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1. A higher levels of classification(above family level) there is controversy on how to put different groups together. Eichler's grouping of 1883 will be used below:

THE PLANT KINGDOM

DIVISION	CLASS
-Thallophyta	Phycotinae(Algae) Mycotinae(fungi)
-Bryophyta	Hepaticae(liverworts) Musci(mosses)
-Pteridophyta	Psilotinae(psilotum) Lycopodinae(lycopodium, selaginella) Equisetinae (Ferns)
-Spermatophyta	Gymnospermae(gymnosperms) Angiospermae(angiosperms)

Representative forms, genera and species of the plant kingdom shall be discussed,

Examine:

- i. the habitat
- ii. range of form
- iii. the economic importance
- iv. the reproductive systems
- v. adaptive departure from lower levels of organisation among plants.

2. IMPORTANCE OF ALGAE TO HUMANS

- Algae are important as food or fish. Certain species are harvested for food and cosmetics in the far East.
- Algae are considered nutritious because of their high protein content and high concentrations of minerals, trace elements and vitamins.
- Algae have high iodine content therefore prevent goiter.
- Brown algae yield alginic acid which is used to stabilize emulsion and suspensions; found in products such as syrup, icecream and paint.

-Algae have been used for centuries, especially Asian countries, for their purported powers to cure or prevent illnesses e.g. cough, gout, gallstones, goiter, hypertension, and diarrhoea.

3. UNICELLULAR FORM IN ALGAE

- Found in stagnant water usually.
- Chlamydomonas represents the unicellular and motile forms of green algae.
- Found in stagnant water usually along with the other forms.
- Flagella are the structures for mobility.
- The cell is bounded by a cell wall; contains organelles e.g. nucleus, mitochondria, stigma (eyespot), cup-shaped chloroplast, pyrenoid.
- The nucleus carries the genetic programme of the cell.
- The stigma is for photoreception.
- The mitochondria mediate the elaboration of energy molecules.
- Manufactured sugar is processed into starch on the pyrenoid.

4. Reproduction is both asexual (vegetative reproduction) and sexual.

ASEXUAL REPRODUCTION

Asexually by means of vegetative reproduction: results in production of daughter cells in which the amount and quality of genetic material in the nucleus of the mother cell is maintained in the daughter cells. Thus, if the amount of genetic material in the mother cell nucleus is n , the daughter cells also have n quantity of genetic material.

The kind of cell division which maintains the quantity and quality of genetic material is called mitotic division. It is responsible for the increase in number of cells in unicellular organisms and for increase in size in multicellular organisms. In *Chlamydomonas*, a cell about to divide loses its flagella. The cell undergoes mitotic division leading to two nuclei, cell walls are elaborated which delimit cytoplasm around each nucleus, that is, two daughter cells (zoospores) are released.

Increase in the population of cells in a colony is achieved by repeated mitotic division.

SEXUAL REPRODUCTION

Certain environmental conditions e.g. lack of nutrients or moisture may trigger the haploid daughter cells to undergo sexual reproduction. Instead of forming into spores, the haploid daughter cells form gametes that have two different mating strains which are structurally similar and are positive and negative strains. Opposite mating strains fuse in a process called isogamy to form a diploid zygote, which contains two sets of chromosomes.

After a period of dormancy, the zygote undergoes meiosis, a type of cell division that reduces the genetic content of a cell by half. This cell division (that is, meiosis) produces four genetically unique haploid cells that eventually grow into mature cells.

5.

- Pandorina: usually occurs in water blooms. The colony consists of 16 cells attached to one another. Each cell has many attributes/features in common with *Chlamydomonas* e.g. nucleus, large chloroplast, pyrenoid, flagella and stigma.

-Volvox: yh genus, volvox(also green colonial form) shows more complex forms than pandorina. There are more cells in the colony, number may run into thousands and connected with cytoplasmic strands that run through the cells.

Not all cells form new colonies; but the larger cells at the posterior ends(gonidia) are the only ones that divide to form new colonies. Other cells remain vegetative throughout the life of the colony.

6. FUCUS

A genus of brown algae whose species are often found on rocks in the inter tidal zones of the sea shores.

The plant body is flattened, dichotomously- branched thallus with a mid rib, a vegetative apex, a reproductive apex at maturity and a multicellular disk (hold fast) with which plant is attached to rock surface. The plant body also has air bladders which is believed to aid the plant to float on the water. Various species of fucus exist; cat in size from a few centimetres to about 2 metres in length.