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Course: General Biology II ( BIO 102)

1.Classify plants according to Eichler's grouping of 1883

Eichler's system was based on dividing the plant kingdom into two.

1. Those plants with concealed reproductive organs (non floral) i.e the Cryptogamae. These include the divisions Thallophyta, Bryophyta and Pteridophyta.
2. Those plants with visible reproductive organs (floral) i.e the Phanerogamae. These include the division Spermatophyta.

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| Division  | Class |
| Thallophyta | Phycotinae (Algae)Mycotinae (Fungi) |
| Bryophyta | Hepaticae (Liverworts)Musci (Mosses) |
| Pteridophyta | Psilotinate (Psilotum)Lycopodinae (Lycopodium, Selaginella)Equisetinae (Horsetails)Filicinae (Ferns) |
| Spermatophyta | Gymnospermae (Gymnosperms)Angiospermae (Angiosperms) |

2. How are algae of importance to man?

* Algae serves as thickening agents in ice cream and shampoo
* It serves as food for people
* It contains high iodine content therefore prevents goitre
* Brown able yields Alginic acid which is used to stabilize emulsions and suspensions
* Different species of red algae provide agar and carrageen used for the preparation of various gels used in scientific research.
* They are sources of three chemical extracts used extensively in the food, pharmaceutical, textile and cosmetic industries.

3. Describe a unicellular form of algae.

* Chlamydomonas represents the unicellular and mobile forms of green algae found in stagnant water. They posses flagella for mobility. The cell is bounded by a cellulose cell wall, containing organelles e.g nucleus, mitochondria, stigma, paranoid e.t.c. The nucleus carries the genetic programme of the cell. The stigma is for photoreception. The mitochondria mediates the elaboration of energy molecules. Manufactured sugar and food materials are processed into starch in the pyrenoid.

4. How does this unicellular algae described in question 3 carry out its reproduction?

* In the chlamydomonas, reproduction can either be vegetiative(asexual) or sexual. The asexual reproduction results in the production of daughter cells in the which the amount and quality of genetic materials in the nucleus of the mother cell is maintained in the daughter cells. 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 the 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.
* The sexual reproduction is triggered by certain environmental conditions. Instead of formation of spores, the haploid daughter cells form gametes which have two different mating strains which are structurally similar. In chlamydomonas, clumping in a colony occurs under favourable conditions. These cells pair by their flagellated ends. Pairing is said to be isogamous due to the fact that pairing cells are morphologically identical. The cytoplasm undergoes plasmogamy and flagella is lost. The two cells each with n quantity of genetic material undergo karyogamy to produce a single cell with 2n nuclear material. After karyogamy, the zygote undergoes two successive cell divisions. The first division restores the haploid condition by halving the nuclear material in the two resulting nuclei while in the second division each haploid nucleus undergoes a normal mitotic division. These two divisions which end up with four cells and with n quantity of nuclear material are together known as meiosis.

5. Differentiate between the two types of colonial form of algae

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| Pandorina | Volvox |
| Pandorina is composed of 8,16 or sometimes 32 cells  | Volvox forms spherical colonies of up to 50,000 cells |
| Sexual reproduction occurs by division of each cell of the colony into 16-32 zoogametes. | Sexual reproduction is oogamous i.e the male gamete is motile while the female gamete is not motile |

6.Describe a named complex form of algae

The fucus is a genus of the brown algae whose species are often found on rocks in the internal zone of the sea shores. The plant body is flattened, dichotomously branched phallus with a mid rib, a vegetative apex, a reproductive apex at maturity and a multicellular disk with which the plant is attached to the rock surface. The plant body also has air bladders which is believed to aid the plant to float on water. Various species of fucus exist. They vary in size from a few centimeters to about two meters in length.

Sexual reproduction in the fucus is oogamous i.e the male gamete is motile and the female gamete is not motile. Sex cells are produced in conceptacles which have openings on the surface of the thallus.