



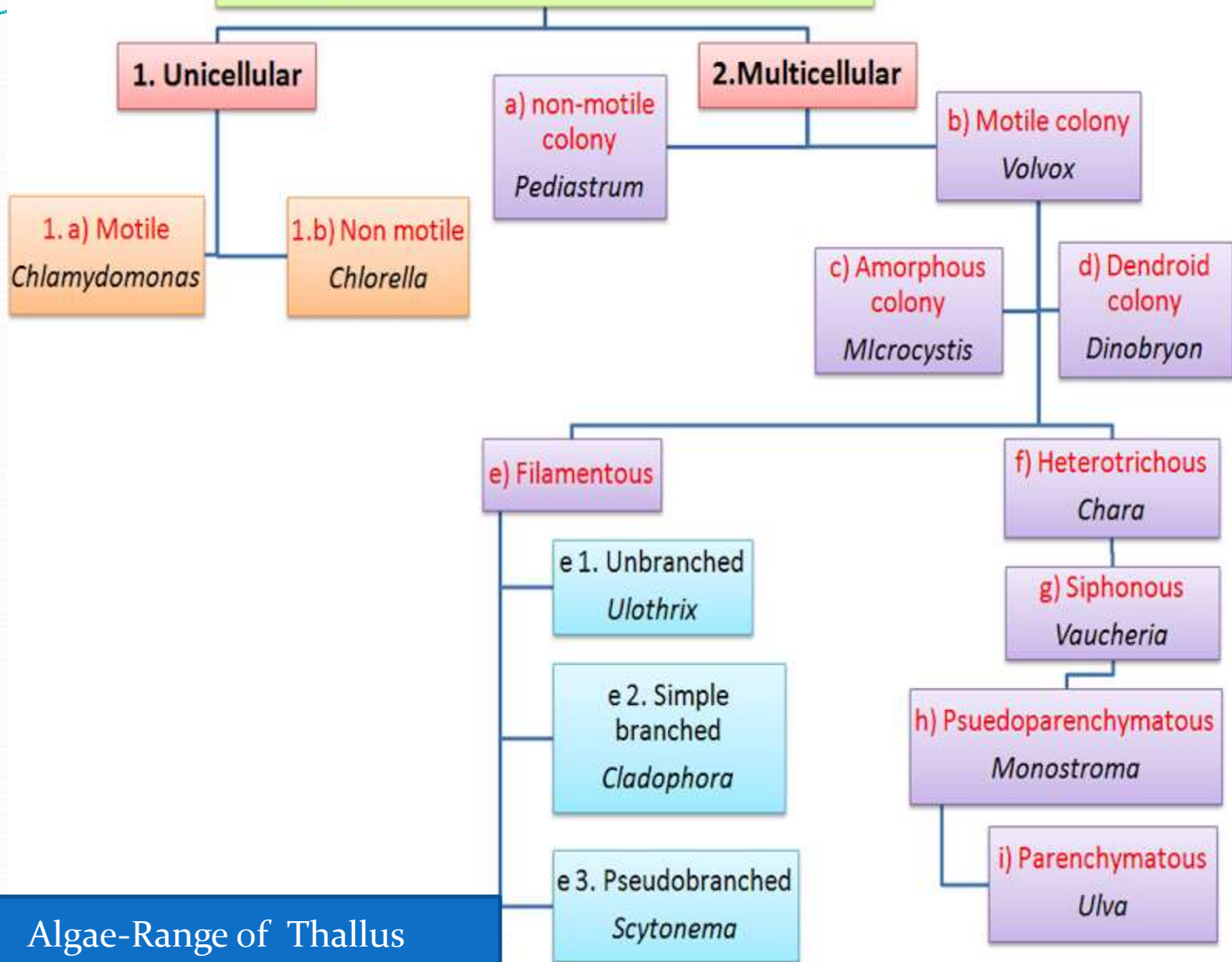
Algae

Dr. Indrani Das

General features

- Almost all are aquatic
- Chlorophyll bearing autotrophic haploid body
- Unicellular to large robust multicellular structure
- The sex organs are generally unicellular. But when multicellular, all cells are fertile and in most cases the entire structures does not have any protection jacket
- There is no embryo formation in algae. Zygote undergoes development by mitosis or meiosis
- With distinct alternation of generations
- Independent gametophyte & sporophyte generations

Range of thallus structure in Algae



Algae-Range of Thallus

Algae range in size from minute unicellular plants (less than $1\ \mu$ in diameter in some planktons) to very large highly differentiated multicellular forms e.g., some sea-weeds.

THALLUS ORGANIZATION IN ALGAE



UNICELLULAR ALGAE

1. **RHIZOPODIAL UNICELLS:** eg *Chrysamoeba*
2. **FLAGELLATED UNICELLS:** eg *Euglena, Chlamydomonas*
3. **NON MOTILE UNICELLS:** eg. *Chlorella*
4. **SPIRAL UNICELLS:** eg. *Spirulina*

UNICELLULAR FORMS OF ALGAE

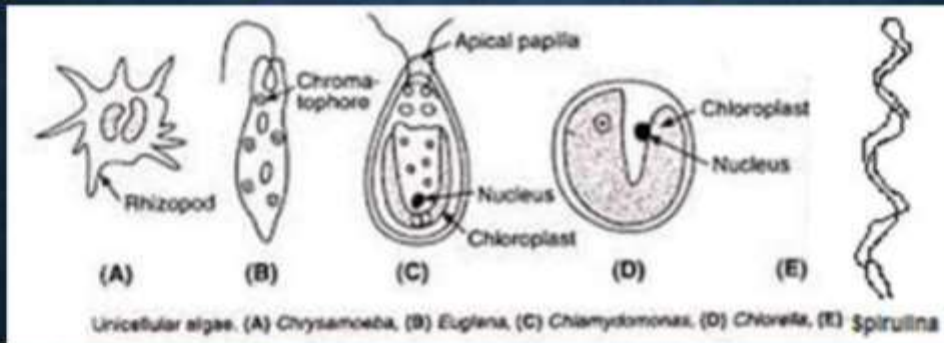
1. RHIZOPODIAL UNICELLS:

- ▶ Lack rigid cell wall
- ▶ Amoeboid movement by cytoplasmic projection
- ▶ eg. *Chrysamoeba*

MOTILE FORMS

2. FLAGELLATED UNICELLS:

- ▶ Possess flagella for locomotion
- ▶ May be periplastic i.e. without cell wall (eg. *Euglena*) or with cell wall (eg. *Chlamydomonas*)



3. NON MOTILE UNICELLS:

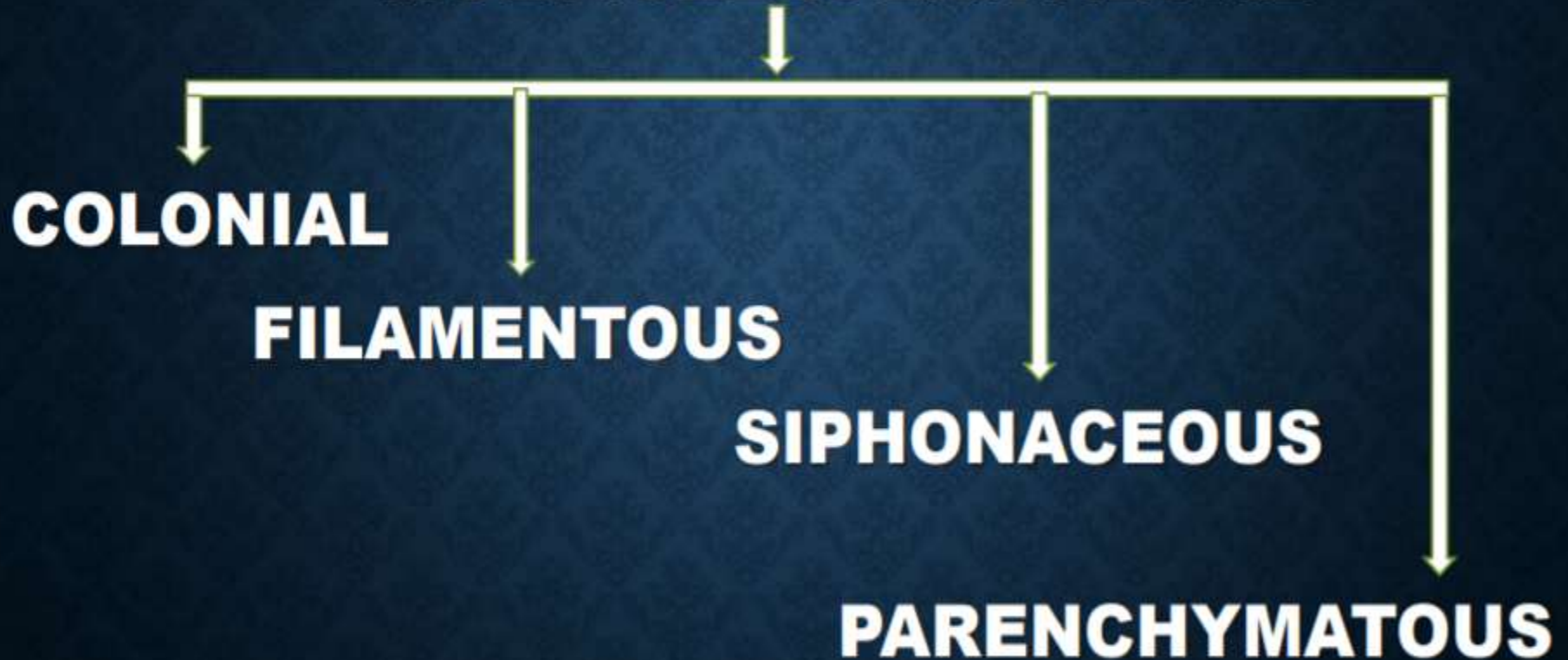
- ▶ Non motile
- ▶ Flagella absent
- ▶ eg. *Chlorella*

NON MOTILE FORMS

4. SPIRAL FILAMENTOUS UNICELLS:

- ▶ Unicellular filamentous
- ▶ eg. *Spirulina*

MULTICELLULAR ALGAE



MULTICELLULAR ALGAE

1. **COENOBBIUM:** eg *Volvox* (motile), *Hydrodictyon* (non motile)
2. **PALMELLOID:** eg *Tetraspora*
3. **DENDROID:** eg. *Chrysodendron*
4. **Rhizopodial colony:** eg. *Chrysidiastrum*

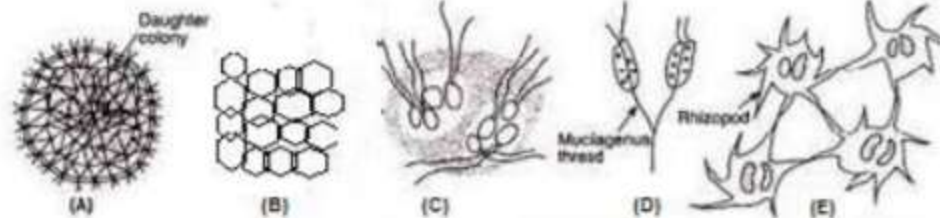
MULTICELLULAR COLONIAL FORMS OF ALGAE

1. COENOBIDIUM:

- ▶ No. of cells definite
- ▶ Arrangement of cells definite
- ▶ May be motile (eg *Volvox*) or non motile (eg. *Hydrodictyon*)

2. PALMELLOID:

- ▶ No. of cells not definite
- ▶ Arrangement of cells not definite
- ▶ Generalized production of mucilagenous mass
- ▶ eg. *Tetraspora*, *Palmella*



colonial alga: (A) Motile Coenobium colony (*Volvox*) (B) Non motile Coenobium colony (*Hydrodictyon*) (C) Palmelloid colony (*Tetraspora*) (D) Lenticoid colony (*Chrysothamnium*) (E) Rhizopodial colony (*Chrysidiastrum*)

3. DENDROID:

- ▶ No. and arrangement of cells not definite
- ▶ Cells united in branching manner by localized production of mucilagenous mass at the base of each cell
- ▶ eg. *Chryso dendron*

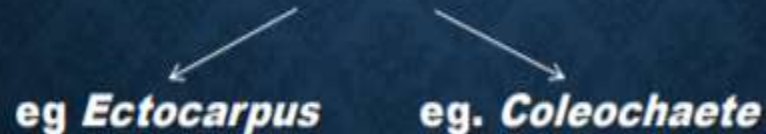
4. RHIZOPODIAL COLONY:

- ▶ Cells united through rhizopodia
- ▶ eg. *Chrysidiastrum*

MULTICELLULAR FILAMENTOUS FORMS ARE OF TWO TYPES :

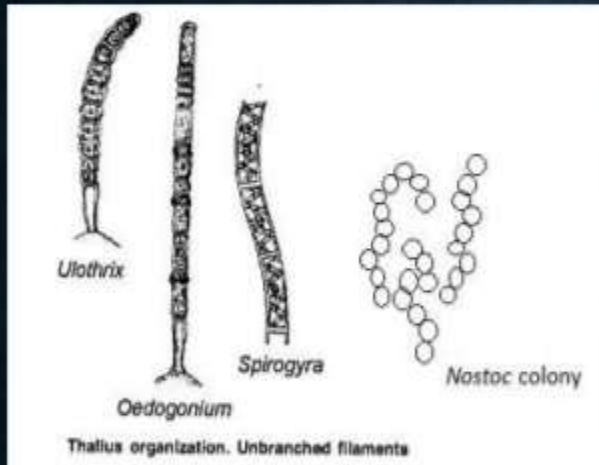
- 1. UNBRANCHED:**
- (i) Free floating eg *Spirogyra*
 - (ii) Attached to some substratum eg. *Ulothrix*
 - (iii) Colonial eg. *Nostoc*

- 2. BRANCHED:**
- (i) False eg. *Scytonema*
 - (ii) True: (a) Simple eg. *Cladophora*
 - (b) Heterotrichous

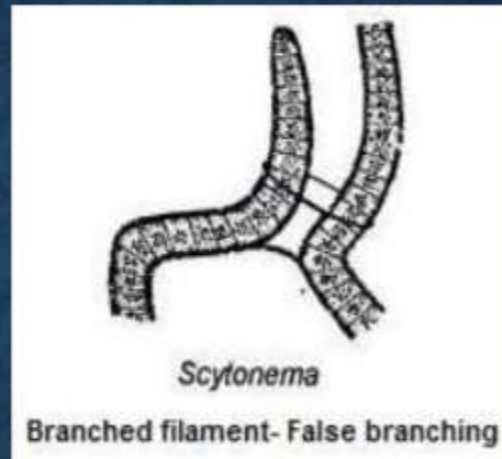


- (iii) Pseudoparenchymatous: (a) Uniaxial eg. *Batrachospermum*
- (b) Multiaxial eg. *Polysiphonia*

MULTICELLULAR FILAMENTOUS FORMS OF ALGAE



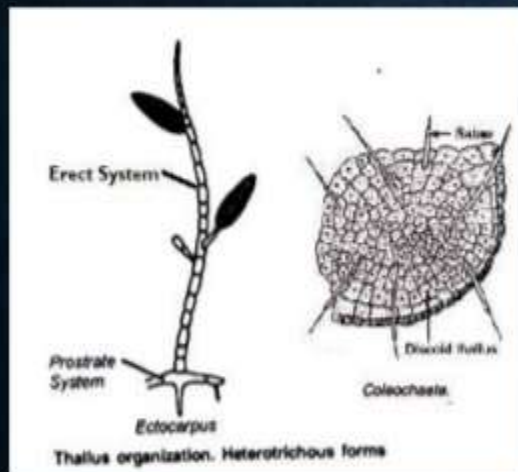
UNBRANCHED



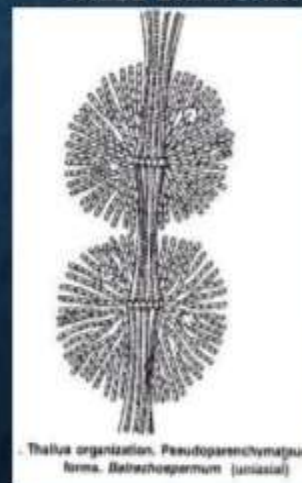
FALSE BRANCHING



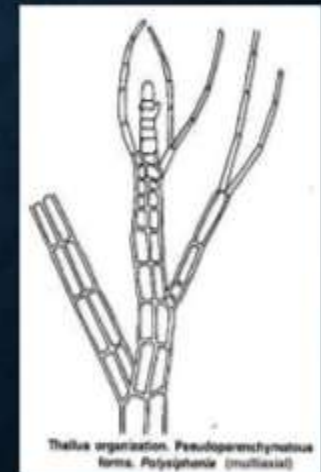
TRUE SIMPLE BRANCHING



HETEROTRICHOUS



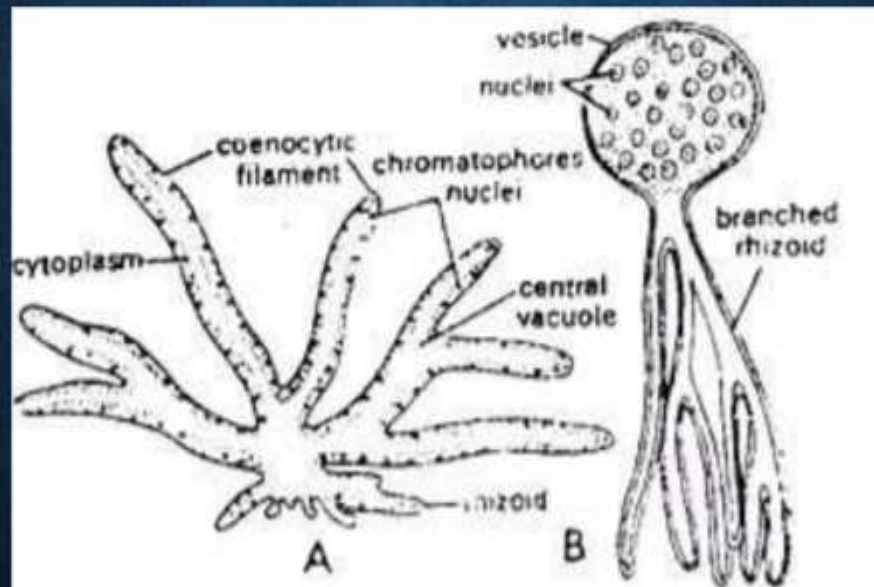
PSEUDOPARENCHYMATOUS (UNIAXIAL)



PSEUDOPARENCHYMATOUS (MULTIAXIAL)

SIPHONACEOUS FORMS OF ALGAE

MULTINUCLEATE THALLUS WITHOUT SEPTATION EXCEPT DURING FORMATION OF REPRODUCTIVE ORGAN
eg. *Vaucheria*, *Botrydium*

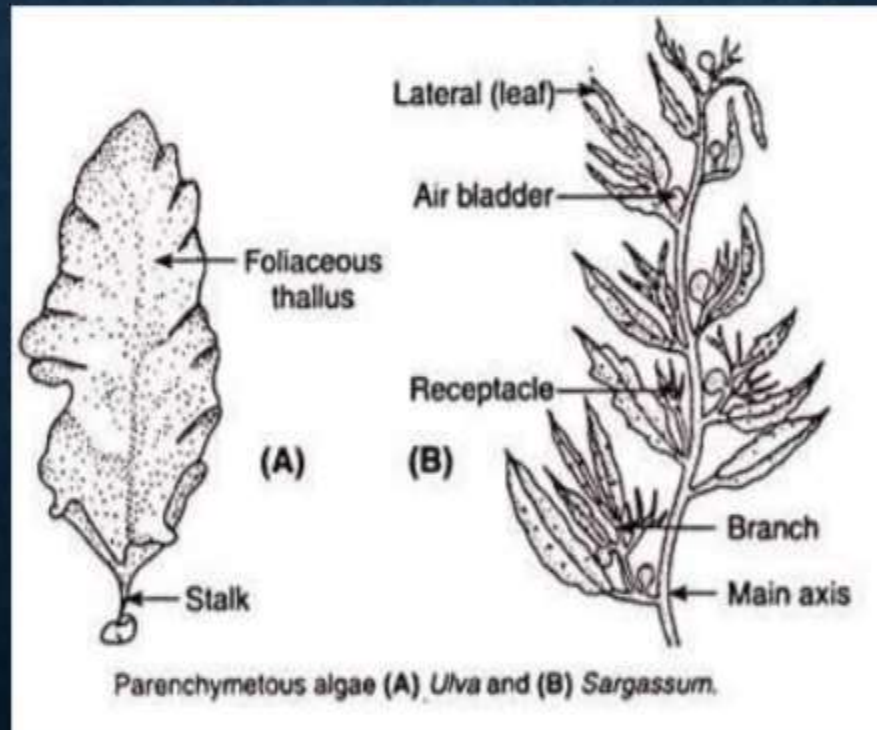


Thallus organization. Siphonaceous forms. (A) *Vaucheria*, (B) *Botrydium*.

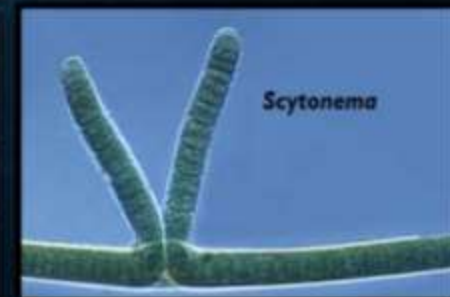
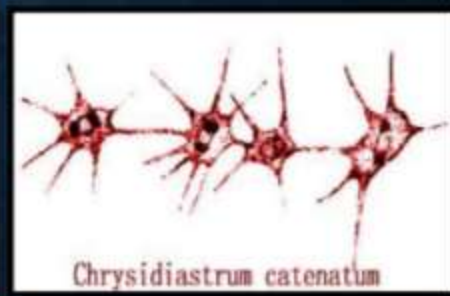
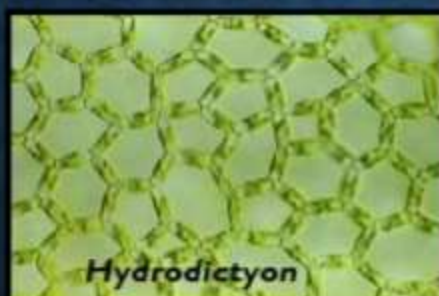
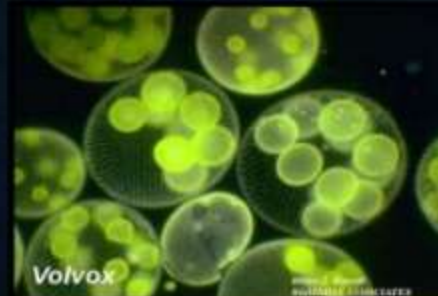
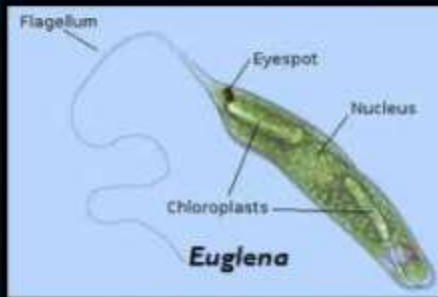
PARENCHYMATOUS FORMS OF ALGAE

VEGETATIVE CELLS DIVIDE IN TWO OR MORE PLANES AND THE PRODUCTS DO NOT SEPARATE RESULTING IN THE FORMATION OF PARENCHYMATOUS THALLUS OF VARIOUS SHAPES

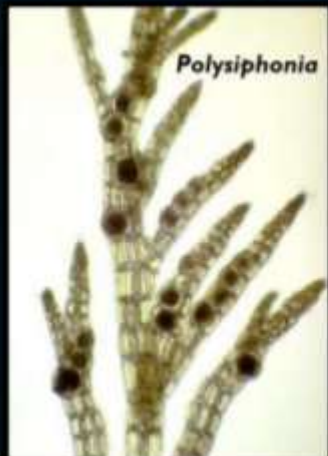
Eg. *Ulva*, *Sargassum*



IMAGES OF ALGAE



IMAGES OF ALGAE



Classification of Algae (Fritsch)

- F.E.Fritsch (1935, 1948) was the first who proposed a most comprehensive & authoritative classification of algae in his book 'The structure and reproduction of the Algae'
- The classification was based on following characteristics
 1. Pigmentation
 2. The metabolic or assimilatory food products
 3. Types of flagella

Classification of Algae

F E Fritsch proposed 11 classes of algae which are as follows:

Chlorophyceae (Green algae)

Cryptophyceae

Phaeophyceae (Brown algae)

Rhodophyceae (Red algae)

Xanthophyceae (Yellow-green algae)

Dinophyceae

Bacillariophyceae (Diatoms)

Chloromonadineae

Eugleniae

Chrysophyceae

Myxophyceae (Blue-green algae)