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Course: BIO 102
Matric No: 19/MHS 01/347
Dept: MBBS
Level: 100

Assignment

1. Classify the Plant Kingdom according to Fichler's grouping of 1983

- Thallophyta
- Bryophyta
- Pteridophyta
- Spermatophyta

2. How are algae of importance to man?

1) They serve as food for both man and animals because of their high protein content and high concentration of minerals, trace elements and vitamins.

2) Algae have high iodine content which prevents goitre.

3) Some species are used as cosmestics in the perfume industry.

4) Seaweed are sources of

a) Brown algae yield Alginic acid which is used to stabilize emulsions and suspensions.

b) Different species of red algae provide agar and carrageenan used for the preparation of various gels used in scientific research.

3. Describe a unicellular form of algae

An example of a unicellular form of algae is the Chlamydomonas. They are usually found in stagnant water with other forms and their locomotory organ is flagella. Their cell is bounded by a cellulose cell wall and contains organelles like nucleus, Pyrenoid etc. Their nucleus carries the genetic programme of the cell and their mitochondria mediate the elaboration of energy molecules. The stigma is responsible for photoreception and manufactured sugar is processed into starch on the Pyrenoid.

4. How does this unicellular algae described in Q3 carry out its reproduction?

Reproduction can either be asexual or sexual.
Asexual: This type of reproduction results in the production of daughter cells containing the same genetic material as the mother cell. For instance, in Chlamydomonas, a cell about to divide loses its flagella and undergoes mitosis leading to the production of two nuclei. The cell walls are elaborated which delimit cytoplasm around each nucleus. i.e. two daughter cells are produced.

Sexual: Certain environmental factors like lack of moisture may trigger the haploid daughter cells to undergo sexual reproduction. The haploid cells pair by their posterior ends which is isogamous because the pairing cells are morphologically identical. The cytoplasm of the pairing cells fuse together (Plasmogamy) and they lose their flagella. The two nuclei fuse (Karyogamy) and form a Zygote, this process is known as fertilization. After karyogamy sometimes the Zygote undergoes two successive cell divisions; the first division restores the haploid condition by dividing the nuclear material into two nuclei while in the second division each haploid nucleus undergoes a normal mitotic division. This ^{two divisions} results to four cells with a quantity of nuclear material are together known as meiosis. The four products of meiosis are released as haploid zoospores.

5-D: Differentiate between the two types of colonial form of algae

Pan dornia	Volvox
1. It consists of 16 cells attached to one another	It consists of more cells and is also more complex than Pan dornia
2. Sexual reproduction is anisogamous	Sexual reproduction is oogamous

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6. Describe a named complex form of algae

Fucus:

It is a genus of brown algae which are usually found on rocks in the intertidal zone of the sea shore. The plant body is flat and dichotomously branched thallus with a midrib, a vegetative apex, a reproductive apex at maturity and a multicellular disk (hold fast) with which the 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. Sexual reproduction is oogamous, where both sex cells are produced in conceptacles which have opening on the surface of the thallus. In the male conceptacle, one of the diploid cells from outgrowth of the wall of the conceptacle undergoes meiosis. The meiotic product undergoes mitotic division to produce antheridium which has 64 cells of which each cell develops into a biflagellate sperm that swims out of the conceptacle through the opening. In the female conceptacle, it leads to the production of an 8-celled oogonium similar to the situation in the male conceptacle, each becomes an egg, which is the female sex cell.

Male sperm cell from the antheridium, moves through the female ostiole into the female conceptacle where the eggs are fertilized and zygote is produced. Apart from the antheridium and oogonia, sterile multicellular filaments are also

Produced in the conceptacles which are dispersed among the arborescent and acaescent outgrowths and at the entrance into the conceptacles. The diploid zygote germinates into a new diploid Fucus plant making the diploid the dominant generation. Various species of Fucus exist, based on their size, whether the same cells are found in the same sexual chamber or different chambers or different plant bodies.