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Cyanophyaceae: A Primitive Algal Group

Teena Agarwal*

University of Banasthali, Department of Plant Genecology, Niwai, 304022, India.

Review Article

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***For Correspondence**

University of Banasthali,
Department of Plant Gencology, Niwai, 304022, India, Tel: 9680724243.

E-mail: tagarwal02@gmail.com

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ABSTRACT

The algae are the heterogeneous group of the organisms; they have been found from the billions of years and have the profound effects on the biogeochemical cycles of the world. As photosynthetic organism algae produce the enormous amount of the oxygen in the world, in addition large amount of the organic carbon in the ecosystem is also provided by the algae in the world. Majority of this the carbon served as the sources of the food in the ecosystem and in the food chain. Algae are the major contributor of the global biodiversity; algae are the heterogeneous organism which varies from the single cell the giganteous thallus kelps in the sea weeds. These variations are according to the evolutionary values. Mostly of the algae are the photosynthetic and they produce the oxygen in the ecosystem, they lack any body and reproductive features of the land plants. Reproduction occurs by the asexual means and by the vegetative methods. In this review article we are presenting some of the aspects of the cyanophyta and the class cyanophyaceae and description of the some of the members.

Cyanophyta are the typical prokaryotes and they have the blue -green pigments in higher amount than the green pigments, so the colour of the algae are the blue and they have been termed as the blue green algae. They reproduce by means of the asexually, sexual means of the reproduction is totally absent in the cyanophyta.

INTRODUCTION

The division cyanophyta belongs to the kingdom eubacteria, prokaryotes are the organisms which possess the no cell organelles as well as the centre nuclei and the body, DNA lies in the centre of the body and the thylakoids are not presented in the any compact body like the chloroplast of the eukaryotic organisms, pigments are present in the body of the phycobiliosomes [1].

The division cyanophyta contains about the 150 genera 's and the 2000 species, these algae are found in the most diverse kinds of the habitats, they are present in the fresh water, in the sea in the moist places, in the extreme and most diverse kinds of the environment like the glaciers, desert and the hot springs [1-6].

Blue green algae are generally found in the form of the phytoplankton, in the fresh water bodies [1]. In temperate lakes they generally form the dense populations. Some of the feature of the blue green algae are summarised as **Figure 1.**

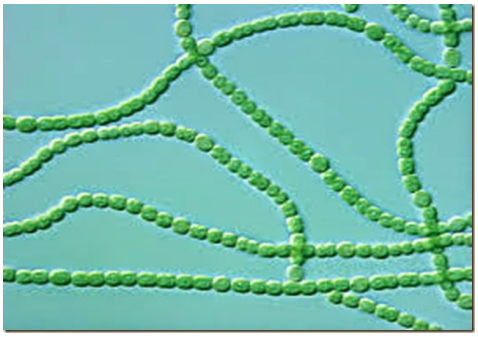

Figure 1. Cyanophyaceae algae (sources: Plant sciences).

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Pigments and The Chromatoplasm

The blue green is blue green due to their pigmentation by the presence of the accessory pigments, phycocyanin, phycoerytheirn, in some of the case red phycoerythrin has been observed phycocyanin and the phycoerythirn are the similar kinds of the compounds and they have been termed as the phycobiliproteins [1,7,8]. In most of the blue green algae the components are the phycocyanin, so the cells are the blue green in colour. In the chlorophyll content the chlorophyll a occurs whereas the chlorophyll b is totally absent, several kinds of the carotenoids are present. B carotenes are also found in many of the strains [1,9,10].

The photosynthetic pigments are not present in the chloroplast like of the structure, they are found in the membrane like structure, these have been termed as the chromatoplasm [2-6]. Chromatoplasm contains the thylakoid like structure, on which pigments are present, phycobiliprotiens are present on the small bodies these have been termed as the phycobilisomes, close examination shows that the phycobiliosomes are consisted of the triangular cores and sixes arms are radiating from the cores in different directions [1]. The phycobiliprotiens function as the accessory pigments in the transfer of the energy in the chlorophyll molecules as the antenna molecules in the photosystem II and devolution of the oxygen **(Figure 2)** [1].

Figure 2. Blue green algae genus (sources: Research gate).

Centroplasm

The centre part of the cell is termed as the centroplasm. They are paler in colour than the rest of the chromatoplasm. The centre part has the nucleic acid and the nuclide material, and the nuclear material is not surrounded by the any kinds of them membrane of the eukaryotic cells [1].

The ribosomes of the cyanophyaceae are the prokaryotic origin and they are of the 70s types. unlike the ribosomes of the eukaryotic cells the ribosomes are totally different in shape and the structure [1].

Gas Vacuoles

In the blue green algae in the certain condition, gas vacuoles are formed, and they can be seen with the help of the light microscopes. Gas vacuoles are field with the gas not by the with like the other eukaryotic plants. The gas vacuoles are formed by the any kinds of the hollow gas tubules [1]. These gas vacuoles are for the bouncy regulations. Some of the species of the Aphanizomenon, and Anabaena flos-aquae has such kinds off the buoyancy mechanism and the regulation [1].

Reserve Substances

some of the reserve food material of the cyanophyaceae members is as follows.

Cyanophyacaen starch

This is the *α-1, 4* linked cyanophyacean starch which is like the glycogen, and the amylopectin portion of the higher plants. These are invisible in the light microscope and they lies in between the thylakoids [1].

Cyanophyaceae granules

Polyphosphate granules polyhedral bodies, *poly β hyxroxybutyrate* are the reserve food material of the blue green algae [1].

Cell Wall

Some of the blue green algae are surrounded by the only cell wall like the oscillatoria, however in some of the member the

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outer sheets the mucilage the covering by the mucilage cyanothece and the chrococcus. In many members the mucilage is so vast that they have the large amount of the mass of the mucilage like in the member Gloecapsa, Microcoelus, Nostoc.

Cell wall has the typical peptidoglycan nature and has the four layers [1].

The cell also has the gliding mechanism, the filamentous moves by the gliding way in the habitat. These movements are very significant in the case of the blue green algae, and some of the members have the prominent kinds of the movement. As they creep behind they leave the trail of the mucilage behind the movement point [1].

The phototectic and the photophobic kind of the movements enable the cells to move in the extreme kinds of the habitat and the surroundings.

Heterocysts and The Nitrogen Fixation

Heterocyst is different from the other kinds of the cells of the blue green algae in the sizes and the shape and the colour of the cell form the rest of the filaments. The cell wall of the heterocyst is thick than rest of the cells and they have the polar nodules [1].

Heterocyst has the power or function of the nitrogen fixation, if the surrounding environment is an oxygenic. Inside the heterocyst the cells create the oxygen free environment and in the presence of the nitrogen they fix the atmospheric nitrogen and supplies to the wholes of the filaments [1].

Akinetes

These are the thick cell wall structures and they are the means of the perennation of the cells in the tough environment conditions. They develop from the vegetative cells [1].

Reproduction

Reproduction occurs by the only asexual means; sex reproduction is totally absent in the blue green algae. In many colonial and the unicellular algae, the reproduction occurs by the vegetative means of reproduction. Sometime the reproduction occurs by the Hormogonia and the endospores, and exospores [1].

Cyanophyaceae has the overall five orders, these are enlisted as:

1) Chrococcales
2) Pleurocapsales
3) Oscillotoriales
4) Nostocales
5) Stignemotales.

Some of the genera of the blue green algae are enlisted as

Cyanothece, Aphanothece, Merismopedia, chroococcus, Gloeocapsa, oscillatoria, Nostoc, stigonema, Anabaena.

CONCLUSION

Overall this is the small presentation of the cyanophyaceae and its features. Cyanophyaceae are the typical algal group which shows the evolution of the algae in different directions. They have the reservoirs of the many kinds of the genes and the metabolites. careful analysis of the genes and the other aspects leads to the phylogeny of the group and help in the tracing out the evolution.

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