Rock and Grow the Reprise

By: Alexis Scheid

The Study of How Sound Affects the Growth and Germination of Plants

Q1: Research Question

Purpose:
Helping to improve the growth and germination rates of plants by using sound at different frequencies.

Introduction/Project Statement:
Can the growth and germination of a plant be improved by using sound at different frequencies? Others have done this project and they had discovered that some frequencies did improve the growth of the plants. The previous experiment conducted showed that sound can improve the growth and germination of plants.

Hypothesis/Problem Statement:
Research shows that some frequencies can increase the amount of energy in the cell, increasing the cell's metabolism, and the flow of cytoplasm in the cell. But too much energy from a higher frequency may end up stunting the growth of the plants. If plants are grown in different frequencies of sound playing for them, then the plant with 250 Hz playing for it should grow the tallest with the highest rate of germination.

Q2: Methodology

Step 1
- Install speakers and grow lights into 5 different, insulated plywood boxes.

Step 2
- Put 72 grams of dirt in each of the pots.

Step 3
- Plant 9 seeds, in 3 rows of 3 in each of the pots.

Step 4
- Water each of the pots with 15 milliliters of water, and measure daily.

Manipulated Variable: The frequencies 250 Hz, 500 Hz, 750 Hz, and 1000 Hz.

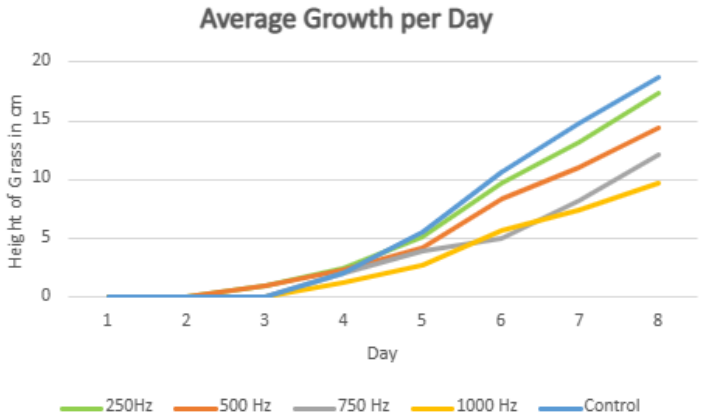
Responding Variable: The height of the cat grass each day.

Control: The plant that is growing with no frequencies playing.

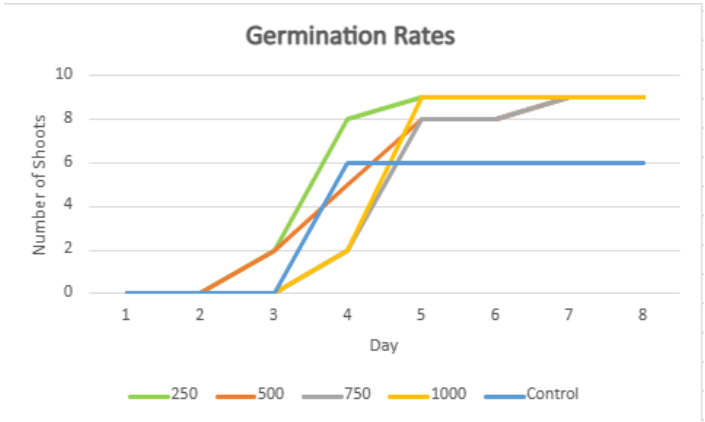
Constants: Amount of dirt in each pot, the amount of water each plant is water with, the number of seeds in each cup, and the amount of light each plant is exposed to.

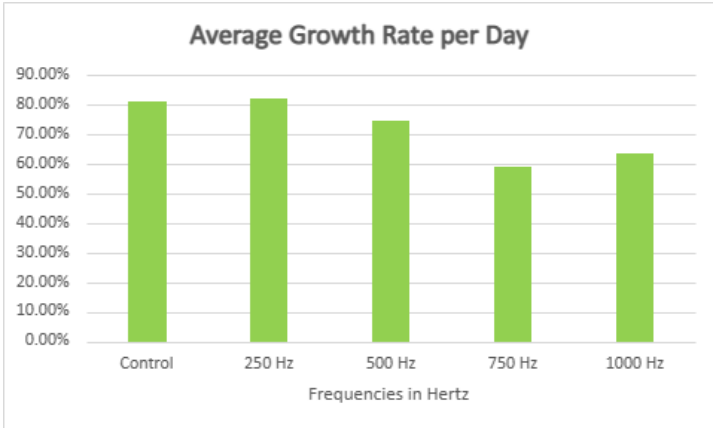
Q3: Data Analysis and Results

measured in cm	Growth per Day				
Day	250Hz	500 Hz	750 Hz	1000 Hz	Control
1	0	0	0	0	0
2	0	0	0	0	0
3	1	1	0	0	0
4	2.44	2.3	2	1.25	2.08
5	5.17	4.25	4	2.72	5.58
6	9.67	8.31	5.06	5.67	10.67
7	13.22	11	8.22	7.44	14.83
8	17.44	14.44	12.18	9.78	18.75



	Shoots Sprouted per Day				
Day	250	500	750	1000	Control
1	0	0	0	0	0
2	0	0	0	0	0
3	2	2	0	0	0
4	8	5	2	2	6
5	9	8	8	9	6
6	9	8	8	9	6
7	9	9	9	9	6
8	9	9	9	9	6





DAILY GROWTH RATE PERCENTAGES				
Control	250 Hz	500 Hz	750 Hz	1000 Hz
81.23%	82.31%	74.79%	59.28%	63.81%

Conclusion: Q4: Interpretations and Conclusions

At the end of this experiment, it was learned that the plants that were exposed to sound did not grow as tall as the control plant. The plant that was exposed to 250 Hz grew nearly as tall as the control and after that in height, 500 Hz grew the third tallest, then it was 750 Hz, and then 1000 Hz. So, it was concluded that the higher the frequency the shorter the plant would be. However, it was also learned that the plant that was exposed to 250 Hz, had a higher growth rate than all the other plants including the control. Another thing that was learned, was that all the plants that were exposed to a frequency, all 9 seeds germinated, whereas in the control, only 6 seeds germinated. These results did not completely line up with the research that was collected. The results also did not support the hypothesis.

Future Research:

Some potential future experiments that could be conducted are that you could start to test the frequencies that work the best at different decibels, or volume, to see if that influences either the germination or growth of the plants. Another thing that could be done to advance this project is applying the frequencies to plants other than just cat grass. Another thing that could be done is play the frequencies for the plants once again, but spray water on some of the plants, and water the others, to test if the frequencies affect the opening of the stomata that the research that was collected had mentioned. This project could be used to help increase the speed at which food is grown, helping feed more people.