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DEPARTMENT: PHYSIOLOGY

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

The system was based on dividing the plant kingdom into those plants with concealed reproductive organs (non-floral), the (Cryptogamae, = hidden reproduction) and those with visible reproductive organs (floral), the (Phanerogamae, = visible reproduction). Moreover, Eichler was the first taxonomist to separate the Phanerogamae into Angiosperms and Gymnosperms and the former into Monocotyledonae and Dicotyledonae. He divided the plant kingdom into four divisions: Thallophyta (the algae and fungi), Bryophyta (the liverworts and mosses), Pteridophyta (the club mosses, horsetails, and ferns), and Spermatophyta (the seed plants), the last of which were in turn divided into two major categories: the angiosperms (the flowering plants) and gymnosperms (such as pines, spruces, and firs).

2. How are algae of importance to man.

Algae are used as food for man, livestock and fish.

Brown algae yields alginic acid which is used to stabilize emulsions and suspensions.

They are used as thickening agents in ice cream and shampoo

Algae is used in the manufacture of iodine

Describe a unicellular form of algae.

The unicellular forms of algae function as complete living organism. They have both sexual and asexual kind of reproduction. The unicellular algae maybe motile or non – motile.

CHLAMYDOMONAS: This is a unicellular form of green algae. It possesses flagella for locomotion as it is motile. It possesses a cellulose cell wall and other organelles: mitochondria, stigma (eyespot), cup shaped chloroplast, nucleus, pyrenoid etc.

Manufactured sugar is processed into starch by the pyrenoid.

The stigma is used for photoreception.

The nucleus carries the genetic programme of the cell.

Mitochondria mediate the elaboration of energy molecules.

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

ASEXUAL REPRODUCTION:

By zoospores- The zoospore formation takes place during favourable conditions. The zoospore formation takes place as follows: The protoplast contracts and gets separated from the cell wall. The parent cell loses flagella or in some species of Chlamydomonas flagella are absorbed. The contractile vacuoles and the neuro-motor apparatus disappear. The protoplasm divides longitudinally by simple mitotic division forming two daughter protoplasts.

The second longitudinal division of protoplasm takes place at right angle to the first, thus making four daughter chloroplasts. Sometimes the protoplasm may further divide to make 8-16-32 daughter protoplasts. The pyrenoids and initials of neuro-motor apparatus also divide. The contractile vacuoles also develop in daughter protoplasts. Each daughter cell develops cell wall, flagella and transforms into zoospore.

SEXUAL REPRODUCTION: The sexual life cycle of Chlamydomonas reinhardtii consists primarily of four critical stages – gametogenesis, zygote formation, zygote maturation (zygospore formation), and meiosis (zygospore germination). Gametogenesis is induced by the loss of a nitrogen source and light. When gametes of opposite mating types are mixed together, flagella adhesion triggers gamete activation that leads to the cell-cell fusion (zygote formation). Zygotes will develop into zygospores with a thick cell wall, which is a dormant stage in the life cycle. The cycle begins again when the appropriate environmental conditions stimulate the dormant zygote to undergo germination, in order to produce new

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

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| --- | --- |
| Volvox | Pandorina |
| It consists of thousands of cells attached to each other. | It consists of 16 cells attached to each other |
| Not all cells form new colonies. | All cells form new colonies |
|  |  |

6. Describe a named complex form of algae.

Fucus, also called rockweed, genus of brown algae, common on rocky seacoasts and in salt marshes of northern temperate regions. Fucus species, along with other kelp, are an important source of alginates—colloidal extracts with many industrial uses similar to those of agar. Bladder wrack (F. vesiculosus) was one of the original sources of iodine

Fucus is a perennial algae, some of which have a life span of up to four years. They feature bladder like floats (pneumatocysts), disk-shaped holdfasts for clinging to rocks, and mucilage-covered blades that resist desiccation and temperature changes. The growth of the thallus is localized at the tips of forked shoots, and most species are between about 2 and 50 cm (0.8 to 20 inches) in length. The male and female reproductive organs may occur on the same organism or on separate ones; some species produce eggs and sperm all year long.