SEED ACTIVITY I: Seed Germination

The Relationship Between Seeds, Growing Conditions, Germination, and Plant Size

American Society of Agronomy

Thank you Science Buddies (www.sciencebuddies.org) for developing the original activity. Adapted by the American Society of Agronomy.

Overview

Plants have evolved many clever mechanisms to ensure their seeds will wait for appropriate conditions before sprouting. Some may only germinate after a fire, others only after going through a cold spell, or in certain types of soil, among many other variables. This project explores one important variable among many that determine the ideal conditions for seed germination.

Germination is the process by which a seed emerges from the seed coat. We know seeds germinate when the plant emerges from the soil. Many variables can affect the process of germination and plant growth and can be tested to see how seeds respond to different conditions.

Variables could include:

- Different species of the same plant types
- Seed size
- Air temperature
- Soil types
- Soil acidity
- Amount of light
- Planting depth
- Soil fertility
- Or other variables!

Time Required

Very Long (a few days to possibly 1+ months)

Objective

To determine if one variable (with all others constant) impacts germination.

Materials and Equipment

- Seeds that are different sizes/types. Consider: garden peas, super sweet cord, onion, lima bean, radish, lettuce, etc.
- Kitchen scale (if seed weight is a factor) such as a digital pocket scale (check Amazon)
- Ruler (for measuring seed size, plant growth, planting depth)
- Pots (clear cups with holes poked in the bottom will work as well)
- Soil medium (sand, silt, clay, combination soil type, potting soil, soil from yard or garden)
- Use popsicle sticks (taped on or inserted) to mark each pot with the type of plant and the variable studied.
- Soil pH strips if testing soil acidity

Experimental Procedure – example using planting depths as the variable

1. Select the types of seed(s) you will be using for the experiment.
2. For each seed/seed type, record the weight, size (diameter or other dimensions if not round, such as corn or carrot); this will be difficult for very small seeds, such as flax, carrots, chia, et al. Record the recommended planting depth.
3. For each seed/seed type, determine the planting depths that you will use for this experiment. Here is a recommendation for determining the different depths:

- Depth 1: Recommended planting depth.
- Depth 2: Lay the seeds on the surface of the soil.
- Depth 3: Two times the recommended planting depth (this will be your deepest seed).
- Depth 4: Halfway between the surface and the recommended planting depth.
- Depth 5: Halfway between the recommended planting depth and the deepest seed.

4. For each seed type, plant the seed in a pot at each of the depths. (So, if you are using six different types of seeds, you will have 30 pots, one for each seed type at each depth).
5. You should repeat this experiment at least twice to ensure you get enough data for each seed type at each of the depths. This is called replication.
6. Observe the pots daily and note the date of emergence.
7. After about 17 days, measure and record the heights of each of the plants.

Lab notes (adapt this chart for different variables):

Planting date:					
Seed Type	Weight	Size	Planting Depth	Emergence date	Height after 17 days

Discussion

Did you see a correlation between the size of the seed and the planting depth that they grew best at? Did all seeds emerge? Did the largest or smallest seeds grow best at the deepest depth? Did the seeds planted at their recommended planting depth do better than the seeds not planted at their recommended depth?

Bibliography

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