The Effect of Commercial Inoculum and Mycorrhizae Relationships

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INTRODUCTION

- Mycorrhizae relationships between plants and fungi are highly beneficial for most plants, with some plants being completely dependent on the relationship(3).
- Mycorrhizae relationships work by increasing the availability of macronutrients for uptake by the plants(1). Phosphorous, for example has been known to be affected by mycorrhizae(2).
- In nutrient deficient soils, like that of cool season grasses, mycorrhizae allow for the required uptake of limited nutrients. This is made possible by the increase in fungal hyphae length in connection with the root(4).
- Plants such as grasses that grow rapidly require the ability to absorb nutrients at a rapid pace. Late succession plants such as trees, lack this requirement(5).
- There are currently many commercially available mycorrhizae fungi that claim to boost plant growth and production. **Our experiment took commercially available mycorrhizae and tested them in multiple soil types to test these claims**.
- We developed our hypothesis around the biomass of the plants to determine if the commercial mycorrhizae differ in effect, when compared to wild mycorrhizae found in nature.
- **Hypothesis** – There will be an apparent difference in plant biomass when comparing wild vs commercial mycorrhizae relationships.

METHODS

- Each lab group was given two species of plants to study. Our group, lap group 1, received ***Desmanthus illinoeinsis*** and ***Monarda fistulosa***.
- Using the commercial inoculum "**Plant Success Endo and Ecto-Mycorrhizae"** as our inoculum and prairie soil samples, the experiment was divided into four treatment groups:

1) Commercial inoculum present, with non-sterile soil type
2) Commercial inoculum present, with sterile soil type
3) Commercial inoculum absent, with non-sterile soil type
4) Commercial inoculum absent, with sterile soil type

- Each treatment level was replicated six times per plant species, with a total of 48 specimens in total.
- The individual plants were watered daily and monitored in a light controlled laboratory for 6 weeks . The plant height was measured weekly using a standard meterstick and leaf count was also noted.
- At the end of the 6 week cycle, final leaf count was taken per individual plant, and plants were harvested from the containers with roots intact.
- Each plant was allowed a weeks time to lose water weight before being separated into above and below ground biomass, and then weighed.

RESULTS

Our Experiment found that there is no significant difference between plants grown in live soil and sterile soil**(p>0.05,fig 1 and 2)**. The above ground biomass of live soil was insignificantly greater than sterile soil **(p=0.051,fig 1).** Plants grown in live soil had no more above ground biomass than those in sterile soil. There is also no apparent correlation between leaf count and the type of mycorrhizae a plant is inoculated with **(fig 3).** *Monarda fistulosa* was excluded from our results due to poor survivorship as only 6 individuals survived. **The few *M. fistulosa* that did survive did not seem to be affected by any soil type or inoculum.**

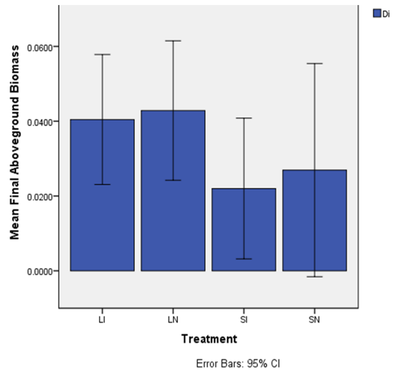


Figure 1. Final mean above ground biomass in grams of *D.illinoeinsis* from the four treatment groups respectfully.

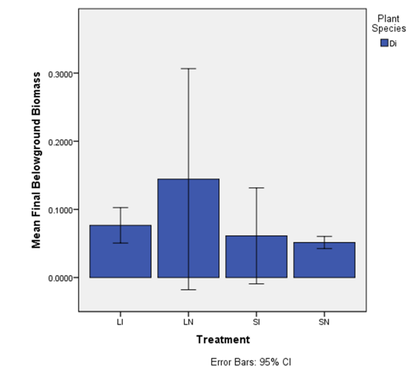


Figure 2. Final mean below ground biomass in grams of *D.illinoeinsis* in the four treatment levels respectfully.

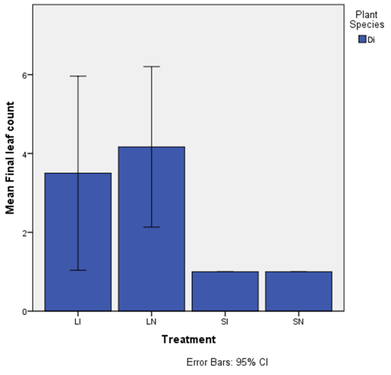


Figure 3. Final leaf count of *D. illnoeinsis* in the four treatment levels respectfully

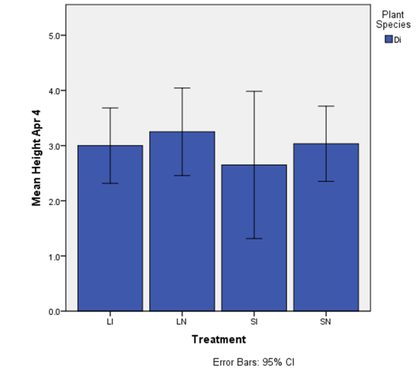
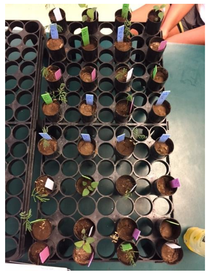


Figure 4. Final mean height in inches of *D.illnoeinsis* between the four treatment levels.

M. Fistulosa in separate planters



Experiment setup

CONCLUSION

Based on the data we collected, plants grown in live soil did not differ from that of the soils that were sterilized. This could be due to the responsiveness of the plant species in our experience. With plants that are more responsive to mycorrhizae there could have been a significate response. In order for plants to thrive to their fullest potential the soil needs optimal nutrient levels. Again, mycorrhizal fungi mainly help plants ability to uptake these important nutrients plants need to survive. The picture below shows two *M. Fistulosa* that were removed after the experiment was complete, both plants were grown in sterile non inoculated soil. **With *M. Fistulosa's* poor survivorship, this could have greatly affected our P values, and other important variables needed to compare the rates of growth between two species of plants.**

Future Research

Possible suggestions for future research would include the transplantation of older plants, so there would be a **higher rate of survivorship for certain species.** Weighing the plants total mass before transplanting would give an initial weight for each plant. With this information you could see how much a certain plant actually increased in growth by means of mass. After the experiment is complete, before the plant is dried, you could weigh the total mass before weighing the above and below ground growth separately.

LITERATURE CITED

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