The Effects of Different Fertilizers on Brassica Rapa

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Introduction

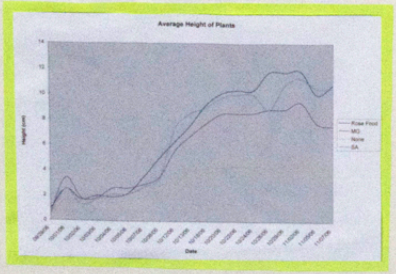
Fertilizers are used to ensure that plants get necessary nutrients while they are growing. Companies have developed many different formulas for various plant needs. These formulas usually involve ratios of nitrogen, phosphorus, and potassium. Our goal is to discover which ratio is the most effective when growing Brassica rapa. Phosphorus is the most important of these three components when growing plants whose edible portion is a seed, flower, or root. Brassica rapa is a type of mustard plant whose seed is edible, therefore we hypothesize that the formulas with ratios heaviest in phosphorus will be most effective in helping this plant grow. In order to test this theory we used Soil Acidifier, Miracle Grow, and Rose Food whose nitrogen - phosphorus - potassium ratios are 30-10-10, 15-30-15, and 18-24-16 respectively. And so the percentages of phosphorus in the Soil Acidifier, Miracle Grow, and Rose Food are 20, 50, and 41.4 respectively. Therefore we believe that Miracle Grow will be the most effective because it contains the most phosphorus which is most important to the growth of Brassica rapa. This Miracle Grow will be followed by Rose Food in effectiveness, and Soil Acidifier will be the least effective as it has the lowest percentage of phosphorus.

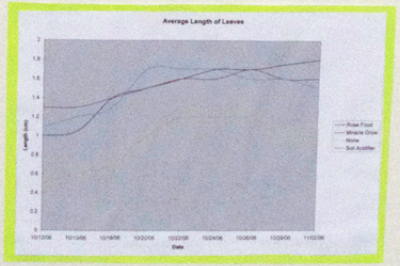
Methods

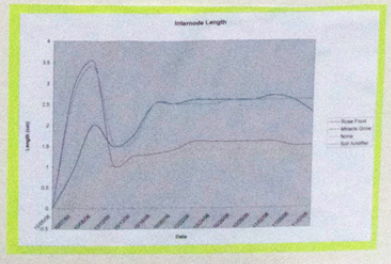
The first step in this fast plants lab was to plant the seeds of the mustard plants. Seeing as we were trying to determine which fertilizer out of three different kinds was best at helping the plants to grow, it was necessary to plant two quadrants for each fertilizer as well as for the control. The control plants did not receive any kind of fertilizer during the experiment. Every day for the first week each plant was given three drops of its specific fertilizer. During this time the height of both plants for each fertilizer group were measured and averaged every day. After that first week, the plants were fertilized in the same way, but the number of times the plants were fertilized was changed to just once per week. The number of times the plants were measured was now approximately three times per week. By this time the plants were also growing leaves, so the length of the internode was measured. The internode, or height of the stem between the bottom leaf and the next leaf above it, was measured on both stalks of each plant and the average was taken for each pair of fertilized sets. The number of leaves for the plants of each type of fertilizer were also counted and averaged. When the leaves became large enough, their length was also measured and averaged. Over the course of the experiment, all of the data was recorded on a chart. By the end of the experiment there was a column for each of the three kinds of fertilizers and the control plant that included the average heights, lengths of internodes, number of leaves, and lengths of leaves of the plants over the seven weeks of the experiment.

Results

Pictures taken 10/13







Conclusion

From the data we collected, we can note that the plants treated with *Rose Food* had the most growth followed closely by *Soil Acidifier* and next by *Miracle-Gro*. The plants with the least amount of growth were those that were not treated with any fertilizer. Our hypothesis was partially supported by this experiment. We stated that the plants that were treated with fertilizers would grow bigger and more rapidly than the plants without fertilizer. This aspect of our hypothesis was supported however we also hypothesized that *Miracle-Gro* would cause the biggest growth followed by *Rose Food* and *Soil Acidifier* respectively. The experimental data supports the theory in which the types of minerals a plant is exposed to will effect its growth and development. Not only will the types of minerals that a plant is exposed to affect its growth, but growth will also be affected by the ratios of the types of minerals. All three plants were treated with fertilizers that contained nitrogen, phosphorus and potassium however there were different ratios of each of these three minerals in each fertilizer. The ratio of nitrogen to phosphorus to potassium that the *Rose Food* had, which was 18:24:16, was the optimal mix of minerals for growth and development in our experiment. *Rose Food* contained the highest amount of phosphorus which is necessary for plants whose edible parts are flowers, seeds, or roots[2]. Phosphorus is also a component in nucleic acids, phospholipids and ATP and the *Rose Food*[3]. Nucleic acids, phospholipids and ATP are all essential aspects to cellular division and growth which could be an explanation as to why the plants treated with *Rose Food* developed the fastest[1]. The untreated plants did not receive any additional minerals aside from what was already in the soil. We can note from the data that the untreated plants had very little growth and were significantly smaller than the other plants which most likely results from the fact that it was lacking many of the essential minerals needed for growth and development.

We didn't have any major issues with our experiment and all plants survived until the end. To improve upon our experiment however we could have had a more constant schedule for maintenance and data collection. We collected data around three times a week however the days in which we collected data were not always consistent. Another aspect of the project we could have improved upon would be to include more plants in the experiment so we could have more data to observe from.

Resources Used

[1] Audesirk, Teresa, Gerald Audesirk, and Bruce E. Byers. Biology: Life on Earth. 7th ed. New Jersey: Pearson Prentice Hall, 2005.
[2] Minkoff, Eli C. and Pamela J. Baker. Biology Today: An Issues Approach. New York: Garland Publishing, 2004.