

Chrysophyceae an Important Class of the Heterokontophyta

Teena Agarwal*

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

Review Article

Received date: 02/11/2017

Accepted date: 18/01/2018

Published date: 25/01/2018

*For Correspondence

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

E-mail: tagarwal02@gmail.com

Keywords: Chryosphyceae, aquatic flora,
planktonic, accessory pigments, Haplontic life
cycles, golden brown colour, resting zygote, apical
inserted flagella

ABSTRACT

Algae are the heterogeneous group of organisms, they exert the profound kinds of the effects on the ecosystem, as they harbour the very big amount of the oceanic ecosystem, they produce the very large amount of the atmospheric oxygen and produces the tremendous amount of the organic carbon in the ecosystem. Much of the organic carbon works as the food into the biogeochemical cycles and the food chains. Algae produce a large amount of the secondary metabolites and they are used for the variety of the purposes. In this review articles we are presenting some of the aspects of the class chryosphycaee of the algae. Most of the species of the chrysophyceae are the unicellular and the colonial, which may or may not be flagellates, the flagella are not inserted near the lateral side but at the apex of the cells. The chloroplast is the golden brown and the colour of the chloroplast are covered by the accessory pigment Fucoxanthin.

The chrysophyceae are restricted to the fresh water habitats. These species have the haplontic kinds of the life cycles, the zygote of the cells are the resting stage and they are of the siliceous kinds. This class is best known for the planktonic kinds of the representatives. Then name of the class is due to the colour golden brown due to the presence of the accessory pigments due to which the green colours is masked by these kinds of the pigments. The members of the class are the primary producers and they play an important variety of roles in aquatic ecosystem.

INTRODUCTION

The algae are heterogonous assemblage of the organism, they range in the sizes from the unicells to the large and gignateous kinds of the thallus, the evolutionary lineages of theses thallus also range from most primitive to the most advanced types. Algae are generally produces the photosynthetic oxygen and they are the algae are also present in the found in the aquatic habitat, however some of them also present in the moist habitat. Algae lacks the well-defined kinds of the thallus body and it is not differentiated in to the any kinds of the division in to the leaves, stem and the roots. Algae are defined as the microalgae, macro algae based on the thallus origination. Algae reproduces by the Varity of the methods these are asexual as well as the sexual methods of the reproduction. Asexual spores are the zoospores, aplanospores and the autospores. Sexual reproduction occurs by the formation of the zygote. Based on the types of the gametes the reproduction are the isogamous, oogamous and the anisogamous types (**Figure 1**).



Figure 1. Chrysophyceae colonies (sources brtinnica.com).

Here in this review articles we are working on the some of the aspects of the class chrysophyceae, this is the important class of the heterokontophyta by the Hoek, Manns, Jahns 1995.

The flagellate cells of the heterokonyophyta are of the two types, the one flaggers of the heterokontophyta are the long and the pleunematic kinds and they have the stiff hairs called as the mastigonemes, and another one is the smaller flagella. The chloroplast is enclosed by the double membranes and the membrane has been termed as the chloroplast ER. The chlorophyll a and the, c c-1 is present but the chlorophyll b is absent. The principles accessory pigments are fucoxanthin. The main food material is β 1-3 linked glucan (**Figure 2**).

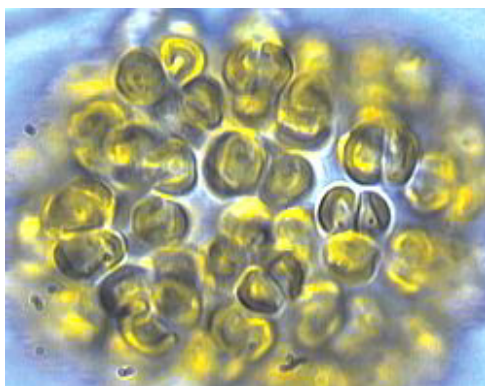


Figure 2. Ochromonas species (sources: microbewiki).

Hoek, Jhan, Mannes 1995, involves the about nine algal classes in the Heterokontophyta. These are enlisted as the.

- A) Chrysophyceae
- B) Parmophyceae
- C) Sarcinochrysidiophyceae
- D) Xanthophyceae
- E) Eustigmatohyaceae
- F) Bacillriophyceae
- G) Raphidophyceae
- H) Dictyophyceae
- I) Phaeophyceae

This class is best known for its planktonic representatives in the aquatic ecosystem. The chrysophyceae owe their names based on their golden-brown colour due to the presences of the accessory pigments in the chloroplast and theses colours are masked by the green pigments. The dominant accessory pigments are the Fucoxanthin. In addition to the Fucoxanthin other kinds of the xaathophylls pigments are also present these are the zeaxanthin, antheroxanthin, vioxanthin, diatoxanthin.

It is estimated that the chrysophyceae includes the about 200 genera's and the 1000 species. The members of the class are distributed in the fresh water; however, some of the members are also have been found in the salt and the brackish water ^[1-4].

Freshwater Chrysophyceae are founds in the oligotrophic lakes, the members of the Chrysophyceae also play a very significant role in the primary production of the aquatic ecosystem ^[1-4].

Various Level of the Structural Organization of the Chrysophyceae

In this class following level of the organization can be found.

A) Unicellular flagellates (Moanoid level of organization)

Ochromonas is the representative members of the group. Some of them lie in the coup and urn shaped shells or theca, called as the loricae. Pseudokephyrion, Dinobryon ^[1,3].

B) Colonial flagellate level of organization

In this level of organization several flagellate cells are interlinked with each other and form the colony. Each cell possesses the two chloroplasts, and bear tow unequal flagella eg Synura ^[3,4].

C) Amoeboid level of organization

Here in this level of organization the cells are naked, and they bear the pseudopodia when they are thick, the pseudopodia take the food inside ^[1-2].

D) Palmelloid level of organization

In Palmelloid forms, the cells are embedded in the mass of mucilage. In this mucilage they form the colonies and the green algae are the Tetraspora. Hydrurus ^[1-4].

E) Coccoid level of organization

Theses algae are the Nonmotile and the non-flagellate cells, each of which is surrounded by the cell wall. Sometimes the cells are united to forms the colonies, examples Chryso-sphaera ^[1-4].

F) Filamentous level of organization

At this level the cells are arranged in the filamentous body whether they are branched or unbranched Phaeothamnion.

G) Thallus level of organization

Here the cells are organised in to the Parenchymatous tissues. The mass of the thallus may be one or two layers thick and form the margin outer fibres are arises. Examples are the Thallochrysis.

Siphonous level of organization are absent in the chryso-phyaceae ^[1-3].

Different level of classification of the Chryso-phyaceae has been proposed by the differ algologist from time to time, here we are presenting one of the accepted and the advanced kind of the classification of the Chryso-phyaceae.

Some of the orders of the Chryso-phyaceae are as follows:

- 1) Ochromonadales
- 2) Mallomonadales
- 3) Pedinellales
- 4) Chyroamoeboidales
- 5) Chrysocapsales
- 6) Phaeothmniales.

Some of the features of the genus Ochromonas are presented here as the basic example of the class ^[1-3]

Theses members lie in the freshwater and they are generally of the unicellular in nature. They are generally found in the ponds, ditches and the rain water harvesting reservoirs. About 50 species are found of the Ochromonas.

Ecosystem of the algae: Chryso-phyaceae also favours the slightly acidic, soft water of moderate to the low productivity, preferences of the low PH water, has been related to their production, chryso-phyacase diversity is the key factor in the tropic levels of the ecosystem of the algae. They are the key factors of the ecosystem since some of them works as the oligotrophic level as well as the phototrophic levels ^[5].

Cell Exterior

The cells are naked, and they have not cell wall. These organisms have the capacity of the amoeboid movements ^[1,2].

Nucleomorph like structure are also lacking in the chryso-phyaceae, since these structures have been reported in the cryptomonads and the lower very primitive algae ^[5].

Flagella

They arise from the anterior of the cells. They are generally of the unequal in sizes. The structure and the dimension of the flagella is of the very typical and they are according to the typical eukaryotic organization ^[2-4].

There may be one or two contractile vacuoles per cells.

The cells contain one or two palte like chloroplast, the thylakoids are in the group of the three and they are very unusual from the green chloroplast of the higher plants ^[2-4].

Eyespot and Flagella Swelling

The eyespot can be seen in many algae group and they are the part of the flagella.

Endogenous Cysts

Ochromonas produces the endogenous cysts, these cysts generally form in the vegetative cells. The cysts are formed in the silica deposition vesicles [3,4].

Sexual reproductions are unknown in the Ochromonas but in some of the members of the Chrysophyceae like the Dinobryon the isogamous kinds of the reproduction have been reported [3,4].

Stamatocysts

The term stamatocysts is used for the stoma like resting bodies of the class, they have been termed as the stamatocysts. Sometimes they have been also regarded as the siliceous cyasts, or statospores. The wall of the cysts is so highly siliceous thick that the silica deposits of the walls dissolves in the fresh water habitat of the algae. The fossil remains of the statospores have been reported from the creataceous periods time, it shows that the algae was present in that time of the evolution. Most statocyst are spherical and they are of the sizes of the micron, they have the single pore. statocysts can result from the asexual as well as the sexual reproduction [5].

CONCLUSION

well this is the short review articles of the Chrysophyceae class, these are the groups which forms the significant part of the aquatic ecosystem or the biota. They form the major part of the aquatic food chains and the primary productivity. These are the basic planktonic, the colour of the class is the yellow green, due to the major presences of the pigments which cover the absolute green colour of the chlorophylls A, well these creatures are the mains in the aquatic ecosystem. Due to the change of the ecosystem these organisms are degrading, and they are the living fossils of the fascinating evolution of the algae in the remote past, so careful analysis of this class is essential for the study of the plants.

REFERENCES

1. Hoek C, et al. Algae an Introduction to Phycology. Cambridge University Press: Cambridge. 1995.
2. Preisig, HR. A modern concept of chrysophyte classification. J Chrysophyte algae: ecology, phylogeny and development. 1995; 46-74.
3. Round FE. The Chrysophyta - a reassessment. In: Chrysophytes: Aspects and Problems. Cambridge University Press: Cambridge. 1986;12.
4. Sandgren CD, Smol JP, J Kristiansen. Chrysophyte algae: ecology, phylogeny and development. Cambridge University Press: New York. 1995.
5. linda E, Graham J, Graham M. Lee Warren Wilcox Benjamin Cummings. 2009; 616.