Ciliates in a hay infusion (Item No.: P1444401)

Curricular Relevance

Area of Expertise: Biology
Education Level: Age 14-16
Topic: Cell biology, microscopy
Subtopic: Protists and prokaryotes
Experiment: Ciliates in a hay infusion

Difficulty	Preparation Time	Execution Time	Recommended Group Size
Easy	10 Minutes	30 Minutes	1 Student

Additional Requirements:

- Pond water
- Hay

Experiment Variations:

Keywords:

Task and equipment

Information for teachers

Information
Surely you have observed on several occasions that the water in flower vases has become turbid after standing too long. Microscopic organisms have grown in this water, resulting in the decay of the plants and producing an unpleasant odor. These organisms are interesting objects when observed under the microscope. We want to enrich them in a hay infusion.

Information on obtaining materials
Hay - and not straw - should be used when making a hay infusion. If you do not have contact with a farming operation, you can obtain it from a pet shop as it is used as animal feed. If possible, a student should be assigned to get it.
If possible, pond water should be used, although rainwater from a collector tank is also applicable.
The organisms are introduced both from the pond water and directly from the hay. Upon drying of the plants, persistent forms of various bacteria and protists develop which are reactivated as soon as water is re-supplied.

Information on hay infusions
The water will turn turbid after a few days and a white film (pellicle) will spread on its surface. This is where predominately bacteria are found which the protists feed on. The multitude of protists to be observed is immense and many field guides and taxonomic identification keys are applicable. The students do not have to learn many names, but they should know that unicellular organisms displaying a partially ciliated (coronal cilia as in the bell animacule) or a fully ciliated body belong to the ciliates. Among the multicellular organisms, nematodes and rotifers should be recognized.

Information on how to proceed

- One ciliate should be exemplarily selected, its structure and life style should be made the topic of discussion. Paramecium is particularly suited because of its high recognizability.
- The withdrawal of samples may proceed in arbitrary intervals and should be recorded. This allows making a documentation of the dynamics of the hay infusion as an ecosystem. If there is only one date possible for examination, the optimum for making observations will be between Day 10 and 14.
- Samples taken from the surface, from immediately underneath the pellicle, the center, or the bottom may be compared.

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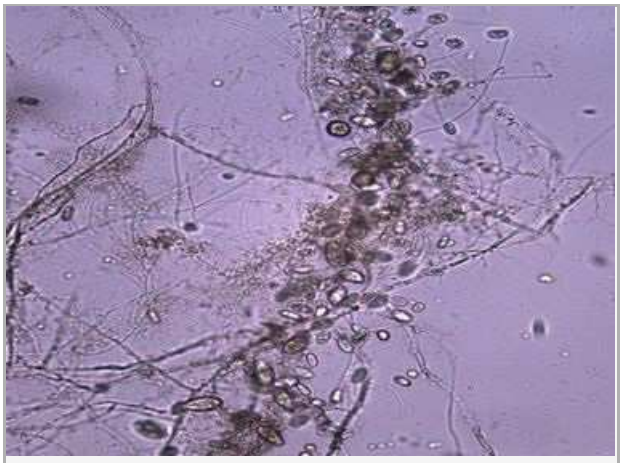
Paramecium 100x

Ciliate, 100x

Euplotes, 400x



Various ciliates, 100x

Ciliates and spirillae, 400x

Ciliate, 400x

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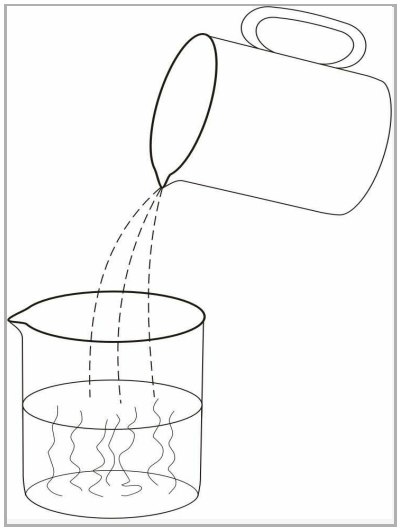
Task and equipment

Task

Prepare a hay infusion and explore what kind of animals have developed in it.



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, high, PP, 1000ml	46275-01	1

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Set-up and procedure

Information
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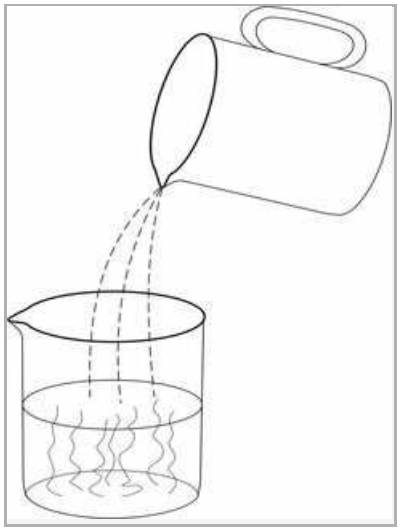
Methods and observations
1. Animal breeding

- Water is poured over a handful of hay. Tap water might contain chloride and is therefore not appropriate. Use water which is as "natural" as possible, for example, taken from a small garden pond, lake, or brook.



- The sample should be kept at a warm location over a period of 14 to 20 days. Avoid direct exposure to sunlight.
- Microscopy may commence on day 5.

2. Microscopy

- Depending on the time available, you should repeatedly take samples from your hay infusion in intervals of a few days (e.g. days 5, 7, 10, 15 etc.)
- You will find bacteria which serve the somewhat larger unicellular ciliates as food.
- The most conspicuous of the ciliates is paramecium. Look at an illustration in your biology textbook and examine the animal under the microscope. Do you see the cilia on its body surface?
- Some of the other quite small animals with a ciliated surface also belong to the ciliates. If you are lucky, you will also discover ameba and rotifers. Use a field guide or your biology textbook to determine the organisms by name.
- Write down or draw some of your findings in the report!

Report: Ciliates in a hay infusion

Result - Observations

Note down your observations

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Evaluation - Question 1

Sketch one ciliate you observed.