The Effect that Native, Commercial, and Absent Mycorrhizae have on the Cellular Growth and Development of *Bromus inermis* and *Elymus canadensis* in both Sterilized and Non-sterilized Soils.

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Introduction

Background

- Arbuscular Mycorrhizal Fungi is a forms a symbiotic relationship with plants exchanging inorganic nutrients, such as nitrogen and phosphorus, for carbohydrates from the plants.
- The growth of plants, such as stem diameter and chlorophyll content, are dependent on the amount of nutrients received from the AM fungi.

Hypothesis

- We predict that plants will have greater stem diameter and chlorophyll content when exposed to native AM fungi as opposed to commercial or absent AM Fungi inoculum.
- We predict that the nonsterilized prairie soil would yield more plant growth than sterilized soil.

Methods

- The plants' native topsoil was collected and then sieved from 10 miles west of Stillwater. Half of the soil remained untreated serving as the living prairie soil and the other half was autoclaved to kill the native AM fungi.
- The two species, *Bromus inermis* and *Elymus canadenis* were split into four groups: Living prairie soil; not inoculated with commercial AM fungi (6 *Bro*, 6 *Ely*), sterilized prairie soil; not inoculated with commercial AM Fungi (6 *Bro*, 6 *Ely*), sterilized prairie soil; inoculated with commercial AM Fungi (6 *Bro*, 6 *Ely*), sterilized prairie soil; not inoculated with commercial AM Fungi (6 *Bro*, 6 *Ely*).
- Over the course of 4 weeks we measured chlorophyll content and stem diameter. At week 8 of the experiment we measured the root and shoot biomass.
- ANOVA software was used to calculate the affects on the plants.

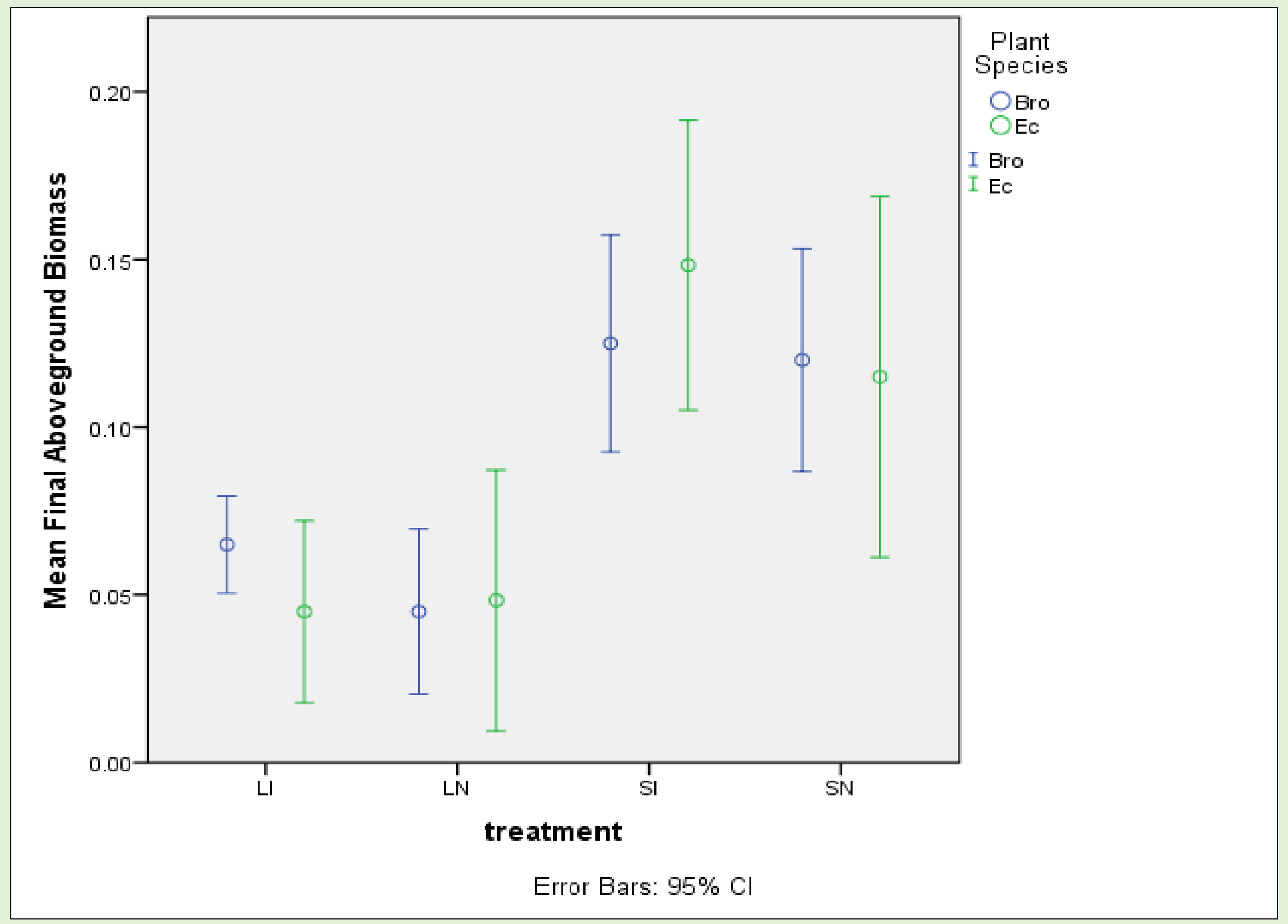

Figure 1. Relationship between *Elymus canadensis* and *Bromus inermis* are affected by soil and mycorrhizae type.

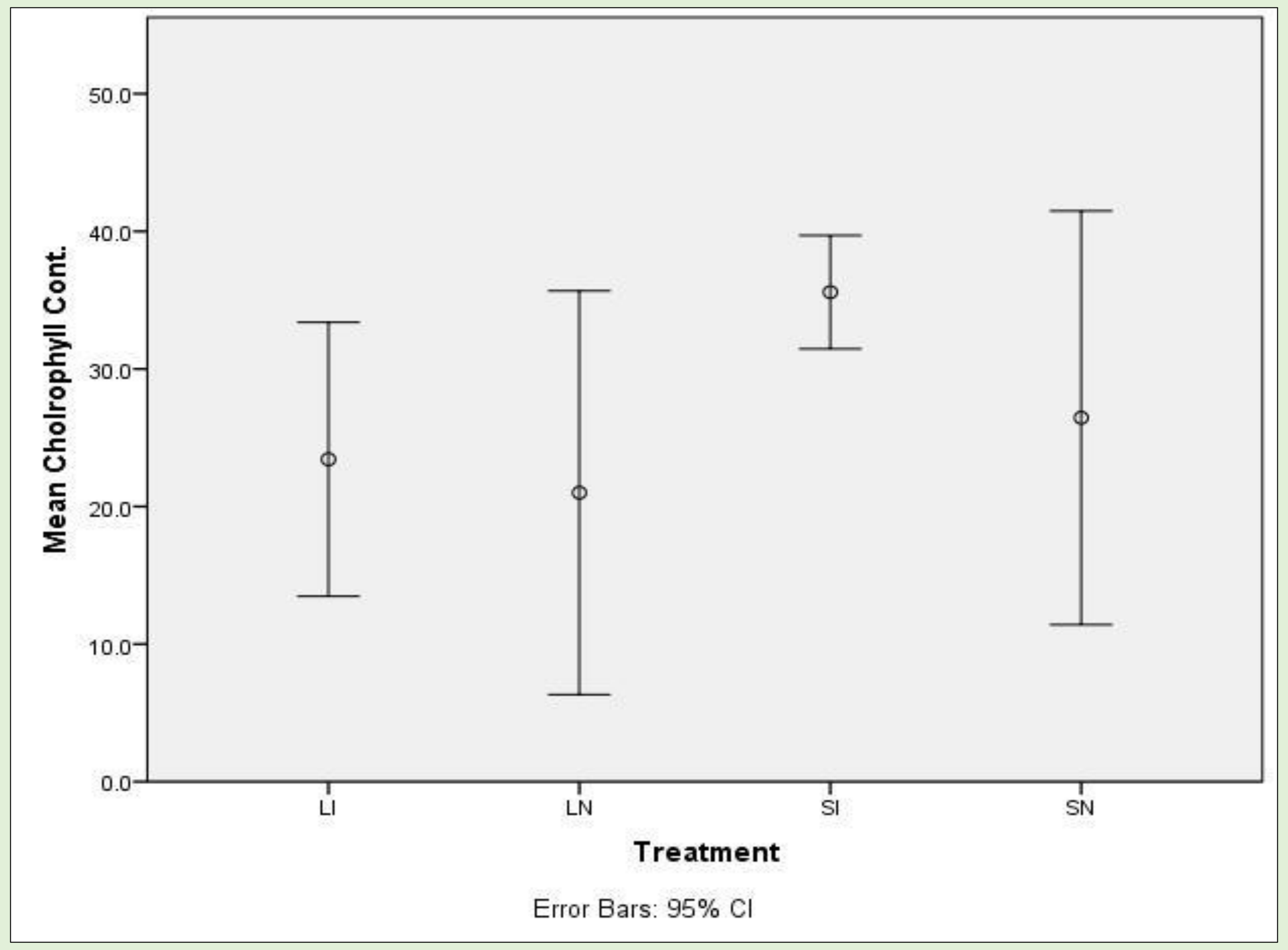

Figure 2. *Elymus canadensis* chlorophyll content in relation to treatment groups.

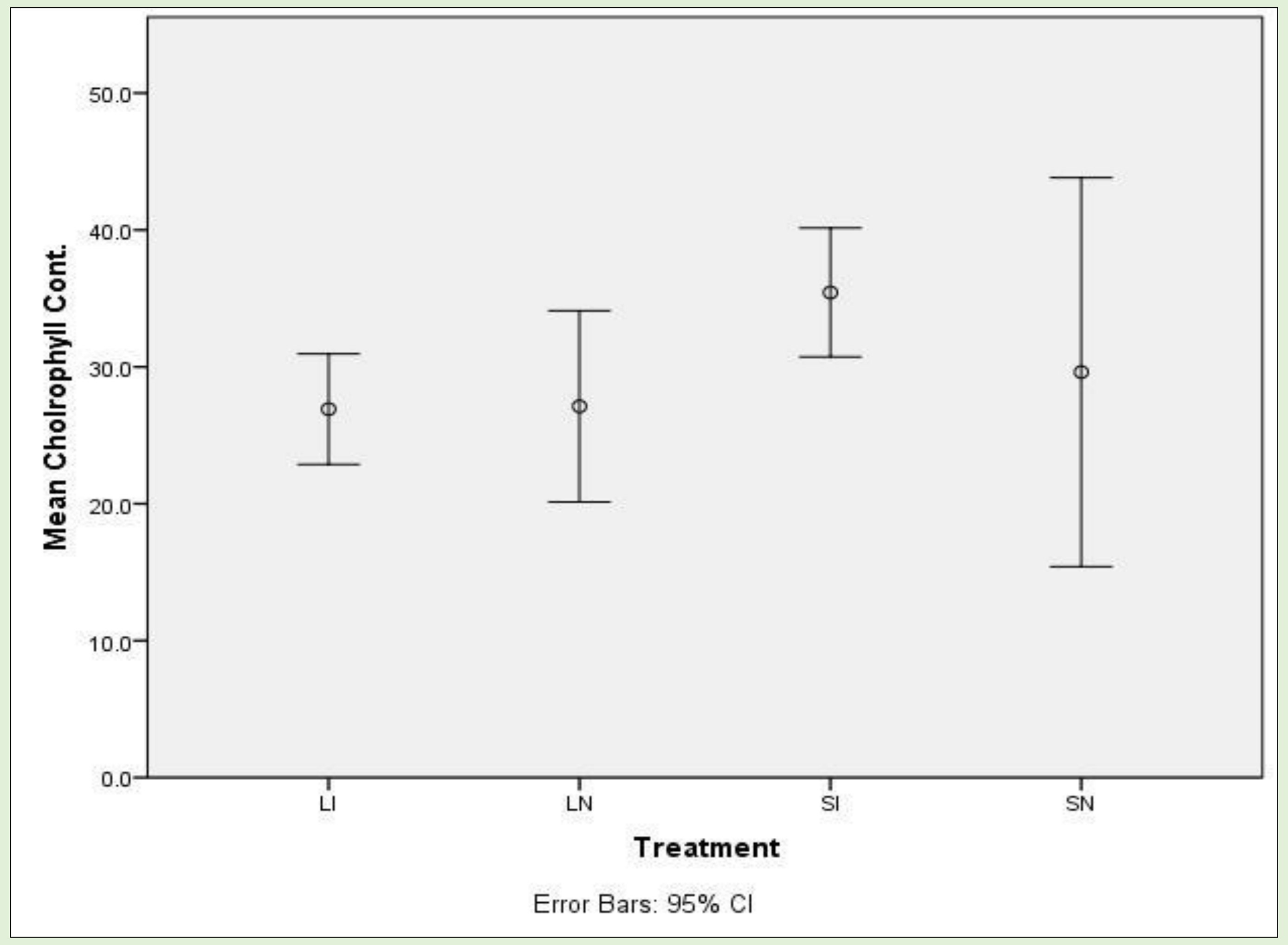

Figure 3. *Bromus inermis* chlorophyll content in relation to treatment groups.

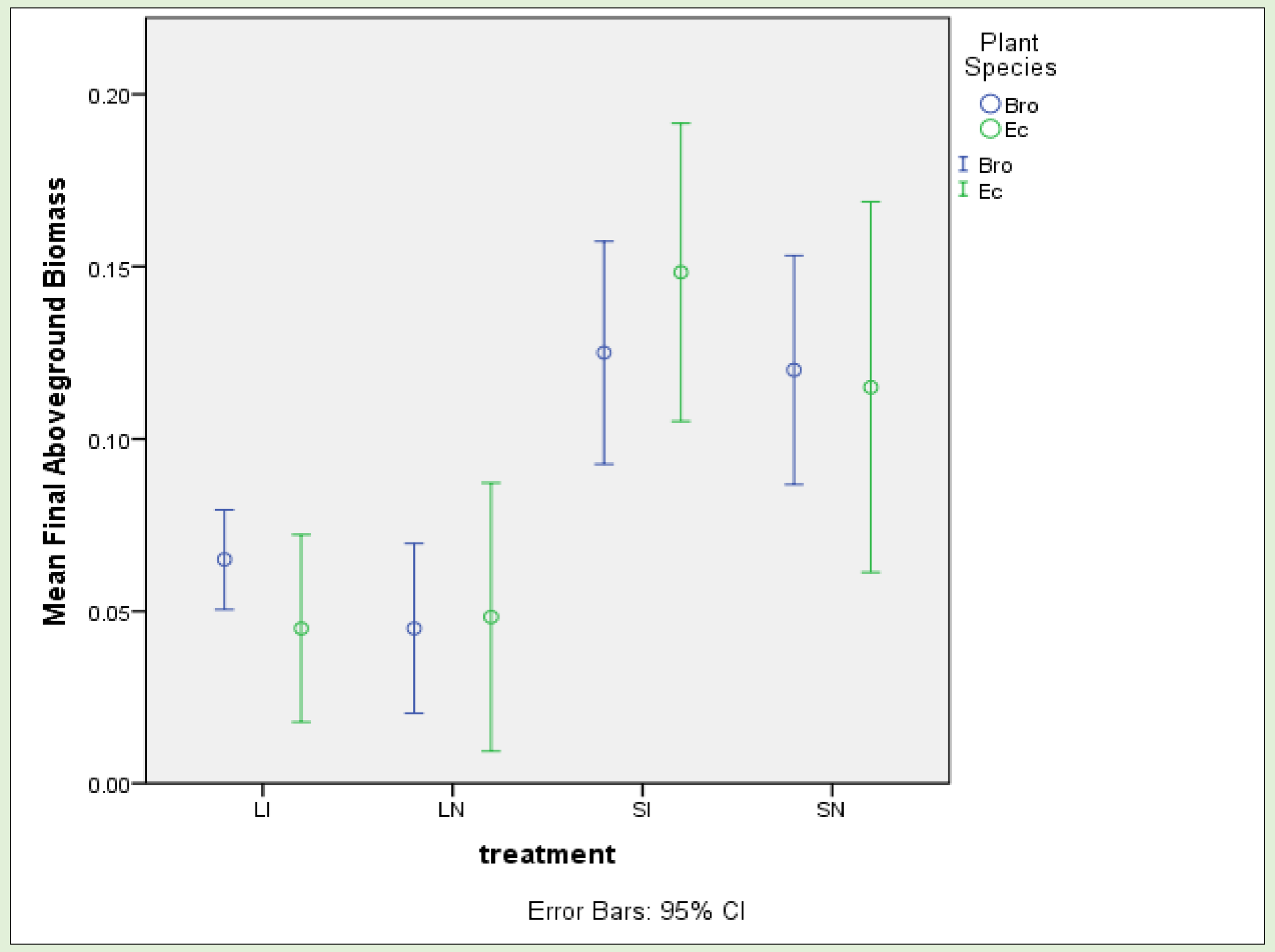

Figure 4. Mean aboveground biomass of *Elymus canadensis* and *Bromus inermis in relation to soil and mycorrhizae type.*

Results

- Figure 1 had a P-value for the soil treatment, .398, and for inoculum, .618. The F-value for the soil treatment, .744, and for inoculum, .25.
- Figure 2 had a P-value for the soil treatment .279 and for inoculum, .101. The F-value for the soil treatment, 1.239, and for inoculum, 1.96.
- Figure 3 had a P-value for the soil treatment, .398, and for inoculum, .618. The F-value for the soil treatment, .744, and for inoculum, .257.
- Figure 4 had a P-value for the soil treatment, .000, and for inoculum, .165. The F-value for the soil treatment, 61.583, and for inoculum, 2.003.

Conclusions

- Our hypothesis was disproven because both species were positively affected by being in sterilized soil, regardless of mycorrhizae innoculate type (Figure 1).
- Additionally, no correlations were found amongst either of the individual species and the two variables measured (Figure 2 & 3).
- Last graph (Figure 4).

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