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Generic Diversity of Fresh Water algae from Dehradun

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Abstract

Water plays a vital role in all living organisms as it performs several major and indispensable activities. Aquatic algae are necessary for maintaining equilibrium between biotic and abiotic components in aquatic ecosystems. The present paper deals with the generic diversity of freshwater algae from freshwater streams of Maldevta, Robber's Cave and Sahastradhara localities in Dehradun (Uttarakhand). Water samples were collected from all the three localities during winter season (October to February) and temporary slides were prepared for the identification of algal components. Overall, 15 genera were recovered collectively from these localities. The assemblage is represented by the members of Bacillariophyceae, Chlorophyceae, Cyanophyceae, Euglenophyceae and Rhodophyceae. It is concluded that class Chlorophyceae is dominant and contributed 53.3%, followed by Cyanophyceae (26.6%) and Bacillariophyceae, Euglenophyceae and Rhodophyceae (6.6% each) in the assemblage. Since all these localities are tourist destinations, so it is necessary to generate botanical database from these localities. Algae also acts as primary producer in aquatic ecosystem and generates biomass which is the foundation of food chains.

Keywords: Algae, Freshwater, Ecosystem, Dominant, Localities, Assemblage, Tourist, Biomass, Food chain.

Introduction

Freshwater algae are globally ubiquitous and highly diverse, with tens or perhaps hundreds of thousands of species, in a myriad of forms and sizes (Sheath & Wehr, 2015). Studies on freshwater algae have been carried out by many workers from different parts of the country (Kamat, 1963; Bhakta et al., 2010; Chakraborty et al., 2010; Das & Adhikary, 2012; Patil et al., 2012; Anekaret al., 2012; Toppo & Suseela, 2013; Reddy & Chaturvedi, 2017) but reports of these from Dehradun district of Uttarakhand are sporadic (Khan, 1970; Gupta et al., 2008, Malik & Bharti, 2012). However, no extensive work has been done so far from this area which comes under the most important mega-floristic zone of India i.e. western Himalayas. So it is very necessary to study fresh water algal components from the area. In the present study we have studied the freshwater algae from freshwater streams of Maldevta, Robber's cave (Guchhupani) and Sahastradhara localities.

Aim of study

To represent the Generic diversity of freshwater algae from different fresh water localities of Doon valley.

Materials and methods

Water samples containing algal components were collected from three sites namely Maldevta (78˚5′58′′E; 30˚18′31′′ N), Robber's cave (78˚3′36′′E; 30˚22′33′′ N) and Sahastradhara (78˚12′ 94′′E; 30˚38′ 84′′ N) during October to February, 2018. The samples were filtered through phytoplankton net of 20 µ mesh size made of bolting silk and the filtrates were preserved in 4% formaldehyde solution. Temporary slides were prepared with small amount of material on a slide, mount it in 10% glycerine with a few drops of formalin and then sealed it with suitable sealing agent(wax or nail paint).The slides were seen under binocular microscope (Olympus 20i H) with attached digital camera (Sony) for the study of morphological characters and photography. Algae were identified with the help of standard books, floras, monographs and research papers (Prescott, 1970; John et al., 2002;Bellinger & Sigee 2010; Gupta, 2012).

Observations

On the basis of our study following observations have been made which are summarized in Tables 1 and Plate 1.

Discussion and Conclusion

Over all 15 algal genera are collectively reported from the fresh water streams of the localities belonging to Bacillariophyceae, Chlorophyceae, Cyanophyceae, Euglenophyceae and Rhodophyceae classes (Table 2). Out of which 9 genera are reported from Robber's cave. Dominace is shown by members of class chlorophyceae and represented by 66.6% followed by Cyanophyceae, Bacillariophyceae and Euglenophyceae each class with 11.1% algal components. No member of Rhodophyceae reported from this site. However, assemblage of Maldevta is represented by members of Chlorophyceae (with 66.6%) and Bacillariophyceae (with 33.3%) only.

Since the assemblage of Maldevta is very low but it is the first report of fresh water algae from this site. Whereas Saharstradhara locality represented by 8 genera. Chlorophyceae is again dominant with 50% and followed by Cyanophyceae with 37.5%. Rhodophyceae (with 12.5%) is represented by genus Batrachospermum. In general the data generated from the localities it is concluded that Chlorophyceae is dominant and represented by 8 genera (53.3%). Members of Cyanophyceae class are represented by 4 genera with 26.6%. Classes Bacillariophyceae and Rhodophyceae are represented by 1 genus for each class (with 6.6%) in the assemblage (Fig. 1).Since the areas come under prominent tourists destinations so it is very necessary to generate botanical database from these localities. More studies are needed to conserve the status of vegetation from these areas mainly in terms of fresh water algae. Algae are important primary producers in both freshwater and marine systems. In many water streams they generate biomass which is the foundation of diverse food chains.

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Robber's cave	
Name	Class
Chlamydomonas	Chlorophyceae
Chlorella	Chlorophyceae
Cladophora	Chlorophyceae
Diatoms	Bacillariophyceae
Euglena	Euglenophyceae
Hydrodictyon	Chlorophyceae
Oedogonium	Chlorophyceae
Scytonema	Cyanophyceae
Spirogyra	Chlorophyceae
Maldevta	
Name	Class
Diatoms	Bacillariophyceae
Spirogyra	Chlorophyceae
Ulothrix	Chlorophyceae
Sahastradhara	
Name	Class
Batrochospermum	Rhodophyceae
Chlorella	Chlorophyceae
Nostoc	Cyanophyceae
Oedogonium	Chlorophyceae
Oscillatoria	Cyanophyceae
Spirogyra	Chlorophyceae
Spirulina	Cyanophyceae
Volvox	Chlorophyceae

Table 1. Fresh water algae recorded from the study sites.

Algal Taxa	Site		
	Sahastradhara	Maldevta	Robbers cave
Hydrodictyon	–	–	+
Spirogyra	+	+	+
Euglena	–	–	+
Diatoms	–	+	+
Scytonema	–	–	+
Cladophora	–	–	+
Chlamydomonas	–	–	+
Chlorella	+	–	+
Oedogonium	+	–	+
Volvox	+	–	–
Batrachospermum	+	–	–
Ulothrix	-	+	–
Oscillatoria	+	–	–
Nostoc	+	–	–
Spirulina	+	–	–

Table 2 Comparison of the algal components recovered.

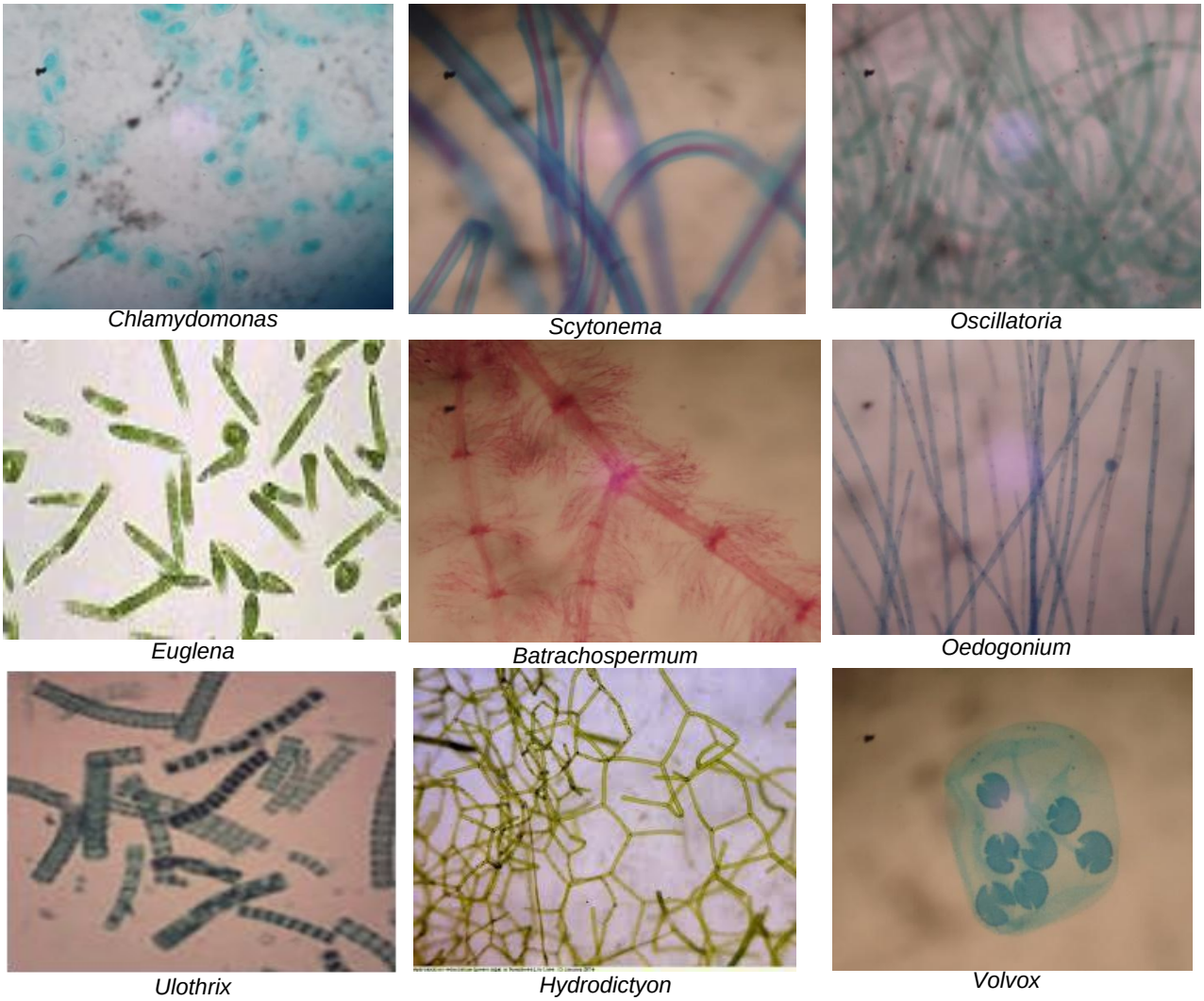

Plate 1 Generic diversity recorded from the study sites.

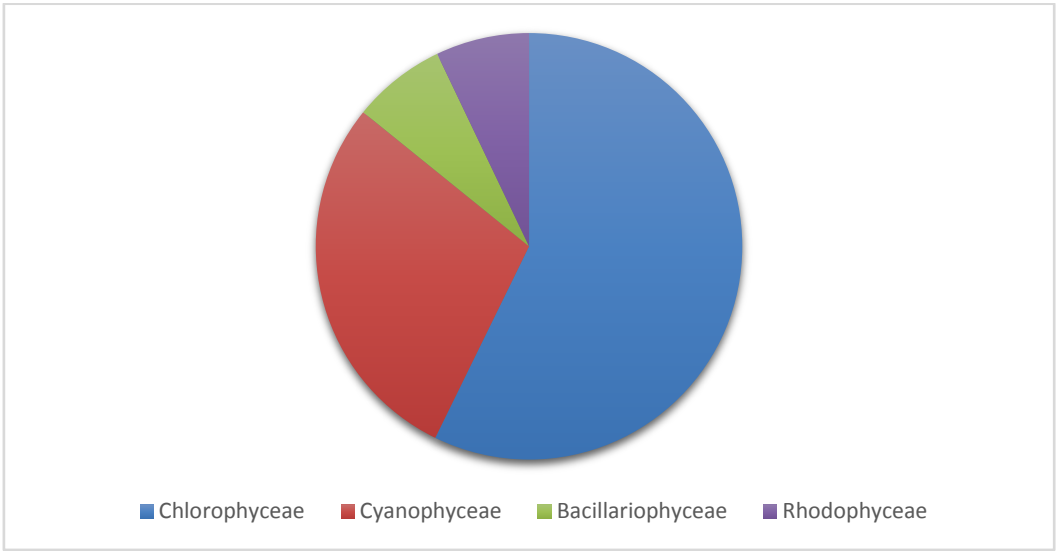

Fig. 1.Pie diagram representing overall percentage of different algal classes reported from all the three sites (Chlorophyceae with 53.3 %; Cyanophyceae with 26.6 %; Bacillariophyceae & Rhodophyceae with 6.6 % each