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Effects of Water on Fast Plants

Abstract:

We assessed the effects of varying amounts of water on plant growth and formed a hypothesis that laid the foundation down for our experiment: “If we fluctuate the amount of water given to each fast plant then the plant growth of each plant with physically vary; a greater amount of water will cause plants to grow taller”. The team of researchers sorted the fast plants into five groups that were each given various amounts of water twice a week; Group 1 received no water, Group 2 received 5mL of water, Group 3 received 15mL of water, Group 4 received 30mL of water, and group 5 received 50mL of water once a day every Tuesday and Thursday for five weeks. As water is vital to a plants survival, it is evident through this experiment that the fast plants had a greater growth in stem height as the water intake increased. The plants that received little to no water struggle to survive whilst the plants that received more water flourished and continued to grow in height.

Introduction:

A variety of factors can affect the growth of plants; from nutrients to sunlight to pesticides, plants survival depends on what outside sources it comes in contact with. Water is just one of the many nutrients that plants rely on for survival. Researchers have long been studying just what elements can affect the negative/positive growth of plants. In one study it was concluded that a greater amount of water would cause a greater growth rate--but only up to a certain point; too much water could cause plant death (“Water and Plant Growth”, n.d.). In addition, in a recent study at Colorado University, a pair of researchers discovered that soda made plants grow a lot quicker and taller than the plants that just received water (Deziel, 2019). Lots of factors can affect the growth rate of plants, whether it be in labs or in the natural world. In this experiment we tested how various amounts of water can affect fast plant growth and evaluated the optimal amount of water for maximum growth(height). We hypothesized that by the end of the experiment we would be able to find the optimal amount of water for the greatest growth in plant height.

Methods and Materials:

Method: In this experiment we used the given materials in order to test the effects of the amount of water on our plant's growth in height. We planted four seeds for every group and manually controlled how much water each group was given. We had 5 groups with 2 cups in each group containing one seed per cup. Each cup contained 90ml of soil and two fertilizer seeds. Twice a week for 5.5 weeks we gave group 1 no water, group 2 5ml of water, group 3 15ml of water, group 4 30ml of water, and group 5 50ml of water. We used a 50ml beaker to measure the amount of water each time we watered the plants. Twice a week (on Tuesday lab days, and Thursdays) we took measurements—in centimeters—of the growth of our plants all the while taking proper observations. Subsequently, we watered each plant group with their designated amount of water (measured in milliliters) two times a week: Tuesdays and Thursdays.

Materials:

- Soil
- Fast Plants Seeds
- Fertilizer
- 50mL graduated cylinder
- 1000mL beaker
- 120 mL cup
- Overhead fluorescent light bank
- Water

Results:

Our hypothesis was confirmed; the more water the fast plants received the more the plants grew. The correlation between the water intake and plant stem height is apparent when **Figure 2** is observed; the plants that received 50 mL of water had much greater growth compared to the plants that just received 5 mL of water. At the end of the experiment, the final heights of each of the plants are as follows **(Figure 3)**: Group 1 (A.0mm, B.0mm), Group 2 (A 0mm, B.0mm), Group 3 (A.215mm, B.155mm), Group 4 (A.185mm, B.220mm), and Group 5 (A.0mm, B.253mm). Although there was no growth in Group 5.A there was significant growth in Group 5.B--253mm as a final height--the tallest fast plant at the end of the experiment. At the beginning stages of the experiment 5 mL of water seemed to kickstart the growth of the group 2 plants, however this little amount of water wasn't optimal for their sustainability--both plants that received 5 mL of

water died at week 3. However, the groups that received greater than 5 mL of water were able to survive and kept increasing in height as the weeks went on. There was no growth in Group 5.A throughout all the weeks of the experiment and although reasons are unknown, there was still very noticeable growth in Group 5.B. All in all, this experiment was successful in that it showed positive correlation between the amounts of water and fast plant growth.

Figure1:

	G.1A	G.1B	G.2A	G.2B	G.3A	G.3B	G.4A	G.4B	G.5A	G.5B
9/24	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm	0mm
9/26	0mm	0mm	0mm	0mm	0mm	0mm	0.5mm	0mm	0mm	0mm
10/1	0mm	0mm	10mm	5mm	31mm	34mm	44mm	40mm	0mm	31mm
10/3	0mm	0mm	25mm	20mm	44mm	43mm	50mm	35mm	0mm	39mm
10/8	0mm	0mm	0mm	0mm	62mm	63mm	120mm	86mm	0mm	80mm
10/10	0mm	0mm	0mm	0mm	90mm	85mm	130mm	101mm	0mm	100mm
10/15	0mm	0mm	0mm	0mm	127mm	138mm	149mm	150mm	0mm	154mm
10/17	0mm	0mm	0mm	0mm	145mm	150mm	178mm	184mm	0mm	177mm
10/22	0mm	0mm	0mm	0mm	145mm	160mm	179mm	205mm	0mm	205mm
10/24	0mm	0mm	0mm	0mm	204mm	162mm	195mm	218mm	0mm	220mm
10/29	0mm	0mm	0mm	0mm	215mm	155mm	185mm	220mm	0mm	253mm

Figure 2:

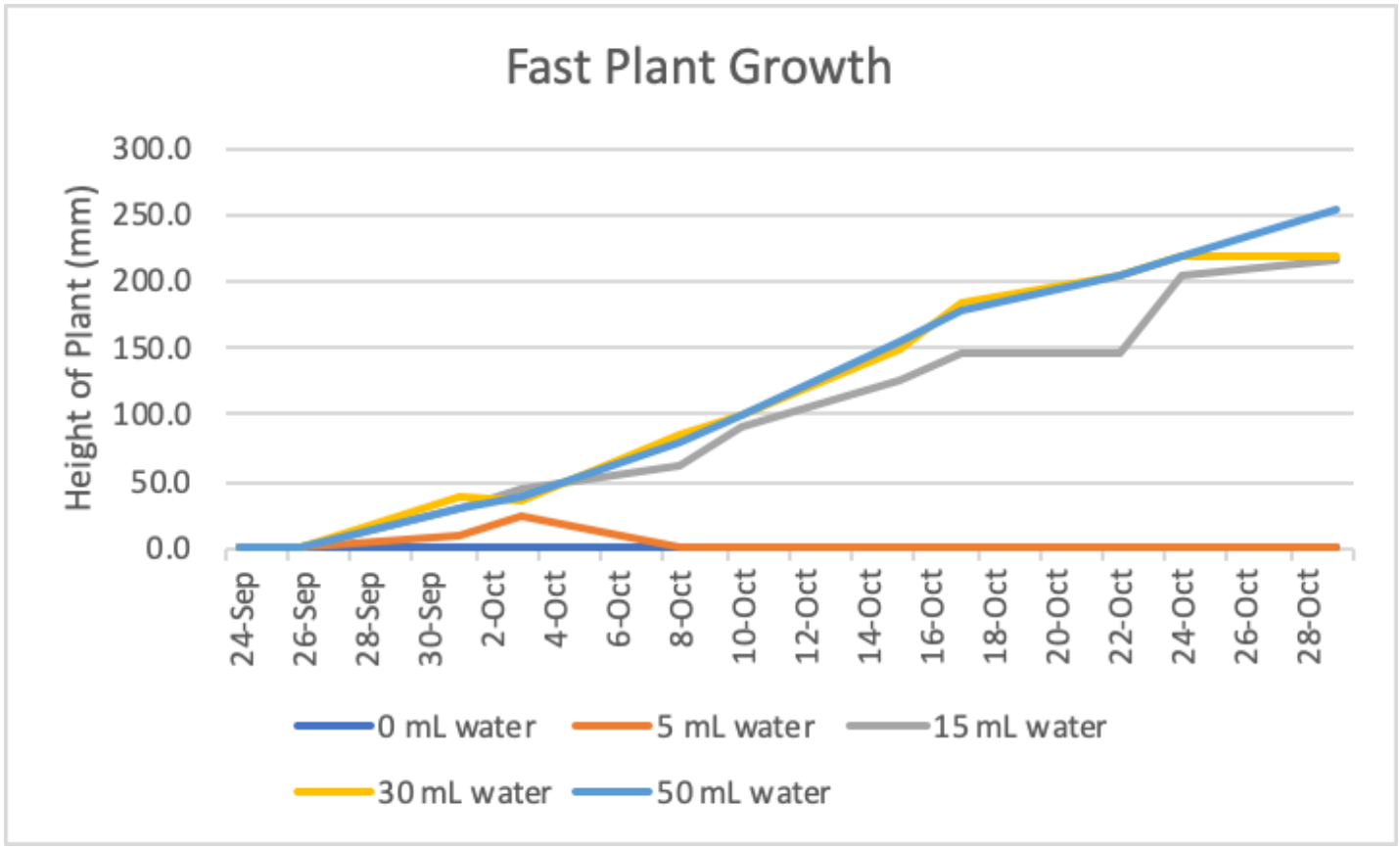
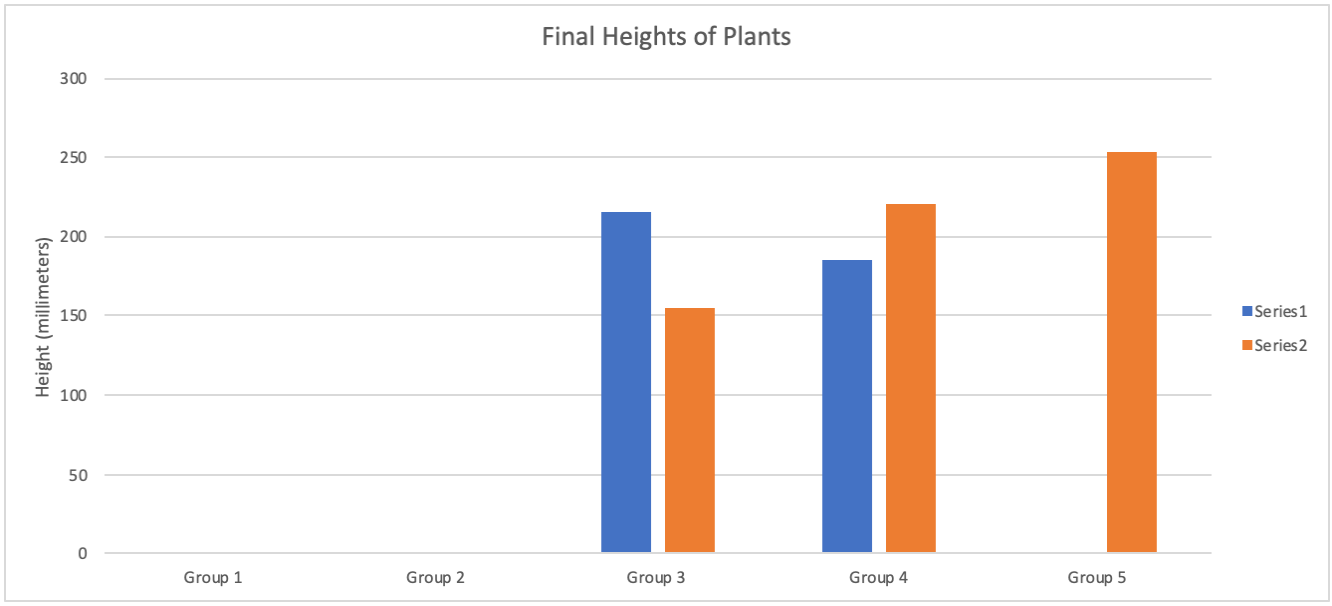


Figure 3:



Discussion:

The primary purpose of this study was to examine the effects of various amounts of water on fast plant growth. Earlier research suggests that more water correlates with greater growth, but only up to a certain point ("Water and Plant Growth", n.d.). Too much water could have adverse effects, thus causing plant growth to decrease or ultimately lead to plant death. Our results revealed that a greater amount of water did cause greater plant growth. The plants receiving 30 mL (group 4) and 50mL(group 5) of water showed significant growth compared to the plants receiving less water; although the group 5 plants grew a couple millimeters taller than the group 4 plants, their heights per week were close in value. Initially while testing the effects of various amounts of water on plant growth, we hypothesized that we would be able to discover the optimal amount of water for the most successful growth. We would do this by testing the plant growth in various amounts of water including "flood like" conditions (50 mL of water). We predicted that the group 5 flood like conditions would not be as successful as the growth in group 4. However, our results show that group 5 was just as successful--if not more--than group 4. In group 5.A our plant failed to germinate, however group 5.B grew significantly. This event could have occured due to a change in our experiment; at week 3 we discovered the 50 mL flasks were starting to overflow with too much water. We replanted the group 5 plants into a 1000 mL beaker and added more soil into those beakers in order to avoid water spillage. This inconsistency in the conditions of the experiment could have been the cause of successful growth in the group 5.B plants because the plant no longer receive flood like conditions; in an actual flood the plant would receive too much water and would most likely fail to grow. If this experiment were to be done again we would repeat the procedure but change some factors: plant all the seeds in 1000mL beakers and add more groups that would each receive greater amounts of water. Doing so would help us discover just what quantity of water is the best for the tallest growth in fast plant height.

Citations

"Science Fair Projects - Water and Plant Growth." *Science Fair Projects Ideas*, www.all-science-fair-projects.com/print_project_1263_150.

Deziel, Chris. "What Happens When You Water Plants With Soda?" *Sciencing*, 2 Mar. 2019, sciencing.com/happens-water-plants-soda-6300916.html.

Science Fair Projects - Examining the Effect of Watering on Plant Growth." *Science Fair Projects Ideas*, www.all-science-fair-projects.com/print_project_1262_50.