

GENERAL BOTANY Lecture 32 - Bryophytes

COMMENT: WELCOME TO THE WORLD OF PLANTS!! (WE'RE NOW IN KINGDOM PLANTAE)

I. General characteristics of the Bryophyte Phyla

- A. Similarities to algae**
1. Produce free-swimming sperm that travel through water to reach the eggs
 2. No vascular system
 3. No lignified tissue
 4. Lack roots and true leaves
- B. What makes Bryophytes members of the Kingdom Plantae?**
1. Eucaryotic
 2. Lack chitinous walls (cellulose instead) & photosynthesis
 3. Embryos have a jacket of sterile cells encasing reproductive cells
- C. Special characteristics of Bryophytes**
1. Eggs formed in archegonia; sperm produced in antheridia
 2. Chief photosynthetic body is the gametophyte (haploid) - note that Bryophytes demonstrate the sporic life cycle (sporophyte & gametophyte)
 3. Structure is usually thallus
 4. Uses: ecological importance, aesthetic value, absorbing ability, food, and medicine
 5. May be the evolutionary link between algae and higher plants

II. Characteristics of Bryophyte Phyla

- A. Phylum Hepaticophyta (liverworts - "HHHHEEEEEPPPPPTTTTT!!!! [liver]") - small, green, ribbon-shaped plants**
1. Two generations: gametophyte (predominant) and sporophyte
 2. Ribbon-shaped thallus can often form a rosette
 3. Female part (archegonia) has a head that looks like a palm tree (archegoniophore); male part (antheridia) has a head that looks like an umbrella (antheridiophore)
 4. Collective term for archegonia and antheridia is gametangia
- B. Phylum Anthocerotophyta (hornworts - "antlers [horns]"): looks like liverwort except that the sporophyte has a much longer structure**
1. Two generations: gametophyte is a ribbon-shaped thallus and sporophyte towers over the gametophyte
 2. Hornworts are unique because they only have one large chloroplast per cell and those chloroplasts have pyrenoids (mosses and liverworts have many chloroplasts and lack pyrenoids)
- C. Phylum Bryophyta - (true mosses - "musk"): conspicuous small plants which almost appear leafy**
1. Two generations: gametophyte and sporophyte both easily recognized
 - a) Gametophyte can be protonema (creeping, filamentous stage) or moss plant with upright or horizontal stem bearing small, spirally arranged green leaves
 2. Morphology - gametophyte like underbrush and sporophyte like a tree towering the forest
 3. Like other Bryophytes, archegonia and antheridia exist
 - a) Homothallic (monoecious) - gametophytes have both parts
 - b) Heterothallic (dioecious) - parts on separate gametophytes
 4. Generalized pattern of reproduction
 - a) Sperm swim from antheridium to fertilize the egg in archegonium
 - b) Fertilization - zygote is 2n - it develops into sporophyte w/ foot, seta, and sporangium
 - c) Sporangium (capsule) lengthens and grows above the gametophyte
 - d) At some point, cells inside sporangium divide to make haploid spores
 - e) End of old archegonium (calyptra) falls off sporangium
 - f) The end of the capsule (operculum) falls off to reveal peristome teeth
 - g) Under dry conditions, teeth open and release spores
 - h) Spores are haploid and germinate to make a protonema
 - i) Protonema grows to become another gametophytic plant with characteristics of moss