Effects of Commercial Mycorrhizal Inoculant vs. Native Prairie Fungi on Biomass and Leaf Number On *Desmodium canadense* and *Salvia azurea*

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Introduction

Background

- Success of plant growth is easily quantifiable through shoot and root biomass, as well as leaf and reproductive organ number. (Wu et al.)
- There are many known benefits to mycorrhizal interaction, as the fungi increase the surface area of the roots.(Blal et al.)
- This observable increase in plant biomass also requires an increase in nutrient and water supply throughout the plant(Rydlová et al.), which is aided through the development of more extensive relationships with the fungi.(Rincón et al.)
- Certain species are more prone to forming symbiotic relationships with mycorrhizae then others.(Shi et al.)
- A flaw in many recent mycorrhizal studies, is the lack of a comparison between natural and commercial mycorrhizal inoculum.(Wang et al.)

Hypothesis

Commercial mycorrhizal inoculum, in natural prairie soil , will maximize nutrient uptake, and lead to increased biomass and leaf/reproductive organ number

Methods

- Plant species used: *Desmodium canadense(Dc)* and *Salvia azurea(Sa)*
- Mycorrhizal species: *Rhizophagus irregularis* (formerly *Rhizophagus intraradices*, *Glomus intraradices*)
- Commercial Mycorrhizal: Extreme Gardening Mykos.
- Young plants of each species were replanted in Conetainers in one of four soil/mycorrhizae combinations detailed below.
- Commercial mycorrhizal inoculum present in non-sterilized prairie soil(Li), Commercial mycorrhizal inoculum present in sterilized prairie soil(Si), Commercial mycorrhizal inoculum absent in non-sterilized prairie soil(Ln), Commercial mycorrhizal inoculum absent in sterilized prairie soil(Sn)
- Each species had six replicates in each treatment group.
- 24 total plants per species.
- Leaf number was taken weekly, excluding dead leaves.
- Commercial mycorrhizal inoculum present, non-sterilized prairie soil, Commercial mycorrhizal inoculum present, sterilized prairie soil, Commercial mycorrhizal inoculum absent, non-sterilized prairie soil, Commercial mycorrhizal inoculum absent, sterilized prairie soil

Inoculant Treatment

Soil Treatment		
	Li	**Ln**
	Si	Sn

- Data was interpreted via SPSS to generate NAOVA's for each variable measured.
- During final week, plants were removed from Conetainers in order to be dried and determine dry mass of each shoot and root.

Results

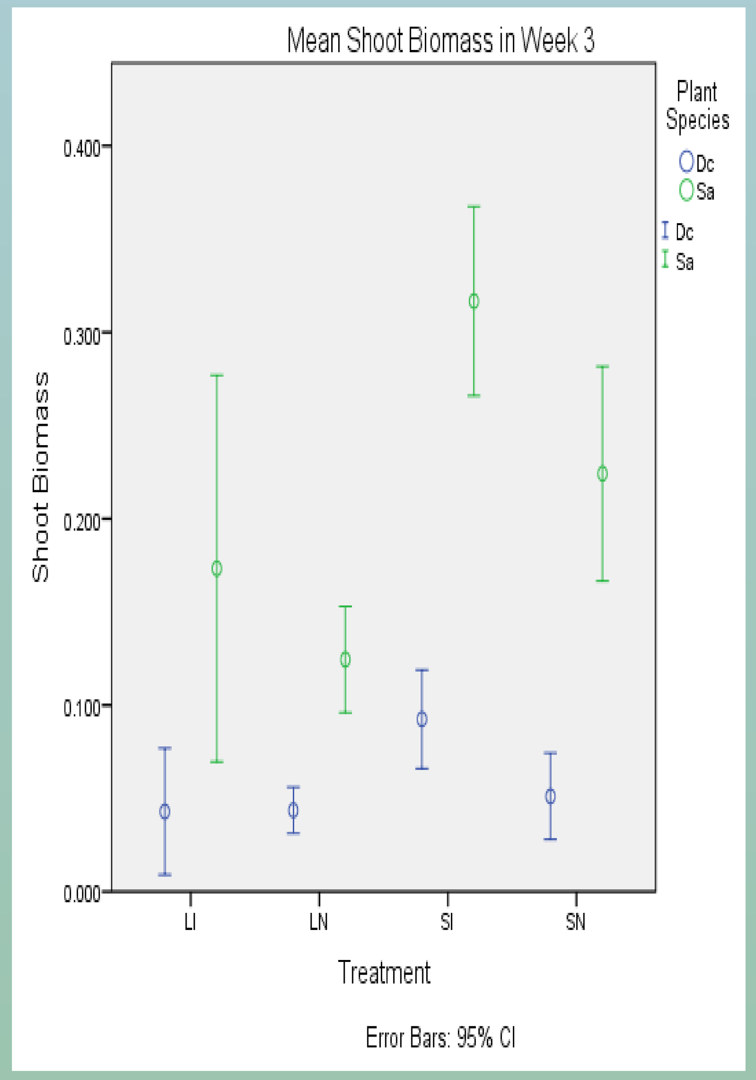

Figure 1. Average Shoot Biomass After Three Weeks.

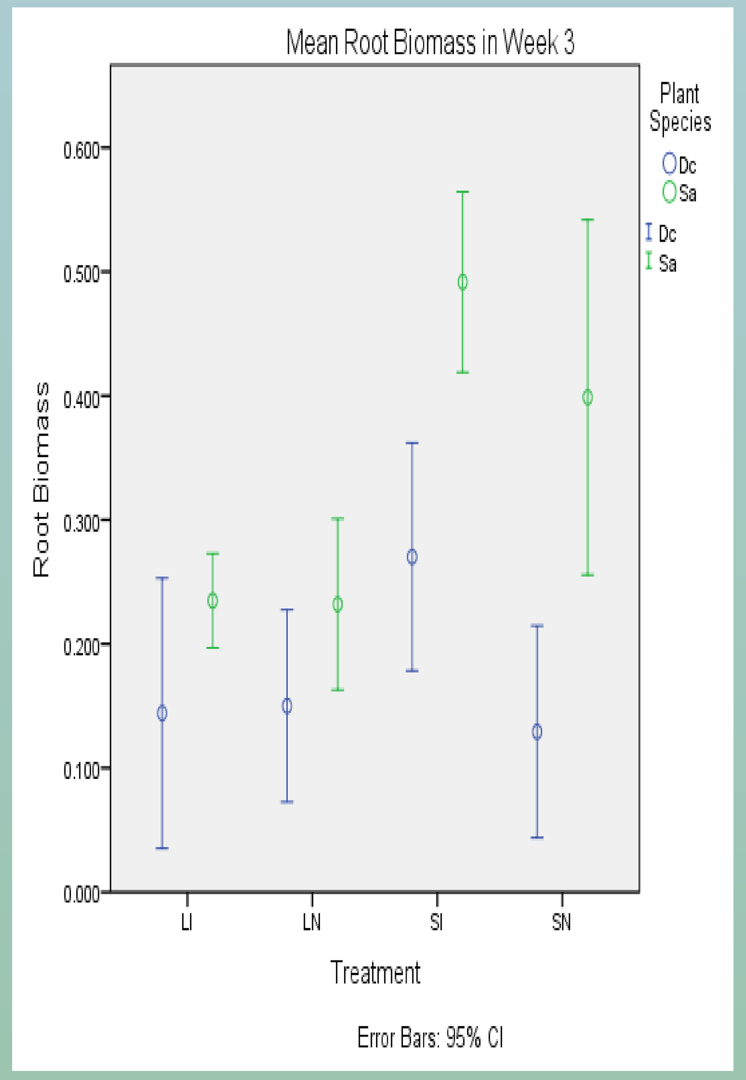

Figure 2. Average Root Biomass After Three Weeks

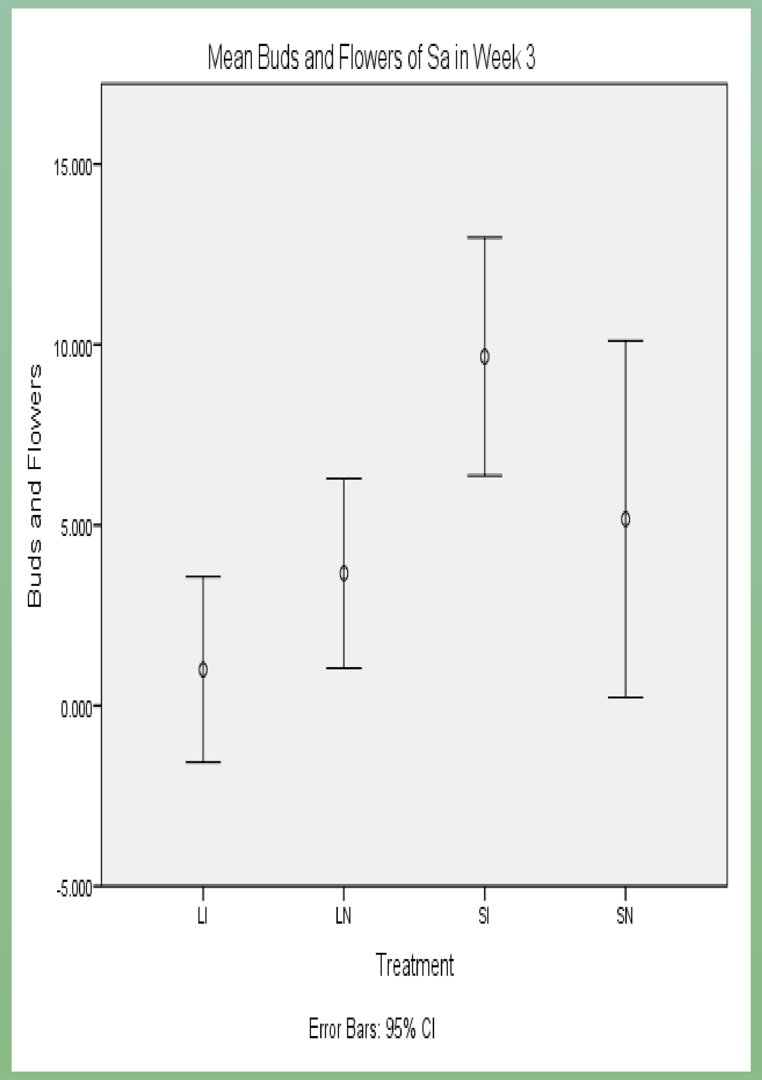

Figure 3. Mean Buds and Flowers of Sa in Week 3.

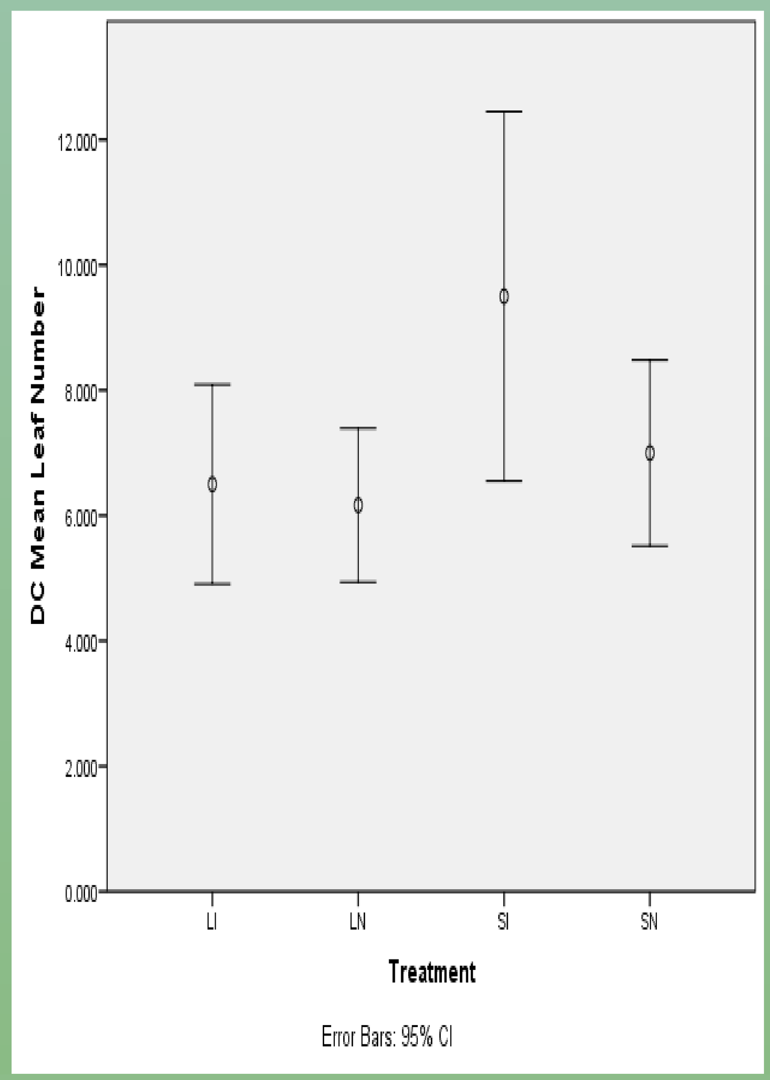

Figure 4. Average leaf number of Dc in Week 3.

Key for Graphs: Species: Sa = *Salvia azure*, Dc = *Desmodium canadense*.
Treatments: Li = Living prairie soil with commercial inoculum, Ln = Living soil with no inoculum. Si = Sterilized prairie soil with commercial inoculum, Sn = sterilized prairie soil with no commercial inoculum.

Results Continued

- Significant soil (F = 11.436, P = .002), and inoculum treatment(F = 10.950, P = .004) effect on the shoot biomass for *Salvia azurea*, refer to figure 1.
- No significance for soil(F = 3.350, P = .075) or inoculum treatment (F = 2.426, P = .127) effect for shoot biomass of *Desmodium canadense*, refer to figure 1.
- Significant soil treatment(F = 29.052, P = .000), and innoculum treatment(F=5.538, P = .024) effects on root biomass of *Salvia azurea*, refer to figure 2.
- No significant effects on *Desmodium canadense* root biomass from soil(F=.335, P = .566), or inoculum(F =.162, P =.689) treatments, refer to figure 2.
- Significant soil treatment for the number of buds and flowers produced by *Salvia azurea* (F = 51.501, P = .001), refer to figure 3.
- Insignificant inoculum treatment for the number of buds and flowers produced by *Salvia azurea* (F = .455, P = .508), refer to figure 3.
- There was a significant soil treatment affect for *Desmodium canadense* leaf number(F=5.944, P = .025), but no signficant inoculum affect on leaf number(F = 3.247, P = .088), refer to figure 4.
- Neither soil(F = .021, P = .887), nor inocolum(F=1.691, P=.208), treatments had a significant effect on leaf number produced by *Salvia azurea.*

Discussion

Our data concluded that the *Salvia azurea* species groups were affected by the soil and inoculum treatment: on the other hand, the *Desmodium canadense* species was not significantly affected by the different treatments of mycorizhae. When the biomass of each species was measured, the *Salvia azurea* showed a greater overall biomass average than the *Desmodium canadense* species. This trend was present across the 4 different treatment levels that were being observed. From this information, it can be determined that *Salvia azurea* are greater benefitted from mycorrhizal relationships. The results also showed that the commercial inoculum was more affective than natural occurring mycorrhizae in the *Salvia azurea* , as the biomass of the species was greater in the inoculated soil (both sterile and living) than in the uninoculated treatment groups. *Desmodium canadense* had the greatest biomass in the sterilized, unincoulated treatment group, which reveals that the species does not form an elaborate, symbiotic relationship with mycorizhae. We also discovered that *Salvia azurea* had a increased flower number in the sterilized soil types than in the living soil, and the growth was even more predominant in the inoculated, sterilized soil treatment group. The leaf number in *Desmodium canadense* is the greatest in sterilized soil with innoculum. While the inoculum did not havbe a significant affect on the biomass of DC, there is an apparent inocula affect on the leaf number

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Acknowledgements

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