3	--	4	1	--	--	--	2	--	5
November	1	2	2	3	2	3	--	--	--	3	3	--
December	--	--	2	2	1	2	--	1	2	--	--	3
Total	18	23	31	29	33	35	16	18	25	28	30	35

Conclusion

The present research work helped to know the diversity of algal flora, the pattern of distribution and change in the occurrence of algal species at Darna River. As the Stream Darna is presented to truly expanding strain concerning a few anthropogenic factors particularly quick paces of human settlements; natural efficiency is viewed as expanding which is clear from expanded number of algal species particularly natural contamination lenient genera. During the present investigation; pollution tolerant algal genera at six sampling sites were recorded. Of these; genera like Chroococcus, Lyngbya, Microcystis, Nostoc, Oscillatoria, Phormidium, Scytonema from Cyanophycea

Bibliography

1. Agarkar, D. S. (1967). Myxophyceae of Gwalior, Madhya Pradesh. Phykos, 6(1&2), 1-6.
2. Andhale, S.B. and P. B. Papdiwal (2007).Diversity of some Blue Green Algae from Jayakwadi Bird Sanctuary, Paithan Aurangabad J.Aqua. Biol. 24(2). 5-11
3. APHA (1989). Standard methods for the examination of Water and Waste Water, 17th Edition APHA, Washington D.
4. Desikachary, T.V. (1959). Cyanophyta, ICAR New Delhi.1-686
5. Mishra, A.P. Borah, B.K. and Sharma, M. (2001). Limnological investigation of freshwater tributary. Freshwater Biol. 1 (2) : 1-5.
6. Marathe, K.V. and Sontakke, S.D. (1977). Observations on some wall algae. The Botanique. 3(1) 13-19.
7. Mayakkannan, G. (2010). Biodiversity and Biology of Microalgae of forest soil and subaerial habitats of Tamil Nadu state Ph.D. Thesis University of Madras.
8. Sarode, P. T. and Kamat N. D. (1984). Freshwater diatoms of Maharashtra'; Saikrupa Prakashan, Aurangabad: 1-324.
9. Sanap RR (2007): Hydrobiological studies of Godavari River up to Nandur

Madhmeshwar dam, Dist. Nashik, Maharashtra. Ph. D. thesis, University of Pune, Pune, India
10. Sarles, W.B. (1961). "Madisons lake must Urbanisation destroy their beauty and productivity", Algae and Metropolitan wastes- Tr. of the 1960 seminar U.S. Dept. of Health Edu. and Welf. Pp.10-18.
11. Pingle S. D. (2007). 'Chlorophycean and Cyanophycean algae of Pune and Ahmednagar districts (M.S.)'; Proc. Nat. symp. Recent trends in algal Biodiversity
12. Prescott, G. W.(1951).Algae of the Western Great Lakes Area'; Cranbrook Institute of Science, Bloomfield Hills, Michigan:1-946.
13. Tagad R. N., Pingale S. D. and Bhoge R. H. (2012). 'Taxonomic Diversity of Genus Lyngbya, Oscillatoria and Scytonema of Cyanophyta in Junnar and Ambegaon Talukas of Pune District (India)'; Flora and Fauna; 18(1):27-34.
14. Trivedy, R. K., Goel, P. K., & Trisal, C. L. (1998). Practical methods in ecology and environmental science Karad: Enviro Media Publications. (pp. 1–340).