



# Texas Coastal Prairie Ecotype Project



## Summary 2001-2007



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**Study Number: STPMC-P-0138- RA**

**Study Title:** Texas Coastal Prairie Ecotype Project

**Introduction:** In 2001, an initiative was begun between the USFW Service, CKWRI, the Gulf Coast Association of Soil and Water Conservation Districts, the STN Project, and the Kika de la Garza PMC to produce native, eco-typic plant material to displace invasive species on pastures and agricultural fields, along the Texas Coastal Prairie.

**Problem:** There is a need for native adapted ecotypic plants for range restoration, wildlife habitat, and xeriscaping along the Texas Gulf Coast.

**Objective:** The PMC will establish a seed nursery of Texas Coastal Prairie ecotypes for a variety of grasses, forbs, and legumes. The ecotype region was established to be large enough to retain regional integrity and genetic adaptability. The seed nursery will consist of approximately 20 collections of each species. The nursery will consist of transplants that are isolated as necessary to maintain species integrity and diversity. The seed nursery will be hand harvested to ensure a complete spectrum of seed is harvested from each species. The nursery seed will be planted in production fields where it will then be harvested and bulked per species. The ecoregion seed will then be made available to commercial seed growers.

**Discussion:** Thirteen species were selected for initial collecting and evaluation. This selection included 4 forbs: white prairie clover (*Dalea candida*), black-eyed Susan (*Rudbeckia hirta*), rattlesnake master (*Eryngium yuccifolium*), and Kansas gayfeather (*Liatris pycnostachya*). One cool season grass, Virginia wildrye (*Elymus virginicus*), was included. Eight warm season grasses were also included: yellow Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium* var. *scoparium*), switchgrass (*Panicum virgatum*), Florida paspalum (*Paspalum floridanum*), brownseed paspalum (*Paspalum plicatulum*), eastern gamagrass (*Tripsacum dactyloides*), and sideoats grama (*Bouteloua curtipendula*). Ten to twenty-five collections of each species are being collected from the 29 counties along the Texas Coastal Prairie.

**Collections and Seed Nursery:** In 2001, 42 collections were received, representing 12 of the 13 selected species. In spring 2002, ten of these species were seeded in the greenhouse. Eleven accessions were transplanted in to the field in 2002 to start the seed nursery (Table 1).

In 2002, 48 additional collections were received representing 11 of the selected species. In December 2002, 22 collections were seeded in the greenhouse. Thirty-two accessions were added to the seed nursery in 2003 to bring the total to 42 accessions.

In 2003, 6 additional collections were received representing 5 of the selected species. In December 2003, 1 new accession of rattlesnake master, 9 yellow Indiangrass, 7 big bluestem, 2 little bluestem, 2 switchgrass, 1 Florida paspalum, and 5 sideoats grama were seeded in the greenhouse. Sixteen accessions were added to the seed nursery in 2004 to bring the total to 58 accessions.

In 2004, 5 additional collections were received representing four of the selected species. In December 2004, 10 yellow Indiangrass, 5 big bluestem, and 4 little bluestem were

seeded in the greenhouse. Thirteen accessions were added to the seed nursery in 2005 to bring the total to 71 accessions.

In 2005, 10 additional collections were received representing 5 of the selected species. In December 2005, 5 new accessions of Kansas gayfeather, 2 black-eyed Susan, 12 yellow Indiangrass, 7 big bluestem, 7 little bluestem, 4 switchgrass, 2 Florida paspalum, 4 brownseed paspalum, and 3 sideoats grama were seeded in the greenhouse. Ten accessions were added to the seed nursery in 2006 to bring the total to 81 accessions.

In 2006, 7 additional collections were received representing 5 of the selected species. In December 2006, 6 new accessions of Kansas gayfeather, 4 black-eyed Susan, 4 yellow Indiangrass, 1 big bluestem, 1 little bluestem, 2 switchgrass, 2 Florida paspalum, and 1 brownseed paspalum were seeded in the greenhouse. Eleven accessions will be added to the seed nursery in 2007 to bring the total to 92 accessions. Twenty-five accessions representing 10 of the selected species have been received so far in 2007. Some of these accessions were received in time to seed in the greenhouse for planting spring of 2007. The rest of the accessions will be planted in the greenhouse in December 2007.

**Accessions Needed:** There are few of the twenty-nine coastal counties are actually represented per species in the seed nursery. This is largely due to a lack of collections as well as some collections exhibiting poor or no germination in the greenhouse. Each accession is planted in the greenhouse two years before it is abandoned, which represents planting 2,000 seeds if that many seeds were submitted. See Table 2 for counties represented in the seed nursery by species.

**Progress of Each Species:** There is one accession each of white and roundhead prairie clover in the seed nursery. Roundhead prairie clover seems to be the largest and densest of the two species and most abundant seed producer. Harvest germination is excellent after scarification (65-91%). However, several attempts have been made to get another accession for comparison with no success. Each new accession brought in has had little or no seed fill. A wild collection of roots with nodules is also needed for isolation of the associated rhizobium.

The two black-eyed Susan accessions that were planted in the field in 2006 had many volunteer seedlings come up this spring. The only delay with this species is a lack of collections. Four of the nine accessions submitted as blacked-eyed Susan turned out to be yellow Mexican hats.

Rattlesnake master was discontinued in 2006. Only four collections had been received. While it is an indicator species of intact habitat, it does not seem to play a strong enough role to warrant further work at this time.

Kansas gayfeather is being looked at from a horticultural release perspective. One accession has been an excellent seed producer, but the plants grow very tall and fall over. While this is not an issue in a range setting, it is not a desirable trait in a garden. Other accessions stay smaller and do not lodge, but they either die out after the first year, or grow back weaker the next year. Germination of seed harvest of this species has also shown a large range (1.3-84%) even from the same accession across multiple years (15-84%).

So far only two collections of Virginia wildrye have been submitted. We have received five accessions of sideoats grama and planted each 2-3 times in the greenhouse, but not a single collection has produced even 10 plants to start a field planting (0-0.5% germination).

There are accessions of yellow Indiangrass, big bluestem, little bluestem, and seacoast bluestem that have good field performance. There are only 3 accessions of switchgrass. However, all five of these species have exhibited extremely low seed fill numbers. Seedheads are produced, but few caryopsis are actually present. This has been seen in both wet and dry years. It is thought that high night temperatures may be effecting the pollination process. One accession each of yellow Indiangrass, big bluestem, little bluestem, and a few other species for other projects will be planted at Katy Prairie in Katy, TX and the Knox City Plant Materials Center in Knox City, TX this year. Seed will be collected and examined to see if these climates will positively effect seed fill for these species. If this is successful, the promising accessions selected by field evaluations in Kingsville will be evaluated there for seed characteristics. Commercial seed production may need to be moved north as well.

Brownseed paspalum has also exhibited poor seed fill. Six accessions of brownseed paspalum were chosen for advanced evaluation out of the original collections. These six showed higher numbers of seed fill than the others. Four of these six are from coastal counties. Seed fill and seed shatter continue to be a problem with this species. An evaluation has been planted at the East Texas Plant Materials Center to compare with the South Texas site.

Florida paspalum has been a weak field performer over all and also exhibits poor seed fill. The most promising accession was moved into seed increase in 2005, but did not produce a seed crop in 2006 due to dry conditions. All of the eastern gamagrass accessions have performed well, but none produce enough seed to make commercial production feasible. There is also one accession that seems to be a dwarf form of Eastern gamagrass. It produces a plant and seed at about half the size of the others consistently over several years.

**Table 1. Seed Nursery Summary by Year**

Species	# Accessions In Seed Nursery					
	2002	2003	2004	2005	2006	2007
White prairie clover	1	1	1	1	1	1
Roundhead prairie clover	-	1	1	1	1	1
Black-eyed Susan	-	-	-	-	2	5
Rattlesnake master	2	3	4	4	-	-
Kansas gayfeather	-	3	5	5	5	6*
Virginia wildrye	-	-	1	1	-	-
Yellow Indiangrass	-	3	7	7	9	12*
Big bluestem	-	7	11	16	19	19
Little bluestem	2	3	5	9	13	14*
Seacoast bluestem	-	7	7	11	11	11
Switchgrass	-	1	2	2	2	3*
Florida paspalum	2	4	5	5	7	7
Brownseed paspalum	4	4	4	4	6	7*
Eastern gamagrass	-	5	5	5	5	5
Sideoats grama	-	-	-	-	-	-
<b>Total</b>	<b>11</b>	<b>42</b>	<b>58</b>	<b>71</b>	<b>81</b>	<b>92</b>

\* Number expected after transplanting is completed for 2007

**Table 2. Counties Represented in Seed Nursery by Fall 2007**

	# Accessions In Seed Nursery														Total*	
	White prairie clover	Roundhead prairie clover	Black-eyed Susan	Rattlesnake master	Kansas gayfeather	Virginia wildrye	Yellow Indiangrass	Big bluestem	Little bluestem	Seacoast bluestem	Switchgrass	Florida paspalum	Brownseed paspalum	Eastern gamagrass		Sideoats grama
Aransas	-	-	-	1	-	-	3	1	1	1	2	-	-	-	-	9
Austin	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	2
Brazoria	1	-	-	2	2	-	-	-	-	-	-	1	-	1	-	7
Calhoun	-	-	1	-	-	-	-	-	-	4	-	-	-	-	-	5
Chambers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Colorado	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	2
Ft. Bend	-	-	2	-	-	-	1	-	2	-	-	2	2	-	-	9
Galveston	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-	3
Hardin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Harris	-	-	1	-	1	1	1	-	1	-	-	1	1	-	-	7
Jackson	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Jasper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Jefferson	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Kleberg	-	-	-	-	1	-	3	4	-	2	-	-	-	-	-	10
Lavaca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Liberty	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Matagorda	-	-	-	-	-	-	1	-	5	-	-	-	1	-	-	7
Montgomery	-	-	-	-	1	-	1	-	1	-	-	1	-	-	-	4
Newton	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Nueces	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	4
Orange	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Polk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Refugio	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
San Jacinto	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
San Patricio	-	-	-	-	-	-	-	6	1	2	1	-	1	4	-	15
Tyler	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Victoria	-	-	-	-	-	-	1	4	2	-	-	-	4	-	-	11
Waller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Wharton	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

\* Numbers expected after transplanting is completed for 2007