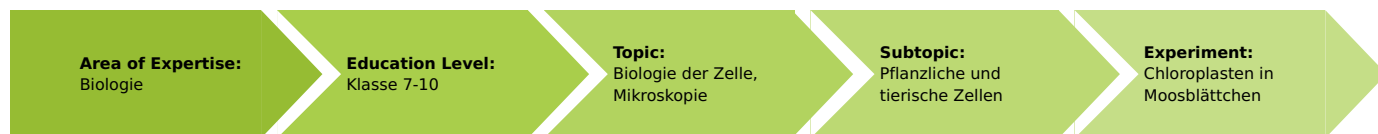


Chloroplasts in moss leaves (Item No.: P1441201)

Curricular Relevance



Difficulty



Easy

Preparation Time



10 Minutes

Execution Time



30 Minutes

Recommended Group Size



1 Student

Additional Requirements:

- Moss
- Water

Experiment Variations:

Keywords:

Task and equipment

Information for teachers

Information

The characteristic feature of almost all plants is their green color. It comes from a pigment which is the catalyst of the most significant biochemical process on earth: photosynthesis. The name of this pigment is chlorophyll. Chlorophyll is not evenly distributed in a plant cell but located in particular reaction compartments, i.e. the chloroplasts. This is where photosynthesis takes place.

Information on chloroplasts

Within their protoplasm, plants possess plastids that are surrounded by membranes. Depending on their pigment content, we distinguish chloroplasts (with chlorophyll/green), chromoplasts (with carotinoids/red or xanthophylls/yellow), and leucoplasts or amyloplasts (colorless).

Chloroplasts are mostly lentiform and possess discoid membrane structures inside, where the green pigment is located.

Chloroplasts can move within a cell, allowing protoplasm streaming to be inferred from their movements.

Information on practical performances

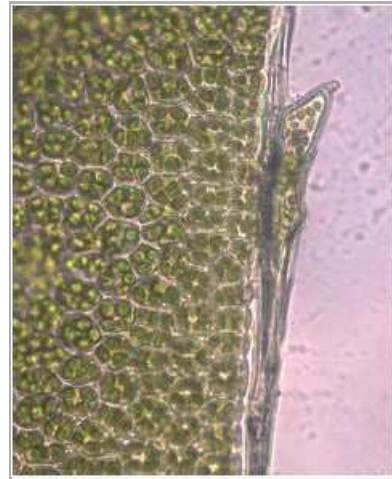
1: Preparation of slides

If the moss is obtained considerable time before microscopy, some leaflets will become quite undulated and therefore cannot be easily examined under the microscope. For this reason, the moss needs to be moistened with lime-deficient water before lessons start. The students shall not find it difficult to prepare the slides, since sections etc. are not required.

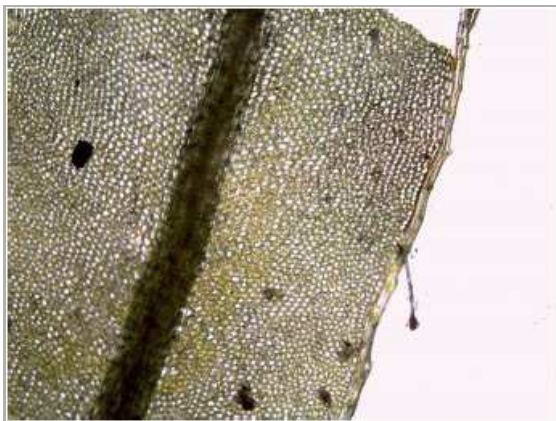
2: Microscopy



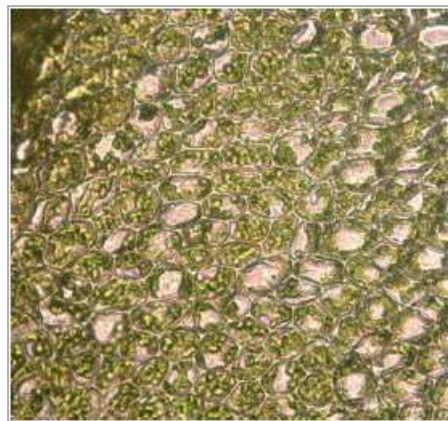
Moss, (100x)



Moss, (400x)



Moss, (100x)

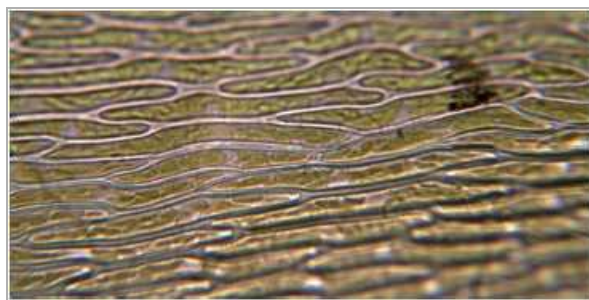


Moss, (400x)

The following images display very small cells, so that the chloroplasts will become discernible only under 1000-fold power, which cannot be done in class. Consequently, the specimens must be examined in advance.



Moss, (400x)



Moss, (1000x)

Chloroplasts in moss leaves (Item No.: P1441201)

Task and equipment

Task

Describe shape and arrangement of the chloroplasts in a plant cell!



Equipment

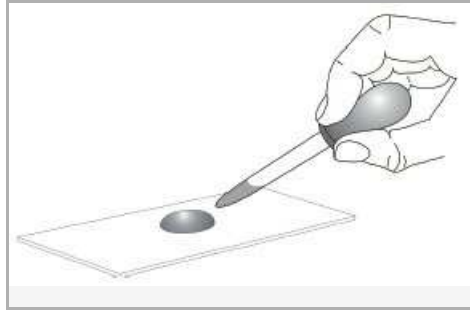
Position No.	Material	Order No.	Quantity
1	Euromex BioBlue BB.4250 microscope	EUR-BB-4250	1
2	Microscopic slides, 50 pcs	64691-00	1
3	Cover glasses 18x18 mm, 50 pcs.	64685-00	1
4	Beaker, low form, plastic, 100 ml	36011-01	1
5	Dropping pipette with bulb, 10pcs	47131-01	1
6	Tweezers, straight, pointed, 120mm	64607-00	1

Set-up and procedure

1. Preparation of slides

Mosses possess very thin, almost transparent leaflets and are particularly suited for this experiment.

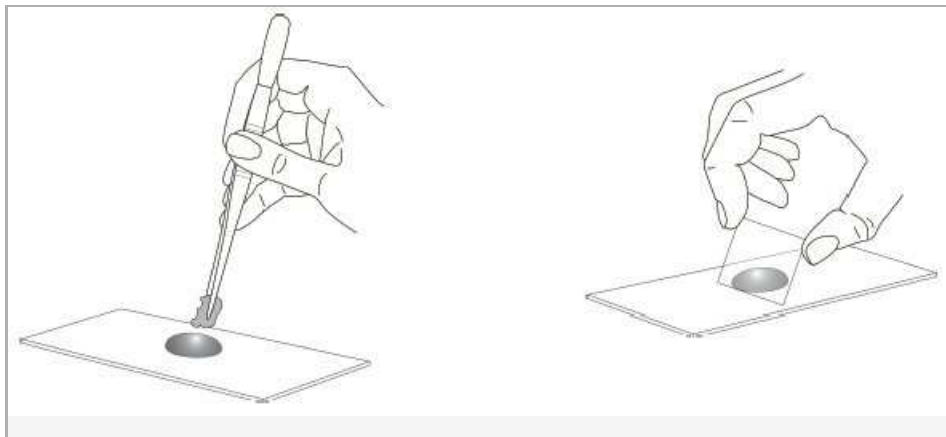
- Pipette a drop of water onto a slide.



- Tear a single leaflet from a moss plant using forceps.



- The leaflet is placed directly into the water drop.



2. Microscopy

Study the specimen under the microscope at first with the lowest power. In some areas, several cell layers will lie one on top of the other. Individual cells cannot be seen here. However, you will find individual cells containing the chloroplasts in marginal areas or near the midvein.

If you spot a nice cell, move the site of interest right into the center of the visual field. Then switch to an intermediate power by turning the revolving nosepiece. Describe the shape of the chloroplasts in the report.

Information on obtaining materials

Proper mosses (*Bryopsida* or *Musci*) can be found in almost all locations. Particularly high abundances are naturally encountered in all moist and shaded locations. However, some species possess very small cells and chloroplasts, so that they are useful only when viewed under high powers. The teacher should therefore test the available species for their microscopic suitability beforehand.

Particularly suited are various types of mosses that are found growing on forest soil, e.g. wood-hair cup moss (*Polytrichum formosum*), Swan's neck thyme moss (*Mnium hornum*), Harts-tongue thyme moss (*Plagiomnium undulatum*), Catherine's moss (*Atrichum undulatum*), and many others.

If a natural habitat is unavailable, inquiries should be made at commercial gardening shops.

Alternatively, microscopy is also possible with the common aquarium plant elodea (*Elodea*) which is available at pet shops.

Report: Chloroplasts in moss leaves

Result - Observations 1

Describe the shape of the chloroplasts.

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Result - Observations 2

How are the chloroplasts distributed in the cells?

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Evaluation - Question 1

Draw a moss cell.