

Biology 205 – Plant Biology

Dr. Chandler

Dobo 214

x 7616





To enroll in BIO 205

- See Bob York (Friday Hall 126 or the adjacent greenhouse)
– x 7852
- Then see me to enroll in lecture

Biology of Plants

- Useful reference resource
- BUT ...



Doing well in BIO 205

- Come to class
 - I do not teach directly from text
- My exams require **STUDY**
- See me **BEFORE** problems arise
- Office hours: Mon. 2-4 pm



BIO 205 Lab

- **Make sure you get the correct lab book**
 - **Canington (Plant Biology)**
- **Labs begin NEXT MONDAY (22nd Aug.)**
- **Held in FRIDAY HALL 132**
- **Lecture and lab should intersect, but sometimes they will not**

Course Grading

- 3 exams plus lab
- Each worth 25%
- Pay attention in lab!
 - get your grade higher
- **NO EXTRA CREDIT IS GIVEN**

Me, me, it's all about me!

- **Plant taxonomy/systematics**
 - diversity
 - classification
 - evolution
 - floristics
- **Molecules and morphology**
 - assorted lab techniques
- **Like to travel? Try systematics!**

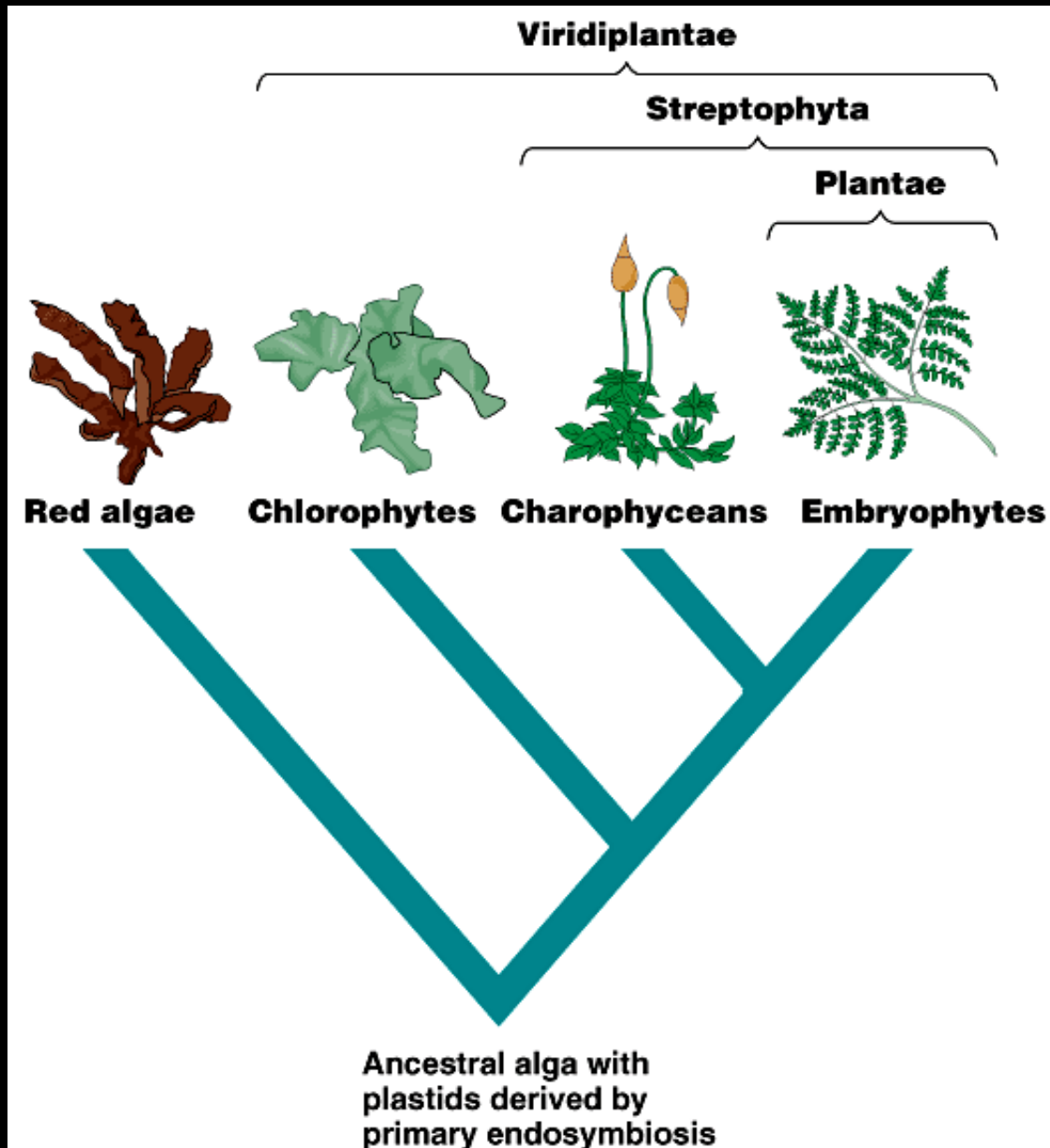
What are plants?



Possibilities

- Photosynthetic organisms
- Land plants (and relatives)
- Multicellular, photosynthetic organisms
- Vascular plants
- Fungi + photosynthetic organisms
- These awful green things that I have to study in this compulsory course!

Some competing hypotheses



Problems With Definitions

- Fungi included as plants or plant-like
 - Cells protected by cell wall
 - Appear non-mobile
- Issues
 - Cell wall does not contain cellulose
 - Do not photosynthesize (lack chlorophyll)

All Photosynthetic Organisms

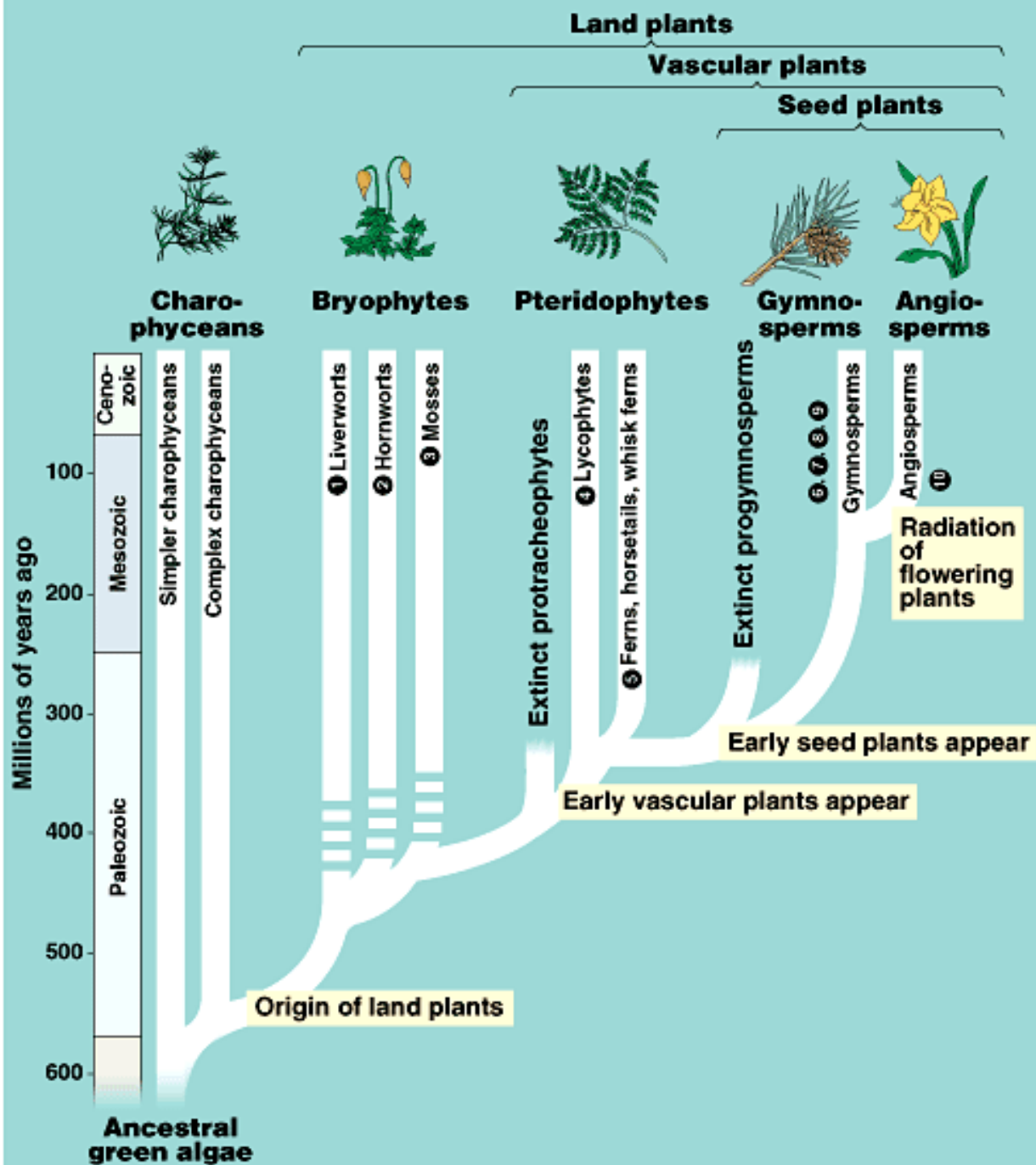
- Includes
 - Algae
 - Bacteria
 - “Plants”
- Different chlorophylls
- Represent quite distinct, often distantly related, lineages

So What the #\$%# Are They, Then?

- For our purposes, plants:
 - are multicellular
 - have cellulose-rich cell walls
 - are photosynthetic (or derived from photosynthetic ancestors)
 - are adapted to life on land (if aquatic, derived from land-adapted ancestors)
 - possess embryos - EMBRYOPHYTES

And these would be, ...?

• Hepatophyta (liverworts)	6,500 spp.
• Anthocerophyta (hornworts)	100 spp.
• Bryophyta (mosses)	12,000 spp.
• Lycophyta (lycophytes)	1,000 spp.
• Pterophyta (ferns etc.)	12,000 spp.
• Ginkgophyta (ginkgo)	1 sp.
• Cycadophyta (cycads)	150 spp.
• Gnetophyta (weird ones)	70 spp.
• Coniferophyta (confiers)	550 spp.
• Magnoliophyta (flowering)	250,000 spp.



Charophyceans are the green algae most closely related to land plants

- Land plants share two key ultrastructural features with the charophyceans:



Fig. 20.2

- The plasma membranes of both groups possess *rosette cellulose-synthesizing complexes* that synthesize the cellulose microfibrils of the cell wall
 - These complexes contrast with the linear arrays of cellulose-producing proteins in non-charophycean algae
- Both have peroxisomes
 - Typically found in association with chloroplasts
 - Enzymes in peroxisomes help minimize the loss of organic products due to photorespiration

- **The structure of sperm in land plants that have flagellated sperm cells resembles the sperm of charophyceans**
- **Finally, certain details of cell division are common only to land plants and the most complex charophycean algae**