

Sketch the leaves highlighting the similarities and differences.



Poikilohdry

One nature shared by many mosses and other bryophytes is **poikilohdry (poikilo: variable; hydry: hydration)**, the ability to control the state of internal hydration based on external water availability; i.e., absorb and release water through the surface of the plant body. Take a sample of *Syntrichia papillosa* growing on bark. Place under the dissecting scope and add a drop of water and describe what happens:

Also, note the unusual “structure” that became apparent following hydration. What may these be?

Are these reproductive structures? _____. Are these clonal structures? _____. Justify (this is the critical part!)

What may be the fitness advantage of this strategy?

Would you predict that this is species dioicous or monoicous? _____

Thuidium delicatulum is common moss on 'dry' soil in open habitats or on rocks and logs in forests. The gametophyte is typically branched like a feather, but this sample was left in the growth chamber, and while the main axis continue to grow, branches were not formed. The axes grew upright and develop numerous rhizoids. The stem is also covered by other filamentous structures.

Take one axis and place on a slide and cover with water and slip and observe under the compound scope. Observe the rhizoids. How do they differ from those of liverworts and hornworts?

Describe the other filaments on the stem. How do they differ from rhizoids?

Given those differences, what may be their function?

We may discuss in an upcoming lecture that these may also be involved in holding external water .

Atrichum crispulum is a local species growing in shaded river banks for example.

This moss belongs to the family of haircap mosses, which is characterized by features of its leaves.

Gently remove a couple of leaves from the stem and place two of them in a drop of water, one facing up and one facing down. Compare the two sides of the leaf. What are obvious features you notice?

Challenge: take one leaf, place it in a drop of water facing down. Make a cross section of the leaf! Gently hold the leaf down with your dissecting needle and section by running your razor blade against the needle. You do not need a perfect section but one thin enough for it to lay on its side. If you are successful, you should see a unique feature of this leaf! What may be the function of these structures?

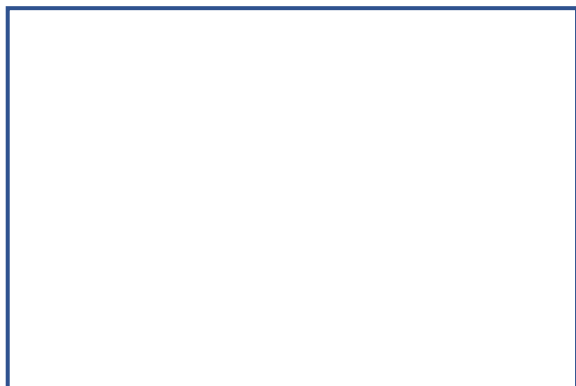


Note also the anatomy of the costa (midrib). Are all cells similar or are they organized in “tissues”?

Return to the stem and remove most or all remaining leaves, clean your slide and place the stem in a small drop of water. Make a transverse section of the stem.

Are the cells similar as you move from the outer layer inward?

How do the cells differ? Sketch a pie-section of the stem to highlight the organization of the stem.



Life cycle

Plagiomnium cuspidatum (Hedwig) T. Koponen is a perennial local moss growing on soil in mesic habitats. The species undergoes sexual reproduction in the fall and the immature sporophytes overwinter and resume their maturation in the spring. We have collections of the population made (today) and last spring, that exhibit these two developmental stages.

The winter sample bears sporophytes in the spear stage, whereas the spring sample has fully developed sporophytes. Observe under the dissecting scope and describe how they differ.

Can you distinguish the calyptra on the winter sporophyte? What is the calyptra?

Sketch the two sporophytes and annotate the parts.



How does this mode of development differ from that observed in liverworts? _____

What may be the advantage of the mode of sporophyte development in mosses?

Take on stem/branch bearing a spear shaped sporophyte. Determine the sex of this gametophyte, i.e., whether the gametophyte is dioicous or monoicous. Where would you look? Justify your answer.
