

## INTRODUCTION

- Mycorrhizal fungi grow in mutually beneficial symbiotic relationships with plant roots and plants grown with mycorrhizae can exhibit increased growth, due to increased access to water and nutrients
- Dry mass, stem diameter, and plant height can be used as a measure of plant growth (Wilson and Hartnett, 1997; Daft and Okusana, 1973).
- Increased stem diameter correlates with increased water uptake (Klepper, Browning, and Taylor, 1971)
- Sympatric relationships between plants, mycorrhizae, and soil results in the greatest increase in growth when compared to allopatric combinations, suggesting that the relationship between local plants, soil, and fungi has a greater impact on plant growth than the addition of allopatric mycorrhizae alone (Rúa et al, 2017).
- We predicted that plants grown in local soil with sympatric mycorrhizae and then inoculated with commercial mycorrhizae will display increased biomass, height, and stem diameter due to the beneficial impact of the sympatric relationship on plant growth.

## METHODS

- 48 plants, 24 *Sorghum bicolor* (Sb) and 24 *Sorghastrum nutans* (Sn) with 6 replicates of the following 4 growth treatments:
  1. living prairie soil inoculated with commercial mycorrhizae
  2. sterilized prairie soil inoculated with commercial mycorrhizae
  3. living prairie soil that is not inoculated to measure the effect of wild mycorrhizae,
  4. sterilized prairie soil that is not inoculated as a control
- Commercial mycorrhizae used was MycoBloom.
- Plant height and stem diameter were measured weekly during the investigation and plant biomass was measured at the conclusion.
- Plants were harvested after 8 weeks to weigh root and shoots.



## RESULTS

Figure 1. Final aboveground Biomass

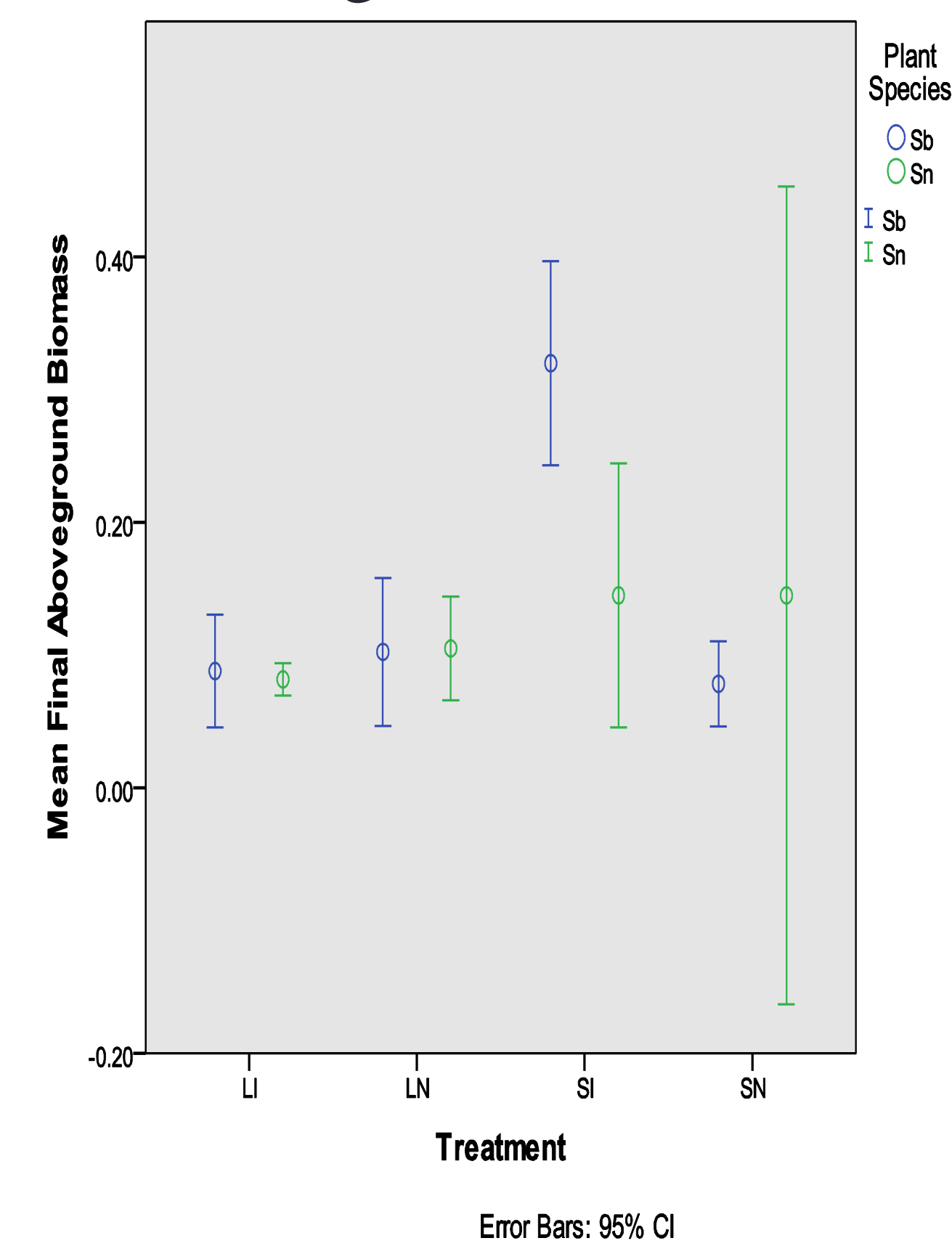


Figure 2. Diameter Sb

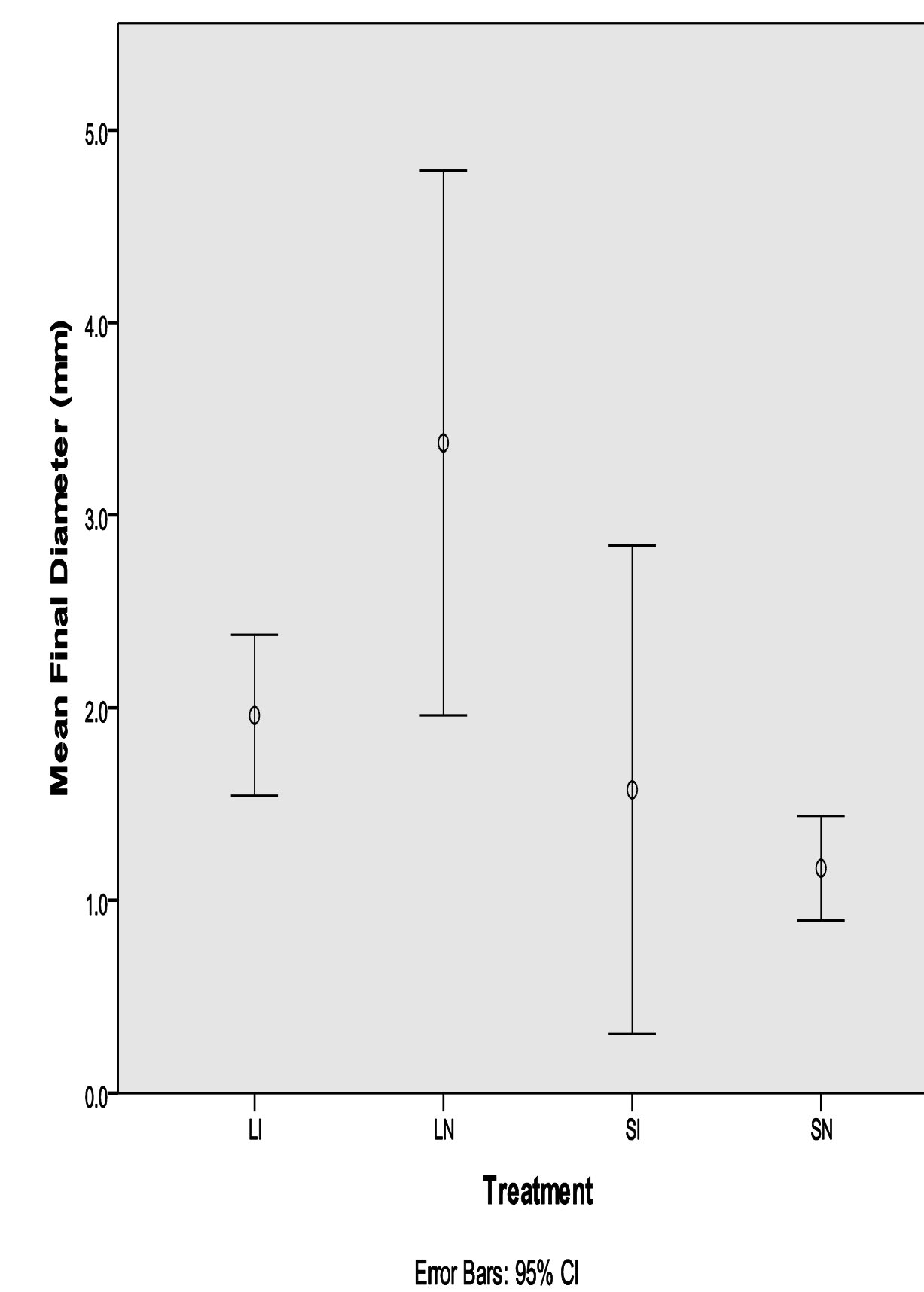


Figure 3. Sb Height

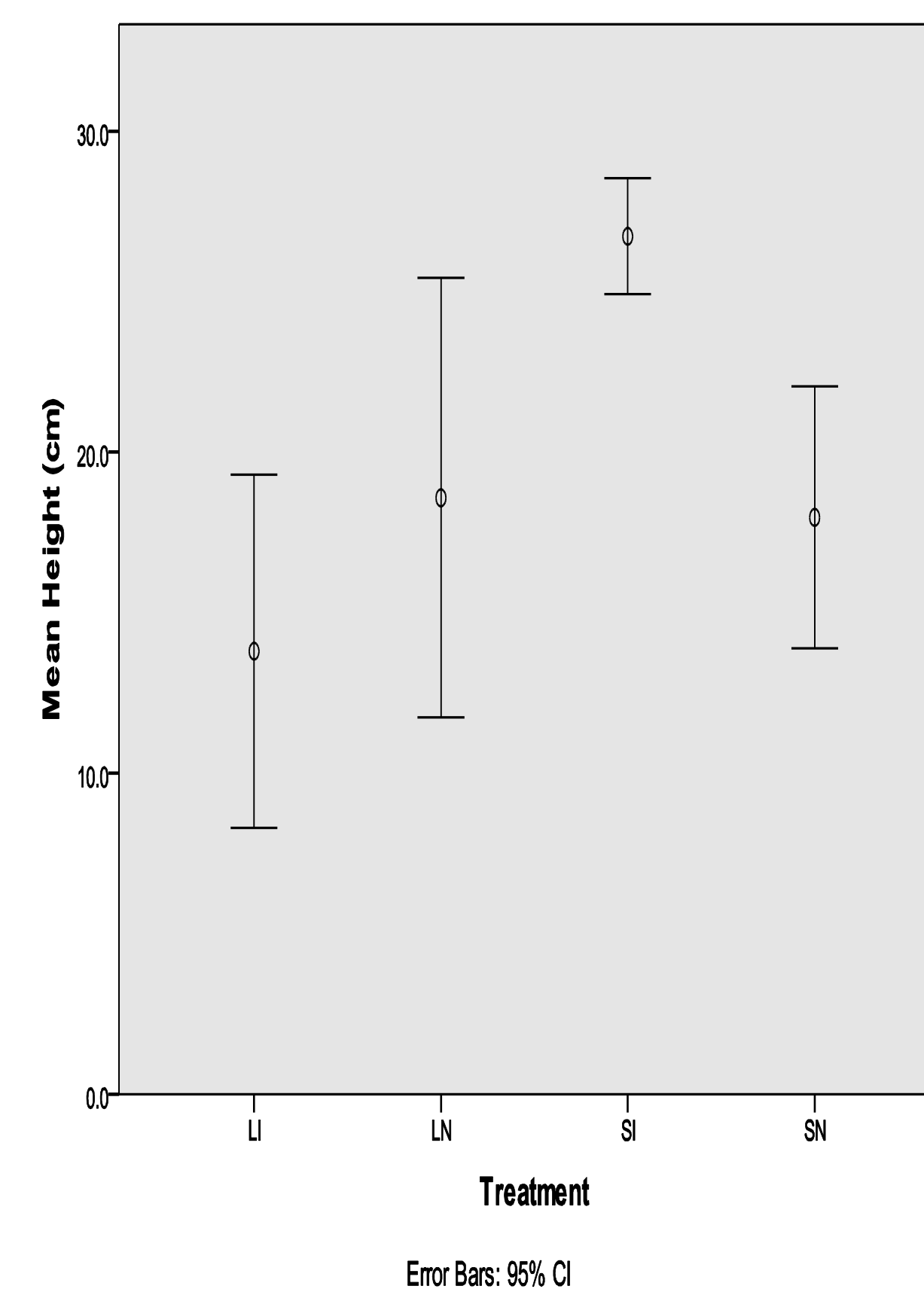
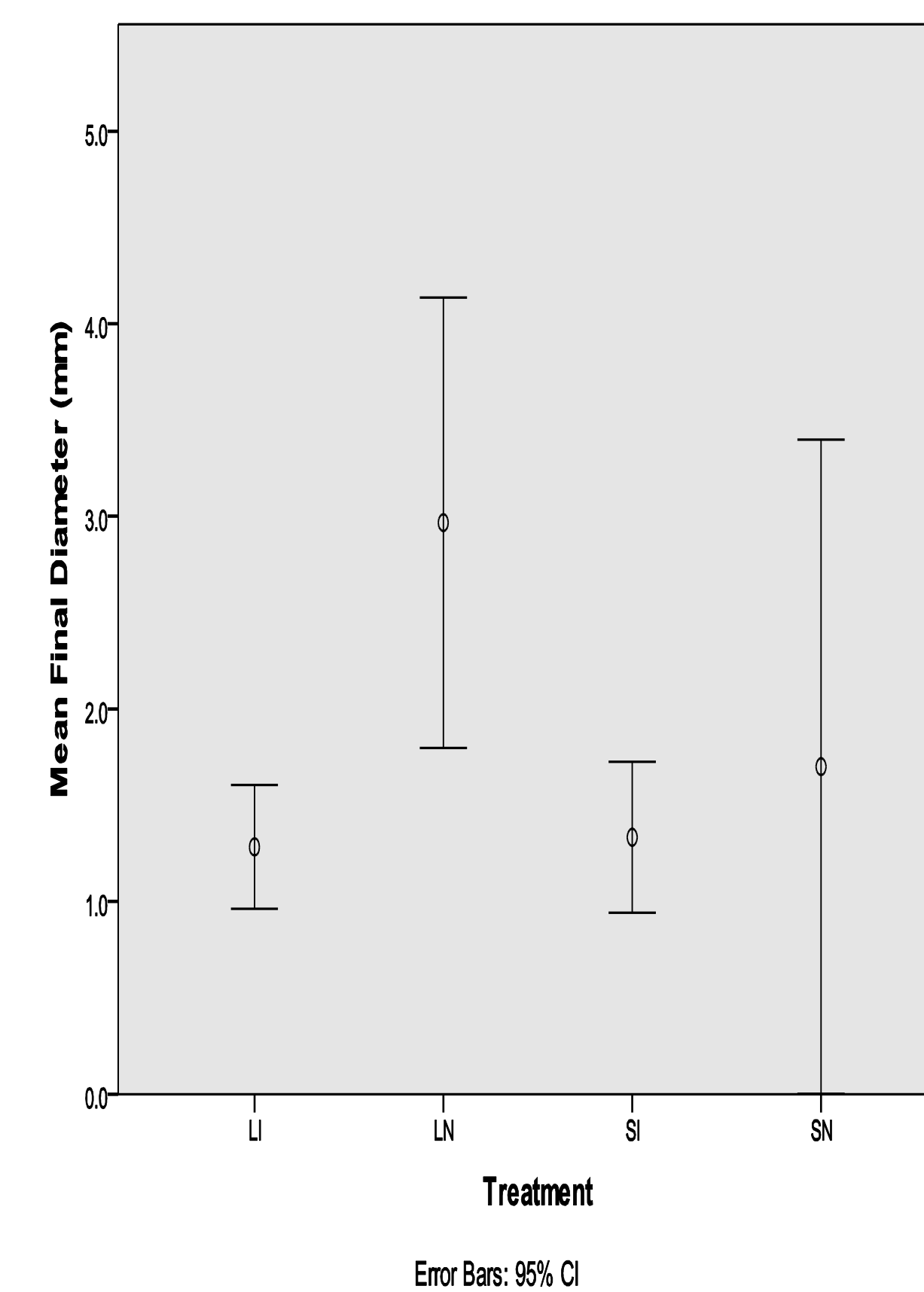


Figure 4. Sn Diameter



## RESULTS

- Aboveground Biomass
  - Soil:  $F = 10.676$ ,  $P = 0.003$
  - Plant Species:  $F = 1.387$ ,  $P = 0.247$
  - Inoculum:  $F = 4.581$ ,  $P = 0.040$
- Sb Diameter
  - Soil:  $F = 23.003$ ,  $P = 0.000$
  - Inoculum:  $F = 3.466$ ,  $P = 0.082$
- Sb Height
  - Soil:  $F = 10.280$ ,  $P = 0.006$
  - Inoculum:  $F = 0.072$ ,  $P = 0.793$
- Sn Diameter
  - Soil:  $F = 3.291$ ,  $P = 0.086$
  - Inoculum:  $F = 9.343$ ,  $P = 0.007$

## DISCUSSION

We found that the soil ( $P = .003$ ) has the most significant affect on the aboveground biomass, the least significant was the plant species ( $P = .247$ ). The diameter of Sb was affected more from the soil ( $P = .000$ ) than the inoculum ( $P = .082$ ). The height of Sn was more affected by the soil ( $P = .006$ ) than inoculum ( $P = .793$ ). The diameter for Sn was affected more by the inoculum ( $P = .007$ ) than the soil ( $P = .086$ ). These results suggest that the effects of sympatric soil, plant, and mycorrhizae are actually more complex than we originally thought. While live, non-inoculated soil increased stem diameter in Sb and Sn, sterile inoculated soil had the greatest effect on Sb height but didn't have a significant effect on Sn height.

## ACKNOWLEDGEMENTS & REFERENCES

- Our appreciation to the Department of Plant Biology, Ecology & Evolution for the opportunity to conduct research. Thank you to Justin Dee for his guidance in lab.
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