The effects of auxin on plant growth to apical meristem and varying effects of light intensities.

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Introduction

- Auxin (Indole 3-acetic acid) a plant hormone primarily involved in regulating plant growth and development.
- Previous studies have been conducted to better understand the role auxin plays in plant growth and development.
- Our study investigates the interaction between auxin and light intensities.
- We hypothesis that if a plant receives supplemental Auxin treatment, it will need more light to grow/survive.

Material and Methods

Plant Generation:

- Wisconsin Fast Plants (*Brassica rapa)*
- 40 3-inch pots
- four groups, 10 in each
- Two of the groups were placed in high light incubation (five light bulbs)
- Two groups were placed in low light incubation (two light bulbs)
- Two drops (.10ml) of 1% auxin solution, for one group under each light intensity
- Same groups of plants again received auxin treatment (.25ml)

Subject Measurements and Statistical Analysis:

- Height
- Number of leaves
- Average width of leaves
- Number of reproductive structures
- Shoot biomass
- Two-way Analysis of Variance.

Results

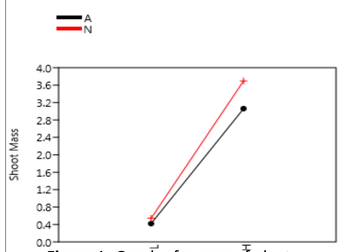

Figure 1- Graph of means of plant shoot mass (g) in high and low light, and auxin applied (A) or no application (N).

- Light intensity, independent of auxin, was significant across all variables (**Fig.1**).

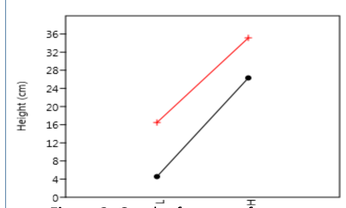

Figure 2- Graph of means of plant height (cm) in high and low light, and auxin applied (A) or no application (N).

- The affect of auxin, independent of light intensity, was significant in plant height (P = 0.001582) (**Fig.2**).

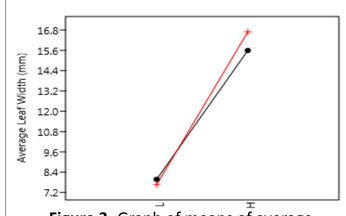

Figure 3- Graph of means of average leaf width (mm) in high and low light, and auxin applied (A) or no application (N).

- The affect of auxin, independent of light intensity, was also significant in the number of reproductive structures (P = 0.000853) (**Fig.4**).

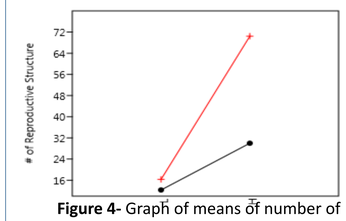

Figure 4- Graph of means of number of reproductive structures in high and low light, and auxin applied (A) or no application (N).

- The interaction between auxin and light intensity was significant in the number of reproductive structures (P = 0.009239) (**Fig. 4**).

Discussion

- We hypothesized that the high light plants with auxin applied would exhibit the largest growth across all measured variables.
- In contrast, measurements showed that varying light intensity, independent of auxin application, was the most significant factor that affected the plants growth. This was seen in the significant difference in growth across Shoot Mass (g), Plant Height (cm), Average Leaf Width (mm), and Number of Reproductive Structures.
- In addition, the application of auxin to the plant meristems showed to be insignificant across all variables, as seen by lesser values for Shoot Mass (g), Plant Height (cm), Average Leaf Width (mm), and Number of Reproductive Structures.
- The application of auxin seemed to stunt the growth of the plants. After the first application, plants with auxin applied grew at a slower rate and had a higher number of plants die.
- In conclusion, we did not obtain enough significant evidence to suggest that varying light intensities increases the functioning of auxin when applied to the apical meristem of plants.

- Future Reference:
  - The auxin was applied in an inefficient manner. In future studies, a different method should be used to ensure the best results.
  - Futures studies could be conducted to examine if the location of auxin application is a factor. In addition, when the auxin is applied during the plants lifecycle could be studied.
  - Examine the interaction between auxin and variable other than light. Effects of varying light intensities and plant growth is well documented.

References

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