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ALGAL DIVERSITY OF RIVER CHANDRABHAGA, DIST-AMRAVATI (M.S.) DURING WINTER SEASON

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ABSTRACT

In present study algal diversity of Chandrabhaga river in Amravati District was recorded during winter season. Overall 51 genera and 66 species of algal group viz. chlorophyta, cyanophyta and bacillariophyta were recorded from river water. The chlorophycean members were dominant and represented by 21genera and 28 species along with the highest density (47%) as compared to the other algal groups. Bacillariophyta recorded with 17 genera and 21 species along with 27 % density of all the groups. Cyanophyta was reported with 13 genera and 17 species with 26% of density among all the groups. The members of chlorophyta dominated river water throughout the winter season followed by bacillariophyta and cyanophyta. Dominance of chlorophyceae and bacillariophyceae members supports fresh water environment and purity but also the dominance of cynophycean members during same season implies possibility of alkaline and hard nature of river water.

KEY WORDS: *Algal diversity, winter season, Chandrabhaga river, Amravati Dist.*

INTRODUCTION

Algae are not restricted to the particular habitat and occur in almost all types of habitat. Being important component in aquatic ecosystem wide range of aquatic environments like lentic as well as lotic prefers by the different algal community. Their thallus ranges from unicellular and colonial or multicellular, filamentous free floating non-motile or motile structure. Algae are considered to be of prime concern in maintaining the food chain and food web in an aquatic ecosystem due to photosynthetic nature and as a primary producer in trophic level. Algal diversity is mainly based on the level of richness of species and their functional importance in ecosystem. Algal community is considered as the most sensitive to the water pollution, indicates any undesirable changes in aquatic environment which leads to the significant turn down in diversity with respect to the seasons (Arulmurugan et.al. 2011).Therefore the measurement of their diversity in different climatic conditions seasons can be helpful in understanding possible causes pertaining to the water quality (Pawar et al., 2006). Several studies has been carried out on the algal diversity of rivers so far (Venkateswarlu, 1969; Khanna et al., 2012; Kshirsagar et al., 2012; Bhatnagar and Bhardwaj,2013; Sarwade and Kamble, 2014) Rivers being the source of fresh water an attempt in present study made on the estimation of algal diversity of Chandrabhaga river during winter season.

MATERIAL AND METHODS

Sampling site and collection of algal samples

Chandrabhaga River is one of the important rivers in Amaravati district of Maharashtra. It is also the tributary of Purna River, it forms a part of Tapti-Purna river system. The main stream of Chandrabhaga River raises just down the Vairat plateau in the Chikhaldara hills. There the Chandrabhaga River takes an eastward course draining the south slopes of Chikhaldara and Gawilgarh plateaus. There is a dam on the Chandrabhaga River as it comes out of the valley. Chandrabhaga River takes a more southward turn from the dam and passes through the town of Daryapur before it meets with Purna River on the border of Amravati District and Akola district(source: https://www.indianetzone.com/67/chandrabhaga_river.htm).

A survey of Chandrabhaga river was conducted during winter seasons for algal collection. Survey and sample collection comprises area of Daryapur Tehsil where the river course occurs. During algal collection notes were made on visible algal growth along with descriptions on each collection site followed by collection of macroscopic and microscopic (water sample) forms in glass bottles for estimation of abundance and taxonomic analyses in laboratory.

Taxonomical analyses

Sub-sample of each macroscopic and microscopic form was added to 100 ml of water and homogenized with the help of handheld blender for 15s. Then the obtained homogenate was preserved in Lugols iodine and stored in temperature controlled incubator for establishing taxonomic composition and the relative abundance of algal taxa present. Determination of relative abundance were made by preparing one to three slides of homogenate and counting over 300 algal units (individual algal cells or a fragment) at magnification of 400-1000X with the help of microscope (Olympus BX50) for identifications and an Olympus Camedia C5060 Wide Zoom digital camera for photographic records. Identifications were made by using appropriate literature on chlorophyta, cyanophyta and bacillariophyta (Desikachary 1959, Gandhi 1998; Prescott 1982; Anand 1998; Hustedt 1930; Guiry, and Guiry 2014.)

RESULTS AND DISCUSSION

The, density along with species and percent composition of each algal group is clear from the table 1, figures 1 and 2. Overall 51 genera and 66 species of algal group viz. chlorophyta, cyanophyta and bacillariophyta were recorded from river water during winter season.

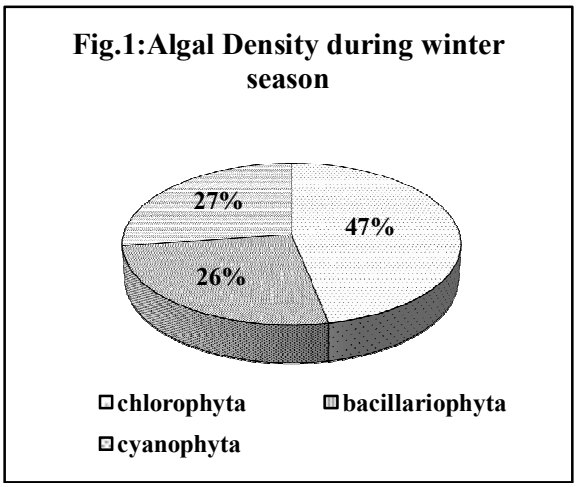
Table 1: Algal diversity, density and species composition of river water.

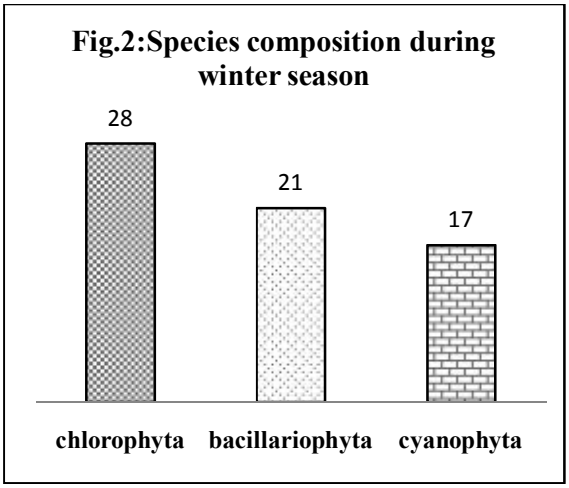
Sr.No.	Name of the Algal group	No. of cells in water (No./L)
	CHLOROPHYTA	
1	*Ankistrodesmus falcatus*	6
2	*Chlamydomonas sp.*	8
3	*Chlorococcum humicola*	11
4	*Chlorococcum infusionum*	4
5	*Chlorella vulgaris*	14
6	*Chlorella pyrenoidosa*	7
7	*Closterium cynthia*	13
8	*Closterium lanceolatum*	10
9	*Coelastrum microporum*	9
10	*Cosmarium angulare*	12
11	*Cosmarium granatum*	15
12	*Euastrum sp.*	3
13	*Eudorina sp.*	4
14	*Hydrodictyon sp.*	4

15	*Kirchneriella contorta*	12
16	*Oedogonium formosum*	6
17	*Oocystis sp.*	11
18	*Pediastrum sp*	8
19	*Rhizoclonium sp.*	6
20	*Scenedesmus bimorphus*	12
21	*Scenedesmus longus*	9
22	*Scenedesmus quadricauda*	15
23	*Selenastrun minutum*	7
24	*Stigeoclonium tenue*	4
25	*Spirogyra singularis*	6
26	*Spirogyra neglecta*	9
27	*Ulothrix sp.*	3
28	*Zygnema sp.*	5
	Total density and no. of species of chlorophyta and % among density of all	**233 (28) 47%**
	CYANOPHYTA	**No. of cells in water (No./L)**
29	*Aphanocapsa grevillei*	7
30	*Anacystis sp.*	5
31	*Anabaena sp.*	3
32	*Chroococcus minor*	10
33	*Gloeotrichia sp.*	8
34	*Rivularia sp.*	16
35	*Lyngbya contorta*	4
36	*Lyngbya majuscula*	7
37	*Microcystis aeroginosa*	9
38	*Merismopedia pulverea*	6
39	*Scytonema bohneri*	8
40	*Oscillatoria formosa*	6
41	*Oscillatoria acuta*	9
42	*Oscillatoria okenii*	2
43	*Oscillatoria curviceps*	8
44	*Phormidium ambiguum*	10
45	*Spirulina major*	11
	Total density and no. of species of cyanophyta and % among density of all	**129 (17) 26%**
	BACILLARIOPHYTA	**No. of cells in water (No./L)**
46	*Asterionella formosa*	4
47	*Amphora sp.*	7
48	*Coloneis silicula*	10
49	*Cymbella offinis*	12
50	*Cymbella tumida*	8
51	*Cyclotella glomerata*	6
52	*Diatomella sp.*	3
53	*Eunotia sp.*	1

54	*Fragillaria brevistriata*	13
55	*Fragilaria intermedia*	9
56	*Gyrosigma scalproides*	5
57	*Gomphonema intricatum*	5
58	*Melosira sp.*	2
59	*Mastogloia baltica*	1
60	*Naviculla placentula*	8
61	*Nitzschia regula*	11
62	*Pinnularia dolosa*	8
63	*Synedra acus*	11
64	*Synedra ulna*	6
65	*Synedra offinis*	3
56	*Tabellaria sp.*	2
	Total density and no.of species of bacillariophyta and % among density of all	**135 (21) 27 %**
	Total of all the groups	**497**

The chlorophycean members were dominant and represented by 21genera and 28 species along with the highest density (47%) as compared to the other algal groups. It is characterized by the presence of algal species like *Ankistrodesmus falcatus, Chlamydomonas sp., Chlorococcum humicola, Chlorococcum infusionum, Chlorella vulgaris, Chlorella pyrenoidosa, Closterium cynthia, Closterium lanceolatum, Coelastrum microporum, Cosmarium angulare, Cosmarium granatum, Euastrum sp., Eudorina sp., Hydrodictyon sp., Kirchneriella contorta, Oedogonium formosum, Oocystis sp., Pediastrum sp., Rhizoclonium sp., Scenedesmus bimorphus, Scenedesmus longus, Scenedesmus quadricauda, Selenastrun minutum, Stigeoclonium tenue, Spirogyra singularis, Spirogyra neglecta, Ulothrix sp.* and *Zygnema sp.*





Bacillariophyta was second largest algal group reported from the river water with 17 genera and 21 species along with 27 % density of all the groups. It is characterized by the presence of algal species *Asterionella formosa, Amphora sp., Coloneis silicula, Cymbella offinis, Cymbella tumida, Cyclotella glomerata, Diatomella sp., Eunotia sp., Fragillaria brevistriata, Fragilaria intermedia, Gyrosigma scalproides, Gomphonema intricatum, Melosira sp., Mastogloia baltica, Naviculla placentula, Nitzschia regula, Pinnularia dolosa, Synedra acus, Synedra ulna, Synedra offinis* and *Tabellaria sp.*

Altogether cyanophyta was reported with 13 genera and 17 species with 26% of density among all the groups. It includes the cyanophycean members like *Aphanocapsa grevillei, Anacystis sp., Anabaena sp., Chroococcus minor, Gloeotrichia sp., Rivularia sp., Lyngbya contorta, Lyngbya majuscula, Microcystis aeroginosa, Merismopedia pulverea, Scytonema bohneri, Oscillatoria formosa, Oscillatoria acuta, Oscillatoria okenii, Oscillatoria curviceps, Phormidium ambiguum* and *Spirulina major.*

Present study reveals that algal diversity of river water during winter characterized by the presence of more number of species and density of algal group chlorophyta fallowed by bacillariophyta and cyanophyta. The dominance of members of these algal groups during winter might be attributed to the factors governing the river water quality like low water temperature, dissolved oxygen, pH, low turbidity, low conductivity and nutrient status (Rajagopal *et al*., 2010, Rao and Pragada, 2010 ; Panigrahi and Patra , 2013). Dominance of members of Chlorophyta and bacillariophyta could be the result of less metabolic activities and organic decomposition and indicates purity as well as fresh environment of water with poor ionic status (Descy, 1987 and Kadiri, 2006). The dominance of chlorophyta and bacillariophyta during winter in lotic ecosystem has been reported by several authors (Venkateswarlu, 1969; Singh, 1990; Khanna et al., 2012) and the dominance of cyanophyta reported maximum during summer (Bhatnagar and Bhardwaj, 2013). But the similar dominance of algal group cyanophyta with bacillariophyta in the same season indicates alkaline and hard river water which could be either geological or hydrological in origin (Tiwary et al. 1995; Tiwary and Dhar, 1994).

CONCLUSION

It can be concluded that the algal diversity of river during winter season characterized by the three major algal groups chlorophyta, cyanophyta and bacillariophyta. The members of chlorophyta dominated river water throughout the winter season followed by bacillariophyta and cyanophyta. Dominance of chlorophyceae and bacillariophyceae members supports fresh water environment and purity but also the dominance of cynophycean members during same season implies possibility of alkaline and hard nature of river water.

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