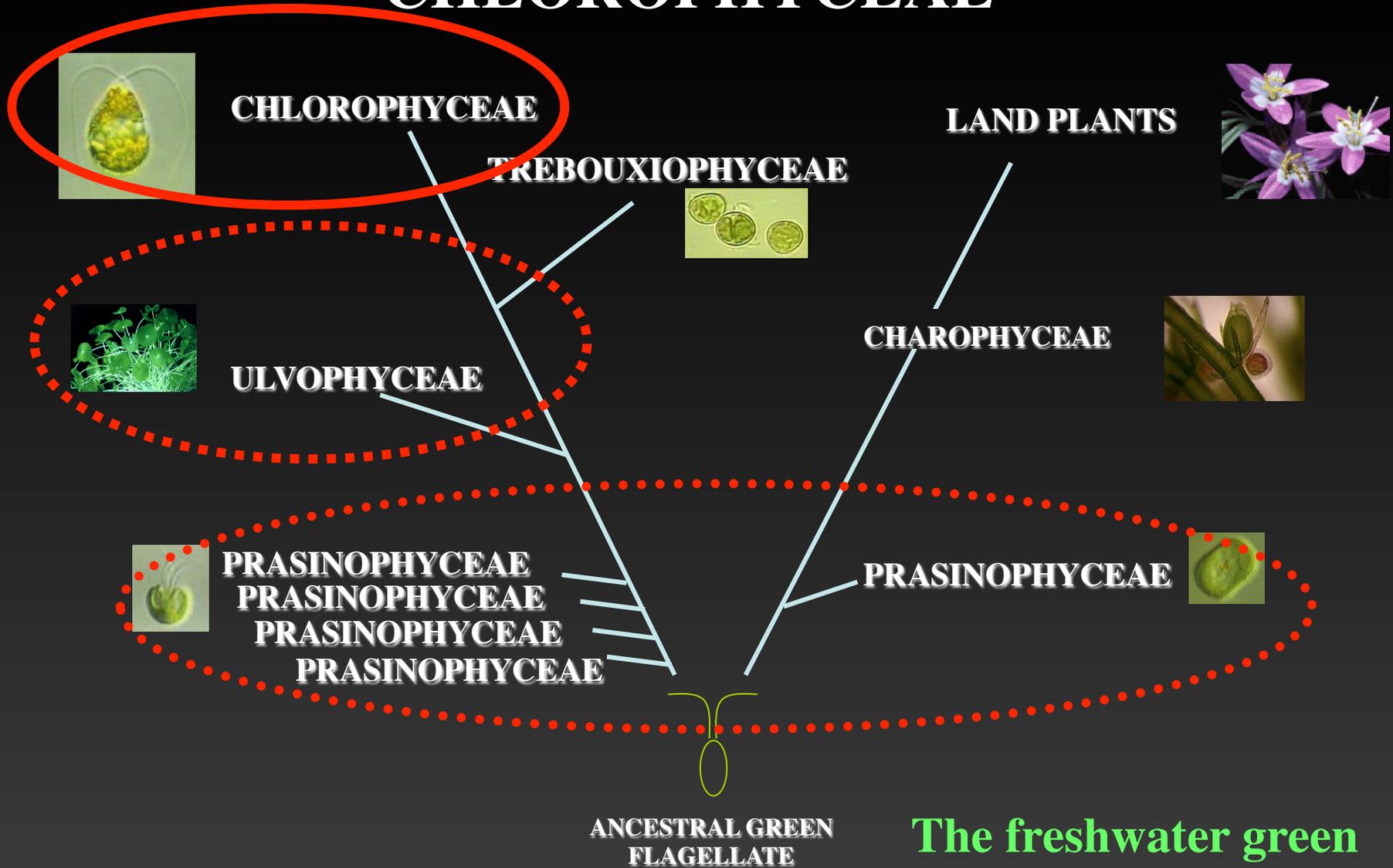
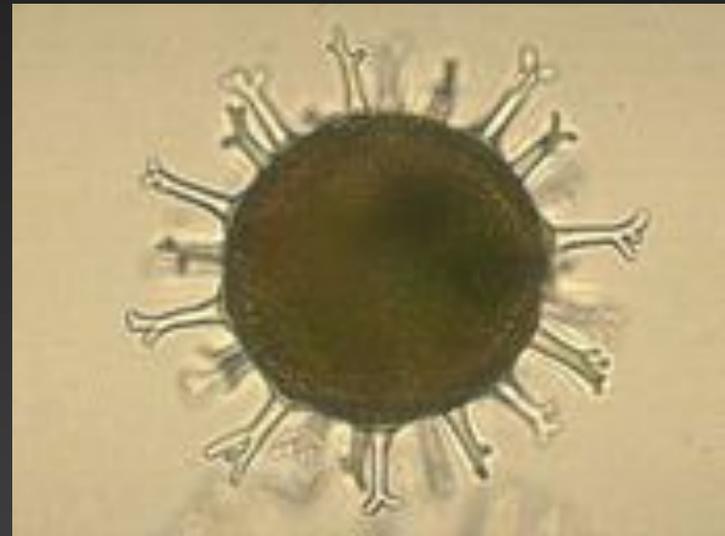


# CHLOROPHYCEAE



**The freshwater green algal celebrities!**

- Mainly freshwater (some terrestrial)
- Unicellular or colonial (monadoid or coccoid), filamentous, some coenocytic
- Closed mitosis with a **Phycoplast**
- **CW** or **DO** orientation of basal bodies
- Zygotic meiosis with **Hypnozygotes** (sleeping zygotes)
- Many of the famous algae!
- Around 7,000 species



Hypnozygote

## Major groups of the Chlorophyceae:

A. CW group

B. DO group

C. Oedogoniales group

# A) THE CW GROUP: The order VOLVOCALES

## Unicellular and Colonial Monadoids!

### *Chlamydomonas*

Freshwater and snow

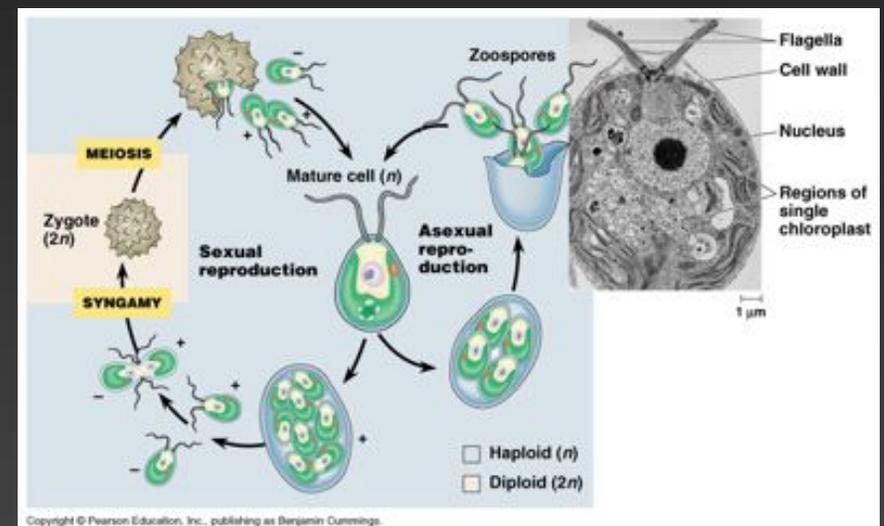
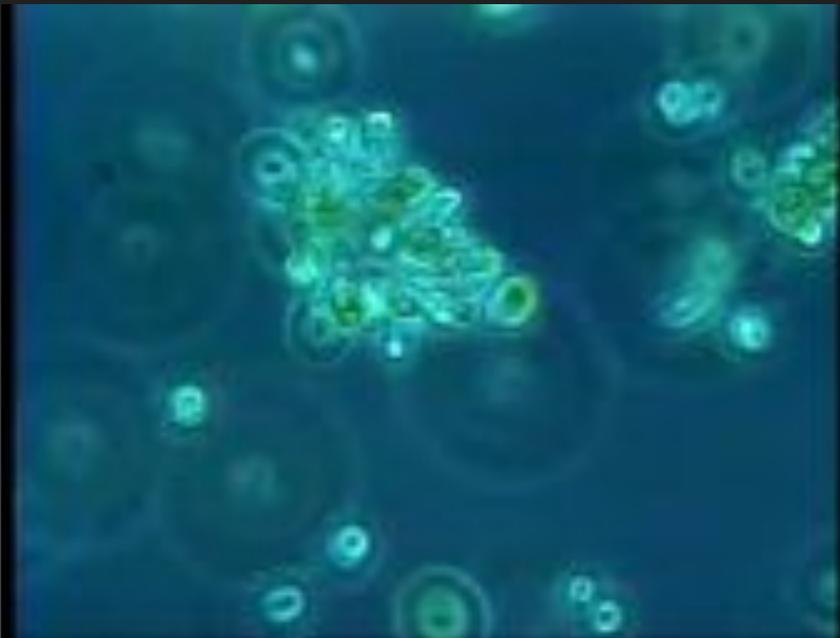
Single biflagellated cells

Cup-like chloroplast

Zygotic meiosis

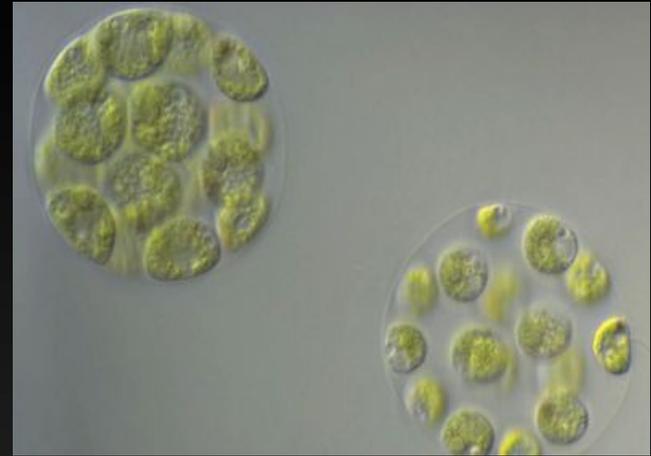
Widely used as model system

@500 spp



# THE CW GROUP: The order VOLVOCALES

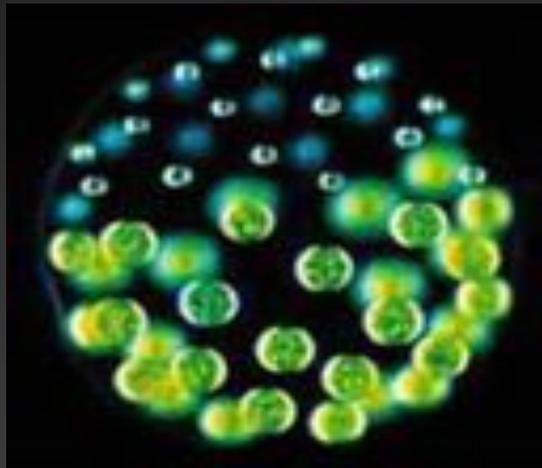
## Morphological Trends in Volvocales



*Chlamydomonas*  
Isogamy

*Pandorina*  
Isogamy

*Volvulina*  
Isogamy



*Pleodorina*  
Anisogamy

*Volvox*  
Oogamy

Volvocales: *Pandorina* and *Volvoxina*



**Autocolony:** a miniature version of the original colony (coenobium)

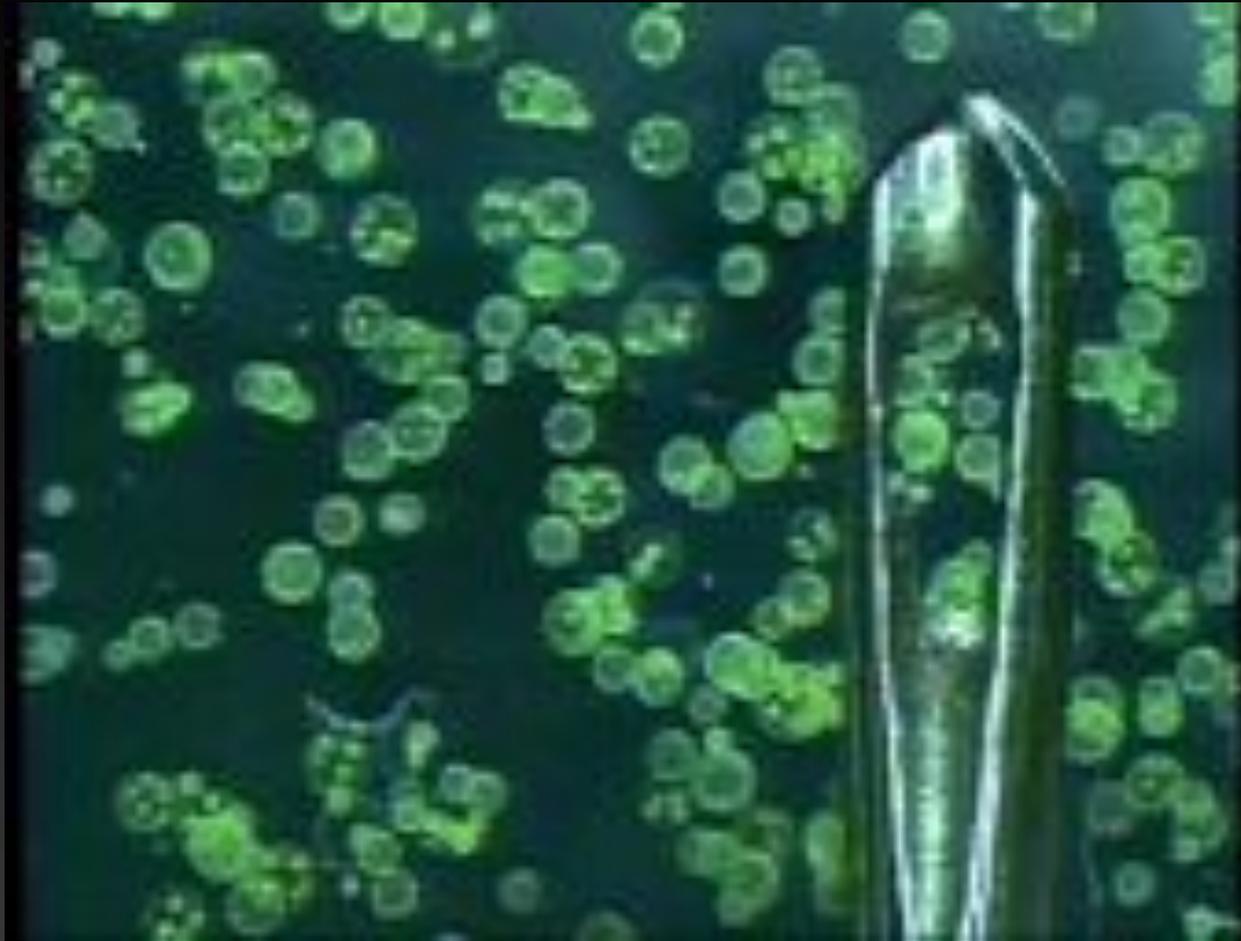
**Inversion:** daughter colonies develop with their flagella facing inward; the colony must turn inside out so flagella are facing outward

Volvocales: *Pleodorina*



Cell specialization: Somatic cells and Asexual reproductive cells (**Gonidia**)

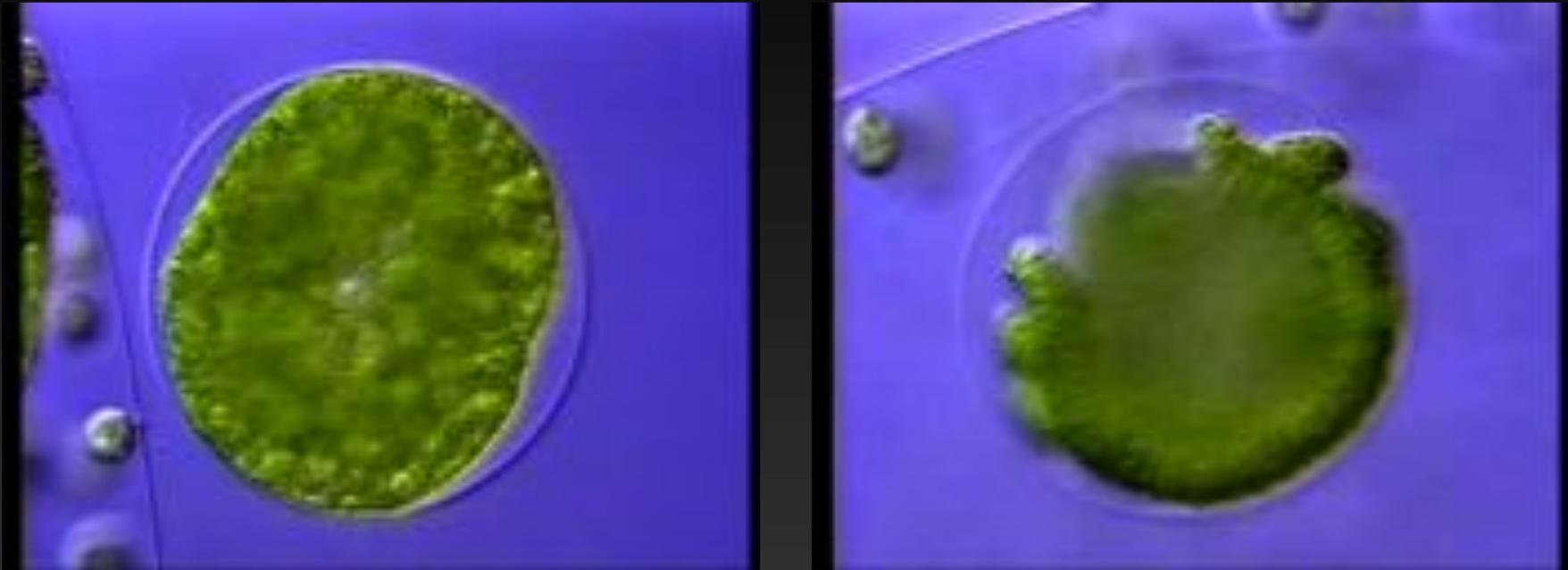
Volvocales: *Volvox*



Colonies with hundreds or thousands of cells!

*Volvox*: Asexual reproduction

Gonidium, Inversion, and Autocolony release



**Phialopore:** a hole in the colony surface through which the colony undergoes inversion

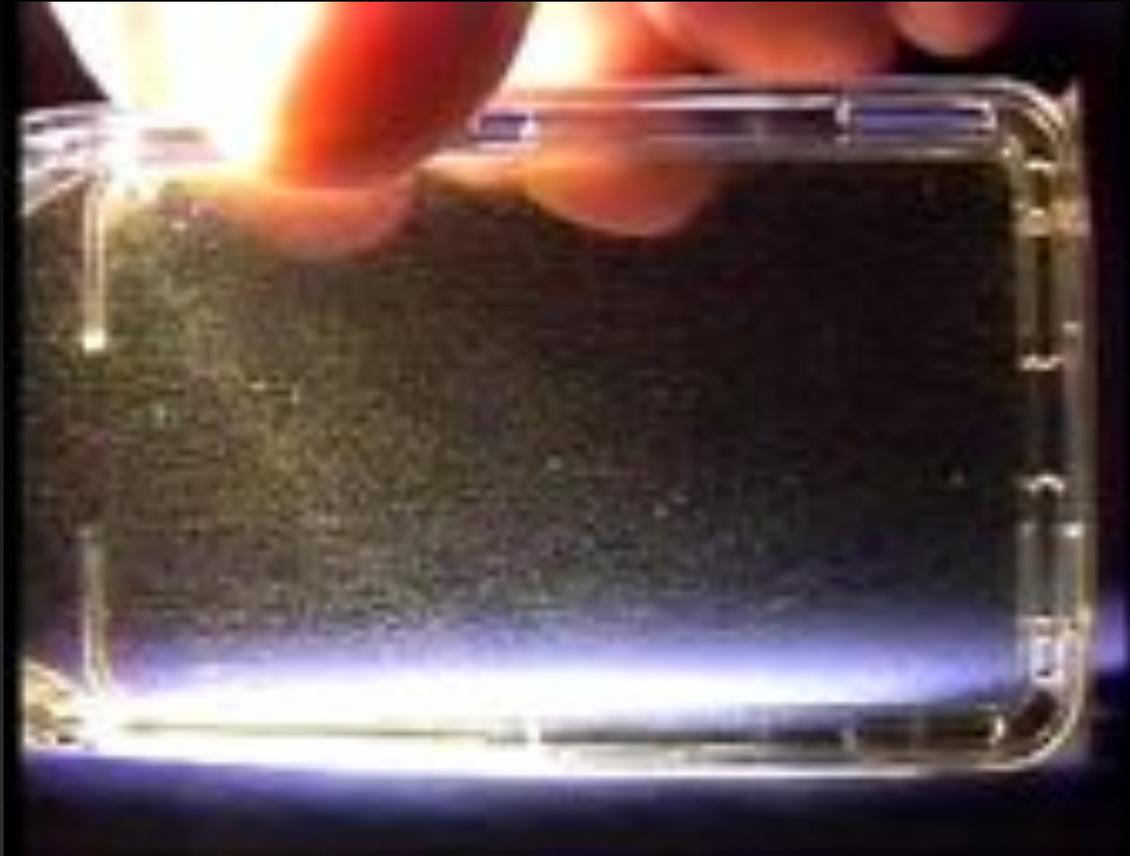
## *Volvox*: Sexual reproduction



Gonidia { Male Colonies with ♂ Gonidia (Androgonidia) form Sperm packets, the ♂ gametes  
Female Colonies with ♀ Gonidia: they will become Oogonia, the ♀ gametes

**Zygotes will become hypnozygotes or sleeping zygotes**

## Volvocales: Eyespot and Phototaxis



**Eyespot (stigma):** a red colored spot, made of lipids and carotenoids, involved in the perception of light

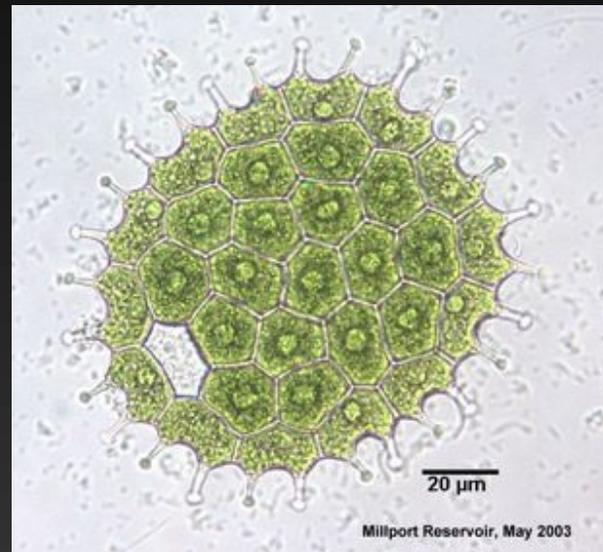
**Phototaxis:** Movement toward (+) or away (-) from light

## B) THE DO GROUP: The cenobial coccoid colonies

### *Scenedesmus-Pediastrum-Hydrodictyon*



*Scenedesmus*

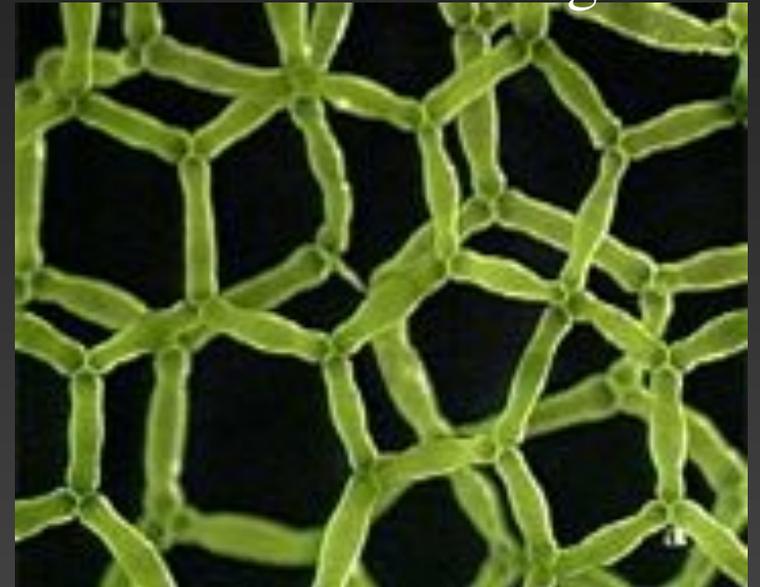


*Pediastrum*



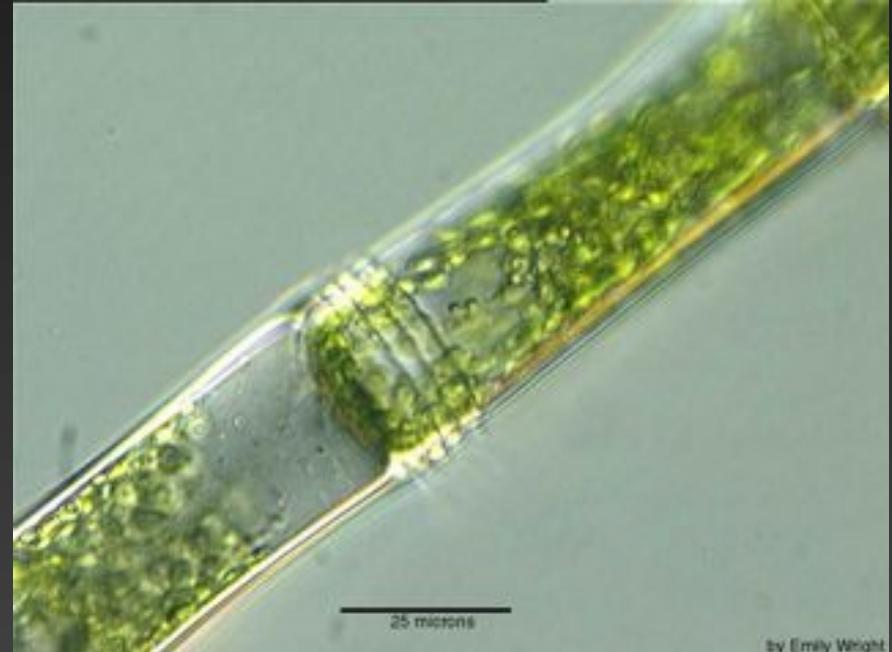
*Hydrodictyon*

“Water-net alga”

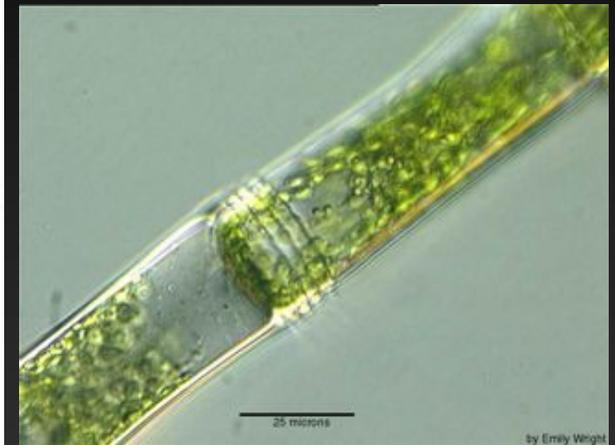
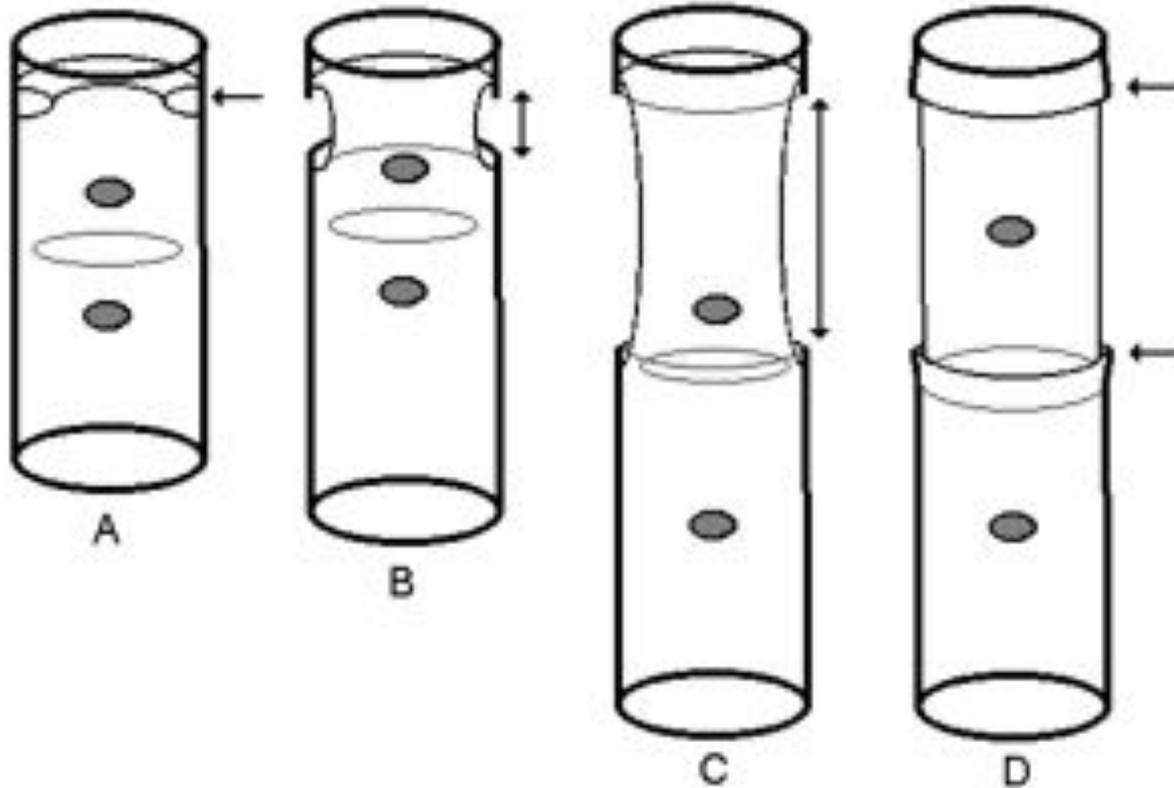


## C) The Oedogoniales group

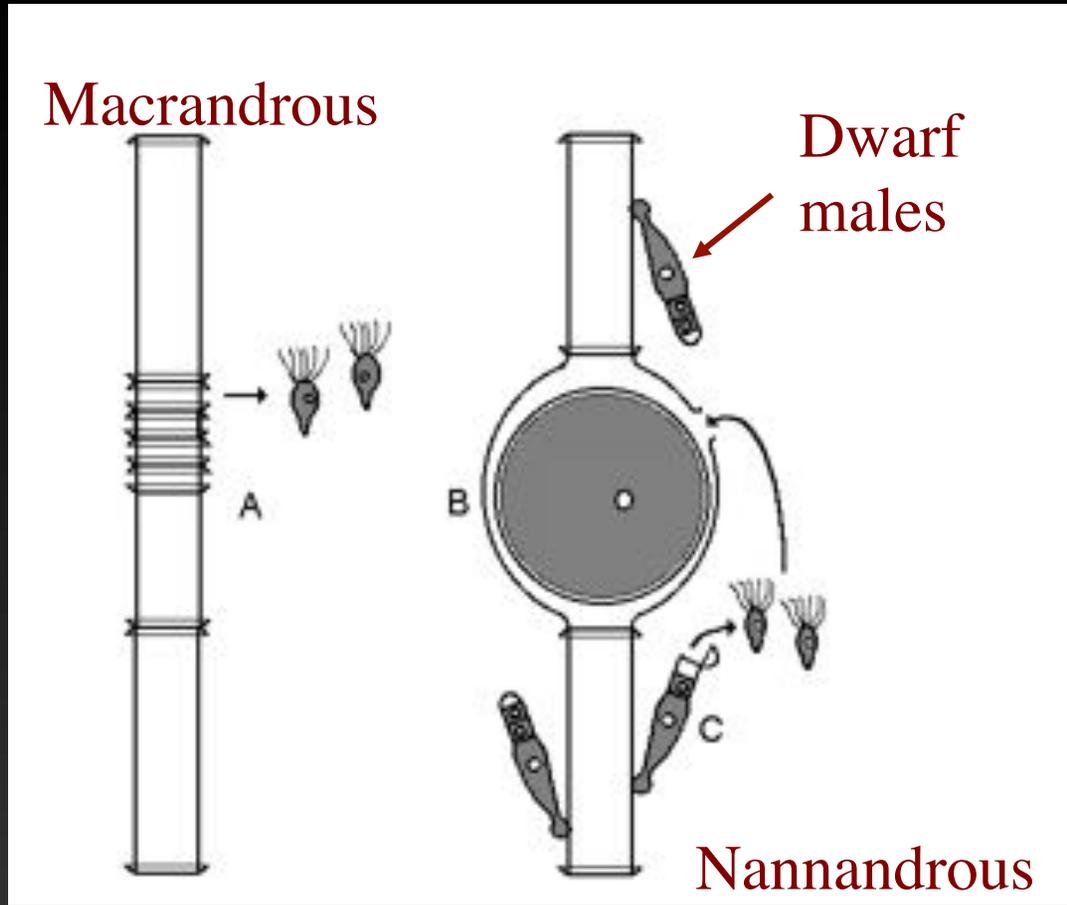
- Filamentous thalli
- Unusual cytokinesis with an “apical cap or ring”
- Stephanokont zooids
- Dwarf males



# Oedogoniales: Unusual cytokinesis with an “apical cap or ring”



# Life cycle: Zygotic meiosis with a hypnozygote



Female with Egg

Species are either:

- **Macrandrous:** Male and female filaments similar
- **Nannandrous:** Female normal size but Dwarf males

