

Native Prairie Restoration in the Lower Rio Grande Valley Texas

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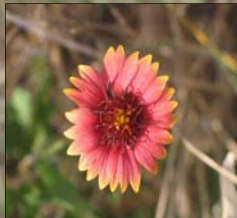
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Abstract

Native prairie restoration is difficult in south Texas due to a lack of commercially available locally-adapted germplasm and competition from aggressive, non-native species such as bermudagrass (*Cynodon dactylon*), guineagrass (*Megathyrsus maxima*), and old world bluestems. We tested the hypothesis that we would be able to establish locally adapted native species and these diverse native stands will withstand invasion from non-native species. A randomized, complete block experimental design was used with 4 replications to test this hypothesis. Treatments randomly assigned in each block were 1) control, 2) land preparation, and 3) prepared and seeded. Preliminary results show convergence of the treatments however, there is 98% higher coverage of seeded native species and 41% greater species richness in seeded treatments.

Introduction

Native rangeland is being lost at a rate of 10% annually in the lower Rio Grande valley. A common practice to combat this problem is the addition of native seed. However, in south Texas rangeland restoration has been unsuccessful in part due to the large number of invasive non-native warm season grasses. These species create monocultures choking out native plants. On the other hand, it is possible that a diverse mix of native species will be resistant to invasion of non-native warm season grasses. We tested the hypothesis that seeding former cropland with locally adapted native species will result in the establishment of native species and these stands will be more resistant to invasion by non-native warm season grasses than areas that received land preparation only.



Site Description

Our study site is located on the Toramina unit of the Los Palomas wildlife management area (26° 6' 35.81" N, 98° 1' 31.60" W) which is currently owned by the Texas Parks and Wildlife Department. Before Texas Parks and Wildlife acquired the property it had been farmed for >50 years. The study area is in the lower Rio Grande valley, which receives 65 cm of rain annually and averages 23° C. The soil for this area is Harlingen Clay, a very-fine, smectitic, hyperthermic Sodic Hapluster.

Figure 1. Plot layout



Methods

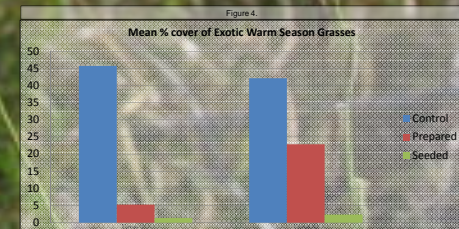
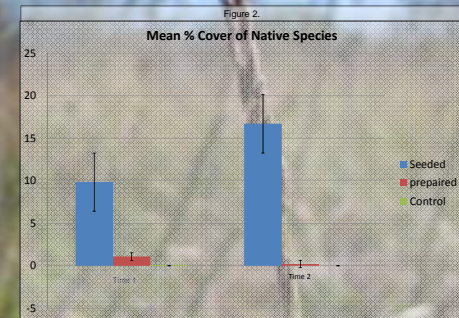
Our experiment is a randomized complete block design with 4 replications. There are 3 treatments within each block. Treatments are 1) no treatment, 2) land preparation, 3) land preparation and seed addition with 31 different native species (Fig. 1). Land preparation began with mowing was then followed by mechanical grubbing of woody species. After existing vegetation was removed plots were disked twice with an offset disk, moldboard plowed, disked 2 more times, and finished with a field float. All land preparation was completed between late February and early March. Seed was applied using a Truax seed drill along with a tub spreader. Seeding rates were within rates recommended by the Natural Resources Conservation Service. The seed mix listed in table 1 was developed to repopulate a depleted seed bank with equal distribution of early, mid, and climax successional species.

Table 1.

Species
shortspike windmillgrass (<i>Chloris x subdoliostachya</i>)
slender grama (<i>Bouteloua repens</i>)
plains bristlegass (<i>Setaria spp.</i>)
arizona cottontop (<i>Digitaria californica</i>)
mexican hat (<i>Ratibida columnifera</i>)
hairy grama (<i>Bouteloua hirsuta</i>)
tridens spp. (<i>Tridens muticus</i>)
sideoats grama (<i>Bouteloua curtipendula</i>)
false rhodesgrass (<i>Chloris crinita</i>)
bappusgrass (<i>Pappophorum bicolor</i>)
plantain blend (<i>Plantago spp.</i>)
bundleflower (<i>Desmanthus virgatus var. depressus</i>)
little bluestem (<i>Schizachyrium scoparium</i>)
plains lazy daisy (<i>Aphanostephus ramosissimus</i>)
orange zexmenia (<i>Wedelia hispida</i>)
multiflowered false rhodesgrass (<i>Chloris pluriflora</i>)
rio grande clammweed (<i>Polanisia dodecandra</i>)
texas grama (<i>Bouteloua togolosa</i>)
canada wildrye (<i>Elymus canadensis</i>)
indian blanket (<i>Gaillardia pulchella</i>)
brarrie acacia (<i>Acacia angustissima var. texensis</i>)
deer pea vetch (<i>Vicia ludoviciana var. texana</i>)
swiss bush sunflower (<i>Sida calva</i>)
halls panicum (<i>Panicum halli</i>)
plains lovegrass (<i>Eragrostis intermedia</i>)
false mesquite (<i>Calliandra conferta</i>)
thyrus dalea (<i>Dalea scandens</i>)
trushweed (<i>Verbesina microptera</i>)
shortspike silver bluestem (<i>Bothriochloa longipaniculata</i>)
engelmann daisy (<i>Engelmannia pinnatifida</i>)
hoodedwindmillgrass (<i>Chloris cucullata</i>)

Results and Discussion

During October of 2008, percent canopy cover of seeded native species was 89% greater ($P = 0.025$) in seeded plots than in plots with no treatment or with land preparation only. Species richness was also 91% greater ($P=0.003$) in the seeded plots than the other two (Figs. 2 and 3). On the other hand, invasive non-native species had 88% ($P=0.017$) higher cover in the control plots than in the seeded or land preparation plots (Fig 4). By January 2009 only the percentage canopy cover of seeded native species ($P = 0.008$) and species richness ($P = 0.013$) were greater in the seeded plots than in plots with no treatment or with land preparation only (Figs. 2 and 3). Composition of plant species is converging among treatments over time. Our initial results indicate that planting a diverse mix of native plants does not appear to reduce non-native plant encroachment compared to no planting of native plants.



Literature Cited

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