The Effect of Gibberellin on Millet (*Setaria viridis)* Plants

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New Placements of plants shown

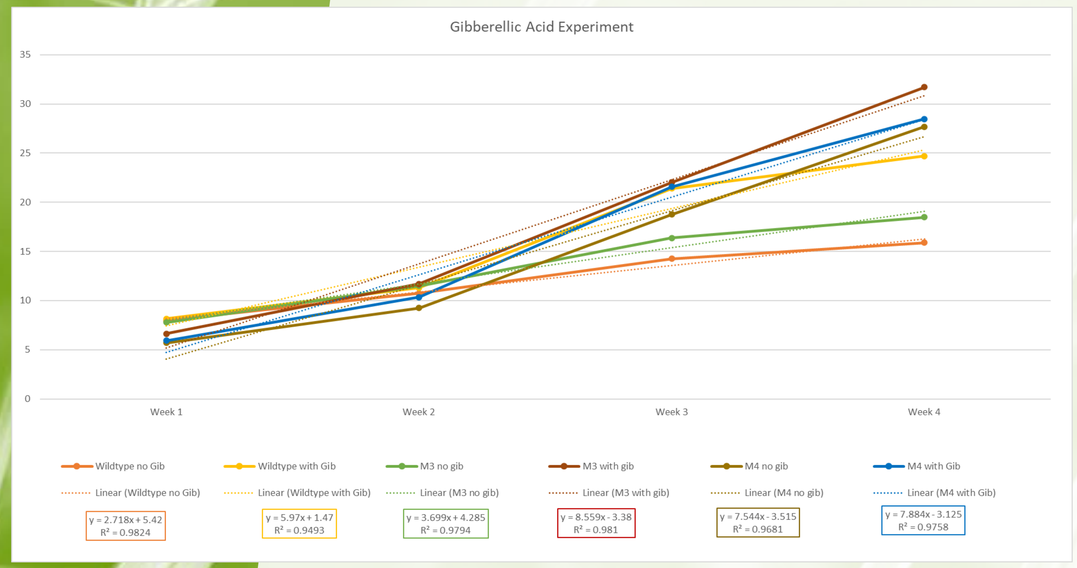


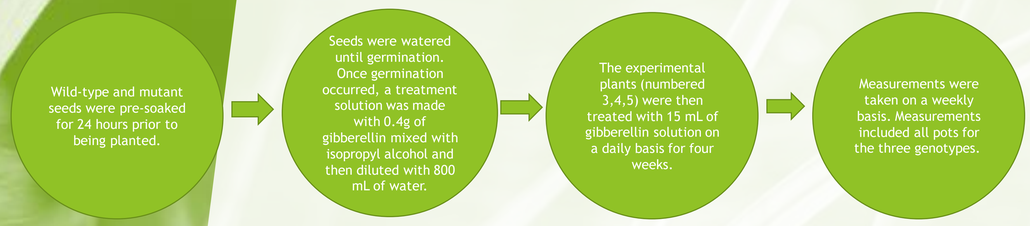
Figure 1: The graph above showcases a trend of wildtype and dwarf mutant growth over a period of time (weeks) by height (cm). The graph shows that for week 1 there was no significant difference in height amongst the six types of treatments; the same can be seen in week 2. During week 3, there was a significant ($p<0.05$) notice that millets treated with gibberellin had a more explosive growth than their counterparts not treated with gibberellin. There was however a notice between *M4* dwarfs receiving treatment and *M4* dwarfs without treatment having no significant difference ($p>0.05$) in height amongst each other. Which can be seen in week, where the two plant types were almost identical in plant height average.

Millet Plants after One week of Gibberellin Treatment

Background Information:

Based off previous background knowledge we knew that Gibberellin is responsible for rapid stem elongation prior to flowering. Gibberellin is a naturally occurring hormone within plants. At the beginning of this experiment we were informed of a Wildtype seed and different dwarf mutants in which we chose two different types to test in our experiment.

The purpose of this experiment was to determine what type of mutation the different mutant plants have. There are two possible types of mutations, either the inability to produce Gibberellin or the inability to synthesize the Gibberellin leading to the dwarf phenotype.



Conclusion:

To determine the type of mutation that the different mutant plants have, we found the p-value to compare the statistical difference in plant height. The P-value for the Wildtype plants is 0.003; this shows that there was significant height growth between the Millets that were treated with Gibberellic acid compared to the ones that were not treated. The P-value for the M3 mutant plants is 0.006; also showing there was a significant height growth between treated and untreated plants. The P-value for the M4 mutant plants is 0.48; showing that there was not a difference in plant height between the treated and untreated plants. This proves that the M3 mutant plants suffered the mutation of not being able to produce their own Gibberellic acid causing the dwarf phenotype. However, the M4 mutant plants suffered the mutation of not being able to synthesize the Gibberellic Acid being produced which resulted in a dwarf phenotype.

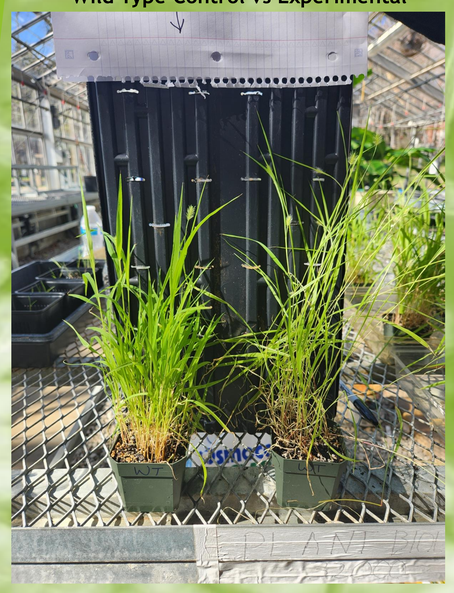
References

Hedden P, Sponsel V. 2015. A Century of Gibberellin Research. Journal of Plant Growth Regulation. 34(4): 740-760. DOI: 10.1007/s00344-015-9546-1

Phinney, B. O. (1956). Growth response of single-gene dwarf mutants in maize to gibberellic acid. Proceedings of the National Academy of Sciences, 42(4), 185-189.

Plant Development with Gibberellic Acid: Plant Products. 2019. Power Grown LLC. https://www.powergrown.com/how-to-use-gibberellic-acid-to-improve-plant-development/

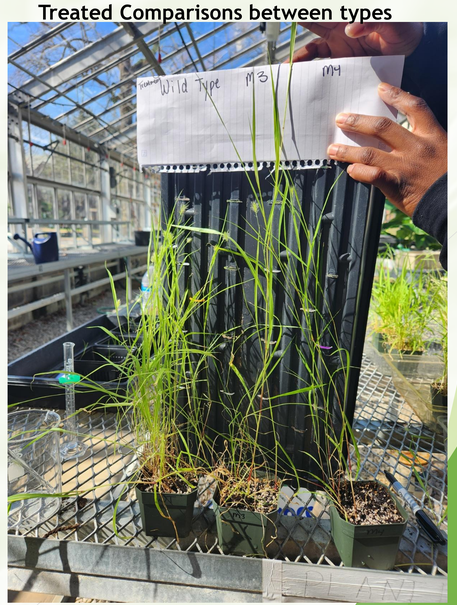
Wild Type Control vs Experimental



M3 control vs Experimental

M4 Control vs Experimental

Treated Comparisons between types



Untreated Comparisons between types