Native Prairie Restoration in the Lower Rio Grande Valley

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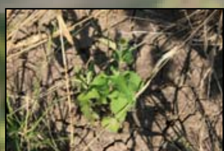
Abstract

Native prairie restoration has been successfully utilized to convert previously cultivated lands back to native habitat. These practices have proven less successful in south Texas due to a lack of commercially available local germplasms as well as aggressive non-native species such as bermudagrass *(Cynodon dactylon)*, guineagrass (*Megathyrsus maxima*), and old world bluestems. In recent history, changes in land owner goals and the farm bill have resulted in a greater demand for local germplasms for restoration plantings . These new germplasms make it possible to test the theory that areas seed with a diverse mix of locally adapted native species 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 1050% greater density of planted species in the prepared and seeded plots.

Introduction

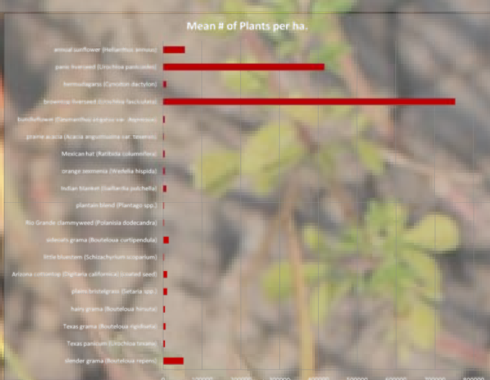
Native habitat loss is occurring at a rate of 10% annually in the lower Rio Grande Valley. Loss of habitat is do to urbanization, agriculture, and displacement by non-native species (Sinclair et al 1995). As the amount of native habitat is lost the need for habitat restoration grows. However, the best rout for restoration often comes into question. Past experiences have shown that restoration areas that have had seeded added are restored at a faster rate (Samuel and Hart 1994). These previous restoration areas have also been shown to have the potential to withstand invasion (Gross et al. 2005). This leads to our hypothesis that areas that have undergone land preparation and seeding with native species will better withstand invasion by non-native species more effectively than non seeded areas.



Methods

We used a randomized, complete block design in the experiment with 3 treatments and 4 blocks.. The 3 treatments are; 1) Control, 2) prepared land , and 3) land prepared and seeded with a native seed mixture (Fig 1). Land preparation involved mowing, mechanical grubbing of trees, two passes with an offset disk, one pass with a moldboard plow, two more passes with the offset disk, and finally leveled with a field float. Following land preparation seeded plots were seeded using a Truax grass drill and a tub spreader. The seed mix was established to provide an accurate 8:2 ratio of grasses to forbs as well as an equal ratio of the three successional categories. The final aspect considered was an emphasis on the aggressive colonizers slender gramma and shortspike windmillgrass. Stem counts were conducted in at June, July, and August. All stems were counted in 25x25 cm squares. Sample points were semi-randomly distributed in prepared and seeded plots as well as prepared only plots. We will estimate canopy cover of vegitation using 20x50 cm frames during October 2008 and March, June, and October 2009.

Figure 2



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. Prior to the Texas Parks and Wildlife Department acquisition of 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 described as Harlingen Clay.

Table 1.

Table 1. List of planted species along with category and percentages of total mix

Plant type	Category	Species	% in seed mix	% by category in mix	% by plant type in mix
GRASSES	Aggressive invader grasses	slender grama (Bouteloua repens)	3.85	15.29	82.38
		shortspike windmillgrass (Chloris x subdolistachya)	11.45		
	Early successional grasses	Texas panicum (Urochloa texana)	8.65	10.22	
		Texas grama (Bouteloua rigidiseta)	1.20		
		Halls panicum (Panicum hallii)	0.25		
		plains lovegrass (Eragrostis intermedia)	0.12		
	Mid successional grasses	hairy grama (Bouteloua hirsuta)	6.45	30.95	
		tridens spp. (Tridens muticus)	3.78		
		plains bristelgrass (Setaria spp.)	11.36		
		Arizona cottontop (Digitaria californica) (coated seed)	9.36		
	Late successional grasses	multiflowered false rhodesgrass (Chloris pluriflora)	3.51	25.92	
		false rhodesgrass (Chloris crinita) (coated seed)	6.01		
		little bluestem (Schizachyrium scoparium)	2.42		
		pappusgrass (Pappophorum bicolor)	7.31		
		longspike silver bluestem (Bothriochloa longipaniculata)	0.15		
		sideoats grama (Bouteloua curtipendula)	3.08		
		Canada wildrye (Elymus canadensis)	3.43		
FORBS	Annual forbs	Rio Grande clammyweed (Polanisia dodecandra)	2.19	6.04	17.61
		plantain blend (Plantago spp.)	2.35		
		deer pea vetch (Vicia ludoviciana var. texana)	0.71		
		Indian blanket (Gaillardia pulchella)	0.79		
	Perrenial forbs	awnless bush sunflower (Simsia calva)	0.29	7.88	
		plains lazy daisy (Aphanostephus ramosissimus)	2.07		
		frostweed (Verbesina microptera)	0.23		
		Engelmann daisy (Engelmannia pinnatifida)	0.10		
		orange zexmenia (Wedelia hispida)	1.82		
		Mexican hat (Ratibida columnifera)	3.37		
	Climax dominant forbs	Thyrsus dalea (Dalea scandens)	0.07	3.69	
		false mesquite (Calliandra conferta)	0.10		
		prairie acacia (Acacia angustissima var. texensis)	1.63		
		bundleflower (Desmanthus virgatus var. depressus)	1.89		

Figure 3.

Percentages of observed and in seed mixture

Figure 1. Plot layout

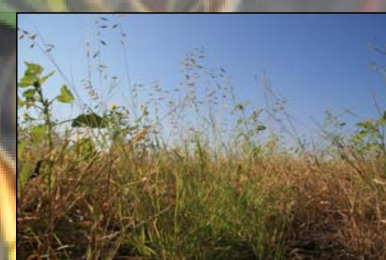
Red – Prepared
Green – Control
Yellow – Prepared and seeded

Results

Stem count results from early June were unusable due to the lack of rain. However, counts conducted in July and August showed significantly higher stem density (P=.0238), native density, (P=.0347) and species richness (P=.0029) in plots that were prepared and seeded compared to plots that were only prepared. Stem counts allowed for the extrapolation of the number of plants per hectare (fig 2). This figure makes it easy to see that slender grama makes up a large proportion of the planted species that germinated. However, all planted species only make up a small part of the vegetation in the plots. The proportion of native species seedlings that were observed was different than was present in the seed mix (fig 3).

Conclusions

Early results show a clear difference in the number of native species. However, with results being only a few months after germination how the non-native species move into seeded plots is unclear. To date no clear conclusions can be made because of the brief time since planting.



Literature Cited

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Acknowledgements

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