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1)Classification of Plant Groups- Cryptogamae and Phanerogamae

In 1883, A.W. Eichler gave a system of classification for the whole plant kingdom.

Eichler classified the plant kingdom into two sub-kingdoms. They are Cryptogamae and Phanerogamae.

I) Cryptogamae (Gk. Kryptos=concealed; gamos=marriage)

The cryptogams are flowerless and seedless plants. They are simple plants like algae, mosses and ferns which do not produce flowers, fruits and seeds. Cryptogams are considered as lower plants.

a)algae

Examples of Algae: Chlorella, Chlamydomonas, Volvox, Cladophora, Zygnema, Sargassum, Gelidium, Polusiphonia, Spiulina, Laminaria.

b) Bryophytes

Are the the simplest land plants with undifferentiated plant body. They are adapted to grow in water and on land. The more advanced forms only on land. Vascular tissues are absent.

Horn Worts

Bryophyta is divided into three classes:

- Hepaticae-Liverworts eg: Riccia, Marchantia etc.

- Anthocerotae-Horn worts eg: Anthoceros

· Musci: Mosses eg: Funaria

Algae vs Bryophytes

Bryophtes vs Pteridophytes

c) Pteidophyta

Psilotum

Are most advanced cryptogams. Vascular tissues are present in the plant body. Therefore pteridophytes are also called vascular cryptogams. The plant body is differentiated into roots, stem and leaves. The ferns are a large group included under pteridophytes.

Selaginella

Pteridophyta is divide into four classes. They are the following

Psilopsida- eg: Psilotum

Lycopsida- eg: Lycopodium, Selaginella etc

Sphenosida- eg: Equisetum

Pteridopsida-eg: Nephrolepis, Pteris , Dryopteris etc

II) Phanerogamae

Phanerogams are seed bearing plants. So they are also known as spermatophytes (Gk. Sperma=seed; phyton=plant). They are higher plants. The plant body is differentiated into roots, stem, and leaves with well developed vascular system.

a) Gymnospermes (Gk.gymno=naked; sperma=seed)

Cycas

Are naked-seeded plants. The seeds are not enclosed in fruits. They do not produce flowers and they are regarded as primitive seed plants. They include mostly evergreen trees like conifers and cycads.

Gymnosperms are divided into three different classes. They are the following

- Cycadopsida-eg: Cycas
- Coniferopsida- eg: Pinus, Cedrus etc.
- Gnetopsida-eg: Gnetum

Gymnosperms vs Angiosperms

b) Angiospemae

Angiosperms (Gk.angion=hidden; sperma=seed) are flowering and seed bearing plants. The seeds are enclosed in fruits. They form the dominant vegetation of the earth at present. They enrich the earth with unmatched beauty, colour and scent.

2)

IMPORTANCE OF ALGAE TO MAN

1.FOOD FOR FISHES AND SEA ANIMALS

2. DIRECT USE OF ALGAE AS FOOD FOR MAN

3. IT SERVES AS A SOURCE OF VITAMIN

5.IT SERVES AS A SOURCE OF AGAR

6. IT IS USED FOR MEDICINAL PURPOSES AND MINERALS

7. IT IS USED TO MANUFACTURE IODINE

8. IT IS USED IN THE MANUFACTURE OF SOAP

9.USED IN THE MANUFACTURE OF POTASH

10.IT HAS SOME ORNAMENTAL PURPOSES

11. USED IN THE PRODUCTION OF PAPER

3).

DESCRIPTION OF A UNICELLULAR FORM OF ALGAE

Chlamydomonas represents the unicellular and motile forms of green algae found in stagnant water usually along with other forms. Flagella are the structures for mobility.The cell is bounded by a cellulose cell wall; contains organelles e.g nucleus,mitochondria,stigma etc. The nucleus carries the genetic program 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 In Chlamydomonas

. Asexual Reproduction:

It takes place by following methods:

(A) 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

The zoospores are liberated from the parent cell or zoosporangium by gelatinization or rupture of the cell wall. The zoospores are identical to the parent cell in structure but smaller in size. The zoospores simply enlarge to become mature Chlamydomonas. Under favourable conditions the formation of zoospores can take place every 25 hours.

(ii) By Aplanospores:

The aplanospores are formed slightly under unfavorable conditions e.g., in C. caudata. The parent cell loses flagella.

The protoplast rounds off and secretes a thin wall outside but does not develop .(A) Parent cell, (B) Aplanospore formation, (C) Hypnos pore flagella. These non-motile structures are called aplanospores. On approach of favourable conditions aplanospores may germinate either directly or divide to produce zoospores

(iii) By Hypnospores:

In extreme unfavorable conditions the protoplast develops thick wall and the structure developed is called Hypnos pore e.g., in C. nivalis. The hypnospores also germinate like aplanospores on approach of favourable conditions.

(iv) Palmella Stage:

The palmella stage is formed under unfavorable conditions as shortage of water, excess of salts etc. The protoplast of parent cell divides to make many daughter protoplasts but they do not form zoospores. The parent cell wall gelatinizes to make mucilaginous sheath around daughter protoplasts. The daughter protoplasts also develop gelatinous wall around themselves but do not develop flagella.

These protoplast segments are called palmellospores. The division and red visions of these protoplast ultimately forms amorphous colony with indefinite number of spores and it is called palmella stage .When favourable conditions return the

gelatinous wall is dissolved, palmellospores develop flagella, and the spores ire released to make new thalli.

2. Sexual Reproduction:

The sexual reproduction in Chlamydomonas can be isogamous, anisogamous or oogamous. he thallus can be homothallic i.e., both types of gametes are produced in same thallus e.g., C. mogama and C. media or can be heterothallic i.e., (+) and (-) gametes come from different parents, he gametes may be naked and called gymnogametes e.g., C. debaryana or covered by cell wall id called calyptogametes e.g., C. media.

(i) Isogamy:

Most of the Chlamydomonas species are isogamous in nature. In isogamous reproduction the fusion of gametes, which are similar in size, shape and structure, take place. These gametes are morphologically similar but physiologically dissimilar.

In many isogamous species the vegetative cells may directly function as gametes without undergoing any division e.g., in C. snowiae, this fusion is called as hologamy. The thalli shed their walls and function as gametes.

The two gametes come close to each other by their anterior ends and later fusion proceeds to lateral sides.The fusion product is quadri flagellate and bi-nucleate structure with two pyrenoids and two eye spots. The quadri flagellate zygote remains motile for several hours to few days.

In C. eugametos, the vegetative cells do not shed their walls, after union the contents of one gamete enter into another gamete as such. According to Chapman (1964) the isogamous reproduction takes place by production of 8, 16 or 32 bi-flagellated gametes. The process takes place as follows . The vegetative thallus functioning as gametangium comes to rest and loses its flagella.

The protoplast withdraws itself from the cell wall. The protoplast divides by repeated longitudinal mitotic divisions to produce 8-16-32 or 64 daughter protoplasts. Each daughter protoplast develops a pair of flagella and transforms into gamete. The

gametes are liberated by breaking the wall of gametangium. The flagella of gametes are covered by agglutins and secrete a hormone called gamone.

These chemical substances are involved in the recognition of gametes of the opposite strains. In heterothallic species (+) and (-) strain gametes cluster together and this phenomenon is called clumping. The gametes of opposite strain fuse by anterior end i.e., apical fusion or laterally i.e., lateral fusion.The paired gametes move away from the clump.

The wall at the place of contact dissolves and fertilization takes place in two steps—plasmogamy and karyogamy. In plasmogamy the fusion of cytoplasm and in karyogamy the fusion of nuclei takes place. After fertilization a quadriflagellate zygote is formed. The zygote later on loses flagella and gets covered by a thick wall and is now called zygospore.

(ii) Anisogamy:

In anisogamous reproduction the gametes are unequal in size. The male gametes or microgametes are smaller, the female gametes or macrogainetes are larger e.g., in C. braunii and C. suboogama. The macrogametes are formed in female gametangium in which the protoplast divides to make 2 to 4 gametes only.

The microgametes are formed in male gametangium where the protoplast divides to make 8-16 gametes. The microgametes are more active than macrogametes. The microgametes come close to the macrogamete, the protoplast of microgamete enters into macrogamete and after fusion a diploid zygote is formed. The zygote secretes a thick wall and transforms into zygospore.

5).

Differences betweens

Pandorina and volvox

Pandorina is a genus of green algae composed of 8, 16, or sometimes 32 cells, held together at their bases to form a sack globular colony surrounded by mucilage. The cells are ovoid or slightly narrowed at one end to appear keystone or pear-shaped.

Each cell has two flagella with two contractile vacuolesat their base, an eyespot, and a large cup-shaped chloroplast with at least one pyrenoid.

The colonies coordinate their flagellar to create a rolling, swimming motion. Pandorina shows the beginnings of the colony polarity and differentiation seen in Volvox since the anterior cells have larger eyespots. Molecular sequencing has shown that Pandorina is paraphyletic with respect to Volvulina.

Asexual reproduction is by simultaneous division of all cells of the colony to form autocolonies that are liberated by a gelatinization of the colonial envelope. Sexual reproduction occurs by division of each cell of the colony into 16-32 zoogametes. Zoogametes show indications of heterogamy, a slight difference in the size and motility of the pairs that fuse to form the smooth walled zygote

WHILE

Volvox may consist of thousands

Pandorina- sexual reproduction occurs through anisogamous pairing

Volvox reproduces sexually through oogamous.

Complex forms in algae

6). Fucus

Fucus is a genus of brown algae found in the intertidal zones of rocky seashores

almost throughout the world.

life cycle

The thallus is perennial with an irregular or disc-shaped holdfast or with haptera.The erect portion of the thallus is dichotomous or subpinnately branched, flattened and with a distinct midrib. Gas-filled pneumatocysts (air-vesicles) are present in pairs in some species, one on either side of the midrib. The erect portion of the thallus bears cryptostomata and caecostomata (sterile surface cavities). The base of the thallus is stipe-like due to abrasion of the tissue lateral to the midrib and it is attached to the rock by a holdfast. The gametangia develop in conceptacles embedded in receptacles in the apices of the final branches.

They maybe monoecious or dioecious. These algae have a relatively simple life cycle and produce only one type of thallus which grows to a maximum size of 2 m.citation needed cavities, the conceptacles, containing the reproductive cells are immersed in the receptacles near the ends of the branches.
After meiosis oogonia and antheridia, the female and male reproductive organs, produce egg cells and sperm respectively that are released into the sea

where fertilisationtakes place. The resulting zygote develops directly into the diploid plant. This contrasts with the life cycle of the flowering plant,where the egg cells and sperm are produced by a haploid multicellular generation, albeit very strongly reduced, and the egg cells are fertilised within the ovules of the parent plant and then released.