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MATRIC. NO.: 19/SCI07/009

DEPARTMENT: AGRICULTURAL SCIENCE

LEVEL: 100 LEVEL

COURSE TITLE: GENERAL BIOLOGY

BIO102 ASSIGNMENT

1. A. Cryptogamae

division I. Thallophyta

classes I. Algae

group I. Cyanophyceae

group II. Diatomeae

group III. Chlorophyceae

group IV. Phaeophyceae

group V. Rhodophyceae

classes II. Fungi

group I. Schizomycetes

group II. Eumycetes

group III. Lichenes

division II. Bryophyta

class I. Hepaticae

class II. Musci

division III. Pteridophyta

class I. Equisetinae

class II. Lycopodinae

class III. Filicinae

B. Phanerogamae

division I. Gymnospermae

division II. Angiospermae

class I. Monocotyleae

order I. Liliiflorae p. 34

order II. Enantioblastae

order III. Spadiciflorae

order IV. Glumiflorae

order V. Scitamineae

order VI. Gynandreae

order VII. Helobiae

class II. Dicotyleae

subclass I. Choripetalae

subclass II. Sympetalae

1. Food for sea animals: The algae are used as a direct source of food by several sea animals and fishes. The marine algae are rich in iodine and several other important minerals. This makes the fundamental source of food for all marine animals and in this respect, sea is the richest food producing area

Mineral content: High mineral content, up to five percent of the wet material, in which all the mineral elements important in human and animal physiology are found, makes sea weeds a unique supplement for a well-balanced diet. Potassium, sodium and chloride are found in the ionic form in sea weeds (Pillai 1956). According to Black (1953), the significance of iodine, as a constituent of food, is that besides being present in organic combination it is also available in part in the readily available form of the precursor of thyroxine, and hence this source of iodine surpasses mineral iodine in drinking water and iodized table salt.

As food for man: Since the pre-historic times, several sea weeds have been used as direct source of food to human beings. Several fresh water algae have also been utilised in the preparation of various kinds of vitaminized food. As we know well that the fundamental food of sea living stock are algae and they are used as food by human beings. Since the algae are rich in vitamins and minerals, all the deficiencies are over run by the use of algae as food. The algae (sea weeds) form the most important part of the diet of Japan and China. And some people think that the artistic taste and cultural development of the people of Japan is because of the use of the sea weeds as food. In our country, a few species of Spirogyra and Oedogonium are utilised as food in South India.

Medicine and minerals: Several diseases caused by vitamin deficiency such as vitex, asthma, tooth decay, etc., may be eradicated, if flour of the sea weeds is added to the food. According to Dr. Weston, iodine is the most important element to enable the thyroid glands to secrete the thyrosin which contains 60% iodine. It controls the general development of the animal. Sea weeds are the best source of iodine for human beings. Several important sea weed medicinal preparations are prepared in various countries, i.e., Kelpeck is prepared from kelps in Chicago; Burbank Vegetable tablets are sea weed preparations from United States. Kelpamalt is a sea weed medicinal preparation from New York (U.S.A.); Isokelp is prepared in California; Parakelp and Manamar are other medicinal sea weed American preparations. An antibiotic drug Chlorellum is also obtained from algae. About forty-five elements are found in a sea weed Macrocystis pyrifera. In addition to these elements, vitamins are also found. No other food contains such a great abundance of minerals and vitamins

1. A unicellular form of algae: An example of a unicellular algae is Chlamydomonas. Chlamydomonas is a genus of [green algae](https://en.wikipedia.org/wiki/Green_algae) consisting of about 325 speciesall [unicellular](https://en.wikipedia.org/wiki/Unicellular_organism) [flagellates](https://en.wikipedia.org/wiki/Flagellate), found in stagnant water and on damp soil, in freshwater, seawater, and even in snow as "snow algae".Chlamydomonas is used as a [model organism](https://en.wikipedia.org/wiki/Model_organism) for [molecular biology](https://en.wikipedia.org/wiki/Molecular_biology), especially studies of [flagellar](https://en.wikipedia.org/wiki/Flagellum) motility and [chloroplast](https://en.wikipedia.org/wiki/Chloroplast) dynamics, biogenesis, and genetics. One of the many striking features of Chlamydomonas is that it contains [ion channels](https://en.wikipedia.org/wiki/Ion_channel) ([channel rhodopsins](https://en.wikipedia.org/wiki/Channelrhodopsins)) that are directly activated by light. [Some](https://en.wikipedia.org/wiki/FLU_(plant_gene)) regulatory systems of *Chlamydomonas* are more complex than their [homologs](https://en.wikipedia.org/wiki/Homology_(biology)) in [Gymnosperms](https://en.wikipedia.org/wiki/Gymnosperms), with evolutionarily related regulatory proteins being larger and containing additional domains.[[4]](https://en.wikipedia.org/wiki/Chlamydomonas#cite_note-4)

[Molecular phylogeny](https://en.wikipedia.org/wiki/Molecular_phylogeny) studies indicated that the traditional genus *Chlamydomonas* defined using morphological data was [polyphyletic](https://en.wikipedia.org/wiki/Polyphyletic) within [Volvocales](https://en.wikipedia.org/wiki/Volvocales), and many species were reclassified (e.g., in [Oogamochlamys](https://en.wikipedia.org/wiki/Oogamochlamys), [Lobochlamys](https://en.wikipedia.org/wiki/Lobochlamys)), and many other "Chlamydomonas" lineages are to be reclassificated

Unicellular cells, spherical or slightly cylindrical, a papilla may be present or absent. Chloroplasts green and usually cupshaped. A key feature of the genus is its two anterior flagella, each as long as the other.

1. Reproduction in Chlamydomonas

Asexual reproduction: Asexual reproduction takes place by zoospore formation. In growing season, the parent cell come to rest. The flagella are reabsorbed, contractile vacuole disappear and protoplast withdraw from the cell wall. The cytoplasm, chloroplast and the nucleus divided along a longitudinal plane into two daughter protoplasts. Then the division comes to transverse with respect to cell as whole. In this way, usually four daughter protoplasts may be formed. The chloroplast is halved along with the pyrenoid at each successive division. One daughter cell receives the eye spot of parent, the other forms it afresh. The aflagellate daughter protoplast remains bound within the parent wall. These daughter protoplasts within the original cell wall look like a colony. Each daughter protoplast acquires a cell wall, develop flagella of its own, the vacuole reappears. They resemble with the parent but small in size. The parent cell wall ruptures and the daughter cell are released and termed as zoospores. The daughter cells soon grow to the full size and repeat the process.

Under unsuitable conditions the motile cell come to rest and loses flagella. The protoplast divides into 4-8 cells and fail to develop flagella and fail to escape. They remain together in the parent cell wall which become mucilaginous and swell up. Each daughter cell continually divided and a colony of considerable size contain numerous cells embedded in common mucilage. This assembly of cell is known as palmella stage. When condition become suitable the cell become motile and escape from the mucilage and grow to the parent size.

Sexual production: Sexual reproduction in Chlamydomonas varies through a wide range. It ranges from isogamy to anisogamy and even primitive type of oogamy.

In isogamy, the fusion of gametes similar in size form and structure and thus are called the isogametes. The sexual fusion takes place between biflagellate gametes coming from the same parent cell. The fusion gametes are motile, naked and smaller in size. At the time of gamete formation, the cell withdraws its flagella and comes to rest. The protoplast of cell then divided to form 16, 32, or 64 daughter protoplast It is pear shape in form and has no cell wall. The gametes release in water and swim for a while Finally they come near each other and fuse in pairs either end to end or side by side. The cytoplasm and nucleus fuses with each other. They come to rest, retracts its flagella, rounds up and secretes a thick wall around it to become a zygospore. It tides over unfavorable conditions.

When the conditions become suitable it become germinate. The diploid nucleus undergoes meiosis to form four haploid nuclei. The haploid nuclei are eventually incorporated into meiospore which are motile. At this stage, the zygospore wall crakes liberating the spores having two flagella. The meiospore then grow to an an adult Chlamydomonas cell.

1. Differences between the two types of colonial form of algae (volvox and synura):

|  |  |
| --- | --- |
| volvox | Synura |
| They are large and elaborately interconnected.  A Volvox colony is a hollow sphere of mucilage having 500 or more biflagellate algal cells that are equally spaced around on its outer surface. | They are small and relatively simple.  They have varied number of ovoid golden brown cells |

1. Spirogyra (common names include water silk, mermaid's tresses, and blanket weed) is a filamentous [charophyte](https://en.wikipedia.org/wiki/Charophyte) [green algae](https://en.wikipedia.org/wiki/Green_algae) of the [order](https://en.wikipedia.org/wiki/Order_(biology)) [Zygnematales](https://en.wikipedia.org/wiki/Zygnematales), named for the [helical](https://en.wikipedia.org/wiki/Helix) or spiral arrangement of the [chloroplasts](https://en.wikipedia.org/wiki/Chloroplast) that is characteristic of the genus. It is commonly found in [freshwater](https://en.wikipedia.org/wiki/Freshwater) habitats, and there are more than 400 species of Spirogyra in the world. Spirogyra measures approximately 10 to 100 [cm](https://en.wikipedia.org/wiki/%CE%9Cm) in width and may grow to several centimetres in length.Spirogyra is very common in relatively clear [eutrophic](https://en.wikipedia.org/wiki/Eutrophic) water, developing slimy filamentous green masses. In spring *Spirogyra* grows under water, but when there is enough sunlight and warmth they produce large amounts of oxygen, adhering as bubbles between the tangled filaments. The filamentous masses come to the surface and become visible as slimy green mats. Spirogyra has a [cell wall](https://en.wikipedia.org/wiki/Cell_wall), [nucleus](https://en.wikipedia.org/wiki/Cell_nucleus), [pyrenoid](https://en.wikipedia.org/wiki/Pyrenoid) and spiral [chloroplasts](https://en.wikipedia.org/wiki/Chloroplast).