

Freezing Seeds Has Different Effects on Different Types of Seeds

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Abstract

In the experiment there wasn't any real pattern in which seeds like to be frozen and which seeds did not. The Ryegrass germination increased in germination the longer they were frozen. Alfalfa and Soybeans varied in germination, so either freezing the seeds or not freezing them wouldn't matter in when it came to germination percentages. Pearl Millet and Radishes did not like being frozen. Both of their germination rates lowered as the seeds were frozen for longer amounts of time. There isn't a real pattern to whether dicots or monocots will grow better when their seeds are frozen.

Introduction/Background

Our class was given an assignment to create an experiment which data would be taken for two weeks. Our group chose to do an experiment on how freezing seeds would affect germination. We chose three types of Dicot seeds and two types of Monocot seeds. The Dicots chosen were : Soybeans, Alfalfa, and Rashes'. The Monocots chosen were : Ryegrass, and Pearl Millet. Each type of seed was frozen for eight, five, one, and zero days. Then the seeds were taken out and measured daily.

Hypothesis

The research Hypothesis is that seeds that were frozen will have stunted growth and a lower germination percentage lower than the seeds that were not frozen and the germination rate will show a decrease as the seeds are frozen for longer amounts of time.

Methods & Materials

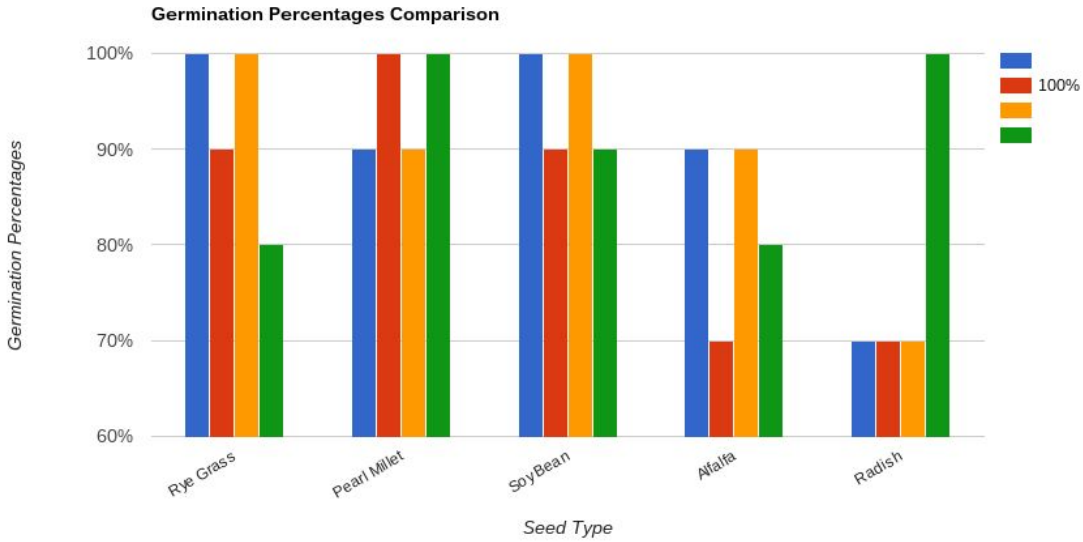
1. Put the paper towel squares in the ziplock baggies and wet them slightly (makes Materials used in the experiment:
 - 20 ziplock sandwich baggies
 - 40 soybean *Glycine max* (Fabaceae) seeds
 - 40 Alfalfa *Medicago sativa* (Fabaceae) seeds
 - 40 Radish *Raphanus sativus* (Brassicaceae) seeds
 - 40 Ryegrass *Lolium multiflorum* (Poaceae) seeds
 - 40 Pearl Millet *Pennisetum glaucum* (Poaceae) seeds
 - Paper towels
 - Freezer

Methods used in the experiment:

1. Cut 20 squares using the paper towel (these need to be small enough to fit in the Ziplock baggies)
2. it easier to put the seeds in)
3. Cut little holes big enough for the seeds to fit in them and stay in place.
4. Put seeds in the holes and then place them in the freezer.

Results/Data

| 8 Days | | 1 Day | |
|--------------|------|--------------|------|
| Rye Grass | 100% | Rye Grass | 100% |
| Pearl Millet | 90% | Pearl Millet | 90% |
| Soybean | 100% | Soybean | 100% |
| Alfalfa | 90% | Alfalfa | 90% |
| Radish | 70% | Radish | 70% |
| | | | |
| 5 Days | | 0 Days | |
| Rye Grass | 100% | Rye Grass | 80% |
| Pearl Millet | 90% | Pearl Millet | 100% |
| Soybean | 100% | Soybean | 90% |
| Alfalfa | 90% | Alfalfa | 80% |
| Radish | 70% | Radish | 100% |



blue: 8 days frozen
red: 5 days frozen

Green: 0 days frozen
Orange: 1 days frozen

Analysis of Results

The results varied in data from freezing. Neither of the samples of Dicots or Monocots showed any sign of pattern (whether dicots liked being frozen compared to monocots, or vice-versa), when it came to being frozen. So the following Analysis will be on each individual sample type.

Ryegrass:

- Ryegrass had a high germination rate on the days frozen, and increased in germination as they were frozen for longer amounts of time. As you can see in the graph and the table ryegrass has a low germination rate in the non-frozen group. This is most likely because Ryegrass grows in a colder climate and has evolved to survive the cold weather.

Pearl Millet:

- Pearl Millet had two 100% germination rates, which were 5 days frozen and 0 days frozen. The two lower germination rates were 90% which is still a pretty High Germination Rate. By the data shown it seems that Pearl Millet is indifferent when it comes to being frozen or not.

Soybean:

- Soybean had the opposite data as Pearl Millet. Which also makes it indifferent when it comes to being frozen or not.

Alfalfa:

- Alfalfa only had a high of 90% and that was day 8 frozen and day 1 frozen. The rest of the data was low so Alfalfa seems to like to be frozen.

Radish:

- The radishes had only a 70% germination rate for all the days frozen. Although radishes had a 100% on the non-frozen sample. So all in all Radishes did not like being frozen at all.

Conclusion

In the experiment all of the seeds had different results. Because of these different results there wasn't any pattern that could be made from how Dicots and Monocots react differently to being frozen. From the results a pattern could be made by which plants are from colder climates and which were from warmer climates. So the Hypothesis was both wrong and right. For seeds that are from colder climates it's wrong, but for seeds from warmer climates it's right.

Future Research

In Future research that can be done is how freezing seeds affects the radicle and hypocotyl length. This would be an interesting study because if freezing plants affects the germination of seeds it would most definitely affect the length of the hypocotyl and radicle of seeds.