









Introduction

Hydroponics is the process of growing plants without soil, indoors, using a mixture of water and nutrients (Shrestha et al., 2010). One of the best benefits of hydroponics is that the amount of space used is minimized. Using hydroponics reduces the need for pesticides and other chemicals and reduces the need to worry about pests and diseases (Gruda et al., 2009). Hydroponics and growing plants in Hoonah is very important because the amount of fresh produce is limited, it can be expensive, and the quality of the plants can be less desirable. With a green house being built in Hoonah there is an opportunity for local needs to be met and traditional values to be incorporated. For example, these values include: sharing, respectful harvesting, minimizing waste, maintaining quality, consideration for the environment, sustainability, and self sufficiency.

Hypothesis

For our experiment, we have hydroponic towers under fluorescent light, and facing a single window. We will rotate the towers once a week. Our hypothesis is that plants receiving direct sunlight from the window for a week at a time (labeled fluctuating) will grow more than plants that receive partial direct sunlight, but do not get rotated away from the window (labeled stable). Even though they will spend one week facing away from the window, we expect that the direct sunlight they do receive will be very beneficial.



Methods



Figure 1: Students transplant Bok Choy into hydroponic tower. Figure 2: Students giving plants nutrients and balancing pH for hydroponic towers. Figure 3: Lettuce growing in a hyrdroponic tower.

1. Cilantro, lettuce, bok choy, and spinach seeds were planted in rockwool, and watered. 2. Plants were transplanted to hydroponic towers.

- 3. Plants were given nutrients and pH was balanced every week.
- 4. The two towers closest to the windows (cilantro, bok choy) were rotated each week.
- 5. Measurements were taken every week to measure plant growth (length of stems) for cilantro and bok choy.
- 6. Plants were harvested and weighed after 4 weeks of measurements.

na, and Bruce Dunn (2010). "Hydroponics." Oklahoma Cooperative Extension Service. Oklahoma State University, Division of Agricultural Sciences and . https://openresearch.okstate.edu/server/api/core/bitstreams/23fd438f-f1c2-41b7-a877-96c8a0072c89/content Gruda, N. (2009). Do soilless culture systems have an influence on product quality of vegetables?. Journal of Applied Botany and Food Quality, 82, 141-147. https://doi.org/10.18452/9433

in hydroponic towers

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Our hypothesis was supported. The data shows that the plants receiving direct sunlight grew taller, despite being rotated every week. The fluorescent light provides less energy needed for photosynthesis, especially in blue and red wavelengths needed for growth. Regardless, even plants that were not facing the window still grew at a healthy (though reduced) rate. Now that the greenhouse is up and running, we would like to compare the health and growth of plants in hydroponics to those grown commercially. Plant height is not the most important factor. Taste, visual appeal and the amount of nutritional value the plant is providing are also very important to take into consideration for our community greenhouse for future success. These questions could be addressed in future RASOR studies.

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Extra sunlight was most important early in the plants' growth, especially for cilantro.



• Both the cilantro and bok choy that had fluctuating sunlight have higher average growth than the stable cilantro and bok choy.

- On average bok choy grew taller than cilantro.
- On average the plants receiving fluctuating amounts of light weighed slightly more than the plants receiving stable light

Discussion