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MATRICULATION NUMBER: I9/MHS01/272

TITLE: BIOLOGY 102 ASSIGNMENT

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

Solution

Eichler’s grouping of 1883 is as follows:

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

1. How are Algae are of importance to man?

Solution

They are for the following reasons:

1. They are used as drugs to prevent diseases.
2. Chemicals extracted from them are used in food pharmaceuticals and cosmetic industries.
3. Used as thickening agent in ice cream and shampoo.
4. They are important sources of food to fish.
5. They are used to further research.
6. Brown algae yield alginic acid used to stabilize emulsions and suspensions.
7. They are used in making syrups.
8. Describe a unicellular form of algae.

Solution

Unicellular form of algae: Chlamydomonas

It is a typical example of unicellular algae. It represents the motile and unicellular form of green algae. It can be found in stagnant water usually along with other life forms.

Characteristics

1. They have 2 flagella for movement.
2. They have cellulose cell wall.
3. They contain organelles e.g. stigma EYESPOT
4. They have nucleus
5. They have stigma for photoreception
6. They have cup shaped chloroplast
7. They have pyrenoids where manufactured sugar is stored.
8. The mitochondria mediate the elaboration of energy molecules
9. How this unicellular algae described in question 3 carry out its reproduction?

Solution

Reproduction: they have both vegetative and sexual reproduction.

Vegetative reproduction results in the production of daughter cells in which the quantity and quality of genetic materials is the same as in the parent 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. This kind of cell division is called **MITOTIC DIVISION.** It is responsible for increase in size in unicellular animals and increase in size in multicellular organisms. When this organism is about to divide, it loses its flagella. Increase in population is via mitotic division.

Sexual Reproduction: Due to an unconducive environmental conditions such as lack of nutrients or moisture, the organisms haploid daughter cells do not form spores but gametes. Two opposite mating strains which are available, fuse together in a process called **ISOGAMY**, lose their flagella and form a **ZYGOTE.** It passes through a period of dormancy. If the condition is not favorable, they secrete a covering to protect the zygote from the harsh environment. When it reaches a favorable environment, it undergoes mitosis to form **4 HAPLOID ORGANISMS/DAUGHTER CELLS** called **ZOOSPORES.**

NOTE- the cytoplasm fuses by a process called **PLASMOGAMY** while the nucleus fuses together by **KARYOGAMY.**

1. Differentiate between the two types of colonial forms of algae.

Solution

The two colonial forms of algae are pandorina and volvox. Their differences are as follows:

a) Pandorina colonies consist of 16 cells attached to each other while volvox colonies are usually up to thousands and connected by cytoplasmic strands.

b) All cells in pandorina undergo divisions to form new colonies but only larger cells called **GONIDIA** found in pandorina form new colonies.

1. Describe a named complex form of alga.

Solution

A named complex form of alga is **FUCUS.** Fucus is a genus brown algae whose species are often found on rocks in the intertidal 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 focus exist; vary in size from a few centimeters to about 2 meters in length. They also vary in terms of whether the sex cells are found in the same sexual chamber or in different sexual chamber on different plant bodies.

Sex cells are produced in **CONCEPTALCLES** which have openings **(OSTIOLES)** on the surface of the thallus. In the male conceptacles undergoes meiosis, the meiotic product undergo many mitotic divisions to produce antheridium having 64 cells of which each cell develops into a **BIFLAGELLATE** sperm that swims out of the conceptacle through the ostiole. In the female conceptacle similar to the situation in the male conceptacle, leads to the production of an 8 celled **OOGONIUM**- each becomes an egg which is the female cell. Motile sperm cell from the antheridium move through the ostiole into the female conceptacle where the eggs are fertilized and diploid zygote are produced. Apart from the **ANTHERIDIUM** and **OOGONIA**, sterile multicellular filaments (paraphyses) are also produced in the conceptacles which are dispersed among the antheridial and oogonial outgrowths and at the entrance into the conceptacles. The diploid zygote germinates into a new diploid FUCUS plant making the diploid the dominant generation.