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Bio 102

① Classification of plants according to Eicher's grouping of 1885

Division	Class
Thallophyta	- Mycetozoa (Fungi) - Phytozoa (Algae)
Bryophyta	- Musci (Mosses) - Hepaticae (Liverworts)
Pteridophyta	- Psilotum (Psilotum) - Lycopodiaceae (Lycopodium and Selaginella) - Equisetaceae (Horse tails) - Filicinae (Ferns)
Spermatophyta	- Gymnospermae (Gymnosperms) - Angiospermae (Angiosperms)

2) Importance of algae to Man

Algae are rich in vitamins and minerals

Algae serves as food for people and livestock

Algae are used to produce fuel

Algae are harvested for cosmetics purposes

3) Unicellular form of Algae

Paramecium. As a case study

Paramecium is a single-celled protist that is naturally found in aquatic habitats. They are oblong or slipper-shaped and are covered with short hairy structures.

called cilia. The cilia is essential for movement. Certain Paramecia are also easily cultured in labs and serve as useful model organisms. Cilia also aid in feeding by pushing food into a rudimentary mouth opening known as the oral groove.

④ Reproduction in the unicellular form of Algae  
Paramecium reproduces both asexually and sexually. It also undergoes several kinds of nuclear organizations. It can multiply during nuclear organizations.

Asexual reproduction: No nuclear organization

Binary fission occurs in transverse fashion in Paramecium.

A fully grown paramecium is divided into two daughter individuals.

Paramecium stops feeding before initiating binary fission and then its oral groove disappears.

Macronucleus divides by amitosis. After division, they move to the opposite end.

Micro nucleus divides by mitosis. At the same time the constriction develops at the middle part of the body which divides cytoplasm into two equal parts. In this way two daughter paramecium is produced.

Sexual reproduction: Nuclear organization

Conjugation: the sexual reproduction is cross fertilization. Conjugation is a temporary union of two individuals of same species for mutual exchange of genetic materials. Continuous multiplication by binary fission is interrupted by conjugation as it is necessary for survival and rejuvenation of the race. The two paramecium of opposite mating types come in contact by their ventral surface during swimming. They stick together.

through their oral groove region. following their attachment of feeding apparatus degenerate. pellicle and ectoplasm degenerate at the point of contact and a cytoplasmic bridge (Conjugation bridge) is formed. United Paramecia are called Conjugants. The Conjugants attach with each other for several hours and exchange of nuclear material occurs. Changes in macronucleus: Macronucleus breaks into fragments and these fragments are later dissolved into the cytoplasm.

Changes in micronucleus: the diploid micronucleus in each conjugant grows in size and then divides by meiosis (in meiotic division a single cell gives 4 haploid daughter cells). Then four haploid daughter micronuclei are produced as a result of the meiotic division. Out of these four micronuclei, three degenerate and disappear. The remaining one micronucleus divides by mitosis to form two unequal pronuclei. Out of the four micronuclei, degenerate and disappear. Each daughter Paramecium obtained from exconjugants has 2 macronuclei and 1 micronucleus. The micronucleus of daughter individuals again divide mitotically with the division of cytoplasm to produce 4 daughter individuals each with one macronucleus and one micronucleus. In this way 8 Paramecia are produced as a result of conjugation four from each mating conjugant.

⑤ Volvox

More Complex than Paramecium

Paramecium

Complex form of algae

Not all cells form new colonies  
Only the larger cells at posterior end

All cells form new colonies

Volvox	Paramecium
Sexual reproduction is <del>is</del> <sup>is</sup> <del>organism</del>	Sexual reproduction is <del>is</del> <sup>is</sup> <del>organism</del>
A colony of thousands of cells <del>from</del> <sup>are</sup> attached to each other	A colony of 16 cells attached to one another

6) A named complex form of Algae

Case Study: Kelp

Kelps are large brown algae seaweeds that make up the order Laminariales. There are about 30 different genera. Despite its appearance kelp is not a plant, it is a ~~hetero~~ heterokont. Kelp grows in underwater forests in shallow oceans, and is thought to have appeared in the Miocene, 5 to 23 million years ago. It is naturally high in ~~antioxidants~~ antioxidants which help to fight against disease-causing free radicals.