Competition of Radish and Wheat at Varied Light Intensities

Andrew Doyle, Cheyenne White, and Erin Bye

Introduction

A radish is a root vegetable that grows best in full sunlight and wheat is a grass. These two plants could possibly affect each other using allelopathy when grown together. Allelopathy is when plants release chemicals that can be helpful or harmful to other plants. Plants frequently compete for resources in nature, using developments such as body size to outlive surrounding plants (Aarssen, 2015). Larger plants in competitive environments can take the resources of smaller plants, cutting them off and eventually killing them (Nakagawa, 2015). The effects of competition in plants are not fully known and there are still unknown consequences (Aschehoug,2016). Sometimes, plants competing with each other can actually help each other in minor ways (Wright, 2015). Plants can also affect each other in competitions more than the soil they are planted in can (Müller, 2015). Our hypothesis is that the wheat will grow at a faster rate than the radish when grown with other wheat because wheat is a monocot, which typically grows at a fast pace.

Methods

- Four trays one for each competitive landscape and each tray was split in half to create more accurate results.
- The scenarios were low light, normal light, Radish v. Radish, Wheat v. Wheat, and Radish v. Wheat (figure 1).
- Watered every day and once a week Measured height in centimeters and counted leaves
- After extraction of the shots we measured shoot biomass in grams.
- Planted each seed at a depth of about 1-1.5 centimeters deep.

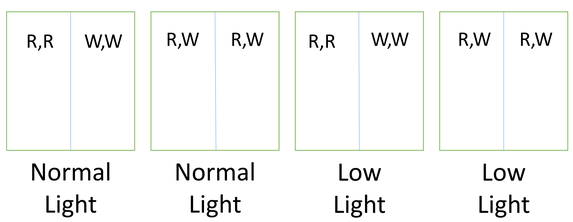

Figure 1. Diagram of experimental design. Radish and Wheat were arranged in three competitive landscapes in both normal and low light environments.

Results

Figure 2. Plants after germination, before thinning. Thinning attempted to reduce variation in dependent variables and select for a homogenous population.

Figure 3. At the end of week 2, plants were harvested and biomass of all 432 plants was recorded.

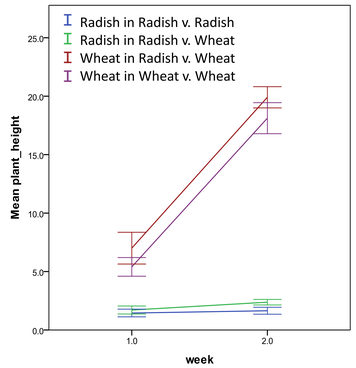

Figure 4. In high light, mean radish height in the intraspecific was larger than in the interspecific environment.

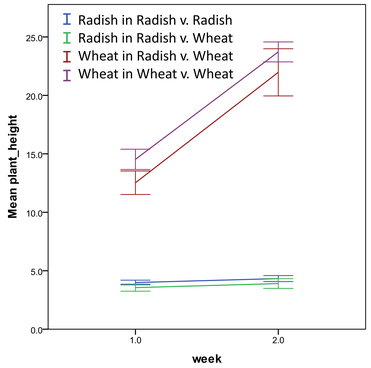

Figure 5. In low light, there was not much variance between the plants. The wheat in each environment began at different heights.

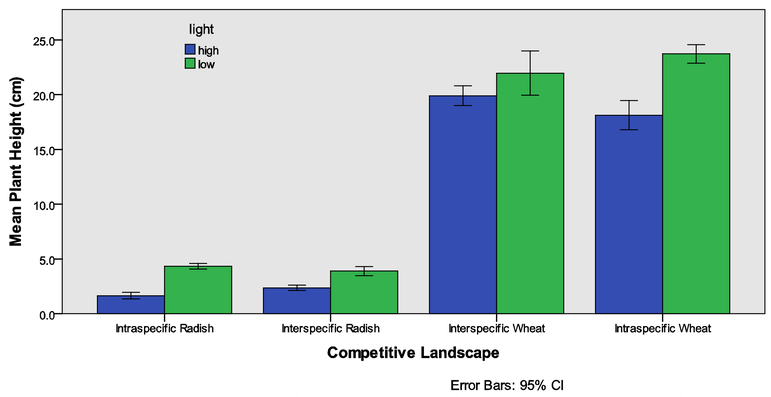

Figure 6. Plants in low light grew taller than plants in high light environments.

Discussion

The goal of this experiment was to obtain information on plant growth in intraspecific and interspecific environments. We did not consider our results to be significant; there was a slight divergence in radish height in high light (Figure 4). However, on average the plants in low light grew taller than the plants in high light (Figure 6). This could be due to a higher demand for water in the high light environment. Initially, we had problems germinating the seeds and ended up planting multiple seeds in each pot and pulling out the excess. This caused the plants to grow in varying distances from each other and not a set distance apart (figure 2). Once thinned out, the heights of the plants were different due to the difference in germination times (figure 3, figure 5). Each group was watered once per day, but not with a set amount of water. This experiment could be repeated over more time while using more careful measurements to procure better results.

Acknowledgments

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