20.6: Bryophyta - Mosses

- Gametophyte Morphology:
  - Exclusively leafy. Leaves are arranged in a spiral and usually have a costa.
  - Simple pores allow for gas exchange (no guard cells, meaning pores are permanently open)

- Sporophyte Morphology:
  - Complex sporangium at the top of a seta
  - Stomata present for gas exchange

The Moss Life Cycle

*If available, observe moss gametophytes with sporophytes under the dissecting scope.* On the gametophytes, look for spirally arranged leaves, each with a costa, and rhizoids at the base. **Female gametophytes** will look tufted at the top. Within these tufts are hidden archegonia, each with a single egg. **Male gametophytes** will have a flat or cupped-looking top called a splash cup where antheridia produce sperm to be splashed out by rain drops. A **sporophyte** will grow from the top of a female gametophyte, emerging from one of the archegonia. Label the bolded features in the life cycle diagram.

*Mnium* life cycle:
In the diagram above, indicate where meiosis and fertilization occur. Color the haploid and diploid tissue differently, and draw arrows to show when mitosis is happening.

*Obtain a prepared slide of a Mnium male gametophyte (antheridal head).* The **splash cup** at the top of the gametophyte holds the male gametangia, **antheridia**. Each antheridium produces haploid, swimming **sperm** by mitosis. Label the bolded features in the life cycle diagram.

*Obtain a prepared slide of an unfertilized Mnium female gametophyte (archegonial head).* This is the structure that produces the female gametangia, **archegonia**. Each archegonium produces a single haploid **egg** by mitosis. The process of fertilization is the same as in the liverworts, described above. Label the bolded features in the life cycle.
Make a wet mount of a moss sporophyte or obtain a prepared slide of a Mnium sporangium. These complex sporangia contain several different parts. When the sporophyte emerges from the archegonium, it tears off the venter and creates a sort of cap on the sporangium, called a calyptra. This calyptra is haploid, as it originated from the female gametophyte tissue. Under the calyptra is a tiny lid-like structure called an operculum that keeps the capsule closed until the spores have developed. When the spores have matured, the operculum pops off and reveals the peristome teeth, which aid in spore dispersal via hygroscopic movements in response to desiccation. Label the bolded features in the life cycle diagram.
This long section shows the developing sporangia (surrounding the grey areas), the operculum (covering the tip of the capsule), and the peristome teeth just below. The calyptra is not present.

If your instructor has found fresh moss sporophytes that have peristome teeth (not all mosses do), place one or two of these sporophytes in a petri dish with a lid on and observe it under the dissecting scope. Draw what you see below and label all parts of the sporophyte.

While looking through the dissecting scope and focused on the peristome, remove the lid of the petri dish. What happens to the peristome and what does this have to do with spore dispersal? If nothing happens, try lightly breathing on it and watching again through the scope.

Contributors and Attributions

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