



Project Summary

Texas Department of Transportation

0-5226: Evaluation of Texas Native Grasses for TxDOT Right of Way

Background

With over 79,000 miles of state maintained highway, the Texas Department of Transportation (TxDOT) has one of the largest right of way areas in the nation. In 2003, the new Texas Pollution Discharge Elimination System guidelines went into effect causing a renewed interest in TxDOT's strive to establish vegetation as quickly as possible. Concern about the negative impacts of planting exotic species has prompted greater emphasis on use of native plants in roadside planting. To address this issue, the USDA, NRCS, and "Kika" de la Garza Plant Materials Center, in conjunction with South Texas Natives at Texas A&M University-Kingsville, are developing native grasses such as hooded and shortspike windmill grasses to serve as competitors to exotic, introduced plant species. These native grasses can reach full height within 6 months, germinate quickly, and succeed throughout Texas temperatures with minimal resource input. It is these attributes which make both native grasses good candidates for planting on highly erodible sites and on sites where introduced species are not desired.

What the Researchers Did

Research was conducted during 2006 and 2007 in 3 Texas counties: Andrews (west Texas), Baylor (north Texas), and Kleberg (south Texas). At each location, an experimental site was established on 2 different soil textures, except at Andrews County, where only a sandy soil study site was available. Within each county and soil texture, treatments were randomly assigned for each experiment and replicated 4 times. Reference plots were also established near or adjacent to the study sites. The absolute canopy cover ($\text{cover (\%)} = 100 - \% \text{ bare ground} + \% \text{ rock} + \% \text{ litter}$), percent windmill grass cover, percent bermuda grass cover, and total canopy cover (canopy cover including overlapping species) were reported for all experiments and treatments at 30, 60, and 90 days after plantings.

Experiments included:

- **TxDOT's standard seed mixture compared with a native seed mixture and a combination of the two mixes.** The objective of this experiment was to develop a native seed mixture, with emphasis on hooded and shortspike windmill grasses, for various soils and rainfall zones throughout Texas, while meeting Environmental Protection Agency requirements with regards to obtaining 70% canopy cover when compared against adjacent reference plots within 90 days of planting.
- **Monoculture plots of hooded and shortspike windmill grasses, and bermuda grass, with the use of a soil retention blanket.** The objectives of this experiment were to compare the establishment of 4 accessions of native windmill grasses with the establishment of bermuda grass in single species plots with the use of a soil retention blanket, and evaluate impacts of mowing on established plots of windmill grass.

Research Performed by:

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- **Monoculture plots of 4 accessions of native windmill grasses and bermuda grass.** The objectives of this experiment were to compare the establishment of 4 accessions of native windmill grasses with the establishment of bermuda grass on single species plots, and evaluate impacts of mowing on established plots of windmill grass.
- **Comparison of 2 common seeding techniques: drill seeding versus broadcasting.** The objective of this experiment was to compare the percent canopy cover obtained from plots that were drill seeded versus hand broadcasting within 90 days of planting.

What They Found

Under the conditions of this study, native windmill grasses, when used as a component in a native seed mixture, provided vegetation cover similar to TxDOT's current standard seeding mixture. However, in Kleberg County during 2006, on sandy soil, the standard seeding mixture produced 19% greater canopy cover than the native mix used on the 90-day post-treatment evaluation. Soil retention blankets increased absolute canopy cover on half of the 90-day post-treatment evaluations. Absolute canopy cover was similar for all treatment plots at these 90-day evaluations. Monoculture plots of windmill grass also provided absolute canopy cover similar to bermuda grass plots within 90 days of planting. Based on results obtained from the mowing regimen, the native windmill grasses survived and no negative effects to its growth were shown, indicating long-term survival traits under mowing. Drill seeding and broadcasting demonstrated the ability of native species to establish in a semiarid area using common seeding methods.

What This Means

Native windmill grasses evolved in the harsh environments of Texas, which demonstrates their potential for long-term sustainability. Hooded and shortspike windmill grasses possess important reproductive characteristics, such as rapid germination, strongly stoloniferous growth habit, and production of seeds throughout the year. Based on the results from this study, these qualities allowed the native windmill grasses to achieve the required vegetative cover within 90 days of planting at different locations and soil textures throughout Texas, based on the 2003 Texas Pollution Discharge Elimination System guidelines.

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