Course- B.Sc. Botany

Semester- I

Paper code- BOT CC101

Paper name- Microbiology and Phycology

Topic- Range of Thallus in Algae

Faculty name- Dr Pinky Prasad

Email- dr.pinky.prasad@gmail.com

RANGE OF THALLUS IN ALGAE

INTRODUCTION

The plant body of algae is thalloid i. e. it lacks true root, stem and leaves. The size of the thallus ranges from unicellular microscopic forms like *Chlamydomonas* attaining a maximum size of 0.5 µ in diameter to large multicellular macroscopic forms like *Macrocystis* attaining a size of 30 m or even more and show a great diversity in appearance.

TYPES

The organization of thallus in algae is basically of two types- unicellular and multicellular.

The thallus of algae can be broadly categorized into five groups-

(I) Unicellular

(II) Colonial

(III) Filamentous

(IV) Siphonaceous

(V) Paranchymatous

TYPES

These groups are further divided into sub-groups as follows-

(I) Unicellular- 4 types

(i) Rhizopodial unicells

(ii) Flagellated unicells

(iii) Non-motile unicells

(iv) Spiral filamentous unicells

TYPES

(II) Colonial- 4 types

(i) Coenobium- 2 types
  (a) Motile
  (b) Non-motile
(ii) Palmelloid
(iii) Dendroid
(iv) Rhizopodial colony

TYPES

(III) Filamentous- 2 types

(i) Unbranched- 3 types
- (a) Free floating
- (b) Attached to some substratum
- (c) Colonial

(ii) Branched- 2 types
- (a) False branching
- (b) True branching- 3 types
  - → Simple
  - → Heterotrichous
  - → Psedoparanchymatous- 2 types
    - ► Uniaxial
    - ► Multiaxial

TYPES

(IV) Siphonaceous- No sub-groups

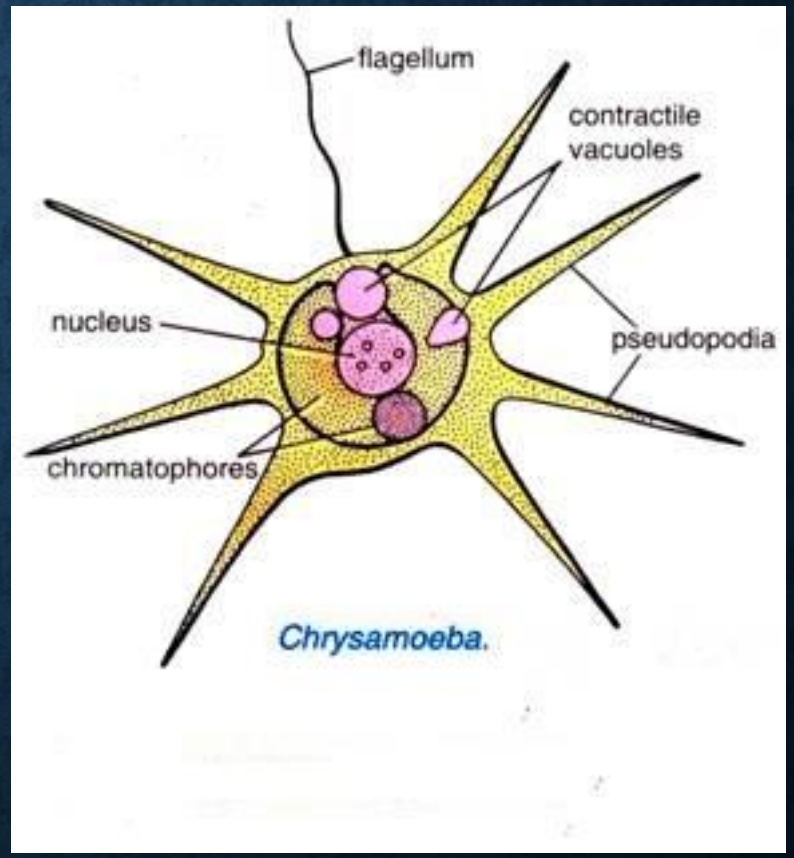
(V) Paranchymatous- No sub-groups

UNICELLULAR FORMS OF ALGAE

All groups of algae except the phaeophyceae (brown algae) include unicellular forms. Unicellular forms can be of the following types-

(i)<u>Rhizopodial unicells-</u> They lack rigid cell wall, possess cytoplasmic projections, peudopodia which help them in amoeboid movement.

eg. *Chrysamoeba*



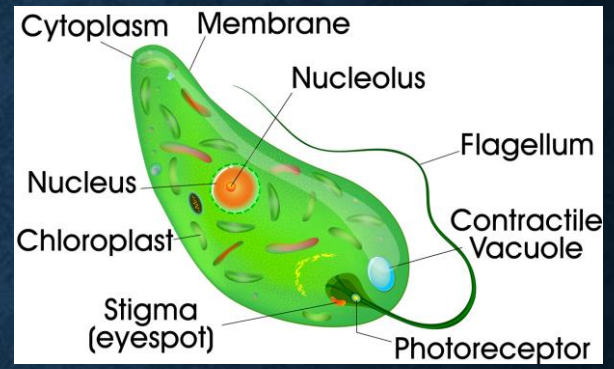
UNICELLULAR FORMS OF ALGAE

(ii) **Flagellated unicells-** They possess flagella for motility.

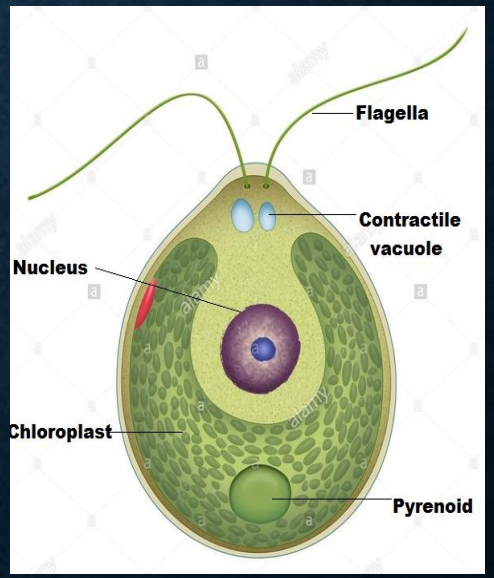
Flagellated cells may be:

(a) periplastic i.e. without cell wall.
eg. *Euglena*

(b) With cell wall
eg. *Chlamydomonas*



Euglena

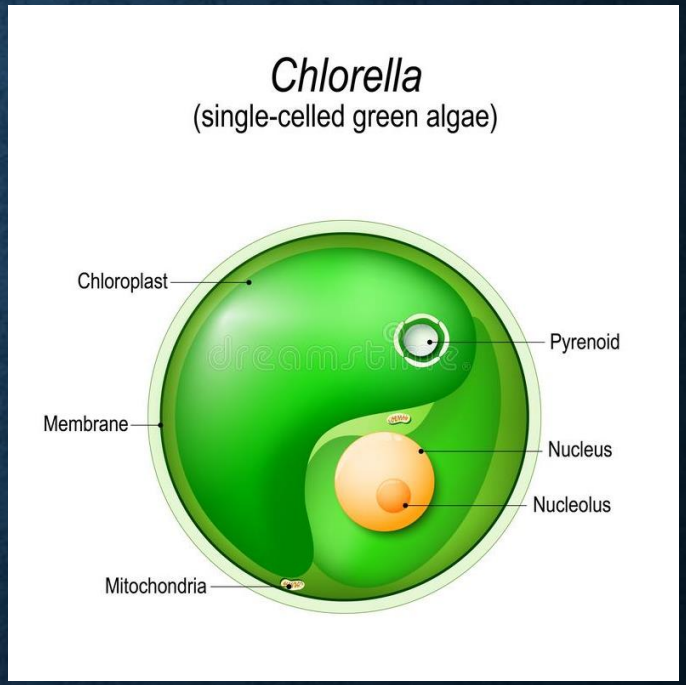


Chlamydomonas

UNICELLULAR FORMS OF ALGAE

(iii) Non-motile unicells- They are non-motile as they neither possess flagella nor pseudopodia for locomotion.

eg. *Chlorella*



UNICELLULAR FORMS OF ALGAE

(iv) Spiral filamentous unicells-

Some unicellular filamentous algae are spirally coiled.

eg. *Spirulina*

Spirulina

COLONIAL FORMS OF ALGAE

Colonial forms of algae is achieved by aggregation of products of cell division within a mucilagenous mass. These associations are usually loose and the colony may break into smaller pieces. In some colonial forms, all the members of the colony are connected with each other by cytoplasmic connections, hence do not break. For example- *Volvox*

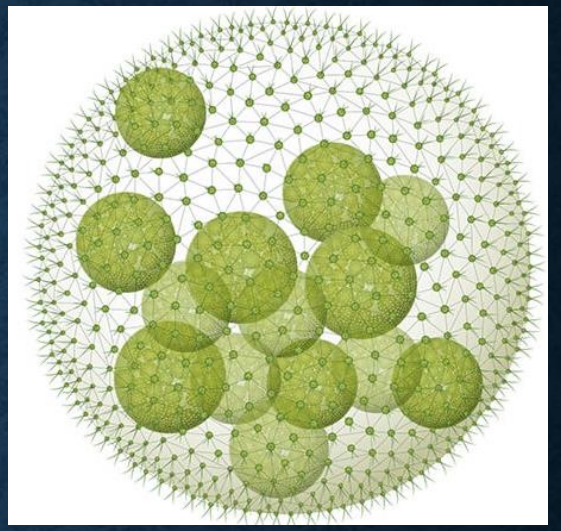
Colonial forms are of 4 types, namely, (i) Coenobium, (ii) Palmelloid, (iii) Dendroid and (iv) Rhizopodial colony.

COLONIAL FORMS OF ALGAE

(i) <u>Coenobium-</u> In this type, definite number of cells in a colony are arranged in a definite manner from early to late stage of development. Here the cells only enlarge, there is no change in number of cells. Coenobium may be-

(a) motile- eg. *Volvox* or

(b) non-motile eg. *Hydrodictyon*



Volvox

COLONIAL FORMS OF ALGAE

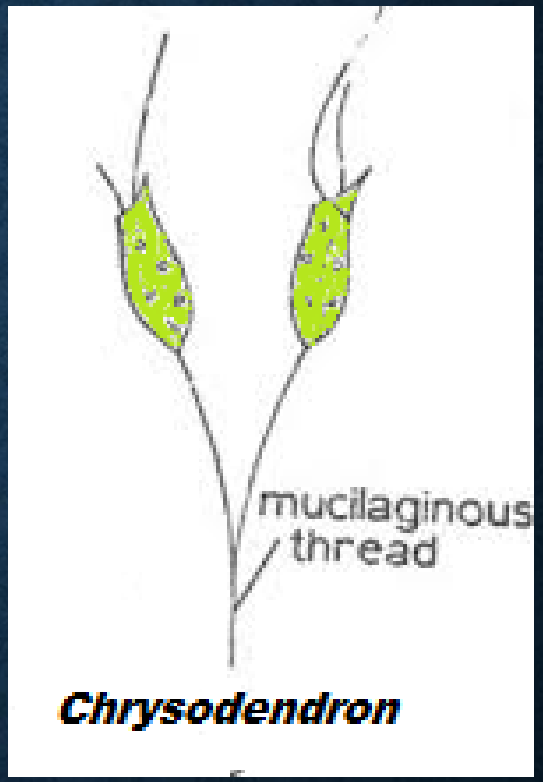
(ii) **Palmelloid-** In this type, the number of cells, their shape and size are not definite. The cells remain irregularly arranged within a common mucilagenous matrix and function independently.

eg. *Palmella*, *Tetraspora* etc.

COLONIAL FORMS OF ALGAE

(iii) <u>Dendroid-</u> In this type also, the number, shape and size of cells are not definite. The cells are united in branching manner by localized production of mucilage at the base of each cell. Whole colony looks like a microscopic tree.

eg. ***Chrysodendron***

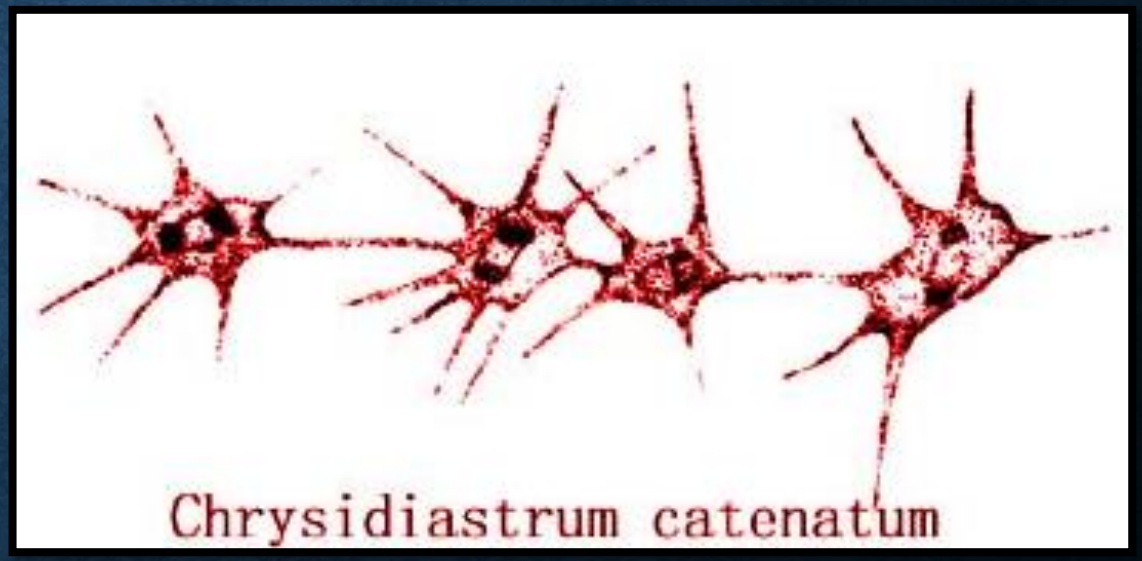


Chrysodendron

COLONIAL FORMS OF ALGAE

(iv) **Rhizopodial colony-** In this the rhizopodial cells of the colony are united through the rhizopodia.

eg. ***Chrysidiastrum***

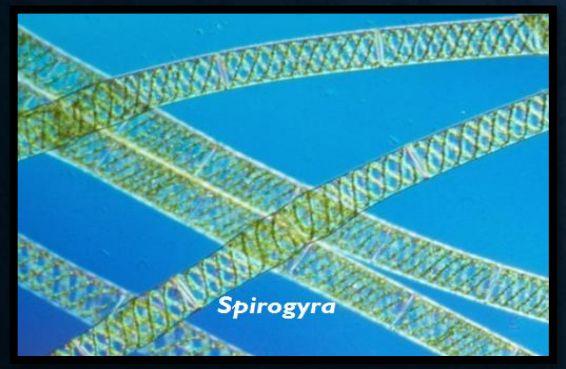


FILAMENTOUS FORMS OF ALGAE

This type is formed by repeated transverse division of cells and the daughter cells remain attached one upon the other in a definite sequence to form the following types of branches-

(i) <u>Unbranched-</u> In this type, the repeated transverse division of cells is in one plane only. It is of the following 3 types-

(a) Free floating
eg. *Spirogyra*

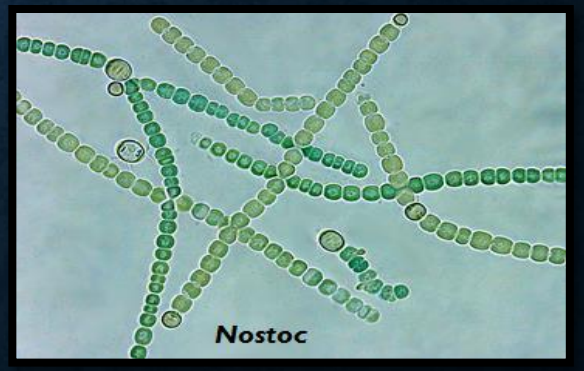


Spirogyra

(b) Attached to some substratum
eg. *Oedogonium*

Oedogonium

(c) Colonial
eg. *Nostoc*

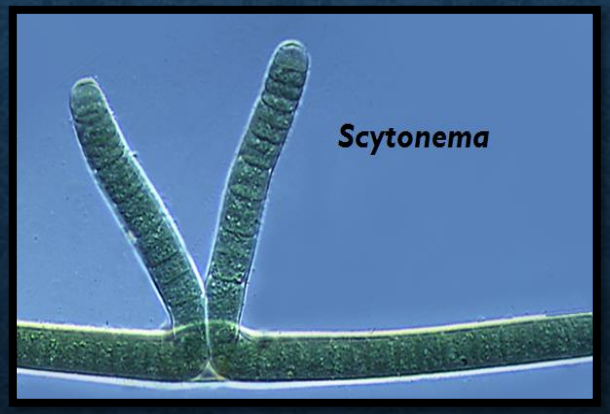


Nostoc

FILAMENTOUS FORMS OF ALGAE

(ii) Branched- This type formed by repeated transverse division of lateral outgrowth of the cells. It is of the following 2 types-

(a) False branching- In this type, the branch does not arise as lateral outgrowth, but the trichome may break due to death or decay of the intercalary cells at the point of heterocyst. The broken end emerges out of the mucilgenous sheath in the form of a branch. It is a common feature seen in *Scytonema*.



Scytonema

FILAMENTOUS FORMS OF ALGAE

(b) True branching- In this type, true branches arise as lateral outgrowth. It is of 3 types-

→Simple branched filaments- In this type, the plant remains attached to the substratum by a basal cell and branches may arise from any cell except the basal cell.

eg. *Cladophora*

Cladophora

FILAMENTOUS FORMS OF ALGAE

➔**Heterotrichous-** in this type, there is an erect and prostrate system of branched filaments.

In some heterotrichous forms, the erect system is well developed. eg *Ectocarpus*

Ectocarpus

In some heterotrichous forms, the prostrate system is well developed. eg *Coleochaete*

Coleochaete

FILAMENTOUS FORMS OF ALGAE

➔**Pseudoparanchymatous-** in this type, one or more central or axial filaments together with their branches form a peudoparanchymatous structure. It is of 2 types-

►**Uniaxial-** In this type, pseudoparanchymatous thallus is formed from a single axial filament and its branches.

eg ***Batrachospermum***

Batrachospermum

►**Multiaxial-** In this type, pseudoparanchymatous thallus is formed from more than one axial filament and its branches.

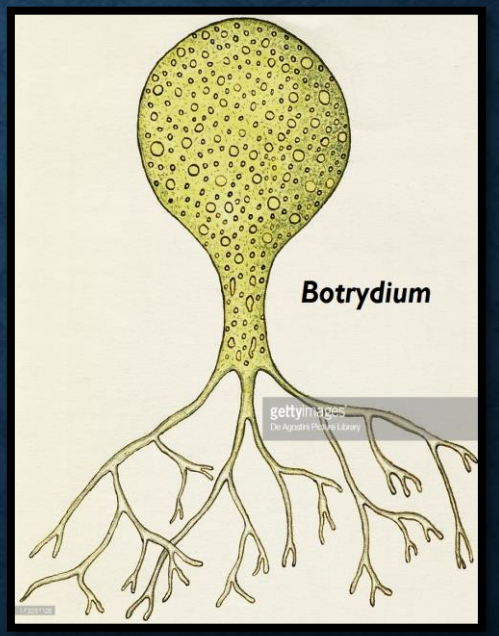
eg ***Polysiphonia***

Polysiphonia

SIPHONACEOUS FORM OF ALGAE

(IV) Siphonaceous- In this type, the thallus is multinucleate without septation (coenocytic) except during formation of reproductive organs. eg *Vaucheria*, *Botrydium* etc.

Vaucheria



Botrydium

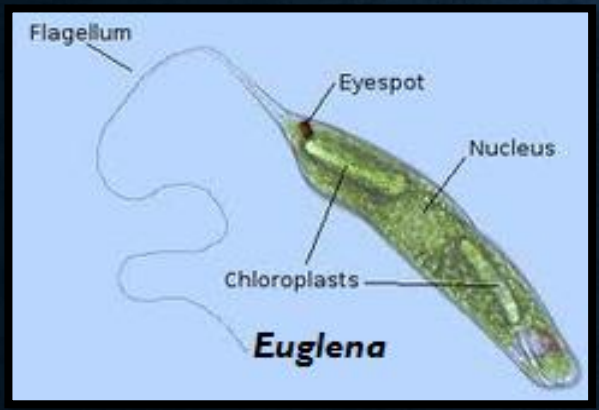
PARANCHYMATOUS FORM OF ALGAE

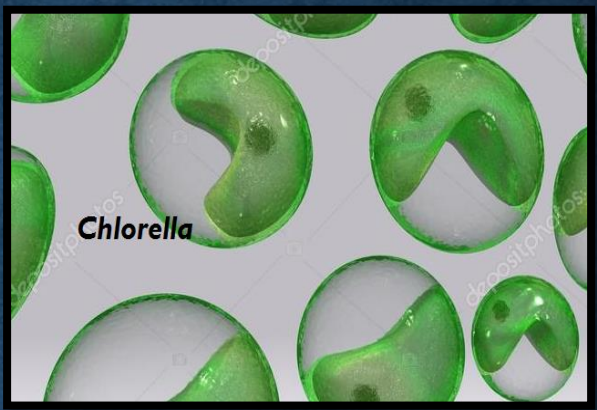
(V) Paranchymatous- In this type, the vegetative division of the cells takes place in two or more planes and the products of division do not separate resulting in the formation of paranchymatous thallus of various shapes. eg *Ulva*, *Sargassum* etc.

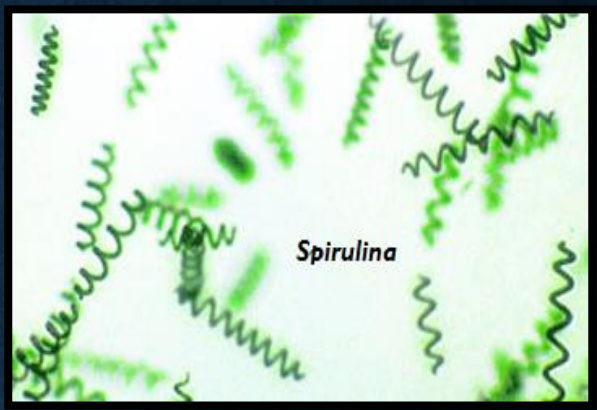
Ulva

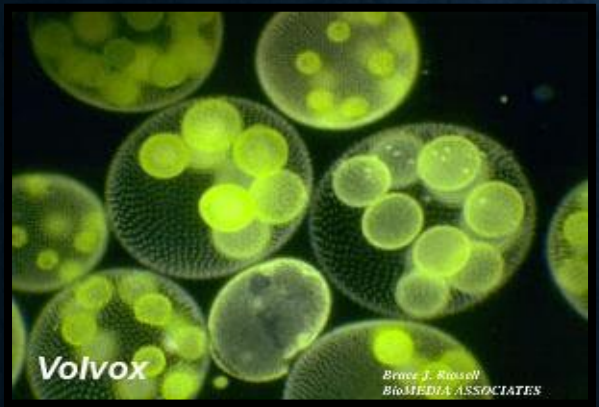
Sargassum

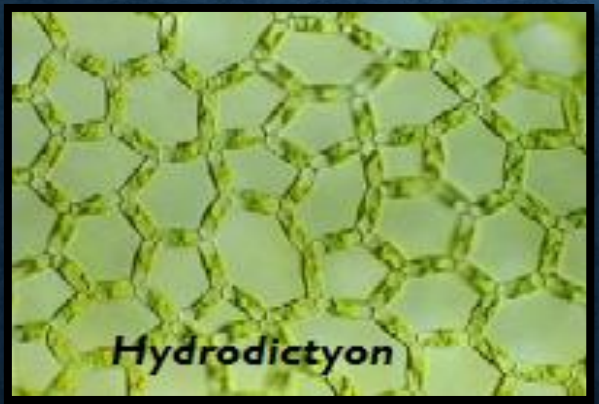
IMAGES OF ALGAE

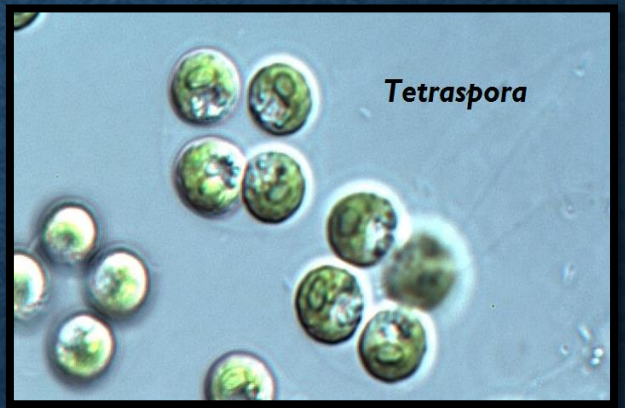


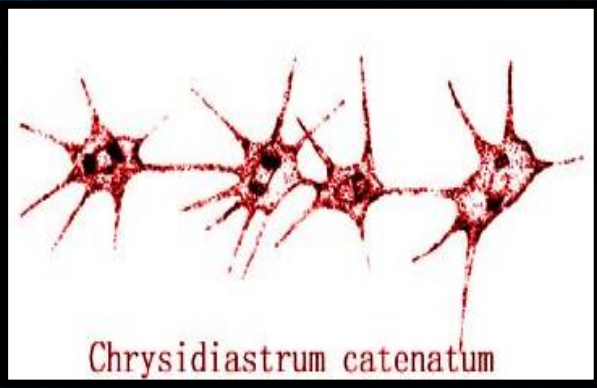


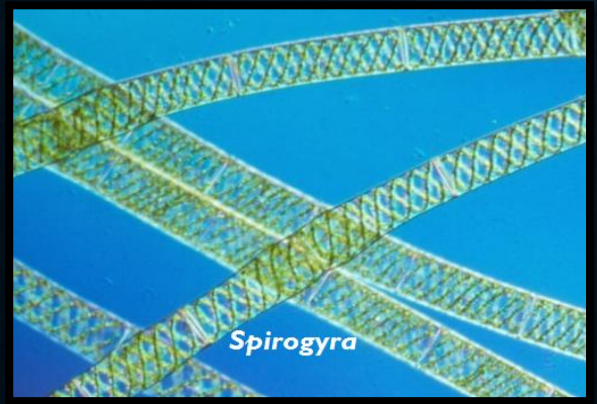


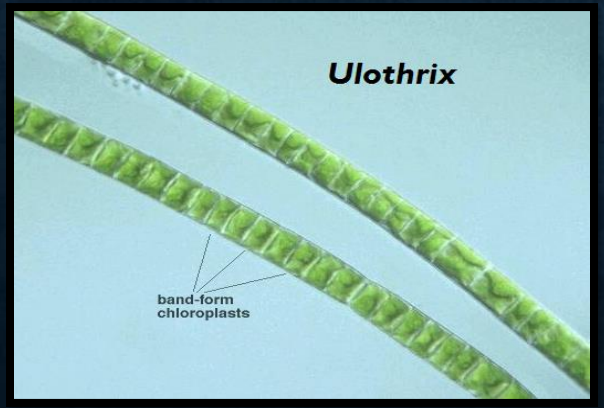


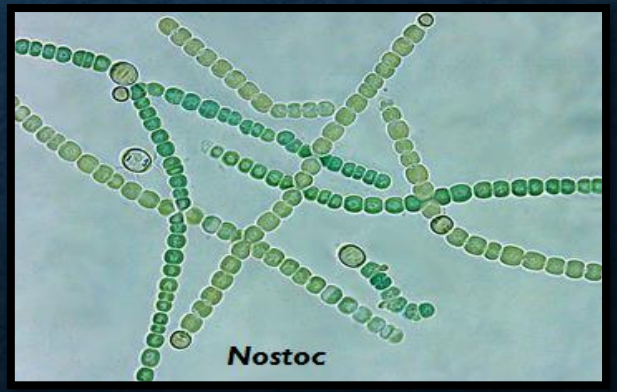


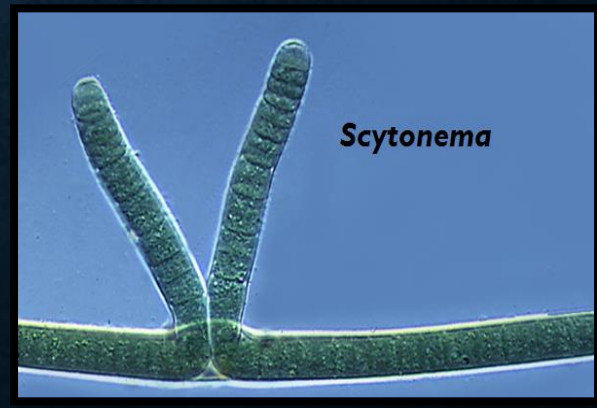




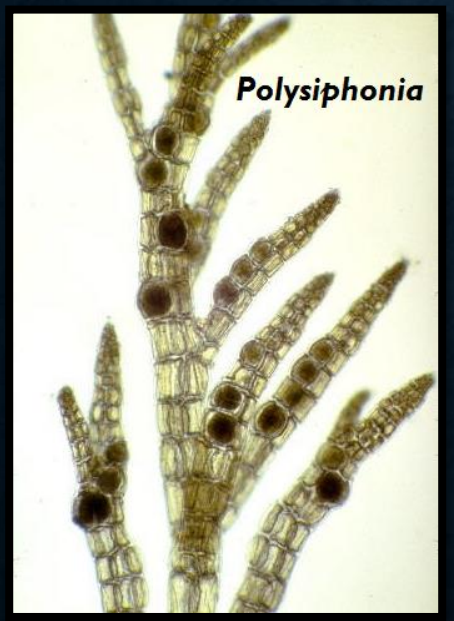


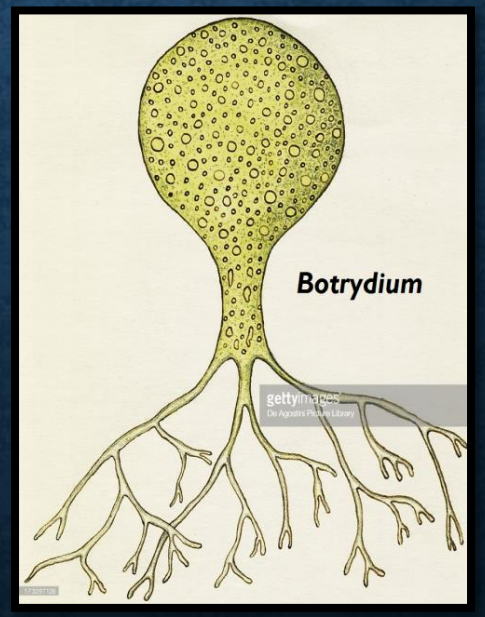






IMAGES OF ALGAE





THANK YOU