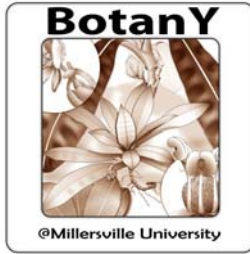


Topic 11: Free-Spring Plants (Bryophytes & Pteridophytes)

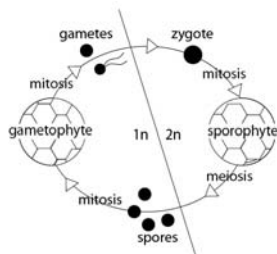


Raven Chap. 16
Chap 17 (pp. 391-392, 394-427)

Kingdom Plantae

(syn. Plants, Land Plants, Embryophytes)

- Cuticle more or less
- Diploid embryo develops within protective maternal haploid tissue.
- Alternation of Heteromorphic Multicellular Generations



What does Free-Sporing mean?

Free-Sporing plants have these shared characteristics:

- no pollen.
- no seeds.
- the spores themselves are the dispersal units.
- gametophytes are free-living and do not develop within sporophytic tissue.
- dichotomous-branching common
- external water needed for fertilization.

**I. Bryophytes
(e.g., liverworts, mosses)**

What distinguishes bryophytes from other free-sporing plants?

- Non-vascular;
- Cuticle wanting;
- Gametophyte dominant, visible component of life-cycle;
- Sporophytes smaller & dependent on gametophytes, unbranched;
- No true leaves or roots.

Where do you find them?

- Moist areas such that they can be bathed in water / high humidity.
- Excellent colonizers of bare (but moist) rock (low profile + rhizoids facilitate this).

A. Liverworts

1. Two forms: both have lobed "leaves" or thallus.

"Leafy"



"Thalloid"



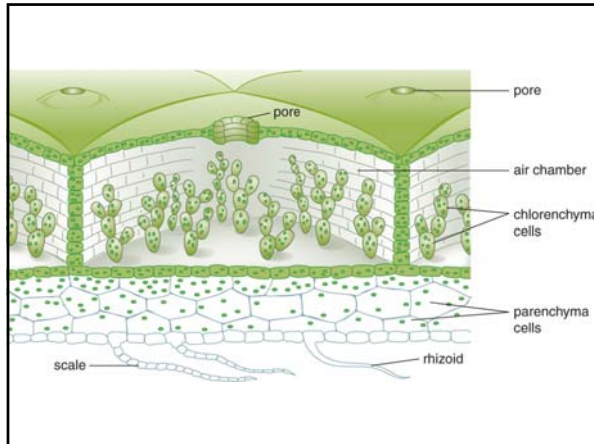
A. Liverworts

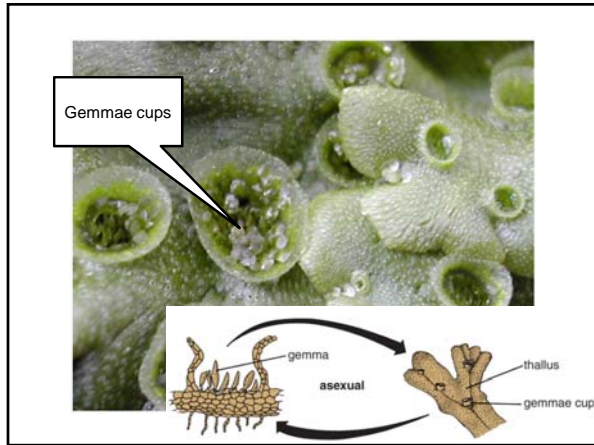
2. Details of thalloid gametophytes.
a. Vegetative

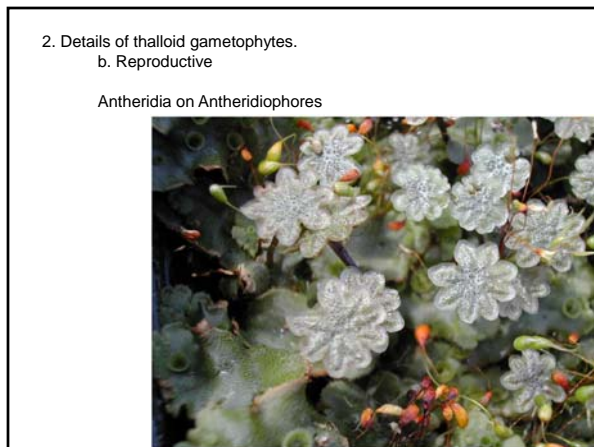
Dichotomously branched

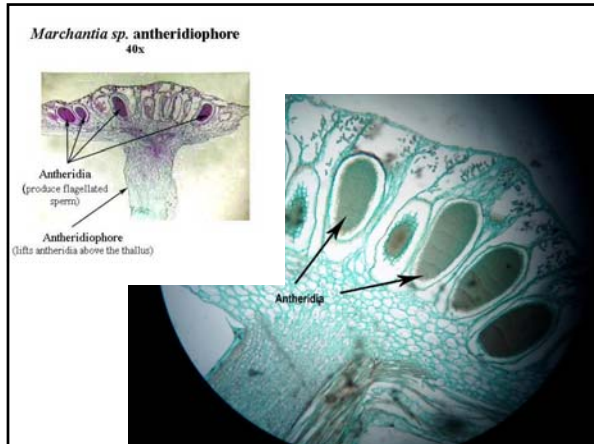




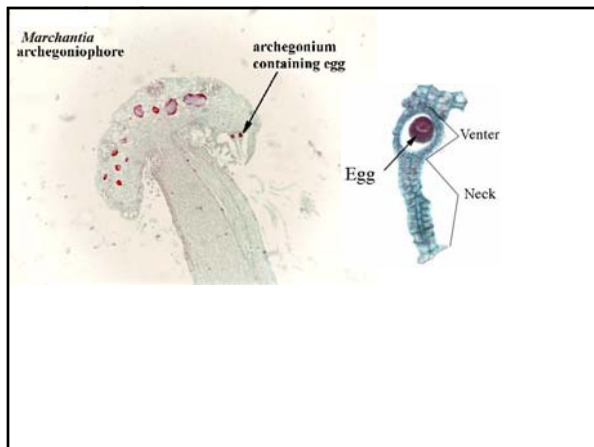




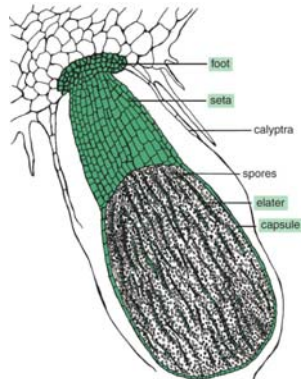






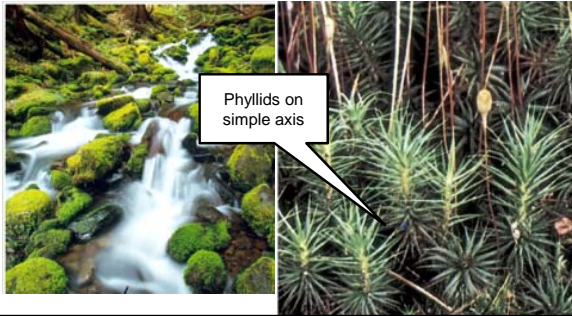


3. Details of thalloid sporophytes.



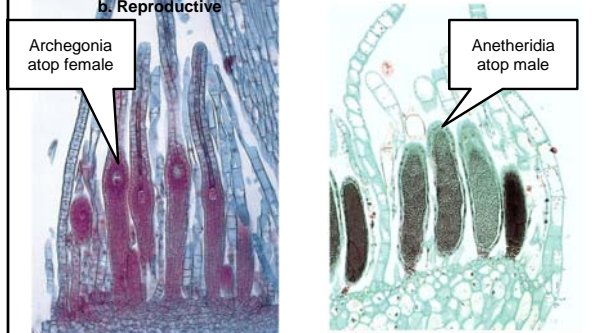
B. Mosses

1. Gametophyte Morphology & Anatomy
a. Vegetative



B. Mosses


1. Gametophyte Morphology & Anatomy
b. Reproductive

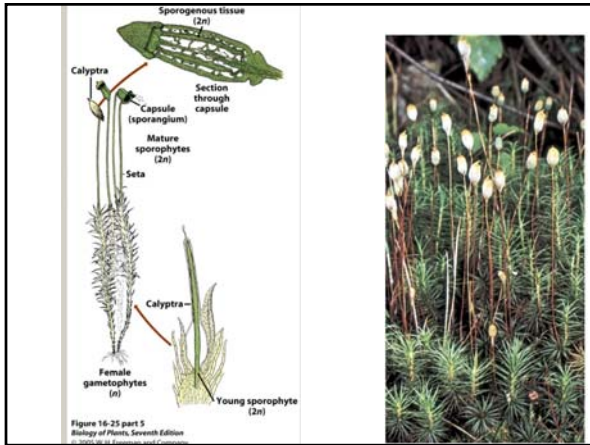


B. Mosses

2. Sporophyte Morphology & Anatomy

Sporophytes atop female gametophytes.





Labels in diagram: Sporogenous tissue (2n), Calyptra, Capsule (sporangium), Section through capsule, Mature sporophytes (2n), Seta, Female gametophytes (n), Young sporophyte (2n).

Figure 16-25 part 5
Biology of Plants, Seventh Edition

II. Pteridophytes (e.g., ferns & allies)

What distinguishes pteridophytes from bryophytes?

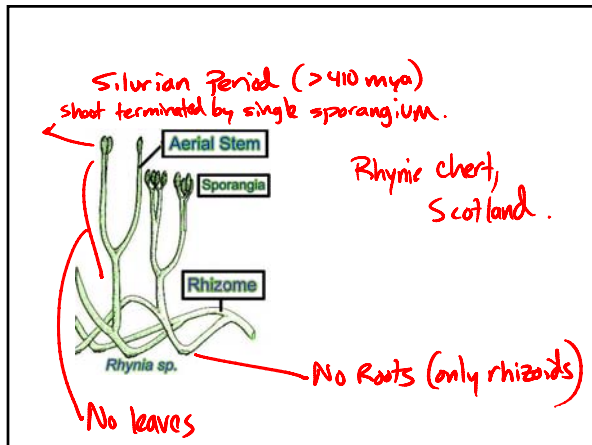
- Vascular;
- Cuticle well developed;
- Sporophytes dominant, visible component of life-cycle;
- Gametophytes smaller, but still free-living, not always green, simple in structure;
- Most with true leaves or roots.

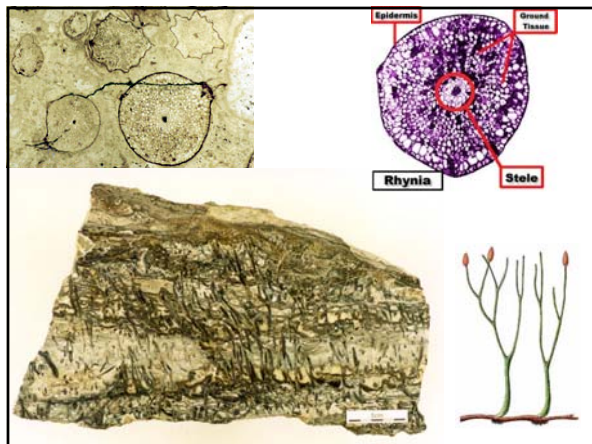
•But external water still needed for fertilization.

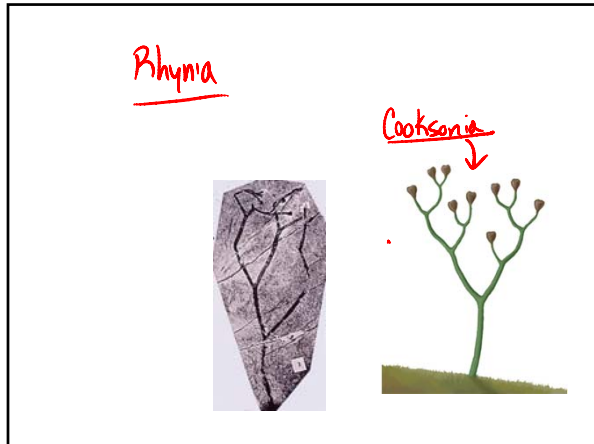
Where do you find them?

- Moist areas such that their gametophytes can be bathed in water / high humidity.
- Further from the water than bryophytes

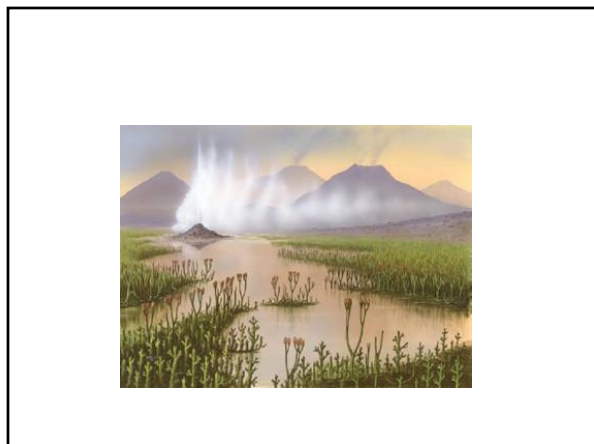
A. Rhyniophytes and Psilotophytes
(e.g., *Rhynia* and *Psilotum*)

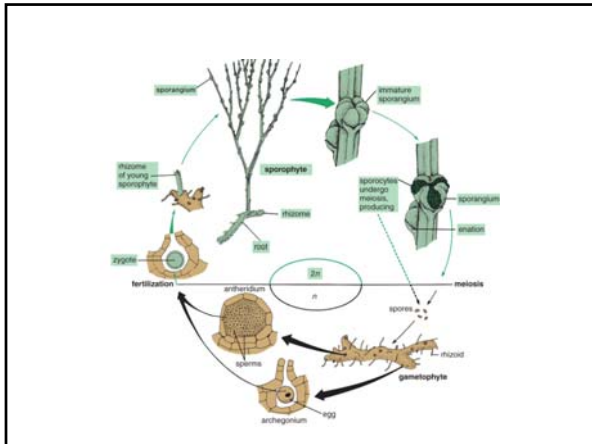




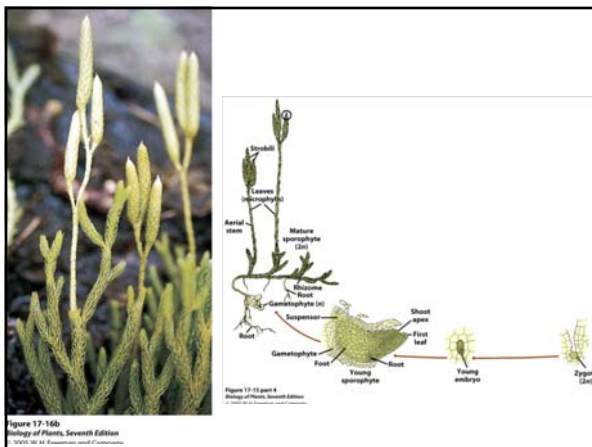




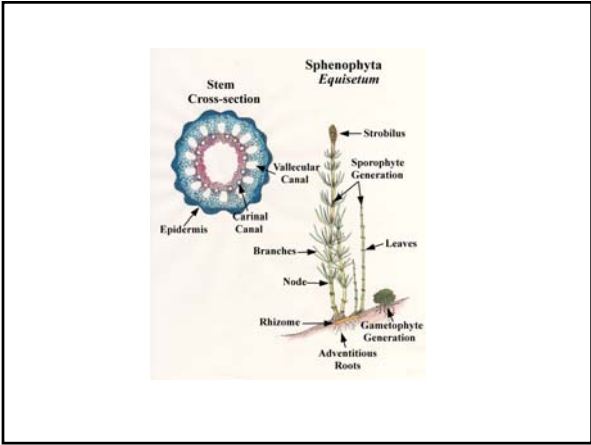


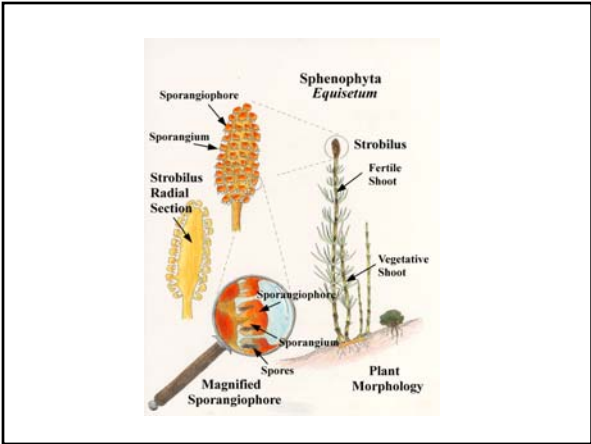


B. Lycopods (e.g., club-mosses, spike-mosses)



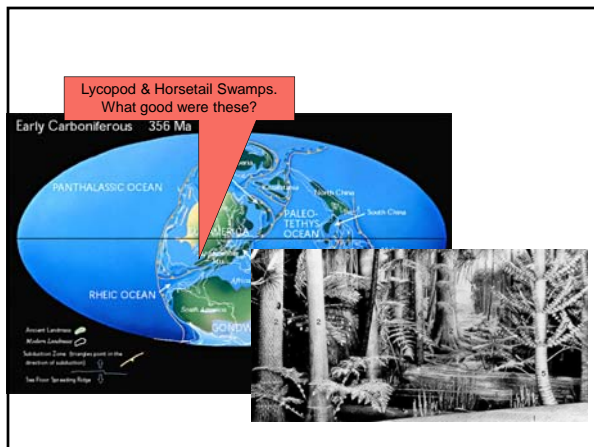
C. Horsetails & Scouring-Rushes

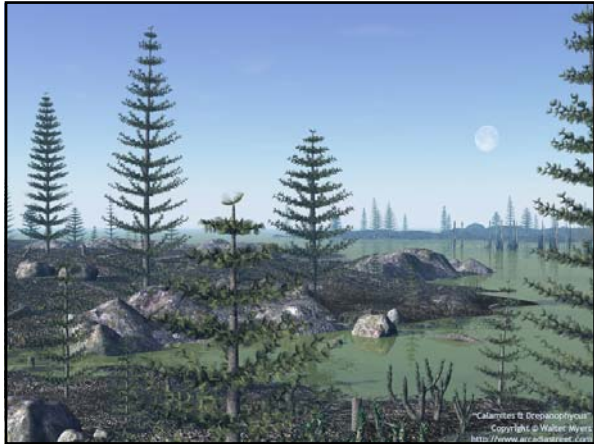




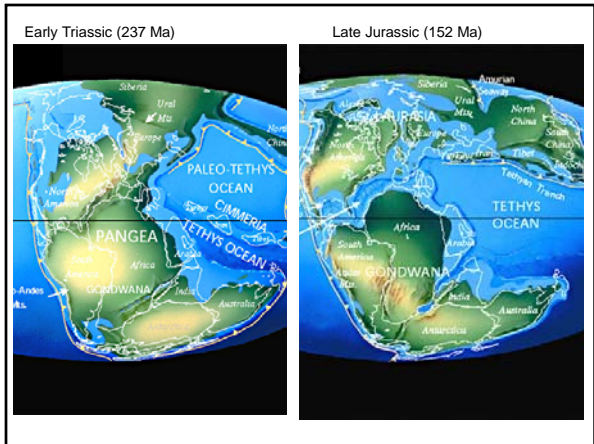


D. Ancient Coal Swamps









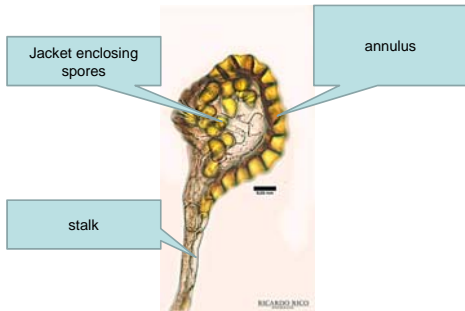
E. Ferns

- Roots
- Stem usually short and rhizomatous
- Macrophyll leaves; alternate and in rosette; often pinnate, circinate vernation.
- Branching various



E. Ferns

- Leptosporangium

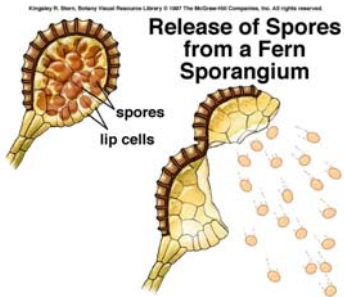


E. Ferns

- Leptosporangium

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Release of Spores from a Fern Sporangium



spores
lip cells

E. Ferns

- Sporangia in sori (singular, sorus) on abaxial leaf surface.




Figure 17-21a, Botany of Plants, Seventh Edition. Figure 17-21b, Botany of Plants, Seventh Edition.

E. Ferns

- Sori naked or indusiate.




Figure 17-21a, Botany of Plants, Seventh Edition. Figure 17-21b, Botany of Plants, Seventh Edition.

