

Corn stress

How can changing climate conditions impact corn germination in your area?

Background

Germination is the process by which a plant emerges from a seed. Certain factors are necessary for germination to occur. Water must be available to hydrate the seed and activate the seed's metabolism. Oxygen must be available for the cell to perform cellular respiration. The soil temperature must be just right—if it is too cold or too hot, it can delay germination. If any of these conditions for growth are not met, the corn seed either will not germinate or will be delayed in growth.

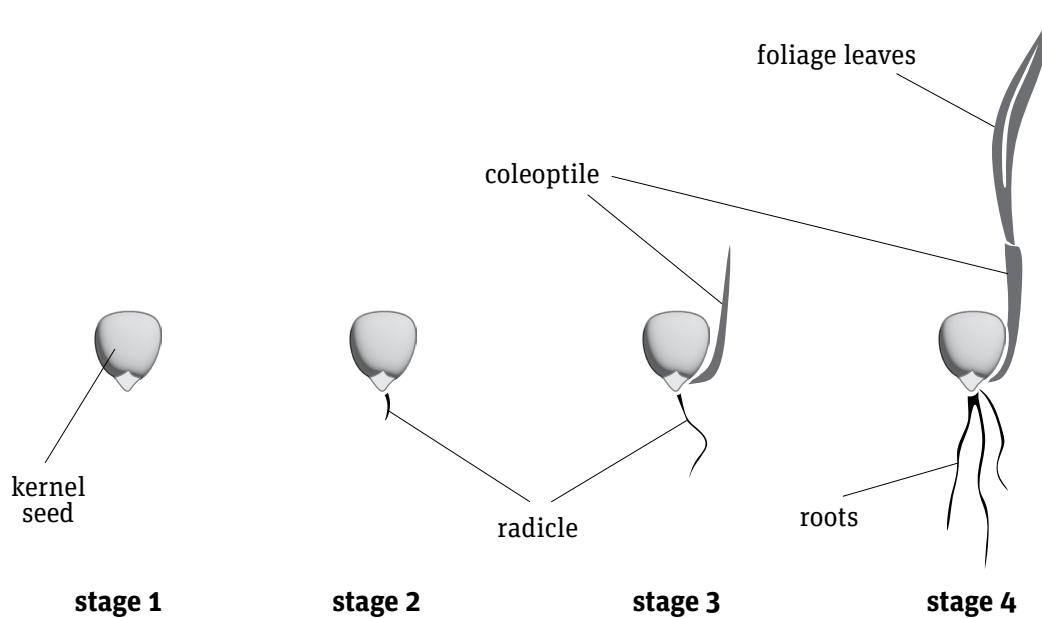
Ohio's climate is changing. Multiple lines of evidence show changes in our weather, lakes, and ecosystems, such as changes in temperature and precipitation patterns; changes in the frequency, intensity, and duration of extreme weather events; shifts in the length of the growing season; migration of invasive species; etc. How can changes like these impact corn seed germination?

Materials

- Cotton balls or paper towels
- Corn seed
- Water
- Growth container: petri dishes, plastic bags, or clear cups

Instructions

1. Look at the image below and complete data table 1 for each germination stage.



Data table 1: Corn germination

| Germination stage | Description |
|-------------------|-------------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |

| Climate change factors | Potential impact on germination |
|---|---------------------------------|
| Changing temperatures (cold spring) | |
| Invasive species | |
| Precipitation (very wet spring) | |
| Drought | |
| Extreme weather events (excessive rain events) | |
| Longer growing season | |

2. Design and conduct a controlled lab experiment investigating a specific climatic stress factor on corn germination. Create a lab report that details the hypothesis, materials, procedure, data collection, and conclusion.
3. Points to consider in your investigation:
 - How many seeds have germinated after 1, 2, and 3 days etc? Calculate the percentage germination for each day. Design a suitable way of showing the information on a graph.
 - Which appears first, the radicle or the coleoptile? Do radicles and coleoptiles grow at the same rate?
 - Measure the radicle and coleoptile as they grow. Design a suitable way of displaying the data on a graph.