The Effect of Fungal Growth on Seed Health

A Project for Elementary Grades

Title: The Effect of Fungal Growth on Seed Health
Purpose: To see the effect the growth of fungi has on seed germination. This experiment can be modified by using more than one temperature. This would simply require an appropriate increase of most ingredients listed below.

Material:

- 200g or more seeds of wheat or barley
- 4 jars with screw top lids
- 9cm petri plates. Require 4 x the number of sampling dates. ie. 10 dates = 40 plates.
- 9cm filter papers. Require the same number as plates.
- balance
- tweezers
- Marking pen
- 5ml pipette or other measuring device
- clear plastic bags
- Water

Method:

1. Place wheat or barley seed into 4 jars with a screw top lid. Put 50g of seed into each jar.
2. To jar #1, add no water. To jar #2 add 5ml of water. To jar #3 add 10ml, and to #4 add 15ml water. Leave at room temperature. Shake jar daily to mix the grain.
3. On the first day, use tweezers to remove 25 seeds from each jar and place on filter paper in a petri dish. Label each plate with the jar # and the sampling date. Wet the filter paper with 5ml of water. Place plates into a clear plastic bag, but do not seal tightly, just fold the top over. Leave the plates at room temperature for 5 to 7 days (Note: If the filter paper does not fit properly in the bottom of the petri plate, one can invert the plate and use the lid as the bottom. However, if you do, one must open the petri plates briefly every few days during incubation).
4. After 5 to 7 days, record the number of seeds which germinated in each dish and the number of seeds with fungi growing on them. Note if there is fungal growth in the jars.

Repeat step #4 twice a week.

Results:

- Prepare a graph showing the change in germination of the seeds for each of the 4 jars?
- Prepare a graph showing the number of seeds with fungi growing on them in the germination tests.

Questions:

1. How many days did it take for the germination rate to decrease in the jars with, 0ml, 5ml, 10ml, and 15ml water?

2.Why do you think the germination rate decreased?
3.Did the seeds germinate in any of the jars? If so, which ones?
4.Did fungi grow in any of the jars? If so, which ones?
5.Where did the fungi come from?
6.Did the amount of water in the jar influence the rate at which the fungi grew?
7.Were the jars where the fungi grew the most also the ones where the germination decreased fastest?
8.If a person wanted to keep seed alive for a long time, how should they store it?

Instructions to teachers:

- The test takes a few minutes to prepare. Sampling of the jars should be done twice a week. Germination can be measured after 5 days. You can terminate the experiment when you feel that a pattern has developed.
- Some seeds may germinate at the higher water levels. This will naturally affect the germination rate, but is unavoidable when one doesn't know the moisture content of the seeds being used. It will show that the seeds require more water to grow than fungi. This means that seeds can become mouldy in storage at moisture levels below which they can grow. Knowing the amount of moisture required for fungal growth allows seed growers to determine when the seed needs to be dried to protect it from spoilage.
- Note that the rate of spoilage and germination loss will be affected by the amount of moisture available, but that time also is important. Even at lower moisture contents the seed will eventually die if the fungi are allowed to grow long enough.
- One can add the effect of temperature by storing the jars at different temperatures.