A NATIVE ALTERNATIVE FOR GREATER SPECIES DIVERSITY?

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Introduction

In March 2003, Phase II of the National Pollution Discharge Elimination System (NPDES) storm water guidelines went into effect. According to the NPDES, the Texas Department of Transportation's engineers are required by the Environmental Protection Agency, to sign their names on both a Notice of Intent (NOI) and a Notice of Termination (NOT) form. This requires construction sites to have 70% perennial summer vegetation as compared to vegetation growing on adjacent property in order to be eligible for an NOT (Texas Department of Transportation 2004). The main component of this study was to provide a native alternative to introduced species while still achieving a NOT in a timely fashion with long term erosion control (Markwardt 2008).

Exotic grasses were planted from 1950 through the 1970's for livestock forage, erosion control and roadside cover (USDA-NRCS 2002 and Simmons et al. 2007). In many cases, exotics developed into monocultures that degraded native wildlife habitat (Simmons et al. 2005 and Flanders et al. 2006). The USDA-NRCS, Kika de la Garza Plant Materials Center along with South Texas Natives at Texas A&M University-Kingsville are developing native grasses to serve as competitors to exotic, introduced species. Windmillgrasses are native bunchgrasses that provide vegetation cover similar to bermudagrass (*Cynodon dactylon*), a sod-forming grass undesirable for bobwhites (Texas Quail Initiative 2005). Plantings of windmillgrasses may also support greater plant species diversity.

Hypothesis

The objective of our study was to test the hypothesis that planting 2 native species of windmillgrass, hooded (*Chloris cucullata*) and shortspike (*Chloris subdolichostachya*), results in similar vegetative cover as bermudagrass, and may provide greater native plant diversity than exotic grasses when added as a component in a native seed mixture.

Study Areas

Study areas were selected by the Texas Department of Transportation (TxDOT) according to their district system. The Odessa district's study area is located along US Highway 385 in Andrews County, Texas, in the southern High Plains. The study area for the Wichita Fall's district is located along US Highway 277 and FM-1919 in the Rolling Plains. The Corpus Christi district's study area is located along FM-1355 in, Kleberg County, Texas, in the South Texas Plains (Figure 1). Locations were chosen throughout Texas to test a wide range of environmental variables with the potential of incorporating native windmillgrasses into TxDOT's standard seed mixture.

Methods

The experimental design was a randomized, complete-block with twelve 6 by 3-m plots. Treatments (TxDOT's standard required seed mixture per district, a native seed mixture including hooded and shortspike windmillgrasses, and a combination of the 2 seed mixtures) were randomly assigned within each block. A 2 year study was replicated in Andrews, Baylor, and Kleberg counties in Texas, where the point intercept method was used to estimate canopy cover within each plot. Shannon's index, species richness, evenness, and vegetative cover were calculated for the Odessa district using SAS software version 9.1. This poster only reports the information gathered from the Odessa district.

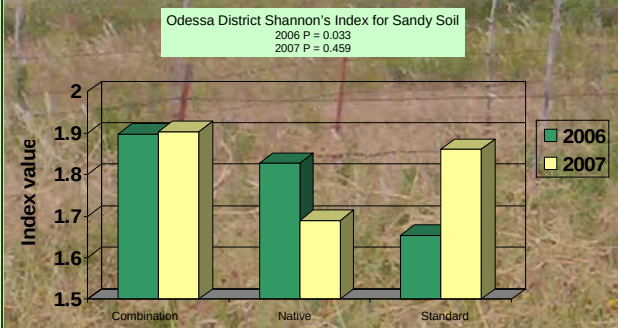

Figure 2. Mean Shannon's index in a combination mix, native mix, and standard TXDOT mix, averaged across sampling dates in 2006 (30, 60, and 90 days after planting), compared to mean Shannon's index in 2007 365 days after planting, Andrews County, Texas, 2006-2007.

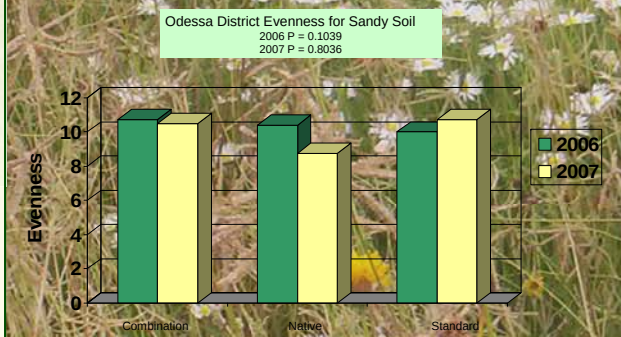

Figure 3. Mean evenness averaged across sampling dates at 30, 60, and 90 days after planting in October 2006, compared against the mean richness at 365 days, per treatment, Andrews County, Texas, 2006-2007.

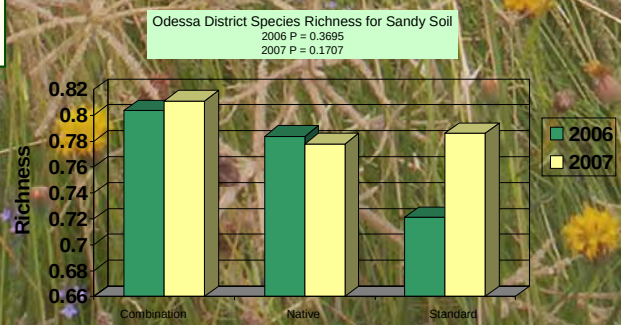

Figure 4. Mean species richness averaged across sampling dates at 30, 60, and 90 days after planting in October 2006, compared against the mean evenness at 365 days, per treatment, Andrews County, Texas, 2006-2007.

Results and Conclusions

Mean Shannon's index among treatments (Combination, Native, and Standard) in the Odessa district during 2006 differed (P = 0.033) among treatments averaged across sampling dates, with the highest index values for the native seed mixture and the combination mixture (Figure 2). However, Shannon's index was similar (P = 0.459) among treatments in the Odessa district in October of 2007. Species evenness and richness were similar (P > 0.05) among treatments (Figures 3 and 4). In addition, canopy cover was also similar (P > 0.05) among plots planted with the native mix, combination mix, and standard mixes in the Odessa district. No significant (P > 0.05) differences existed among treatment plantings in other districts.

Native mixtures containing windmillgrasses can meet TxDOT's standards for vegetative cover on roadside plantings and can provide similar or greater plant species diversity without the use of exotic, introduced species. Windmillgrasses have the potential to provide vegetative cover similar to introduced species, such as bermudagrass, when added as a component in a native seed mixture.

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Figure 1. Study areas located throughout Texas.