



PHYCOLOGY

CLASSIFICATION OF ALGAE 2

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Fritsch's Classification of Algae:

- F.E. Fritsch (1935, 1945) in his book “**The Structure and Reproduction of the Algae**” proposed a system of classification of algae.
- He treated algae giving rank of division and divided it into 11 classes.
- His classification of algae is mainly based upon characters of pigments, flagella and reserve food material.

- **Eleven classes proposed by Fritsch are as follows:**

- 1. Chlorophyceae

- 2. Xanthophyceae

- 3. Chrysophyceae

- 4. Bacillariophyceae

- 5. Cryptophyceae

- 6. Dinophyceae

- 7. Chloromonadineae

- 8. Euglenineae

- 9. Phaeophyceae

- 10. Rhodophyceae

- 11. Myxophyceae.

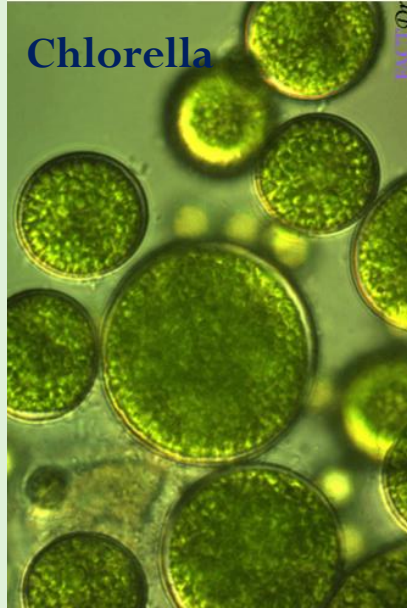
Class 1. Chlorophyceae (Green Algae):

- Unicellular, colonial or multicellular green plants, generally with simple structure, principal pigments are chlorophyll a and b, carotenes and xanthophyll's as in higher plants, contained in plastids.
- Food storage products are mostly starch and sometimes frequently aggregates around the pyrenoids. Reproduction is by asexual and sexual means.
- Zoospores biflagellate or quadriflagellate flagella anterior isokontae, whiplash type, cell wall of cellulose and pectin, fresh water or marine.

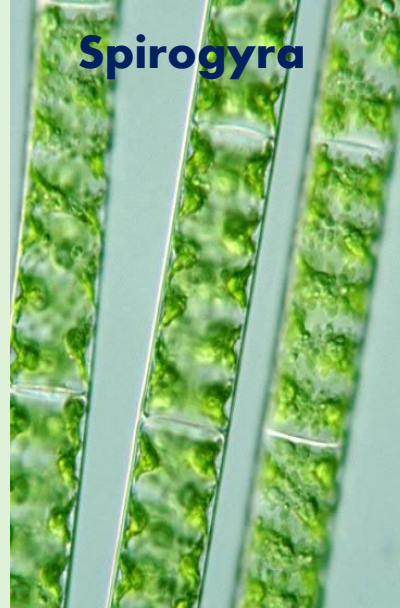
Chlamydomonas



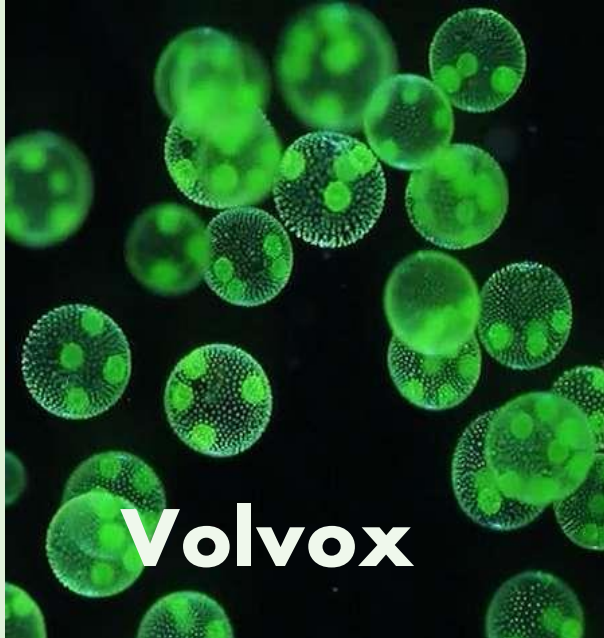
Chlorella



Spirogyra



caulerpa



Volvox



Ulva

Oedogonium



Class 2. Xanthophyceae (Yellow Green Algae):

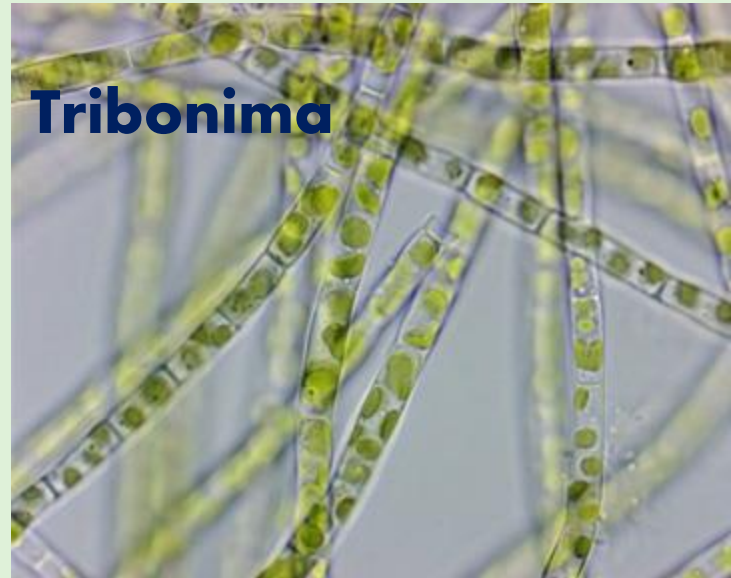
Mostly unicellular, most advanced forms have a simple filamentous habit, principal pigments are chlorophyll a and e, β -carotene and xanthophyll's

Reserve food mostly fat, sexual reproduction rare and isogamous

Cell wall frequently consists of two overlapping halves, constituents are pectin and silica, sometimes cellulose, the motile cells with two unequal flagella at the anterior, one tinsel and the other whiplash type, most abundant in fresh water, a few are marine.



Halosphaera



Tribonima



Botrydium



Chlorobotrys

Class 3. Chrysophyceae

{Golden Algae}:

Mostly unicellular, colonial and filamentous forms

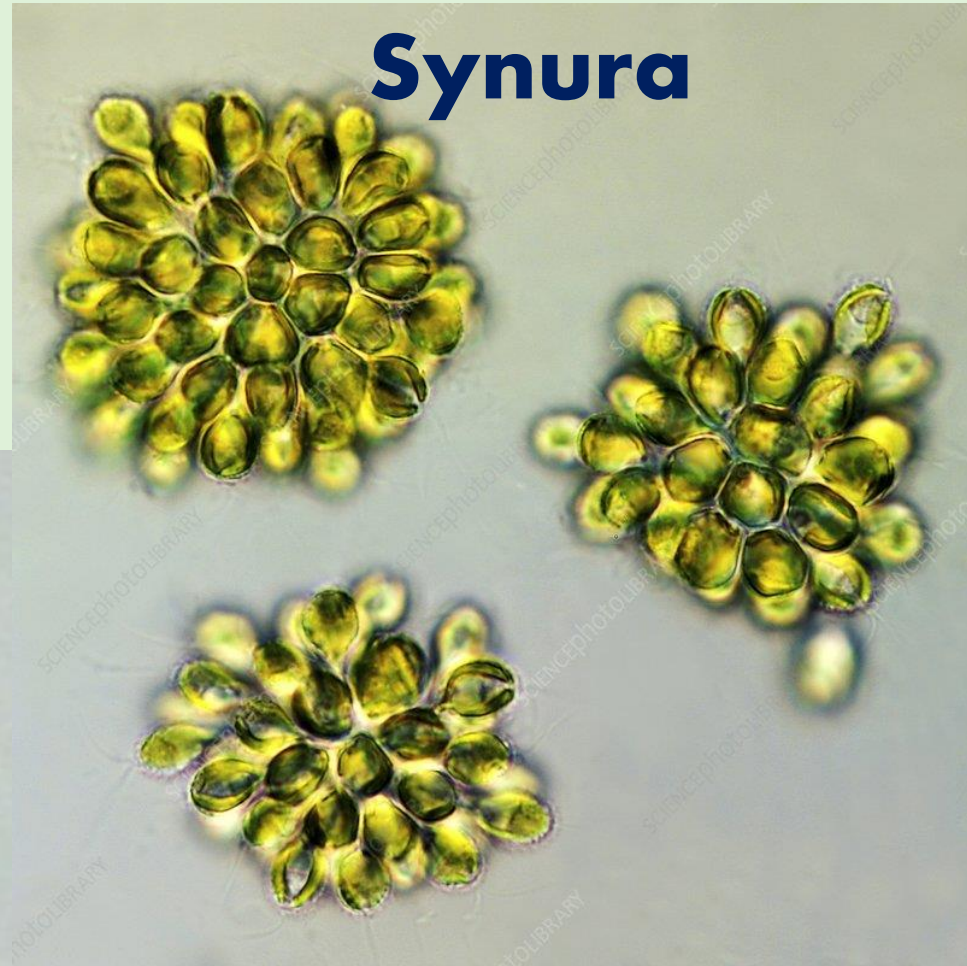
Principal pigments are chlorophyll a, P-carotene and xanthophyll's,

storage product fat

sexual reproduction rare, specialized resting cells known as cysts produced endogenously

flagellated forms have either one flagellum tinsel type or when two one tinsel and one whiplash type, cell wall consists of pectin and silica, fresh water and marine.

Synura



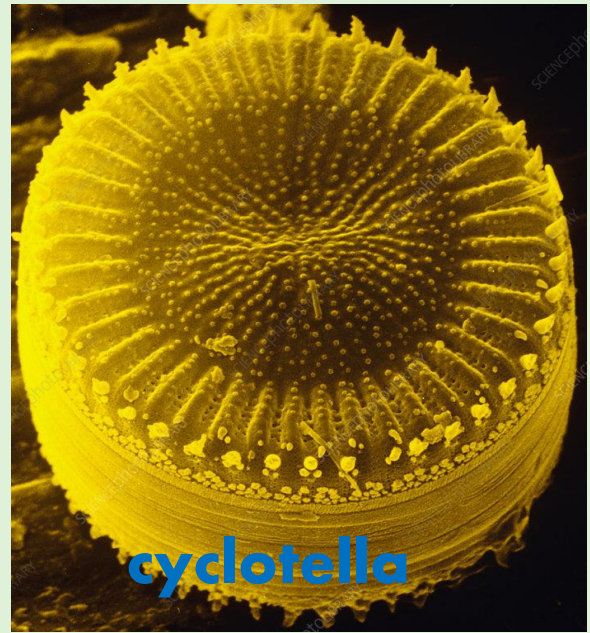
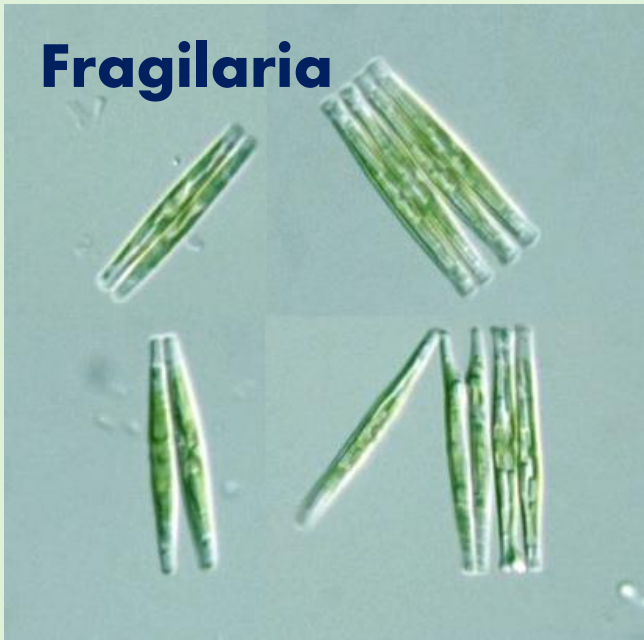
Chromulina



Class 4. Bacillariophyceae (Diatoms):

- All unicellular or colonial,
- principal pigments are chlorophyll a and c,
- β -carotene and xanthophyll's
- storage product in the form of fat or volutins
- sexual reproduction is of widespread occurrence by auxospore formation
- cell wall of pectin and silica, silicified cell wall
- precise nature of motile bodies not known

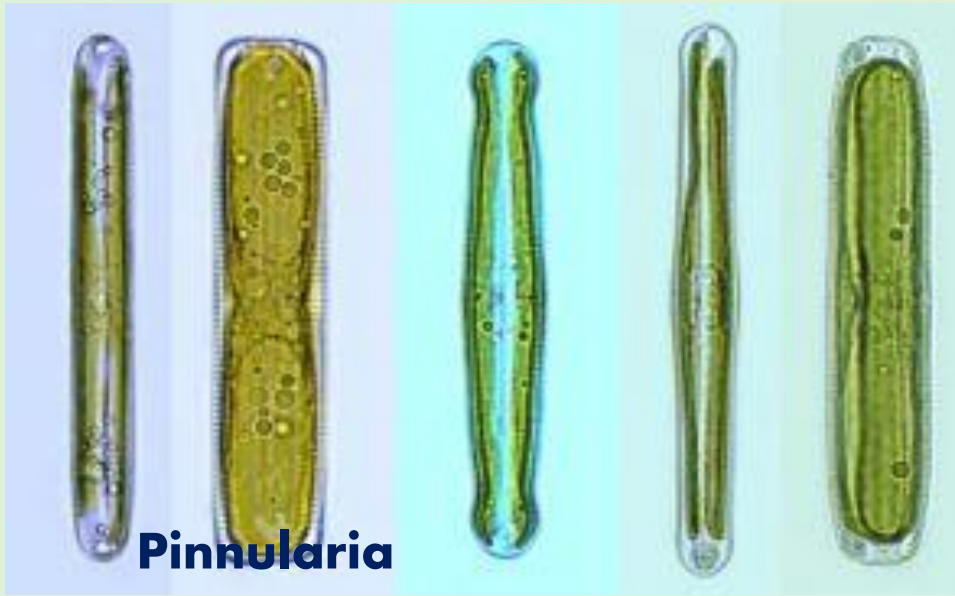
Fragilaria



Cyclotella



Navicula



Pinnularia

Class 5. Cryptophyceae:

- Unicellular flagellated forms,
- Principal pigment nature not definitely known, except the phycobilins,
- Reserve food a form of starch
- Cell wall of cellulose
- Two unequal flagella
- Sexual reproduction rare and isogamous



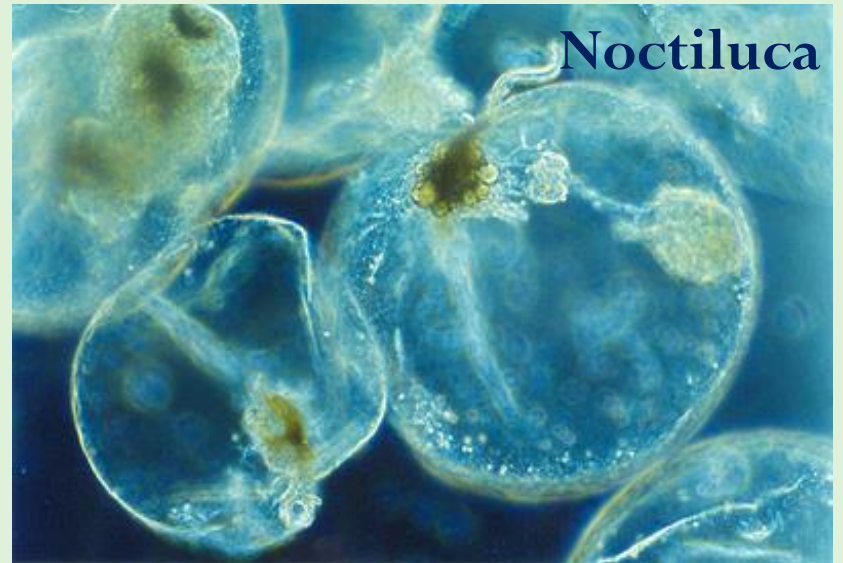
- 1: *Cryptomonas* . 2: *Chroomonas* 3: *Rhodomonas*

Class 6. Dinophyceae:

- Many of them are with motile unicelled structure
- Principal pigments are chlorophyll a and c, β -carotene and xanthophyll's
- Reserve food starch or fat
- Sexual reproduction rare and isogamous.



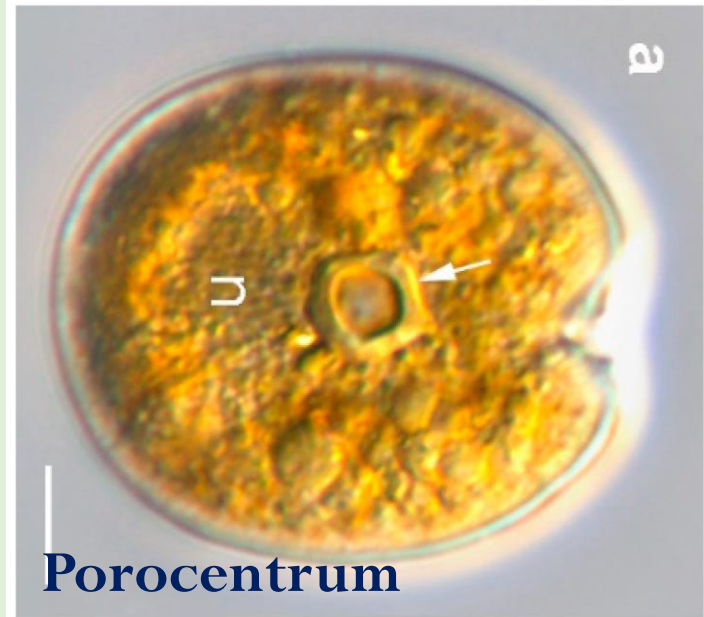
Dinophysis



Noctiluca



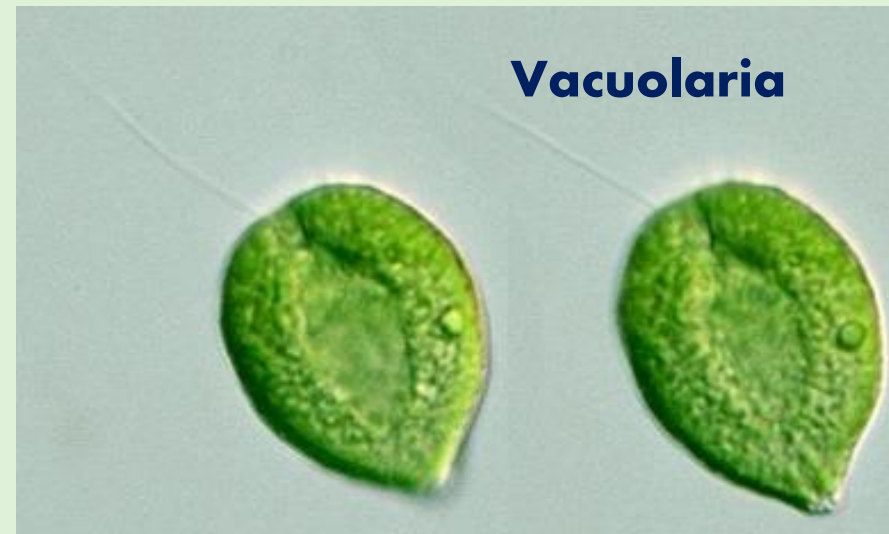
Tetradinium



Porocentrum

Class 7. Chloromonadineae:

- Unicellular
- Chromatophore bright green with excess of xanthophyll's,
- Reserve food is fat,
- Motile cells are biflagellate
- Only fresh water.

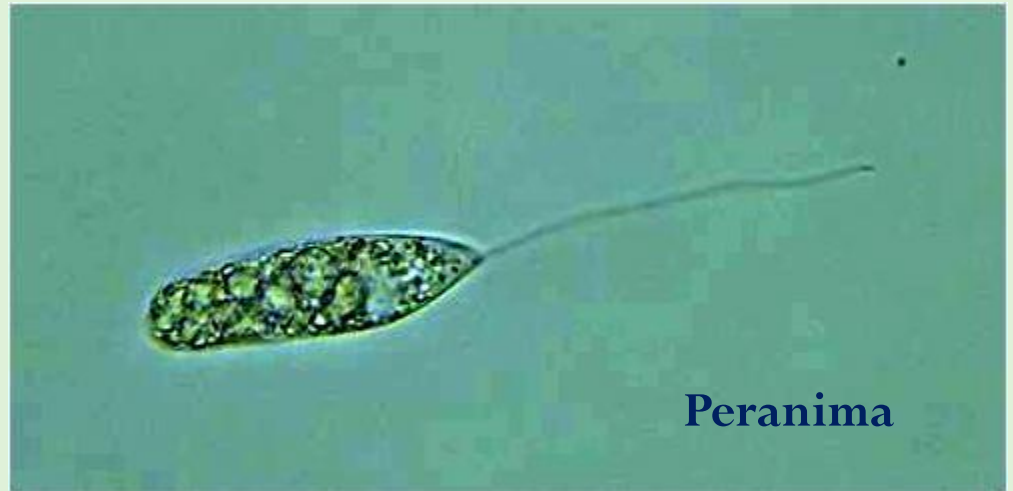


Class 8. Euglenineae:

- Simple unicellular or colonial motile organisms
- Pigments chlorophyll a and b, (β -carotenes, xanthophyll
- Reserve food a polysaccharide paramylon, related to starch, and fats
- Sexual reproduction not proved definitely
- No cell wall, motility by flagella, usually one or sometimes more, tinsel type.



Euglena



Peranema

Class 9. Phaeophyceae

(Brown Algae):

- Structurally the most complex algae, simple filaments to massive plant bodies.
- Pigments include chlorophyll a and c, β -carotene and xanthophyll's
- Stored food in the form of laminarin (polysaccharide) and mannitol form of alcohol
- Cell wall constitution algin, fucoidin and cellulose
- Sexual reproduction ranges from isogamy to oogamy,
- Two unequal flagella attached laterally, one tinsel and the other whiplash type
- Most of the species are marine.



Laminaria



Laminaria



sargassum

Class 10. Rhodophyceae

(Red Algae):

- Most forms multicellular (complex)
- Pigment contents are chlorophyll a and d, α - and β -carotene and xanthophyll's, phycobilins-r-phycoerythrin and r-phycoerythrin
- Reserve food in the form of floridean starch
- Cell wall constitution polygalactose sulphate esters and cellulose, motile cells at any stage of the life history are unknown
- Sexual reproduction advanced oogamous type, mostly marine, a few are fresh water.

Porphyra



Thorea



Gelidium



Corallina



RHODOPHYCEAE

Ceramium



Gracilaria



Champia



Class 11. Cyanophyceae/Myxophyceae (Blue-Green Algae):

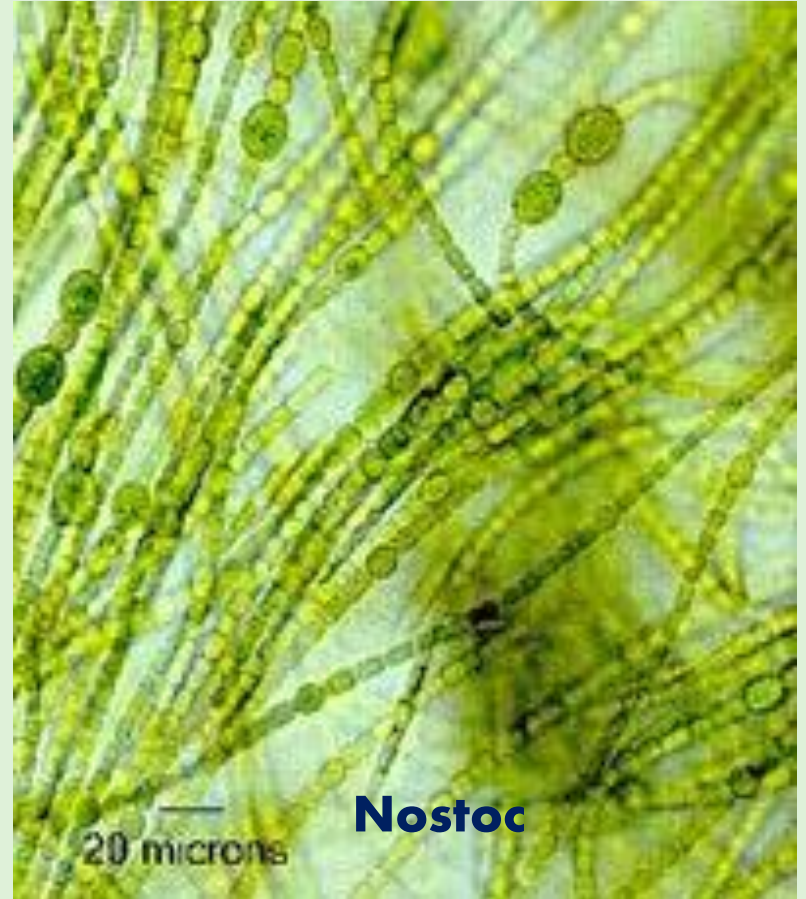
- Simple unicellular, colonial or multicellular bodies
- Lacking nuclear, mitochondrial and chloroplast double membranes
- Cell wall composed of pectin or cellulose
- Most forms are embedded in mucilaginous or gelatinous sheaths
- Pigments not in organized bodies as in other cases
- Principal pigments are chlorophyll-a, β -carotene, xanthophyll's and phycobilins, c-phycoerythrin and c-phyococyanin

- Reserve food in the form of cyanophycean or myxophycean starch
- No motile cell has been observed at any stage
- Reproduction of the bacterial type
- ‘False’ branching and special types of cells called ‘heterocyst’ are characteristic features in many,
- Most diverse in distribution, from pole to pole, almost everywhere, ubiquitous.

V



Anabaena



20 microns

Nostoc

THANK YOU

This class prepared for
Third Semester BSc Botany Students
Little Flower College, Guruvayur
Affiliated to University of Calicut

Next class
Reproductions in Algae