# Laboratory 6 Peatmosses, Pincushion moss, and peristome

## Objectives

Last week you examined various mosses to gain an understanding of the general architecture of their body and in particular of their leaf. Today we will examine two other architectural types, build around dead cells.

As you know most mosses develop a peristome, a set of teeth, contributing to the control of spore release.

### Warm-up exercise! (5 min max)

Last week you observed what poikilohydry means. If you are not convinced, take a stem of *Racomitrium lanuginosum* and move it to a drop of water while you watch it under the **dissecting scope**. What happen and why is this an important observation to understand the biology of mosses in general?

Now remove a few leaves and observe under the compound scope. The shape of the cell and in particular the cell walls is diagnostic of this genus.

#### Sphagnopsida (peatmosses) – Sphagnum austinii

Peatmosses (*Sphagnum*) are widely distributed and are abundant at higher altitudes in the tropics and at high latitudes, especially in Eurasia and North America. The Sphagnopsida comprises four genera, of which *Sphagnum* (until recently the only genus) is the most speciose, counting at least 300 species. Many (and hence not all) of the species are peat-forming and hence dominate the vegetation in peatlands.

Observation of *Sphagnum* leaf and stem architecture is best completed after the plants have been stained in Gentian violet. *Be careful as the stain will not only stain the plant but also your hands*.

#### You should each get one stained and one unstained individual (you only need a branch).

**Unstained individual:** Sphagnum plants are characterized by a unique plant body architecture and leaf architecture. The branching pattern of Sphagnum is unlike that of other mosses in that the branches are clustered, in bundles, with typically branches spreading away from the stem and others hanging down along the stem. Also at the tip the clusters are themselves clustered so that all clusters for a capitulum. Subsequently, the stem cells between the clusters may elongate and the clusters are then more evenly spread.

Remove a branch and mount some leaves on a slide, observe and describe. The leaves are highly concave; make sure you lay some with the concave surface up and others down The areolation (the way cells are shaped and laid out in a lamina is very different form the other mosses you observed)

How many cell types make up the lamina?

Challenge! Try to make a cross section of a single leaf. This is not easy but essential to uncover how the leaf is indeed build.

So, how many cell types make up the leaf? \_\_\_\_\_ do these differ? \_\_\_\_\_\_

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Now prepare a slide with the stained leaves. Record your observations





Leucobryum albidum (pincushion moss) a common moss in our forests.

Prepare a slide with a few leaves. When you focus up and down you should get the feeling that the leaf is composed of....

To check or confirm this hypothesis, make a cross section of the leaf. Is the leaf composed of

different cell types? \_\_\_\_\_ How are these arranged? \_\_\_\_\_

Sketch the section and mark where photosynthesis takes place.

What may be the function of the other cells?

#### Nematodontous versus arthrodontous peristome

You are given a moss with a nematodontous and one with an arthrodontous peristome. You goal is to compare the two and to compile traits in the table below. This is the type of question you may have to answer on the assessment. You should first examine the peirsome under the dissecting scope and record your observation, and only then prepare a slide with the two capsules cut lengthwise and placed each on a slide. Start with the nematodontous one and record traits and score them. Then move to the arthrodontous one and contrast. You should be identifying traits in the latter peristome that you did not notice earlier, so go back and score the nematodontous peristome.

In both cases you should mount one capsule half with the outer surface facing you and one with the inner surface facing you.

Traits to consider, number of rings of peristome teeth, do the traits move with changes in moisture, shape of cells (or plates), ornamentation (what do we mean?), ...

Trait	Nematodontous	Arthrodontous

# Spore dispersal in Atrichum

Take a plant with a sporophyte (Is this plant acrocarpous or pleurocarpous?) and observe the sporophyte under the dissecting scope. The operculum has been released (remember what the operculum is?) and exposed the peristome, which appears unlike what you have seen so far.

This is a nametodontous peristome. How is spore released controlled in this species, which produced tens or hundreds of thousands of spores!

