

Introduction

- Persistence of vegetation planted along roadsides in cold climates is often limited because of salt, prolonged ice encasement, poor management, poor soil quality, and weed competition among other stresses in the northern United States¹²³.
- Seed banks at different sites could be a major driver influencing the type of coverage with turfgrasses commonly growing immediately adjacent to roadsides.
- This study was conducted in conjunction with a multi-site roadside trial assessing the performance of seeded turfgrass species and mixtures.

Research Objective

Identify, quantify, and characterize seed bank pressure between and among individual sites.

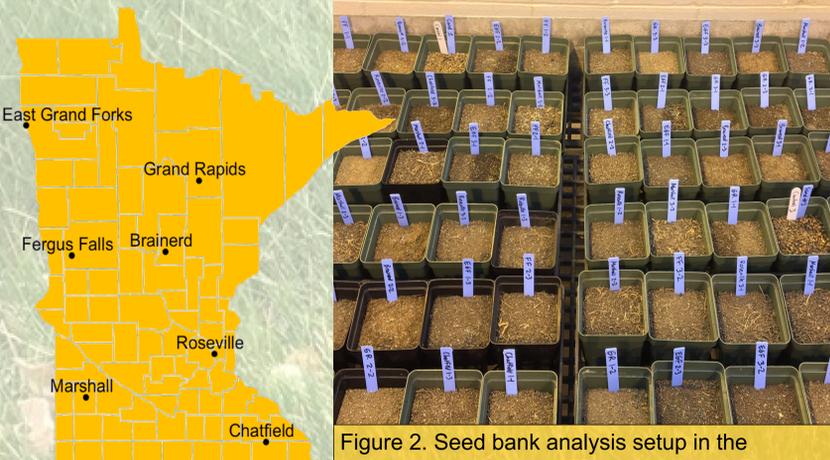


Figure 1. Seven field testing locations



Figure 2. Seed bank analysis setup in the greenhouse contained 63 total samples: 7 locations x 3 reps x 3 subsamples.

Materials and Methods

- Soil samples were obtained from the seven field trial locations throughout Minnesota (Fig. 1)
- Field treatments were arranged in a randomized complete block design with three repetitions, three, 200-g soil subsamples were collected from each replicate block.
- Soil subsamples were screened using a 4-mm mesh sieve and then transferred to pots in the greenhouse to evaluate seedling emergence over a 12-week period⁴.
- The greenhouse had an average high of 27.7 C an average low of 18.7 C and a global average of 22.7 C. Photosynthetic light consisted of natural and supplemental totaling 16 hours of light per day.
- The 63 soil subsamples were arranged in a completely randomized design in the greenhouse (Fig. 2)
- A 10-18-22 fertilizer⁵ was applied at a rate of 49 kg P₂O₅ ha⁻¹
- Weekly data were collected to evaluate soil seed banks for weed species, weed type, and weed life cycle from each subsample.

Results and Discussion

- Of the plants that emerged: 70% grasses, 26% broadleaf, 3% cattail, and the remaining 1% were a rush, sedge, or tree (Fig. 3).
- 46 species were identified: 10 grasses, 32 broadleaves, and four trees (Fig. 4)
- 83% of identified plants were annuals and 13% were perennials. The high percentage of annuals illustrate the amount of disturbance that roadsides experience (Fig. 5)
- 63% of the grasses were identified as *Digitaria sanguinalis* and *Digitaria ischaemum*. Some subsamples contained nearly 70 seedlings (Fig. 6).
- If plants could not be identified as seedlings they were transplanted and allowed to flower (Fig. 7).
- Most *D. sanguinalis* plants were identified from Marshall and Roseville and most *D. ischaemum* plants were identified from Fergus Falls.
- D. sanguinalis* was present in field testing plots throughout the summer at the Marshall location and several other (Fig. 8).

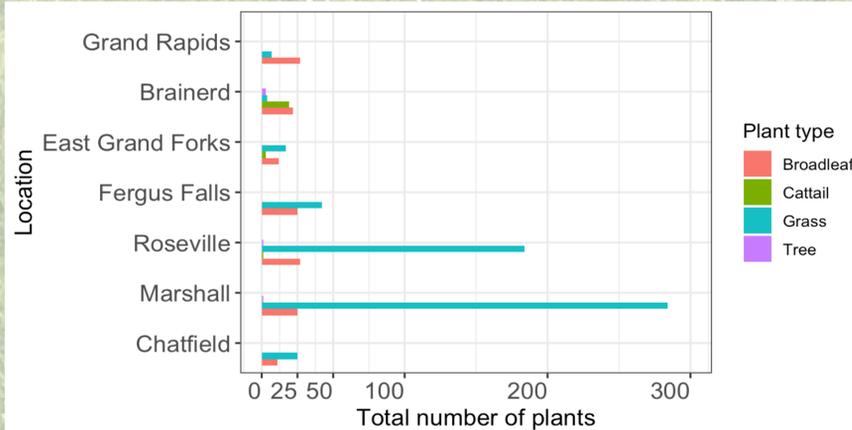


Figure 3. The total number of plants grouped by plant type per location.

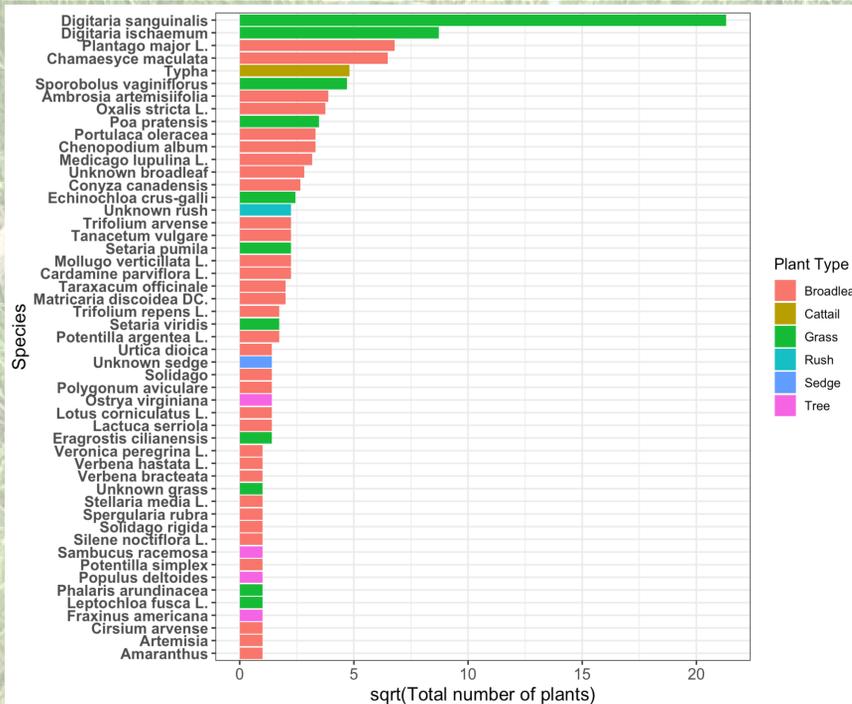


Figure 4. The total number of plants square root transformed by species and grouped by plant type.

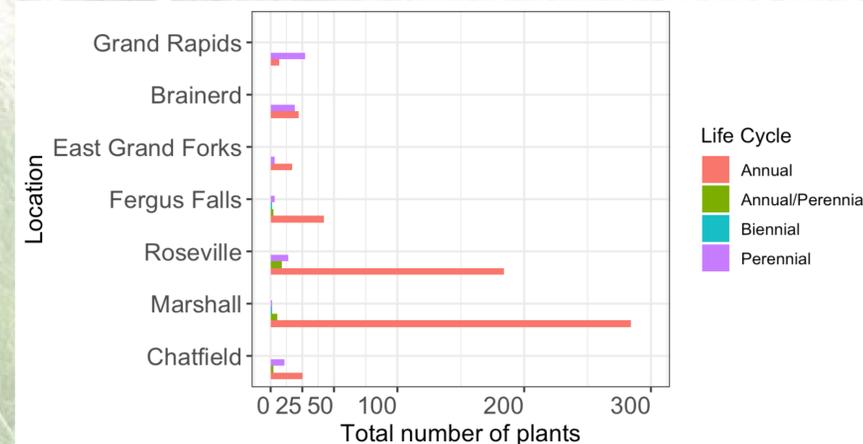


Figure 5. Total number of plants grouped by plant life cycle per location.



Figure 6 and 7. Photo on the left shows a subsample from Roseville with numerous grasses that germinated within one week. Right shows secondary transplant containers.



Figure 8. Plot on the left contained a treatment of 100% slender creeping red fescue and 100% alkaligrass on the right. Large crabgrass is invading the alkaligrass plot.

Implications and Conclusions

- The high percentage of warm-season annual grasses suggests that roadside turfgrass installers should avoid a late spring establishment
- A pre-emergent herbicide application in the spring may be important for dormant seedings
- Seed bank seems to be influencing the type of coverage in the field plots
- This study enhanced the characterization of each individual roadside research testing location

References

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Acknowledgements

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