Department of biology

2025-2026

((Plant groups))

Stage (2)

Seventh lecture

Xanthophyte (Yellow-green Algae)

By

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Xanthophyte (Yellow-green Algae)

- Yellow-green algae are an important group of (heterokont algae). Most live in freshwater, but some are found in soil habitats. They vary from single-celled flagellates to simple colonial and filamentous forms. Xanthophyte chloroplasts contain the photosynthetic pigments Chlorophyll a ,β-Carotene, and the carotenoid diadinoxanthin. Unlike other heterokonts, their chloroplasts do not contain fucoxanthin, which accounts for their lighter color. Its storage polysaccharide is chrysolaminarin. Xanthophyte cell walls are produced of cellulose and hemicellulose.


1000 µm

Environment and presence

- Xanthophyte are generally found in freshwater, wet soil and tree trunks, but there are several marine species. Most of the species occur singly and are found around other algae, making it difficult to find the same species twice. They do very well at low pH in habitats that are rich in iron. It was also found that Xanthophyte loses its cytoplasmic streaming ability and organization of other vegetative filaments, when it is in an aluminum-rich environment. Many of them are found in late winter in still water.

General features of Xanthophyte

- 1- Occurrence: Mostly freshwater and a few found marine water.
- 2- Pigments: Chlorophyll a, β carotene and xanthophylls.

- 3- Pyrenoids: Usually absent.
- 4- Reserve food material: Chrysolaminaran, Oil and fat.
- 5-Cell wall: Rich in pectic compounds and composed of two equal pieces overlapping at the edges.
- 6-Structure: Eukaryotic unicellular motile to simple filamentous,
- 7- Flagella: Present, two unequals, situated anteriorly. Longer one tinsel and shorter one whiplash.
- 8-Reproduction: Vegetative, Asexual and Sexual.

Cell Structure and Metabolism

❖ Xanthophyte are a photosynthetic group of yellow-green algae. Their photosynthate is stored as oils and the storage polymer chrysolaminarin.

- Most Xanthophyta are coccoid or filamentous, but some are siphonous, meaning that they are composed of multiple tubular cells with several nuclei. What makes up the cell wall is unknown but inside some there are two silica valves similar to those in diatoms. For the species that are filamentous the interlocking halves are in the shape of H.
- While not much is known about the life cycle of xathnophyta generally their reproduction is **asexual,** in which the cell divides bilaterally and creates and produces an endogenous cyst.

Differences between Xanthophyte and green algae

1. They lack chlorophyll, and are characterized by a high percentage of xanthophyll and carotenoids, so they appear in a yellowish-green color.
2. The stored food is in the form of Leucosin oils or Chrysolaminarin fats and is not stored in the form of starch.
3. The cell wall contains more pectin materials than in green algae in addition to the deposition of silica.

Reproduction

1- Sexual Reproduction

2- Vegetative Reproduction

3- Asexual Reproduction: These algae reproduce by forming different types of spores. The formation of

these spores depends on the species and the environmental conditions surrounding the algae, **these spores include:**

A-Motile Spores: One, two, or more spores may form inside the cell. These spores are biflagellate of unequal length and structure, naked, pear-shaped, and have one or more contractile vacuoles.

B- Non-Motile Spores: The protoplast may contain one or more non-motile spores, non-motile spore may develop into a new plant after being released from the parent cell, or it may give rise to motile spores that, in turn, develop into a new plant.

C- Autospores: Non-motile spores that retain the shape of the parent cell are called autospores. More than one autospore may form inside the parent cell.

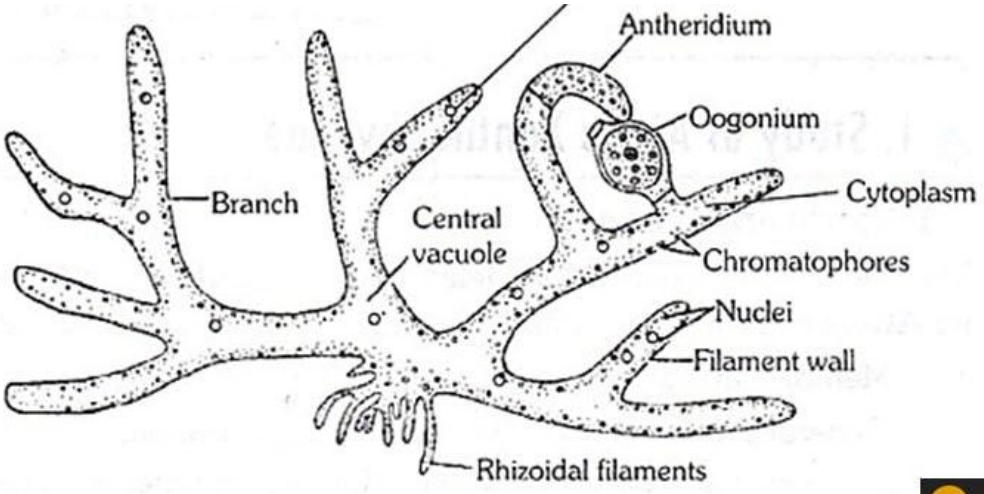
D- Aplanospores: The vegetative cell may directly transform into dormant, spore-like phases, but with thicker walls and more stored nutrients. This type of spore is formed in filamentous species, where a single filament cell may transform into a dormant cell, or several successive cells may transform, or all the filament cells may transform into dormant cells.

Vaucheria genus

This genus includes about 70 species, some of which are marine, while the majority live in freshwater, on mud surfaces, in soil, and in shallow waters. They do not float freely but grow attached to the medium by means of fixed, colorless, branching structures called rhizoids. The algal body consists of a sparsely branched, septate, tubular thallus with a central tubular vacuole, surrounded by a layer of cytoplasm containing

numerous nuclei and plastids. This structure is called coenocytes. The plastids are small discs lacking starch centers, and oil droplets are present in the cytoplasm.

(Reproduction by Sexual Reproduction and Asexual)



Vaucheria—**Thallus to show Habit**