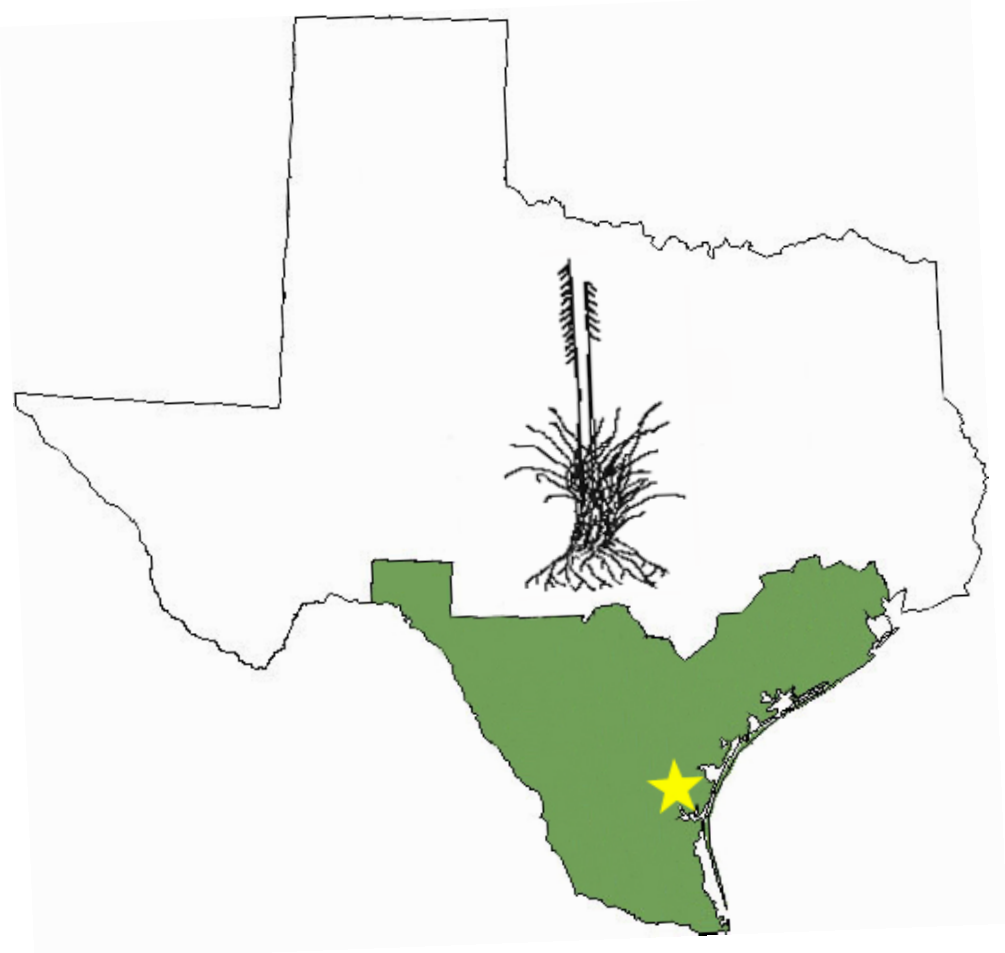
USDA United States Department of Agriculture

Natural Resources Conservation Service

Plant Materials Center

KIKA DE LA GARZA PLANT MATERIALS CENTER KINGSVILLE, TEXAS



2006 ANNUAL TECHNICAL REPORT

E. "Kika" de la Garza
Plant Materials Center

2006

Annual Technical Report

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2006 Annual Technical Report
Kika de la Gaza Plant Materials Center, Kingsville, Texas

INTRODUCTION

The Kika de la Garza Plant Materials Center (PMC) located at Kingsville, Texas was established in April 1981. The PMC is operated by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, in cooperation with an Advisory Board from Texas A&M University-Kingsville, the Caesar Kleberg Wildlife Research Institute (CKWRI), the South Texas Association of Soil and Water Conservation Districts (STASWCD), and the Gulf Coast Association of Soil and Water Conservation Districts (GCSWCD). The Advisory Board provides overall guidance and direction toward meeting the Plant Material Center's objectives.

The objective of the Plant Materials Program is to provide cost effective vegetative solutions for soil and water conservation problems. This means identifying plants for conservation use, developing techniques for their successful use, providing for their commercial increase, and promoting their use in natural resource conservation and other environmental programs.

LOCATION AND FACILITIES

The Kika de la Garza PMC is located just outside of Kingsville on 76 acres of land leased from Texas A&M University-Kingsville and 15 acres leased from the King Ranch (see map inside back cover). The soils at the PMC are Raymondville clay loam and Victoria clay. The King Ranch annex has Delfina fine sandy loam soil and Willacy fine sandy loam soil. Topography of the PMC is flat.

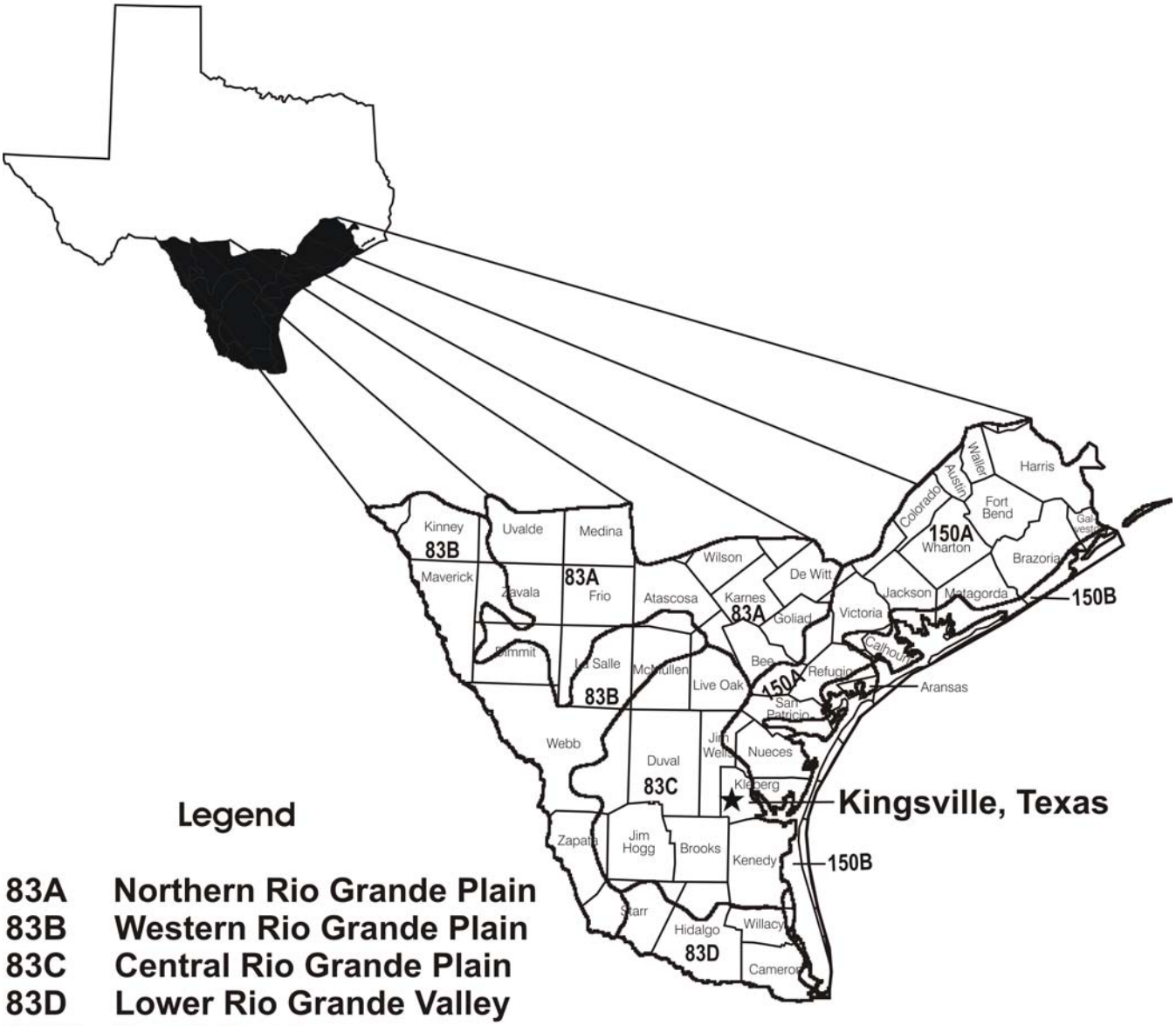
Facilities consist of an office, greenhouse, seed cleaning barn, seed storage building, shop and equipment storage barn, and a fuel and pesticide storage complex. Limited irrigation water is available from a shallow pond located at the PMC and is for furrow irrigation. Specialized hydroponic tanks are located at the PMC for use in production and evaluation of aquatic plants.

INTERNET

You can access our website on the internet to find information about the Plant Materials Center. Information and publications will be added to our home page periodically. The website address is accessed through

http://www.tx.nrcs.usda.gov or http://plant-materials.nrcs.usda.gov.

Kika de la Garza
Plant Materials Center



Legend

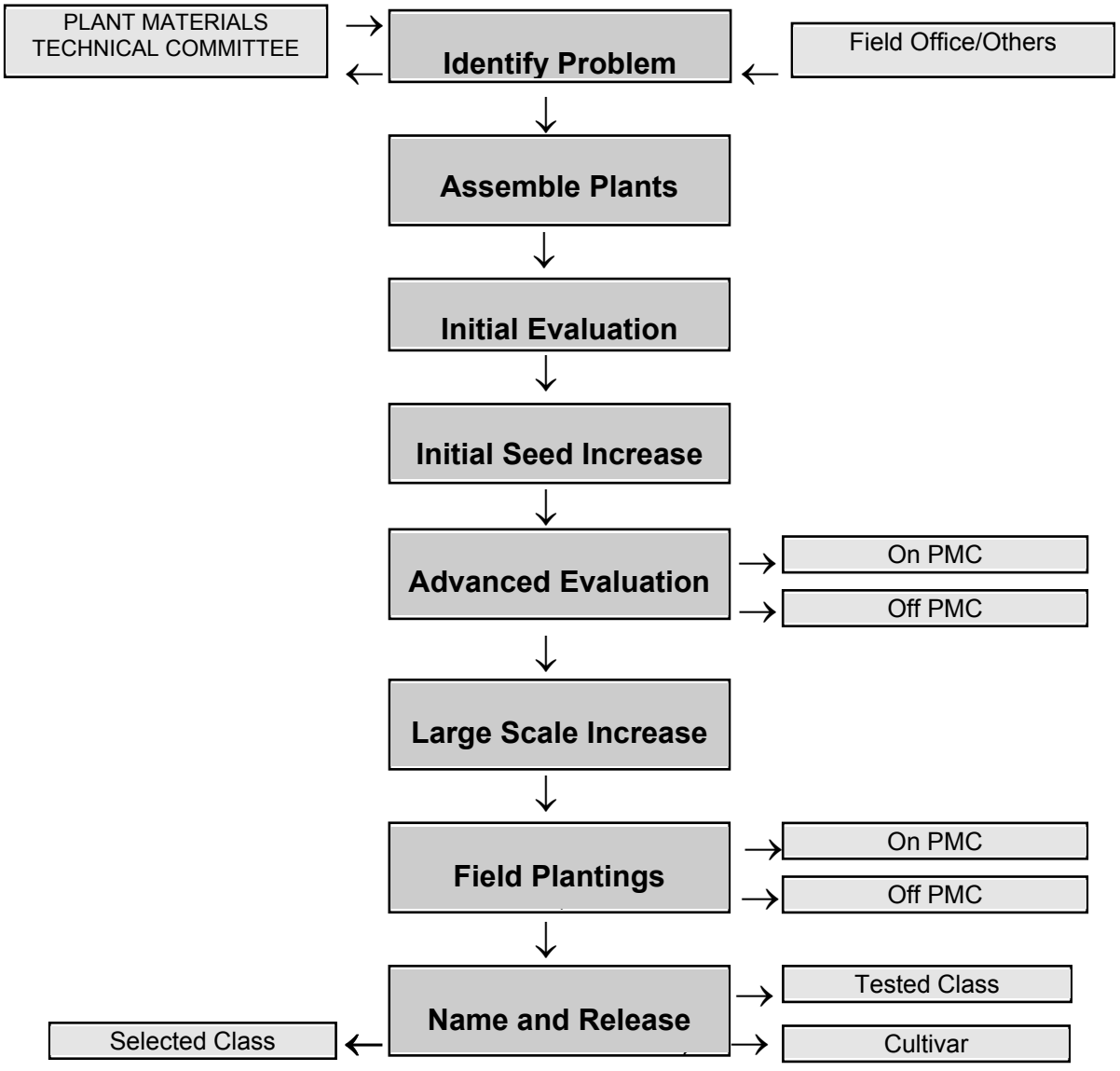
83A	Northern Rio Grande Plain
83B	Western Rio Grande Plain
83C	Central Rio Grande Plain
83D	Lower Rio Grande Valley
150A	Coast Prairie
150B	Coast Saline Prairies

CLIMATE DATA

	TEMPERATURE °F				RAINFALL (inches)	
MONTH	HISTORICAL AVG.	2006 MONTHLY AVG.	2006 MAX	2006 MIN	HISTORICAL AVG.	2006 MONTHLY TOTAL
JANUARY	56.8	61	88	34	1.71	0.24
FEBRUARY	60.2	68	86	45	1.62	0.12
MARCH	66.9	72	97	35	0.86	0.63
APRIL	73.4	85	96	51	1.50	0.0
MAY	78.4	81	107	57	2.58	4.11
JUNE	82.9	83	100	68	3.05	7.60
JULY	84.9	86	98	73	2.13	2.84
AUGUST	84.9	--	102	72	2.72	0.49
SEPTEMBER	81.3	--	97	64	4.47	10.74
OCTOBER	73.8	--	94	48	3.17	2.55
NOVEMBER	65.0	--	89	36	1.26	0.77
DECEMBER	58.8	--	84	30	1.13	2.08
				TOTAL	**26.20**	**30.17**

PLANT MATERIALS PROGRAM
PLANT RELEASE PROCESS

The Plant Materials Program has established a systematic process to evaluate and release plants to address the conservation problems outlined in the long-range program. The intensity and time of evaluation will vary according to the class of release. A cultivar will require many years (10-15) of intense evaluation whereas a selected class plant can be released in 3-4 years with little evaluation. The following flow chart illustrates the steps involved in this process.



LONG RANGE PROGRAM

PRIORITIES:

The Kika de la Garza Plant Materials Center's long range program has identified four high priority conservation needs to direct the operations at the PMC. These priorities have been established by the recommendations of the PMC Advisory Board, PMC Plant Technical Committee and Field Office surveys.

-Plant selection and cultural techniques to supply a better diversity of native forage for livestock.

-Plant selection and cultural techniques for addressing shoreline erosion and water quality issues of coastal and inland areas.

-Plant selection and cultural techniques to supply food, cover, and habitat for wildlife.

-Plant selection and cultural techniques for ecosystem restoration. Emphasis is on restoration sites with alkaline and saline soil problems, endangered species recovery and sand dune stabilization.

Native Forages

-Warm-season native grasses
-Cool-season native grasses
-Native Legumes

Erosion Control and Water Quality Improvement

-Evaluation of vegetative barriers for cropland and gully erosion control
-Plants for coastal shoreline erosion control
-Plants for coastal water quality improvement

Wildlife Habitat Improvement

-Plants for wildlife upland habitat
-Plants for coastal waterfowl habitat

Ecosystem Restoration

-Plant selection and cultural techniques for ecosystem restoration
-Plants for alkaline and saline soils
-Techniques for the restoration of endangered plant species

Initial Evaluation Projects

Study Number: 77IO16H

Study Title: Assembly and Evaluation of Four Flower Trichloris (*Trichloris pluriflora*)

Introduction: Four flower trichloris (*Trichloris pluriflora*) is a warm-season perennial bunch grass native to Texas (Hitchcock, 1971). It is of particular interest because USDA-NRCS soil surveys have reported that four flower trichloris is one of two co-dominant climax species on numerous range sites in South Texas. Four flower trichloris is also known as multi-flowered false rhodesgrass (Gould, 1975). Four flower trichloris grows on plains and in dry woods in south Texas, Mexico, and in southern South America (Correll and Johnston, 1996; Hitchcock, 1971). Although the presence of four flower trichloris is considered to be an indicator of good range condition, there is no known commercial variety of this species.

Problem: There is a need for native, adapted seed available at a reasonable price for the restoration and reclamation of habitat in the South Texas Region.

Objective: The objective is to assemble, evaluate, select and release, and/or provide information on the propagation of four flower trichloris. Four flower trichloris collections will be evaluated for adaptation in two South Texas Ecoregions, the sandy soil region known as the South Texas Sand Plain and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005, there were thirty-two accessions of four-flowered trichloris in the Rio Grande Plain Ecoregion plot and six accessions in the South Texas Sand Plain Ecoregion. In June 2005, a complete harvest was done in both plots. In November, a seed sample was taken from each accession. These harvests will be germination tested in 2007. Half a pound of seed was collected from the seed increase plot of accession 8252 in September of 2005. In April of 2006, the ecoregion plots were evaluated for early growth and seed production (Table 1). A few of the accessions exhibited higher density and more flowers.

In August of 2006, two accessions were added to the Rio Grande Plain Ecotype plot, bringing the total number of accessions to thirty-four. The South Texas Sand Plain plot was taken out in December of 2006 as all the accessions were represented in the other plot. No seed was collected in 2006.

South Texas Natives (STN) also has off-site evaluation plots of four-flowered trichloris in place. In 2005, they planted thirty-eight accessions at Rancho Blanco. In 2006, they planted forty-three accessions at TAES Uvalde and forty-two accessions at Rio Farms.

The 2007 evaluations and seed harvests done by the PMC and STN will be compared, along with data from pervious years, to select accessions for a larger based ecotype blend.

Table 1. Study 77IO16H Four Flower Trichloris Initial Field Evaluation - April 2006

Rio Grande Plains Ecotype - PMC (clay soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Development Stage
9038717	Jim Wells	100	25	5	5	5	5	a few flowers
8252	Willacy	100	25	5	4	5	5	a few flowers
9045782	Starr	100	25	5	5	5	5	a few flowers
9064432	Starr	98	25	5	5	5	5	a few flowers
9052756	Duval	94	25	5	5	5	5	a few flowers
9043300	Frio	100	25	5	5	5	5	a few flowers
9043207	La Salle	100	25	5	5	5	5	a few flowers
9043279	Cameron	96	25	5	5	5	5	a few flowers
9045811	Karnes	100	25	5	5	5	5	vegetative
9089091	Dimmit	96	25	5	4	5	5	many flowers
9090655	Live Oak	100	25	5	5	5	5	a few flowers
9090721	Wilson	100	25	5	4	5	5	vegetative
9091844	Hidalgo	100	25	5	5	5	5	many flowers
9086181	Jim Wells	98	25	5	5	5	5	a few flowers
9086182	Zavala	100	25	5	5	5	5	vegetative
9086184	Jim Wells	98	25	5	5	5	5	vegetative
9086185	Jim Wells	100	25	5	5	5	5	a few flowers
9086186	Jim Wells	100	25	5	4	5	5	vegetative
9091809	Jim Hogg	100	25	5	4	5	5	many flowers
9090594	Maverick	100	25	5	3	5	5	a few flowers
9090579	La Salle	100	25	5	3	5	5	a few flowers
9088772	Webb	100	25	5	3	5	5	many flowers
9090364	Willacy	100	25	5	5	5	5	many flowers
9090413	Medina	100	25	3	3	5	5	vegetative
9091884	Brooks	100	25	5	4	5	5	many flowers
9090315	Wilson	100	25	5	4	5	5	many flowers
9093192	Webb	100	25	5	4	5	5	many flowers
9090281	Hidalgo	100	25	5	4	5	5	many flowers
9091883	Kenedy	100	25	5	5	5	5	many flowers
9088560	Dimmit	100	25	5	4	5	5	a few flowers
9089128	Medina	100	25	4	4	5	5	a few flowers
9090548	Duval	100	25	5	4	5	5	many flowers
9086211	Kleberg	-	-	-	-	-	-	-
9086212	Kleberg	-	-	-	-	-	-	-

South Texas Sand Plain Ecotype - Annex (sandy soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Development Stage
9086181	Jim Wells	90	10	5	5	5	5	a few flowers
9086183	Kleberg	92	10	5	5	5	5	vegetative
9086184	Jim Wells	70	10	6	7	7	5	a few flowers
9086185	Jim Wells	100	10	5	5	5	5	a few flowers
9086211	Kleberg	98	10	5	5	5	5	vegetative
9086212	Kleberg	100	10	5	5	5	5	vegetative

*Ocular estimate (1 = Best)

Study Number: 77IO28CL

Study Title: Assembly and Evaluation of Seacoast Bluestem (*Schizachyrium littorale*)

Introduction: Seacoast bluestem (*Schizachyrium littorale*) is a native, perennial, rhizomatous, warm-season grass. Its previous scientific name, *Schizachyrium scoparium* var. littoralis, described it simply as a variation of little bluestem. It has previously been included under the genus Andropogon as *Andropogon littoralis* Nash (Gould,1975) and *Andropogon scoparium* var. littoralis (Nash) Hitchc. (Correl & Johnston, 1996). Although currently treated as its own genus, Schizachyrium is closely related to the genus Andropogon. It has been separated mainly on the basis of a single rachis per inflorescence, as opposed to at least two in the Andropogon. Other close relatives include the genera *Dichanthium* and *Bothriochloa* (Correl & Johnston, 1996). All four genera bear the common name of Bluestem (Gould 1975). This presence of rhizomes is what most easily identifies it from little bluestem. The inflorescence blooms mainly from August to December and consists of numerous racemes 2.5-5 cm long (Gould, 1975).

Seacoast bluestem can be found along sandy shorelines of Lake Ontario in Canada, on sandy shores of Massachusetts and New York, south to North Carolina, along the sand dunes of Lake Michigan in Ohio and Indiana, and along the sandy gulf coast of South East Texas (Hitchcock, 1971). In Texas, it has also been known to grow as far inland as Jim Hogg county, and is common on the sandy shores of the barrier islands of the gulf coast south into Mexico (Correl & Johnston, 1996). It occurs in deep sand in the Gulf Prairies and Marshes and South Texas Plain regions of Texas, and is common on coastal sands near sea level in southern Texas (Gould, 1975).

Seacoast bluestem is usually the dominant forage grass throughout the Texas Coastal Prairie (Hutch, Schuster & Drawe, 1999). It provides good quality forage for livestock, poor forage for wildlife, but provides good cover (Hutch, Schuster & Drawe, 1999).

Problem: There is a need for native, adapted seed available at a reasonable price for the restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of seacoast bluestem. Seacoast bluestem collections will be evaluated for adaptation in two South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain and the region along the Texas coast known as the Texas Coastal Prairie.

Discussion: At the end of 2005, there were eleven accessions of seacoast bluestem planted in the Texas Coastal Prairie Ecotype field plot, ten accessions in the South Texas Sand Plain Ecotype field plot, and seven accessions in a plot labeled “unknown bluestem”. Seed was collected in December 2005 from the Texas Coastal Prairie Ecotype field plot and will be germination tested in 2007. The South Texas Sand Plain plot did not produce a seed harvest.

In December 2005, five accessions of seacoast bluestem were seeded in the greenhouse, but none were added to the plots due to low germination (0-1%) despite replanting.

Both seacoast bluestem ecoregion plots were evaluated for early growth in April 2006 (Table 1). Several accessions in the South Texas Sand Plain plot had faster regrowth, better vigor and higher density. Overall, the Texas Coastal Prairie plot looked very poor, but one accession, 9089221 from San Patricio, stood out with better performance.

In previous years, the seed harvests of seacoast bluestem have had poor seed fill. To test if this is due to location, plants will be sent to Katy, TX in 2007. These plants will be harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

No new accessions of seacoast bluestem were received in 2006. Any new accessions will be added to the plots as received.

Offsite Evaluations: South Texas Natives (STN) also has off-site evaluation plots that combine little and seacoast bluestem. They have forty-three accessions at Bladerunner Farms and seventy-seven accessions (and four accessions in seed increase) at Rio Farms.

In 2006, seacoast bluestem plants of accession 9064461 were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas. At Bentsen State Park seacoast bluestem performed very well and were judged to have an attractive blue-green color.

Table 1. Study 77IO28CL Seacoast Bluestem Initial Field Evaluation – April 2006

South Texas Sand Plain Ecotype - ANNEX (sandy soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Seed Production*
9064474	DeWitt	96	10	6	6	6	5	na
9064461	Zavala	38	20	5	5	6	5	na
9090280	Brooks	92	20	4	4	5	5	na
9086171	Kenedy	96	10	4	5	5	5	na
9090351	Willacy	94	10	6	6	6	5	na
9086173	Kenedy	86	20	4	4	5	5	na
9086174	Kenedy	90	15	4	5	5	5	na
9090349	Willacy	100	25	5	4	5	5	na
9086172	Kenedy	94	25	4	4	5	5	na
9090299	Kleberg	97	25	5	4	5	5	na

South Texas Sand Plain Ecotype – Unknown Bluestem - ANNEX (sandy soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9091805	Jim Hogg	92	25	4.0	4.0	5.0	5.0	na
9090346	Jim Hogg	78	20	5.0	4.0	5.0	5.0	na
9091812	Jim Hogg	83	10	6.0	5.0	5.0	5.0	na
9086180	Jim Wells	71	10	5.0	5.0	5.0	5.0	na
9090464	Jim Wells	82	20	6.0	5.0	6.0	5.0	na
9090262	Brooks	59	10	5.0	4.0	5.0	5.0	na
9090280	Brooks	87	25	4.0	4.0	5.0	5.0	na

Texas Coastal Prairie Ecotype - PMC (clay soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9088694	Aransas	74	5	7	7	7	5	na
9076899	Calhoun	94	5	7	7	7	5	na
9076898	Calhoun	98	5	7	7	7	5	na
9076885	Calhoun	100	5	7	7	7	5	na
9076886	Calhoun	98	5	7	7	7	5	na
9086175	Kleberg	86	5	7	7	7	5	na
9076894	Nueces	66	5	7	7	8	5	na
9089221	San Patricio	92	10	5	5	5	5	na
9090332	San Patricio	88	5	7	7	7	5	na
9091767	Nueces	81	none	9	9	9	5	na
9090299	Kleberg	90	5	7	7	7	5	na

*Ocular estimate (1 = Best)

Study Number: 77I034J

Study Title: Assembly and Evaluation of Orange Zexmania (*Zexmania hispida*)

Introduction: Orange zexmania (*Zexmania hispida* (H.B.K.) Gray), also known as hairy wedelia (*Wedelia hispida)*, is a common, native, warm-season, perennial forb (Ajilvsgi, 1991). A member of the sunflower family (Asteraceae), it grows approximately 60 to 75 cm tall blooming from March to December (Jones, 1982). Its shrub-like form, bright yellow-orange flowers, and hardiness in both dry and moist conditions make it an attractive plant for landscape use. In addition, it is easily cultivated, and is often browsed by deer, sheep, and goats (Ajilvsgi, 1991). It is found in parts of Texas and Mexico. In Texas, it is found along the Edwards Plateau, the Rio Grande Plain, and less frequently in the Trans Pecos, and in the southern portions of north central and south east regions of Texas (Correll and Johnston, 1996).

Problem: There is a need for perennial forbs for range restoration, wildlife habitat and xeriscaping in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of orange zexmania. Orange zexmenia collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: In December of 2006, four accessions out of fourteen were chosen by the PMC to include in a composite release, 9061276 (Val Verde Co.), 9064386 (Gonzales Co.), 9064456 (Goliad Co.), and 9064430 (Starr Co.). There were other accessions that had higher germination percentages and seed production, but these four accessions showed the most resistance and vigor after the fall rains, when the “heavy” clay soils of the PMC exhibited slow water infiltration, poor root oxygenation, and signs of cotton root rot on the orange zexmenia plants.

South Texas Natives (STN) also had two offsite evaluations of collections they had made since the original PMC Initial Evaluation plot was planted. They have twenty-three accessions under evaluation at TAES Uvalde and fourteen at Rio Farms. They chose their top four performing accessions, 9088799 (Webb Co.), 9089020 (Duval Co.), 9091935 (Jim Hogg Co.) and 9091956 (Bexar Co.), to also be included in the composite release.

Plants from all eight accessions were started in the greenhouse in December of 2006. These will be used to make a composite block from which to harvest breeder seed for release to seed dealers. Since some accessions have limited original seed left, their plants will be used for isolated seed increase plots in 2007 and then they will be added to the composite block in 2008. This release of orange zexmenia is scheduled for 2008.

Study Number: STPMC-P-0110-WLOT

Study Title: Advanced Evaluation of Perennial Lazy Daisy (*Aphanostephus riddellii*)

Introduction: *Aphanostephus riddellii* is commonly known as perennial lazy daisy. Perennial Lazy Daisy has aesthetic value and can be a nice addition to a native garden. A member of the sunflower (Compositae) family, it grows nine to twelve inches tall, and it's yellow-disked, white-rayed flowers bloom from February to December. It grows mostly on well-drained loam soils and caliche in pastures and woods (Jones, 1982).

It can be found in Texas, New Mexico, and northern Mexico. In Texas, it grows on the Edwards Plateau, through the Plains Country, and on limestone cuestas of the Rio Grande Plain (Correl & Johnston, 1996). Lazy Daisy germinates best in cooler temperatures.

Problem: There is a need for perennial forbs for range restoration, wildlife habitat and xeriscaping in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of perennial lazy daisy. Perennial lazy daisy collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: In 2006, lazy daisy plants were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas.

Two of the three plants sent to Bentsen State Park were still alive and blooming in November of 2006. The plants sent to TAES Dallas stayed very small and sparsely bloomed. They did not recommend lazy daisy over other similar plants available.

Study Number: 7710450W

Study Title: Assembly and Evaluation of Coastal Wetland Species

Introduction: Constructed wetlands are receiving increased attention as viable systems for the treatment of wastewater from municipal, industrial, and agricultural sources (Hammer, 1989). They are an innovative, economical, and efficient method of pollution control. Environmental concerns regarding the coastal shrimp and other fish farms along the Texas Coastal Prairie have triggered protests and litigation. Coastal fish farms draw water and discharge water in to the coastal bays and estuaries. Major concerns involve the content of the wastewater discharge. The discharge may be high in suspended solids, turbidity, and nutrients that may adversely affect the marine environment. Coastal fish farms utilize bay water, which can range in salinity levels from 15-35 parts per thousand. Most research on constructed wetlands has been done with fresh water emergent plants (Hammer, 1992; Doyle and Smart, 1993). Therefore, the selection and propagation of plants for saline wetlands is quite specific and virtually unknown.

The Texas Coastal Prairie marshes are internationally significant migration and wintering habitat for North American waterfowl. Texas has seen an estimated 52% loss (8 million acres) in wetland acreage over the past 200 years. Anderson et al, (1996) found that waterfowl in Texas depend on wetlands to meet their pre-breeding nutritional needs. Therefore, it is important to construct wetland types under programs such as the USDA Wetlands Reserve Program and the USFWS Prairie Wetlands Program that will provide high value habitat for waterfowl and other water birds. Currently, there are only a few wetland plant vendors in Texas. Furthermore, the selection of plants is not targeted towards water bird food values.

Problem: There is a need for adapted wetland plants for constructed wetlands and wildlife habitat in South Texas.

Objectives: The objective of this study is to collect, evaluate, select and release, and/or provide information on the propagation of adapted wetland plants for South Texas.

Discussion: In attempt to diversify coastal shoreline plantings, the PMC on June 3, 2005 planted 5 different species at a coastal site in Palacios, Texas. The five species were smooth cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), black mangrove (*Avicennia germinans*), saltmarsh bulrush (*Scirpus robustus*), and marshhay cordgrass (*Spartina patens*). Evaluation of the site on September 16, 2005, revealed that 90-100% survival was attained by the black mangrove and smooth cordgrass. The marshhay cordgrass had a 50% survival, but there was no survival for either the black needlerush or the saltmarsh bulrush. It is suspected that the salinity levels of the coastal waters were too high for these species to survive.

In April 2006, an evaluation of the Palacios study site was conducted. This evaluation was the first conducted on this planting following hurricane Rita. The majority of the smooth cordgrass plants survived the hurricane, but the plants looked very weak. However, the black mangrove survived and looked very good. There is interest by the landowner in expanding this planting. We plan to harvest seed from existing mangrove populations in Texas in 2007 and plant them at the site in the spring of 2008.

Study Number: 77I050JH

Study Title: Assembly and Evaluation of Native Legumes for South Texas

Introduction: Native, perennial legumes can add value to many range planting or wildlife food plots. First, most legumes provide a highly nutritious source of forage. Second, legumes help fix nitrogen in the surrounding soil thereby increasing the soil fertility of the planting site. Third, legumes can be used to add biodiversity to a site when planted with grasses and other forbs. Finally, legumes tend to have showy flowers and can add aesthetic value to a site, and be used in a native, perennial garden.

Problem: There is a need for native perennial legumes for range restoration, wildlife habitat and xeriscaping in South Texas. Currently, the only native legumes used in South Texas are partridge pea and Illinois bundleflower. Partridge pea is an annual species and Illinois bundleflower is a perennial species that has difficulties with survival and persistence in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of native legumes. Native legume collections will be evaluated for adaptation throughout South Texas.

Discussion: For information on golden dalea, prairie acacia, desmanthus, and prairie clover see the individual species project reports.

Calliandra: One accession of calliandra (*Calliandra conferta*) was planted in the field in May 2004. It is a very slow growing woody species and has done very well for the past three years in the clay soil despite being from a caliche soil. Only four plants out of fifty have been lost. Seed shatter will be a problem with this species. Flowering is indeterminate and thus the few pods produced at a time are not uniformly ripe. As soon as the pods ripen and dry, they split explosively, usually launching the seeds. Seed was harvested twice in 2005 and seed on the weed mat under the plants was vacuumed up in December of 2005. A small amount of seed was collected in September 2006. The harvest seed will be tested and compared in 2007 to see if remaining on the ground for a time effects seed quality.

Low Prairie Clover: This is a three foot tall, semi-woody, prairie clover species. Foliage production and density have been good over three years and its seed does not easily shatter. Scarifying seed in a sandpaper scarifier for 5 seconds seems adequate to achieve high germination in just 3 days.

Seed was collected in December of 2005 from the one accession under initial evaluation and will be germination tested in 2007. Due to the potential of this species, a seed increase plot was established in 2006. In December of 2006, 1.4 pounds of seed were collected from the 195 plants. This harvest will be tested in 2007. A collection information bulletin was written for low prairie clover in 2006. The State NRCS Office will be requesting Field Offices to send in more collections of this species.

Study Number: 77I053H

Study Title: Assembly and Evaluation of Pink Pappusgrass (*Pappophorum bicolor*)

Introduction: Pink pappusgrass (*Pappophorum bicolor*) is a native, warm-season perennial bunchgrass (Gould, 1975). It is known as pink pappusgrass because its spikelets usually have 2-3 fertile flowers that are purpulish-pink in color (Correll and Johnston, 1996). Pink pappusgrass can be found in Texas, Arizona, and into Mexico (Hitchcock, 1971). In Texas, it can be found in the southern coastal region, the Rio Grande Plain, the Edwards Plateau, the Rolling Plains or Reddish Prairies, and in the southeast part of the Trans-Pecos region (Gould, 1975). Pink pappusgrass grows on open valley land, grassy plains, along moist stream banks, in waste places and along roadsides where it is moist (Correll and Johnston, 1996; Gould, 1975; Hitchcock, 1971).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of pink pappusgrass. Pink pappusgrass collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005 there were fifty-two accessions of pink pappusgrass in the Rio Grande Plain Ecotype plot. Seed was collected from all accession in June of 2005 and will be germination tested in 2007. Six accessions were added to the plot in June of 2006. This plot was evaluated for early green-up and volunteer seedlings in April of 2006 (Table 1). Several accessions had a few to many volunteer seedlings and a few accessions stood out in density. By November 2006, all of the seed had shattered and there was little difference between the accessions for other traits.

South Texas Natives also evaluated 68 accessions in IEP plots at three off-site locations, Rancho Blanco, Rio Farms, and TAES Uvalde, in 2006. Two accessions were whiplash pappusgrass and seventeen accessions were a mix of pink and whiplash pappusgrass. From these evaluation plots STN chose 3 accessions (9088622-Dimmit Co., 9091841-Zapata Co., and 9088715-Webb Co.) to use in a whiplash pappusgrass release and 7 accessions (9088912-Dimmit Co., 9090520-Duval Co., 9090676-Maverick Co., 9090405-Kinney Co., 9098079-Webb Co., 9090481-Starr Co., and 9085324-Uvalde Co.) to use in a pink pappusgrass release. These accessions will be increased at Rio Farms in 2007 and the releases are planned for 2009.

Table 1. Study 77I053H Pink Pappusgrass PMC Initial Field Evaluation April 2006

PMC – Rio Grande Plains Ecotype Plot

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Volunteer Seedlings
9088540	Frio	100	25	5	6	5	5	a few
9088534	Zavala	100	25	5	5	5	5	-
9091859	Zapata	100	25	5	5	5	5	-
9090635	Kinney	100	25	5	5	5	5	-
9088982	Uvalde	100	25	5	5	5	5	-
9089000	LaSalle	100	25	5	5	5	5	-
9088856	Webb	100	25	5	5	5	5	-
9088858	Webb	100	25	5	4	5	5	many
9088710	Webb	100	25	5	5	5	5	-
9093175	Duval	100	25	5	4	5	5	many
9086195	Zavala	100	25	5	5	5	5	-
9086196	Zavala	100	25	5	5	5	5	-
9085241	Dimmit	100	25	5	5	5	5	-
9085302	Duval	100	25	5	5	5	5	-
9088715	Webb	100	25	5	5	5	5	a few
9088855	Webb	100	25	5	5	5	5	many
9088567	Zavala	100	25	5	4	5	5	many
9090627	Dimmit	100	25	5	5	5	5	-
9090700	Frio	100	25	5	5	5	5	many
9090676	Maverick	100	25	5	4	5	5	many
9088785	Webb	100	25	5	5	5	5	many
9090518	Frio	100	25	5	4	5	5	many
9090500	Frio	100	25	5	5	5	5	many
9090637	Kinney	100	25	5	5	5	5	-
9091882	Dimmit	100	25	5	5	5	5	-
9088995	Dimmit	100	25	5	5	5	5	many
9090646	Kinney	100	25	4	5	5	5	-
9089079	Webb	100	25	5	4	5	5	many
9088954	Frio	100	25	4	5	5	5	many
9085324	Uvalde	100	25	5	5	5	5	many
9088620	Dimmit	100	25	5	4	5	5	many
9088912	Dimmit	100	25	5	4	5	5	many
9088627	Dimmit	100	25	5	5	5	5	many
9088999	LaSalle	100	25	4	4	5	5	many
9090674	Dimmit	100	25	5	4	5	5	many
9088904	Dimmit	100	25	5	4	5	5	many
9085257	Starr	100	25	5	5	5	5	-
9086276	Atascosa	100	25	4	5	5	5	many
9093174	Duval	100	25	5	5	5	5	many
9086272	Atascosa	100	25	4	4	5	5	many
9088622	Dimmit	100	25	4	4	5	5	many
9091841	Zapata	100	25	5	4	5	5	many
9088738	Jim Hogg	100	25	5	4	5	5	many
9090583	Frio	100	25	5	4	5	5	many
9090520	Duval	100	25	5	4	5	5	many

*Ocular estimate (1= Best)

Table 2. Study 77I053H Pink Pappusgrass Initial Field Evaluation April 2006 (Continued)

PMC – Rio Grande Plains Ecotype Plot

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Volunteer Seedlings
9093185	Zapata	100	25	5	4	5	5	many
9090519	Medina	100	25	5	4	5	5	many
9091869	Zapata	100	25	5	5	5	5	a few
9088970	Frio	100	25	5	5	5	5	many
9091895	Maverick	100	25	5	5	5	5	a few
9088639	Dimmit	100	25	4	5	5	5	many
9090755	Frio	100	25	5	4	5	5	many
9089171	Medina	-	new	-	-	-	-	-
9089176	Medina	-	new	-	-	-	-	-
9089205	Uvalde	-	new	-	-	-	-	-
9089239	LaSalle	-	new	-	-	-	-	-
9090469	McMullen	-	new	-	-	-	-	-
9090481	Starr	-	new	-	-	-	-	-

*Ocular estimate (1= Best)

Study Number: STPMC-P-0134-WL

Study Title: Assembly and Evaluation of Bundleflower (*Desmanthus* spp.)

Introduction: Native, perennial legumes are a desirable addition to range plantings for two main reasons. First, they can help fix nitrogen in the soil. Second, they are a valuable food source for wildlife. Foliage is eaten by cattle and deer, and the seeds are eaten by quail, doves, and other wild birds. Several species of the genus *Desmanthus* are native to South Texas. 'Sabine' Illinois bundleflower (*D. illinoensis*) has been released by the USDA as a native Texas legume, but it is not well adapted to the South Texas climate. It tends to die off during the hot, dry Texas summers, acting more as an annual than a perennial. *Desmanthus velutinus*, *D. reticulatus*, and *D. virgatus* var. *depressus* are some species of interest. A particular focus will be on accessions adapted to the South Texas climate, with an upright growth form and good seed production that will facilitate large-scale seed harvest. We are currently collecting *Desmanthus* spp. from South Texas sites that have good seed production and an upright growth form, as well as evaluating existing collections of seed at the PMC.

Problem: There is a need for perennial native legumes for range restoration, wildlife habitat, and xeriscaping in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of *Desmanthus* spp. *Desmanthus* spp. collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: In 2005, one superior performing accession, 9085381-Hidalgo, was chosen out of seventy-four original accessions of *Desmanthus* spp. Accession 9085381-Hidalgo had more regrowth, higher density, and better seed production. A seed increase plot of this accession was planted in June of 2006.

Twelve additional collections of *Desmanthus* spp. were received from Dr. Bill Ocumpaugh in December of 2005. These were planted in a field plot in June 2006, but they had poor survival and were the wrong species of *Desmanthus*. The plot was plowed out in December of 2006.

A second accession, 9090608-Maverick, was chosen to use in an AEP comparison with 9085381-Hidalgo. Trays were seeded in the greenhouse in December of 2006 and had an 88.5% germination rate with 5 seconds of sandpaper scarification. These plants will be used to plant a seed increase plot in the spring of 2007. An AEP will be started as soon as sufficient seed is produced.

Study Number: STPMC-P-0135-RA

Study Title: Assembly and Evaluation of Texasgrass (*Vaseyochloa multinervosa*)

Introduction: Texasgrass (*Vaseyochloa multinervosa* (Vasey)Hitchc.) is a native, warm-season, rhizomatous, perennial bunchgrass (Correll and Johnston, 1996). A member of the Festucaceae tribe of grasses, it can grow from 40-100 cm. tall (Hitchcock, 1971). It flowers from April to November and has been reported only from the southeastern portion of Texas, although it may also be present along the coast of Tamaulipas, Mexico (Gould, 1975). Texasgrass prefers sandy soil, and may occur in sandy woods and open ground (Hitchcock, 1971), and on sandy riverbanks, coastal dunes, and sandy pastures (Gould, 1975). It is the only species in the monotypic North American genus *Vaseychloa* and appears to have no close relatives (Gould, 1975). Although it has been noted to be rare (Hitchcock, 1971), it is periodically abundant on local sites in the Coastal Bend region of Texas (Gould, 1975). Texasgrass provides a good to fair source of forage, and provides good wildlife cover (Hatch, Schuster, and Drawe, 1999). There is currently no known commercial variety of Texasgrass.

Problem: There is a need for native, adapted seed available at a reasonable price for the restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of Texasgrass. Texasgrass collections will be evaluated for adaptation in the sandy-soil region known as the South Texas Sand Plain.

Discussion: At the end of 2005 there were 21 accessions of Texasgrass in evaluation at the Annex and 12 accessions in the Norias plot. Three accession were added to the Norias plot and both plots were filled in with replants in June of 2006. The Annex plot was evaluated for early greenup in April of 2006 (Table 1). The Norias plot was evaluated in September and October (Table 2). Both plots had poor performance again in 2006. It was agreed by both the PMC and South Texas Natives that this species would not be pursued for release at this time. A plant fact sheet will be written and submitted in 2008.

Table 1. Study STPMC-P-0135-RA Texasgrass PMC Initial Field Evaluation April 2006

Annex

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*
9043289	Starr	60	10	6	6	6	5
9045785	Starr	80	10	6	6	6	5
9053724	Jim Hogg	40	10	6	6	6	5
9086162	San Patricio	96	10	6	6	6	5
9086218	Kleberg	90	10	6	6	6	5
9086161	Kleberg	92	10	6	6	6	5
9090337	San Patricio	98	10	6	6	6	5
9090279	Kleberg	76	5	7	7	7	5
43289	Starr	90	10	5	5	5	5
9093207	Jim Hogg	70	25	4	4	4	5
9091814	Brooks	64	25	4	4	4	5
9093205	Jim Hogg	72	25	4	4	4	5
9091802	Starr	66	10	6	6	6	5
9091798	Jim Hogg	36	5	7	7	6	5
9091768	Nueces	32	5	7	7	6	5
9091866	Zapata	78	25	5	5	5	5
9090355	Willacy	74	25	5	5	5	5
9090466	Jim Hogg	30	25	4	4	4	5
9093203	Jim Hogg	38	25	4	4	4	5
9090756	Victoria	34	10	7	7	7	5
9090292	Brooks	56	10	6	6	6	5
9091761	Victoria	58	5	7	7	7	5

* Ocular estimate (1= Best)

Table 2. Study STPMC-P-0135-RA Texasgrass Initial Field Evaluation Fall 2006

King Ranch - Norias Division

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9090355	Willacy	80	90	6	6	6	5	5
9090446	Jim Hogg	60	100	5.5	5.5	6	5	4
9090756	Victoria	70	100	6.5	6.5	6.5	5	5
9091768	Nueces	90	90	6.5	6.5	6.5	5	5
9091798	Jim Hogg	80	90	6	6.5	6.5	5	5
9091802	Starr	90	90	6.5	7	6.5	5	5
9091814	Brooks	80	90	6	6	6	5	6
9091866	Zapata	80	100	6	6.5	6.5	5.5	5
9093203	Jim Hogg	70	90	6.5	6	6.5	5	5
9093205	Jim Hogg	50	90	6	6.5	6	5	4
9093207	Jim Hogg	80	100	5.5	6	6	5	4
9091761	Victoria	60	100	5.5	5.5	6	5	4
9090337	San Patricio	80	new	5.5	5.5	6	5	5
9090279	Kleberg	100	new	5.5	5.5	6	5	4
9090292	Brooks	70	new	6.5	7	6.5	5	7

*Ocular estimate (1= Best)

Study Number: STPMC-P-0137- RA

Study Title: Rio Grande Plain Ecotype Project

Introduction: An initiative was developed in August of 2000 and is spearheaded by Caesar Kleberg Wildlife Research Institute to develop and promote native plants for the restoration and reclamation of habitat on private and public lands in South Texas. The goal of the initiative called the South Texas Natives Project is to provide economically viable sources of plants and seeds and to develop effective planting strategies for the restoration of South Texas plant communities.

Problem: There is a need for native adapted ecotypic plants for range restoration, wildlife habitat, and xeriscaping in South Texas.

Objective: The PMC will establish a seed nursery for South Texas ecotypes of a variety of grasses, forbs, and legumes. Ecotypes will be developed for the Rio Grande Plain ecoregion. The ecotype region was established to be large enough to retain regional integrity and genetic adaptability. The seed nursery will consist of approximately 50 plants per collection of 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: During 2001, 66 collections representing 9 species were collected for the Rio Grande Plain ecoregion. A small seed nursery was established consisting of the following species: four-flowered trichloris (*Trichloris pluriflora*), plains bristlegrass (*Setaria vulpiseta*), seacoast bluestem (*Schizachyrium littorale*), hooded windmillgrass (*Chloris cucullata*), brownseed paspalum (*Paspaulm plicatulum*), pink pappusgrass (*Pappophorum bicolor*), prairie acacia (*Acacia angustissima*), and orange zexmenia (*Wedelia texana*).

In 2002, 869 additional collections representing 97 species were collected for the Rio Grande Plain ecoregion. Throughout the spring and summer of 2002, the seed nursery was expanded to include 79 collections representing 15 species of the Rio Grande Plain ecoregion. The seed nursery included the following species: four flower trichloris, plains bristlegrass, seacoast bluestem, hooded windmillgrass, brownseed paspalum, pink pappusgrass, prairie acacia, orange zexmenia, silver bluestem (*Bothriochloa saccharoides*), Hall's panicum (*Panicum hallii*), green sprangletop (*Leptochloa dubia*), Texas grass (*Vaseyochloa multinervosa*), sideoats grama (*Bouteloua curtipendula*), slim tridens (*Tridens muticus*), and lovegrass tridens (*Tridens eragrostoides*).

Red grama (*Bouteloua trifida*) and hairy grama (*Bouteloua hirsuta*) accessions were germinated in the greenhouse in Spring 2002. Due to very low germination numbers, these accessions were not transplanted into the field.

In the winter of 2002, twenty-three species were seeded in the greenhouse for the Rio Grande Plain Ecotype project: silver bluestem, sideoats grama, hooded windmill grass, Engelmann's daisy (*Engelmannia peristenia*), awnless bush-sunflower (*Simsia calva*), green sprangletop, Hall's panicum, brownseed paspalum, hairy grama, slender grama (*Bouteloua repens*), Texas grama (*Bouteloua rigidiseta*), red grama, plains lovegrass (*Eragrostis intermedia*), curly

mesquite (*Hilaria berlangeri*), vine mesquite (*Panicum obtusum*), and Texas panicum (*Urochloa texana*).

One accession each of slender grama, hairy grama, Texas grama, and red grama were planted at the PMC to observe seed production characteristics. Only slender grama seemed to have characteristics that would allow it to compete with weeds and produce large quantities of harvestable seed. The other gramas in the plot were discontinued in February 2004.

The Texas panicum showed signs of chlorosis and seed shattered readily while still green. The lovegrass and slim tridens did not regrow well and had poor performance. These plots were discontinued.

In 2003, 370 additional collections representing 79 species were collected for the Rio Grande Plain ecoregion. Throughout the spring and summer of 2003, the seed nursery was expanded to include 168 collections representing 19 species of the Rio Grande Plain ecoregion. The seed nursery included the following species in 2003: four flower trichloris, plains bristlegrass, silver bluestem, Hall's panicum, green sprangletop, Texas grass, hooded windmillgrass, pink pappusgrass, prairie acacia, orange zexmenia, seacoast bluestem, sideoats grama, slim tridens, lovegrass tridens and Texas panicum. All accessions of Brownseed were moved to Beeville for evaluation (see brownseed project for details).

In the winter of 2003, twelve species were seeded in the greenhouse for the Rio Grande Ecotype project: Engelmann's daisy, awnless bush-sunflower, Blackfoot daisy (*Melampodium cinerum*), big bluestem (*Andropogon gerardii*), sideoats grama, green sprangletop (*Leptochloa dubia*), Hall's panicum, switchgrass (*Panicum virgatum*), little bluestem (*Schyzachyrium scoparium*), bristlegrass, yellow indiangrass (*Sorghastrum nutans*), plains lovegrass, and lovegrass tridens.

One accession of Blackfoot daisy was planted in Block C in May of 2004. Seed was collected from this accession in April and November of 2004. A new accession of lovegrass tridens, 9086199-Starr, was planted in Block F in June of 2004. Seed was harvested in November of 2004. These harvests were germination tested in 2005. Germination was poor (<10%).

In 2004, 157 additional collections representing 47 species were collected for the Rio Grande Plain ecoregion. Throughout the spring and summer of 2004, the seed nursery was expanded to include 256 collections representing 17 species of the Rio Grande Plain ecoregion. The seed nursery included the following species in 2004: four flower trichloris, plains bristlegrass, silver bluestem, Hall's panicum, green sprangletop, Texas grass, hooded windmillgrass, pink pappusgrass, prairie acacia, orange zexmenia, seacoast bluestem, sideoats grama, lovegrass tridens and Blackfoot daisy. All accessions of Brownseed were still located at Beeville.

In the winter of 2004, twenty species were seeded in the greenhouse for the Rio Grande Ecotype project including: awnless bush-sunflower, frostweed, blackfoot daisy, big bluestem, silver bluestem, sideoats grama, Arizona cottoptop (*Digitaria californica*), green sprangletop, Hall's panicum, switchgrass, little bluestem, seacoast bluestem (*Schyzachyrium littorale*), bristlegrass, yellow indiangrass, Texas grass, slender grama, plains lovegrass, Indian blanket (*Gallardia pulchella*), and Mexican hat (*Ratibidia columnaris*).

The accessions of lovegrass tridens (9086199-Starr) and Blackfoot daisy (9090490-Jim Hogg) were evaluated for field performance in 2005 and seed was harvested in of 2005. This seed will be germination tested in 2007.

Two new accessions were received in 2005 for the Rio Grande Plain ecoregion. Throughout the spring and summer of 2005, the seed nursery was expanded to include 391 collections representing 19 species of the Rio Grande Plain ecoregion. The seed nursery included the following species in 2005: four flower trichloris, plains bristlegrass, silver bluestem, Hall's panicum, green sprangletop, Texas grass, pink pappusgrass, prairie acacia, orange zexmenia, seacoast bluestem, sideoats grama, lovegrass tridens, Mexican Hat, Indian blanket, frostweed, Blackfoot daisy, Arizona cottontop, and slender grama. All accessions of brownseed paspalum are still located at Beeville.

In the winter of 2005, fifteen species were seeded in the greenhouse for the Rio Grande Ecotype project including: prairie acacia, frostweed, big bluestem, sideoats grama, green sprangletop, Hall's panicum, switchgrass, little bluestem, seacoast bluestem, yellow indiangrass, pink pappusgrass, plains lovegrass, slender grama, and Texas wintergrass (*Nassella leucotricha*). The Blackfoot daisy accession was also replanted, but germination was only 2%.

Three new accessions were received in 2006 for the Rio Grande Plain ecoregion. Throughout the spring and summer of 2006, the seed nursery was expanded to include 349 collections representing 22 species of the Rio Grande Plain ecoregion. The seed nursery included the following species in 2006: four-flower trichloris, Southwestern bristlegrass, silver bluestem, Hall's panicum, green sprangletop, pink pappusgrass, prairie acacia, sideoats grama, lovegrass tridens, Indian blanket, frostweed, Blackfoot daisy, Arizona cottontop, brownseed paspalum, Texas wintergrass, Engelmann's daisy, frostweed, switchgrass, big bluestem, little bluestem, and Indiangrass. The IEP plots of plains bristlegrass and slender grama were discontinued in 2006 due to commercial releases of these species.

In the winter of 2006, seven species were seeded in the greenhouse for the Rio Grande Ecotype project. Germination charts for these following species are included under the individual species' project: big bluestem, sideoats grama, little bluestem, Indiangrass, and Indian blanket. The results for Australian saltbush (*Atriplex semibaccata*) and Apache plume (*Fallugia paradoxa*) are included here (Table 2). Accessions with enough plants will be transplanted to field plots in the spring of 2007.

Collection description sheets were written for Maximilian sunflower (*Helianthus maximiliani*), fourwing saltbush (*Artriplex canescens*), and Hall's panicum in 2006. These have been posted on the PMC website and the State Office has requested collections from the Field Offices.

Table 1. Study STPMC-P-0137- RA Rio Grande Ecotype Project Initial Field Evaluation 2006

Species	Accession Number	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
Blackfoot Daisy	9090490 Jim Hogg	3 seedlings	100	5	5	5	5	5
Lovegrass Tridens	9086199 Starr	98	100	5.7	5.7	5.0	5.0	6.0
Texas Wintergrass	9086288 Live Oak	100	new	5.0	5.0	5.0	5.0	5.0

*Ocular estimate (1 = Best)

Table 2. Study STPMC-P-0137- RA Rio Grande Ecotype Project

Greenhouse Germination Winter 2006

Species	Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
Australian saltbush	9093347	Pecos	69	67	67	67
Australian saltbush	9093348	Regan	23	23	23	25
Apache plume	9093349	Jeff Davis	9.3	9.7	10.0	10.7

***Germination count based number of seeds planted.

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 virginicua*), 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 (*Tripsacom dactyloides*), and sideoats grama (*Bouteloua curtipendula*). Ten to twenty-five collections of each species are being collected from the 30 counties along the Texas Coastal Prairie.

Detailed information for white prairie clover, rattlesnake master, Kansas gayfeather, Virginia wildrye, yellow Indiangrass, big bluestem, little bluestem, switchgrass, Florida paspalum, brownseed paspalum, eastern gamagrass, and sideoats grama can be found in the individual species' project. All information for black-eyed Susan is provided here.

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. One accession of eastern gamagrass, 2 accessions of Florida paspalum, 2 accessions of little bluestem, 2 accessions of rattlesnake master, and one accession of roundhead prairie clover were transplanted in to the field to start a small seed nursery.

In 2002, 48 additional collections were received representing 11 of the selected species. In December 2002, 22 collections were seeded in the greenhouse. Three accessions of Kansas gayfeather were planted in the field in July 2003. Accessions with good germination were added to the seed nursery.

In 2003, 6 additional collections were received representing 11 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. Accessions with good germination were added to the seed nursery.

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. Germination information for these species can be found in the individual species' project. Those accessions exhibiting good germination were transplanted into the field in 2005.

In 2005, 10 additional collections were received representing 5 of the selected species. In December 2005, 5 new accessions of Kansas gayfeather, 12 yellow Indiangrass, 7 big bluestem, 7 little bluestem, 4 switchgrass, 2 Florida paspalum, 4 brownseed paspalum, 3 sideoats grama, and 2 black-eyed Susan were seeded in the greenhouse. Ten accessions were added to the seed nursery in 2006 to bring the total to 81 accessions. The black-eyed Susan accessions were evaluated for field performance in April and November of 2006 (Table 1). Both accessions performed well. Seed was collected in November of 2006 and will be germination tested in 2007.

In 2006, 8 additional collections were received representing 5 of the selected species. In December 2006, 6 new accessions of Kansas gayfeather, 2 yellow Indiangrass, 1 big bluestem, 1 little bluestem, 2 switchgrass, 2 Florida paspalum, and 1 brownseed paspalum were seeded in the greenhouse. Germination information for these species can be found in the individual species' project. Four new accessions of black-eyed Susan were also seeded in the greenhouse (Table 2). Those accessions exhibiting good germination will be transplanted into the field beginning in the spring of 2007.

Collection description sheets were written for roundhead prairie clover and white prairie clover in 2006. These have been posted on the PMC website and the State Office has requested collections from the Field Offices

Table 1. Study STPMC-P-0138- RA Texas Coastal Prairie Ecotype Project Initial Field Evaluation 2006

Species	Accession Number	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
Black-eyed Susan	9093299 Fort Bend	96	6.0	6.0	6.5	5.0	5.0
Black-eyed Susan	9090600 Atascosa	95	6.0	6.0	6.5	5.0	5.0

*Ocular estimate (1 = Best)

Table 2. STPMC-P-0138- RA Texas Coastal Prairie Ecotype Project

Greenhouse Germination Winter 2006

Species	Accession Number	Origin (County)	15 Days %	30 Days %
Black-eyed Susan	9093330	Fort Bend	79.0	79.0
Black-eyed Susan	9093335	Jackson	89.0	89.0
Black-eyed Susan	9093336	Calhoun	86.0	86.0
Black-eyed Susan	9093338	Harris	70.5	73.5

***Germination count based number of seeds planted.

Study Number: STPMC-P-0139- RA

Study Title: Assembly and Evaluation of Hall's Panicum (*Panicum hallii*)

Introduction: *Panicum hallii* is a warm-season perennial bunchgrass that grows 60-90 cm in height (Gould, 1975). There are two main varieties: *hallii* and *filipes* (USDA, 1994). *Panicum hallii* var. *hallii* (previously known as *Panicum hallii*) can be found from Oklahoma to Colorado to Texas and Arizona and down into Mexico (Hitchcock, 1971). Commonly known as Hall's panicum or panicgrass, it is found mostly in the rocky, dry uplands in the western two-thirds of Texas (Correll and Johnston, 1996), but can also be found on calcareous soils along the Gulf Coast. It is palatable for all livestock, but provides only fair quality forage (Hatch, Schuster, and Drawe, 1999). In addition, it tends to decrease under heavy grazing (Gay, Dwyer, Hatch, and Schickendanz, 1980). *Panicum hallii* var. *filipes* (previously known as *P*. *filipes*) can be found from Louisiana to Texas, and down into northeastern Mexico (Hitchcock, 1971). It is found along roadsides and in disturbed lowlands from North Central Texas south to the Rio Grande Plain, less frequently in West Texas, and in all but the extreme Northern and Western portions of the Panhandle (Gould, 1975). It is commonly called filly panicum (Hignight, Wipiff, and Hatch, 1988), although the common name, Hall's panicgrass, has been used as well (USDA, 1994). The latter name may come from the high degree of introgression found between the two varieties (Correll and Johnston, 1996). *Panicum hallii* var. *filipes* tends to be more productive than *P*. *hallii* var. *hallii*, but produces only fair to poor quality livestock forage. The seeds of both varieties can be eaten by birds (Hatch, Schuster, and Drawe, 1999). The two varieties can be distinguished from one another because *P*. *hallii* var. *filipes* tends to be taller, have longer, more relaxed leaf blades, larger, looser panicles, and smaller spikelets.

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of Hall's panicum. Hall's panicum collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Three accessions of Hall's panicum had survived in the Rio Grande Plains ecotype plot by the end of 2004. Seed was collected in June, August, and November 2004 from this plot and was germination tested in March of 2005. One accession (9089159-Cameron) had the best germination for all three harvests and the highest seed production. All accessions continue to exhibit poor over winter survival, poor regrowth, and little or no seed production during the second year in the plot. Four accessions were added to the plot and 2 replanted in May of 2005. These accessions were evaluated for field performance in 2005. Accession 9091840-Zapata had great field performance during its first year. Due to superior field performance in 2003 and harvest germination numbers, an isolated seed increase plot of accession 9089159-Cameron was started from original seed. Three hundred plants were transplanted in May of 2005. Seed was harvested in the fall of 2005.

In December 2005, eleven accessions of Hall's panicum (all accessions that still had original seed left) were seeded in the greenhouse. Three had germination at 74% or higher (9091840-Zapata, 9085421-Nueces, & 9089159-Cameron) and the rest were reseeded in an attempt to get enough seedlings for a field planting at the Annex in a sandier soil. Four accession were planted at the Annex in July of 2006. These accessions were evaluated for field performance in November of 2006 (Table 1). Seed was also harvested and will be germination tested in 2007.

Accession 9089159-Cameron had the most dense growth and overall vigor. It is hoped that over winter survival will improve in a sandier soil.

The plot in the clay soil was evaluated one last time in November of 2006. None of the original plants had survived, but four accessions numerous volunteer seedlings (9089159-Cameron, 9090675-Maverick, 9090713-Frio, and 9091840-Zapata). This plot was plowed out in December of 2006.

A collection description sheet was written for Hall's panicum in 2006. It has been posted on the PMC website and the State Office has requested collections from the Field Offices

Table 1. Study STPMC-P-0139- RA Hall's Panicum

Initial Field Evaluation 2006 – Annex Plot (sandy soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9091840	Zapata	92	new	7.0	7.0	7.0	5.0	5.0
9085421	Nueces	98	new	5.0	5.0	5.0	5.0	6.0
9091807	Bee	88	new	5.0	4.0	5.0	5.0	5.0
9089159	Cameron	90	new	3.0	3.0	4.0	5.0	3.0

*Ocular estimate (1= Best)

Study Number: STPMC-P-0140- RA

Study Title: South Texas Sand Plain Ecotype Project

Introduction: An initiative was developed in August of 2000 and is spearheaded by the Caesar Kleberg Wildlife Research Institute to develop and promote native plants for the restoration and reclamation of habitat on private and public lands in South Texas. The goal of the initiative called the South Texas Natives Project is to provide economically viable sources of plants and seeds, and to develop effective planting strategies for the restoration of South Texas plant communities.

Problem: There is a need for native adapted ecotypic plants for range restoration, wildlife habitat and xeriscaping in South Texas.

Objective: The PMC will establish a seed nursery of South Texas Sand Plain ecotypes of 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: In 2001, 24 collections representing five species were collected for the South Texas Sand Plain Ecoregion. In the spring of 2002, eight species were seeded in the greenhouse for the South Texas Sand Plain project including 7 accessions of four-flowered trichloris (*Trichloris pluriflora*), 3 hairy grama (*Bouteloua hirsuta*), 6 switchgrass (*Panicum virgatum*), 10 hooded windmillgrass (*Chloris cucullata*), 4 silver bluestem (*Bothriochloa saccharoides*), 6 brownseed paspalum (*Paspalum plicatulum*), 4 plains bristlegrass (*Seteria* spp.) and 3 Mexican hat (*Ratibida columnifera*).

At the end of 2002, the seed nursery for the South Texas Sand Plain included 3 accessions of Mexican hat, 6 four-flowered trichloris, 4 silver bluestem, and 2 switchgrass. In 2002, 178 additional collections representing 45 species were collected for the South Texas Sand Plain ecoregion. In the winter of 2002, five species were seeded in the greenhouse for the South Texas Sand Plain project including 4 accessions of sideoats grama (*Bouteloua curtipendula*), 8 hooded windmillgrass (*Chloris cucullata*), 5 silver bluestem, 5 brownseed paspalum (*Paspalum plicatulum*), and 3 gayfeather (*Liatris* spp.).

In 2003, 57 additional collections representing 33 species were collected for the South Texas Sand Plain ecoregion. Throughout the spring and summer of 2003, the seed nursery was expanded to include 17 collections representing 6 species of the South Texas Sand Plain ecoregion. In the winter of 2003, 5 accessions of big bluestem (*Andropogon gerardii*), 2 sideoats grama, 3 switchgrass, and 4 yellow Indiangrass (*Sorghastrum nutans*) were germinated in the greenhouse.

In 2004, 66 additional collections representing 30 species were collected for the South Texas Sand Plain ecoregion. Throughout the spring and summer of 2003, the seed nursery was expanded to include 33 collections representing 9 species of the South Texas Sand Plain ecoregion.

In the winter of 2004, 2 accessions of big bluestem, 11 seacoast bluestem (*Schizachyrium littorale*), 13 Texas grass (*Vaseyochloa multinervosa*), 3 yellow Indiangrass, 24 Mexican hat, 24 Indian blanket (*Gallardia puchella*), 6 clammyweed (*Polanisia dodecandra*), and 10 partridge pea (*Chaemaecrista fasciculata*) were germinated in the greenhouse.

In 2005, 2 additional collections representing 2 species were collected for the South Texas Sand Plain ecoregion. Throughout the spring and summer of 2005, the seed nursery was expanded to include 73 collections representing 10 species of the South Texas Sand Plain ecoregion. In the winter of 2005, 1 new accessions of big bluestem, 2 seacoast bluestem, 3 switchgrass, and 5 gayfeather were germinated in the greenhouse. Accessions with good germination were transplanted to field plots in the spring and summer of 2006.

In 2006, 1 additional collection was received for the South Texas Sand Plain ecoregion. In 2006, the seed nursery included 42 collections representing 6 species of the South Texas Sand Plain ecoregion. Mexican hat, Indian blanket, clammyweed, and partridge pea are all annual species and their plots were not replanted for 2006. In the winter of 2006, 1 new accession of Indian blanket, 1 sideoats grama, 5 yellow Indiangrass, and 6 gayfeather were germinated in the greenhouse. Germination results for these species are discussed under the individual species' project. The results for wild buckwheat (*Erigonum multiflorum*) are included here (Table 1). Those accessions with good germination will be transplanted to field plots in the spring and summer of 2007. The seed nursery will continue to expand as more collections are received.

Table 2. STPMC-P-0140- RA South Texas Sand Plain Ecotype Project

Greenhouse Germination Winter 2006

Species	Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %
Wild Buckwheat	9093366	Nueces	20	27	27

***Germination count based number of seeds planted.

Study Number: STPMC-P-0143- RA

Study Title: Assembly and Evaluation of Green Sprangletop (*Leptochloa dubia*)

Introduction: Green sprangletop, *Leptochloa dubia,* is a perennial, warm-season native that grows 1 to 3 feet in height (Gould, 1975). It is widespread and highly palatable, but usually is present in mixed stands with other grasses and is seldom abundant. It is a good grass to include in native grass mixtures when seeding overused ranges. Green sprangletop is found in all areas of Texas except in the Pineywoods and Post Oak Savannah.

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of green sprangletop. Green sprangletop collections will be evaluated for adaptation in the mixed soil region known as the Rio Grande Plain.

Discussion: At the end of 2005 there were eleven accessions of green sprangletop in the Rio Grande Plains Ecotype plot. There seems to be two growth forms of green sprangletop in the plot. There is a shorter, denser form that has better survival, but shows more signs of chlorosis. The other is a taller, less dense form that is greener, but has lower survival.

The cultivar Van Horn green sprangletop was planted in a separate plot in July of 2006. Both plots were evaluated for field performance in 2006 (Table 1). All of the accessions had good performance. No new accessions were received in 2006, thus no new accessions were seeded in the greenhouse in December of 2006. The State NRCS Office will be requesting Field Offices to send in more collections of this species in 2008. Accessions will be added to the plot as received.

Table 1. Study STPMC-P-0143- RA Green Sprangletop - Initial Field Evaluation 2006

Accession Number	Source (County)	Growth Form	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9089102	Goliad	short	100	100	5.0	5.0	5.0	5.0	5.0
9052757	Duval	tall	62	100	6.0	5.5	6.0	5.0	5.0
9088972	Atascosa	short	100	100	5.0	5.0	5.0	5.0	5.0
9090435	Kinney	tall	76	100	4.5	5.0	5.5	5.0	5.0
9090419	Kinney	tall	98	100	4.5	5.0	5.0	5.0	5.0
9090411	Kinney	tall	96	100	4.5	5.5	5.0	5.0	5.0
9090480	Starr	short	100	100	5.0	4.0	5.0	5.0	5.0
9052752	Val Verde	tall	94	100	4.5	5.5	5.0	5.0	5.0
9088630	Dimmit	short	96	100	5.0	4.5	5.0	5.0	5.0
9090720	Frio	short	100	100	5.0	4.5	5.0	5.0	5.0
9091858	Zapata	short	100	100	3.0	3.0	5.0	5.0	4.0
Van Horn	commercial	-	86	new	5.0	6.0	5.0	5.0	5.0

*Ocular estimate (1= Best)

Study Number: STPMC-P-0244- RA

Study Title: Assembly and Evaluation of Silver Bluestem (*Bothriochloa saccharoides*)

Introduction: Silver Bluestem (*Bothriochloa saccharoides*) is a native, perennial bunchgrass with a conspicuous basal cluster of leaves (Gould, 1975). The culms are up to 80 cm tall and unbranched (Hutch, Schuster & Drawe, 1999). Silver bluestem occurs in all areas of the state, usually in dry open places (Correll & Johnston, 1979). It prefers sandy soils but can occur on clay soils if well drained, such as embankments (Gould, 1975). It is one of the most common perennial roadside grasses in northern and western Texas (Gould, 1975). It is relatively frequent on sand and sandy loam sites and other well drained, moderately disturbed soils in the Gulf Coast (Hutch, Schuster & Drawe, 1999). However, it is less common in coastal areas and East Texas than longspike silver bluestem (*Bothriochloa longipaniculata*) (Gould, 1975). Its range extends into Alabama, Missouri, southern Colorado, and south to northern Mexico (Gould, 1975). Silver bluestem flowers from May to November (Gould, 1975), and provides good forage (Hutch, Schuster & Drawe, 1999). It is also known by the common name silver beardgrass.

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of silver bluestem. Silver bluestem collections will be evaluated for adaptation in the sandy soil region known as the South Texas Sand Plain and the broad mixed soil region known as the Rio Grande Plain.

Discussion: At the end of 2005, there were 4 accessions of silver bluestem in the South Texas Sand Plain Ecotype plot at the Annex and 40 accessions in the Rio Grande Plain Ecotype plot in Block E. In 2005, it was determined that these plots contain a mix of four similar looking species: longspike silver bluestem (*Bothriochloa longipaniculata*), silver bluestem (*Bothriochloa laguroides* subsp. torreyana), pinhole bluestem (*Bothriochloa barbinodis* var. perforata), and cane bluestem (*Bothriochloa barbinodis* var. barbinodis). These plots were evaluated for early green-up in April 2006 (Table 1). A silver bluestem from Native American Seed was planted in a separate plot to use for comparison. It was evaluated in November of 2006 (Table 2). No new accessions were seeded in the greenhouse in December 2006.

Accession 9086217-Kleberg, a longspike silver bluestem, was planted in both Ecoregion plots and exhibited above average performance in 2002 and 2003. An isolated seed increase plot of 280 plants of this accession was started in May 2005. Seed was harvested from this plot in the fall of 2005, but not in 2006.

In previous years, the seed harvests of silver bluestem have had poor seed fill. To test if this is due to location, plants will be sent to Katy, TX in 2007. These plants will be harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

Table 1. Study STPMC-P-0244- RA Silver Bluestem - Initial Field Evaluation April 2006

PMC (clay soil)

Accession Number	Source (County)	Species	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086151	Jim Wells	longspike	100	40	4	4	5	5	-
9086214	Kenedy	longspike	94	25	5	5	5	5	-
9086215	Atascosa	silver	100	25	5	5	5	5	-
9086216	Kenedy	silver	92	25	6	6	5	5	-
9089094	LaSalle	pinhole	100	40	4	4	5	5	-
9086270	Jim Hogg	cane	98	25	5	5	5	5	-
9086299	Starr	longspike	100	40	3	3	5	5	-
9088678	Goliad	silver	92	40	4	4	5	5	-
9088983	LaSalle	pinhole	94	25	5	5	5	5	-
9088573	Zavala	silver	96	50	4	3	5	5	4
9088656	Wilson	pinhole	98	40	5	4	5	7	-
9088570	Zavala	silver	98	25	6	6	5	5	7
9089003	Uvalde	silver	84	40	6	4	5	5	5
9088741	Jim Hogg	cane	96	25	6	5	5	5	-
9088830	Jim Wells	cane	100	25	5	5	5	5	-
9088833	Jim Wells	cane	88	25	6	6	5	6	-
9088931	Dimmit	cane	100	25	5	4	5	5	-
9088906	Dimmit	pinhole	100	25	5	5	5	5	-
9086310	Duval	silver	94	40	3	3	5	5	-
9088592	Bee	longspike	96	50	3	4	5	5	-
9088613	Frio	pinhole	70	40	4	4	5	7	4
9088764	Duval	cane	94	25	5	5	5	6	-
9088585	Bee	longspike	100	30	4	3	5	6	-
9088669	Goliad	silver	100	30	3	3	5	5	-
9086274	Atascosa	longspike	100	25	4	5	5	5	-
9089186	Medina	silver	100	50	3	3	5	5	3
9088973	Frio	pinhole	100	25	5	5	5	5	-
9088945	Atascosa	cane	98	25	5	5	5	5	-
9088801	Webb	cane	98	25	5	5	5	5	-
9088724	Webb	pinhole	98	25	5	5	5	5	-
9045834	Webb	silver	54	50	3	2	5	6	5
9093177	Bexar	longspike	100	30	4	4	5	5	-
9090730	Wilson	pinhole	100	30	5	5	5	5	-
9090613	Maverick	pinhole	100	30	5	5	5	5	-
9090665	Maverick	cane	100	50	4	6	5	5	4
9090644	Kinney	silver	88	40	5	4	5	5	5
9089204	Uvalde	pinhole	100	50	4	6	5	5	4
9090698	Bexar	silver	100	25	5	5	5	5	5
9088660	Karnes	silver	54	30	5	4	5	5	6
9090309	Cameron	longspike	80	40	4	5	5	5	5

*Ocular estimate (1= Best)

Table 1. (cont.) Study STPMC-P-0244- RA Silver Bluestem - Initial Field Evaluation 2006

Annex (sandy soil)

Accession Number	Source (County)	Species	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086151	Jim Wells	longspike	92	25	4	4	5	5	-
9086214	Kenedy	longspike	98	20	4	5	5	5	-
9086216	Kenedy	silver	60	25	4	4	5	5	4
9086217	Kleberg	longspike	94	20	5	5	5	5	-

Table 2. Study STPMC-P-0244- RA Silver Bluestem - Initial Field Evaluation Nov. 2006

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
n/a	Native American Seed	100	new	5.0	5.0	5.0	5.0	5.0

*Ocular estimate (1= Best)

Study Number: STPMC-P-0346- RA

Study Title: Assembly and Evaluation of Frostweed (*Verbesina microptera*)

Introduction: Frostweed (*Verbesina microptera*), also known as capitana and crownbeard, is a common, native, cool-season, perennial forb. An attractive member of the sunflower family (Asteraceae), it grows approximately 1.2 m tall blooming from September to November (Jones, 1982). Its bright white flowers, which attract numerous butterflies, and hardiness in dry conditions make it an attractive plant for landscape use. In the field, it is often browsed by deer and cattle (Everitt, Drawe, and Lonard, 1999). It is abundant in loamy soil in parts of Texas and north eastern Mexico. In Texas, it is found along the southern portion of the Edwards Plateau, the Rio Grande Plain, and less frequently in the southern portions of the east and south east regions of Texas (Correll and Johnston, 1996).

Problem: There is a need for perennial forbs for range restoration, wildlife habitat and xeriscaping in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of frostweed. Frostweed collections will be evaluated for adaptation in the broad mixed soil region known as the Rio Grande Plain.

Discussion: At the end of 2005 there were five accessions in a Rio Grande Plain ecotype plot. Seed was collected in November 2005 and will be germination tested in 2007. No new accessions were added in 2006. This plot was evaluated for field performance in April and November of 2006 (Table 1). All accessions performed well in the field and produced seed, however the plants were only about half as large as the pervious year. This may have been a result of dry conditions. There were numerous volunteer seedlings in the surrounding plots. Seed was collected in November 2006 and will be germination tested in 2007.

No new accessions were received in 2006. The State NRCS Office will be requesting Field Offices to send in more collections of this species in 2008. This project will be put on hold until collections are made from more counties.

Table 1. Study STPMC-P-0346- RA Frostweed Initial Field Evaluation 2006

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086146	Frio	84	50	6	6	5	5	5
9086144	Jim Wells	89	50	6	6	6	5	6
9088937	Atascosa	40	50	7	7	7	5	7
9089240	Wilson	58	50	6.5	6.5	6.5	5	6
9090465	Starr	40	60	5.5	5.5	5.5	5	5

*Ocular estimate (1 = Best)

Study Number: STPMC-P-0347- RA

Study Title: Assembly and Evaluation of Sideoats Grama (*Bouteloua curtipendula*)

Introduction: Sideoats grama is a native, perennial grass with flat, linear leaf blades (Gould, 1975). The inflorescence is usually 30-80 short (1-4 cm long) branches bearing 1-12 sessile spikelets (Gould, 1975). This tufted grass is an important forage species (Correll & Johnston, 1979), but has poor wildlife value (Hutch, Schuster & Drawe, 1999). This species contains two varieties separated by the presence (*Bouteloua curtipendula* var. curtipendula) or absence (*Bouteloua curtipendula* var. caespitosa) of creeping rhizomes (Gould, 1975).

Bouteloua curtipendula var. curtipendula occurs throughout Texas in open grasslands, woods borders, right-of-ways, and non-disturbed sites with better soils (Gould, 1975). Its range extends from Southeastern Canada to the plains region of Central United States to Colorado, southern Utah, New Mexico, Arizona, and south to northern Mexico (Gould, 1975). The range of *Bouteloua curtipendula* var. caespitosa includes the Cross Timbers and Prairies, Edwards Plateau, South Texas Plains, and Trans Pecos regions of Texas and is most common in western Texas (Gould, 1975). Its range includes Oklahoma, southern Colorado, Utah, New Mexico, Arizona, and southern California through the highlands of northern and central Mexico to Oaxaca, and in Venezuela, Bolivia, Uruguay, Argentina, and Peru (Gould, 1975). Sideoats grama flowers mostly from June to November (Gould, 1975).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of sideoats grama. Sideoats grama collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, a region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005, there were 29 accessions in the Rio Grande Ecotype plot, 1 accession at the Annex in the South Texas Sand Plain Ecotype plot, and 2 commercial varieties in a separate plot for comparison. To date, none of the collections from coastal counties have had enough germination to transplant into the field.

Seed harvested in 2005 from the evaluation plots was germination tested in September of 2006 (Table 1). The May harvest had much higher germination numbers than the June, September or October harvests. Spikelets, not bare seeds, were used for the tests, so it is possible that low germination numbers may also be due to low seed fill. Two accessions stood out as having higher germination across several dates (9089065-Uvalde County and 9088518-Duval County).

One accession was added to the Rio Grande Ecotype plot and three cultivars were added to the observation plot in July 2006. All three plots were evaluated in April of 2006 (Table 2). No seed was harvested from these plots in 2006.

No new accessions were received in 2006. Accessions will be added to the plot as received.

In previous years, the seed harvests of sideoats grama have had poor seed fill. To test if this is due to location, plants will be sent to Katy and Stephenville, TX in 2007. These plants will be

harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

***Offsite Evaluations*:** STN has also had 18 accessions at an offsite evaluation plot at Rio Farms and 21 accessions and one cultivar at Rancho Blanco under evaluation since 2004. They sent 6 accessions to the Noble Foundation for evaluation in 2006.

In 2006, sideoats grama plants of accession 9088948 were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas.

All three plants sent to Bentsen State Park were still alive, and had persistent seedheads from August till their evaluation in November of 2006. They were judged to be an attractive specimen plant for full sun or dappled shade. The plants sent to TAES Dallas were judged to be the best material of all the species sent for ornamental use. The plants were said to have good flowering characteristics and form.

Table 1. Study STPMC-P-0347- RA Sideoats Grama 2005 Harvest Germination

Block E (clay soil)

Accession Number	Origin (County)	Date Harvested	Grams Harvested	7 Days %	14 Days %	28 Days %
9086152	Karnes	5-25-05	6.0	2.7	4.7	5.3
9088634	Frio	5-25-05	12.9	11.3	14.0	14.0
9088730	Jim Hogg	5-25-05	11.7	18.7	20.7	22.0
9088942	Atascosa	5-25-05	3.1	2.7	4.0	8.0
9089065	Uvalde	5-25-05	5.5	21.3	24.7	26.7
9088518	Duval	5-25-05	8.3	48.0	49.3	49.3
9088948	Frio	5-25-05	13.1	0.7	1.3	2.7
9089167	Uvalde	5-25-05	17.9	6.0	7.3	8.0
9089178	Medina	5-25-05	11.7	9.3	10.0	10.0
9088961	Atascosa	5-25-05	5.0	1.3	2.7	4.0
9089156	Jim Hogg	5-25-05	8.4	12.0	16.7	17.3
9086200	Starr	5-25-05	no seed	-	-	-
9088685	Bee	5-25-05	7.1	0.7	0.7	0.7
9090402	Kinney	5-25-05	6.8	5.3	6.7	6.7
9089187	Medina	5-25-05	no seed	-	-	-
9089190	Medina	5-25-05	1.5	6.0	8.7	9.3
9090389	Kinney	5-25-05	8.6	8.7	12.7	14.7
9090404	Kinney	5-25-05	5.8	6.0	6.0	6.0
9090408	Kinney	5-25-05	11.2	8.0	10.7	10.7
9088541	Medina	5-25-05	5.8	11.3	11.3	11.3
9090510	Frio	5-25-05	6.7	8.0	9.3	9.3
9086152	Karnes	6-28-05	22	1.3	1.3	1.3
9088634	Frio	6-28-05	26	3.3	4.7	4.7
9088730	Jim Hogg	6-28-05	29	8.0	9.3	10.0
9088942	Atascosa	6-28-05	56	8.7	9.3	12.7
9089065	Uvalde	6-28-05	43	10.7	16.0	18.7
9088518	Duval	6-28-05	22	13.3	14.7	15.3
9088948	Frio	6-28-05	98	2.0	4.7	8.7
9089167	Uvalde	6-28-05	21	2.7	2.7	5.3
9089178	Medina	6-28-05	33	1.3	2.7	3.3
9088961	Atascosa	6-28-05	35	5.3	9.3	10.0
9089156	Jim Hogg	6-28-05	40	6.0	6.7	8.0
9086200	Starr	6-28-05	2	6.0	7.3	8.7
9088685	Bee	6-28-05	32	1.3	2.0	2.0
9090402	Kinney	6-28-05	28	1.3	1.3	2.0
9089187	Medina	6-28-05	82	3.3	3.3	3.3
9089190	Medina	6-28-05	33	0.7	0.7	0.7
9090389	Kinney	6-28-05	24	4.7	7.3	8.0
9090404	Kinney	6-28-05	16	5.3	6.0	6.0
9090408	Kinney	6-28-05	20	7.3	8.0	8.0
9088541	Medina	6-28-05	9	4.0	4.0	4.0
9090510	Frio	6-28-05	12	4.7	7.3	7.3

Table 1. Study STPMC-P-0347- RA Sideoats Grama 2005 Harvest Germination (continued)

Accession Number	Origin (County)	Date Harvested	Grams Harvested	7 Days %	14 Days %	28 Days %
9086152	Karnes	9-1-05	30	0	0	0
9088634	Frio	9-1-05	21	0.7	0.7	0.7
9088730	Jim Hogg	9-1-05	22	0.7	0.7	0.7
9088942	Atascosa	9-1-05	23	1.3	1.3	1.3
9089065	Uvalde	9-1-05	50	0.7	0.7	0.7
9088518	Duval	9-1-05	42	4.7	4.7	5.3
9088948	Frio	9-1-05	26	0	0	0
9089167	Uvalde	9-1-05	28	0	0	0
9089178	Medina	9-1-05	33	0	0	0
9088961	Atascosa	9-1-05	35	0	0	0
9089156	Jim Hogg	9-1-05	23	0.7	0.7	0.7
9086200	Starr	9-1-05	13	0	0	0
9088685	Bee	9-1-05	5	0	0	0
9090402	Kinney	9-1-05	21	0	0	0
9089187	Medina	9-1-05	47	0	0	0
9089190	Medina	9-1-05	33	1.3	1.3	1.3
9090389	Kinney	9-1-05	18	0	0	0
9090404	Kinney	9-1-05	21	0	0	0
9090408	Kinney	9-1-05	24	0	0	0
9088541	Medina	9-1-05	8	0.7	0.7	0.7
9090510	Frio	9-1-05	11	0.7	0.7	0.7
9091894	Maverick	9-1-05	5	2.0	3.3	3.3
9090392	Kinney	9-1-05	7	0	0	0
9090652	Kinney	9-1-05	10	0.7	0.7	1.3
9090651	Kinney	9-1-05	8	4.0	4.7	4.7
9093162	Bexar	9-1-05	no seed	-	-	-
9090401	Kinney	9-1-05	24	0	0	0
9093190	McMullen	9-1-05	35	0.7	0.7	0.7

Table 1. Study STPMC-P-0347- RA Sideoats Grama 2005 Harvest Germination (continued)

Accession Number	Origin (County)	Date Harvested	Grams Harvested	7 Days %	14 Days %	28 Days %
9086152	Karnes	10-19-05	199	0	0	0
9088634	Frio	10-19-05	72	0.7	0.7	0.7
9088730	Jim Hogg	10-19-05	94	2.0	2.7	2.7
9088942	Atascosa	10-19-05	50	3.3	3.3	3.3
9089065	Uvalde	10-19-05	87	0.7	0.7	0.7
9088518	Duval	10-19-05	183	8.0	8.7	8.7
9088948	Frio	10-19-05	96	0.7	2.0	2.0
9089167	Uvalde	10-19-05	92	2.0	2.0	2.0
9089178	Medina	10-19-05	63	1.3	2.0	2.0
9088961	Atascosa	10-19-05	100	2.0	2.0	2.0
9089156	Jim Hogg	10-19-05	129	6.7	6.7	6.7
9086200	Starr	10-19-05	110	0.7	0.7	0.7
9088685	Bee	10-19-05	<1	0.7	1.3	1.3
9090402	Kinney	10-19-05	91	3.3	3.3	3.3
9089187	Medina	10-19-05	145	0	0	0
9089190	Medina	10-19-05	93	1.3	2.7	3.3
9090389	Kinney	10-19-05	70	4.0	4.0	4.0
9090404	Kinney	10-19-05	96	6.7	6.7	6.7
9090408	Kinney	10-19-05	136	2.7	2.7	2.7
9088541	Medina	10-19-05	37	1.3	1.3	1.3
9090510	Frio	10-19-05	33	2.7	2.7	2.7
9091894	Maverick	10-19-05	47	10.0	10.0	10.0
9090392	Kinney	10-19-05	32	4.0	4.0	4.0
9090652	Kinney	10-19-05	40	6.7	7.3	7.3
9090651	Kinney	10-19-05	78	2.0	2.0	2.0
9093162	Bexar	10-19-05	no seed	-	-	-
9090401	Kinney	10-19-05	40	2.7	2.7	2.7
9093190	McMullen	10-19-05	119	6.7	6.7	6.7

***12 hours dark 20°C (68°F) / 12 hours light 30°C (86°F)

Cultivar (clay soil)

Accession Number	Date Harvested	Grams Harvested	7 Days %	14 Days %	28 Days %
Pogue	5-25-05	11	7.3	8.7	8.7
Pogue	6-28-05	17	2.7	2.7	2.7
Pogue	8-30-05	37	0.7	0.7	0.7
Pogue	10-7-05	39	0.7	3.3	3.3
Premier	9-1-05	61	0.7	0.7	0.7
Premier	10-7-05	33	2.0	2.0	2.7

***12 hours dark 20°C (68°F) / 12 hours light 30°C (86°F)

Table 1. Study STPMC-P-0347- RA Sideoats Grama 2005 Harvest Germination (continued)

Annex (sandy soil)

Accession Number	Origin (County)	Date Harvested	Grams Harvested	7 Days %	14 Days %	28 Days %
9086200	Starr	5-25-05	14	4.7	4.7	4.7
9086200	Starr	6-16-05	68	3.3	3.3	4.0
9086200	Starr	7-28-05	9	0	0	0
9086200	Starr	10-7-05	27	0	0	0
9086200	Starr	10-21-05	42	0	0	0

***12 hours dark 20°C (68°F) / 12 hours light 30°C (86°F)

Table 2. Study STPMC-P-0347- RA Sideoats Grama Initial Field Evaluation April 2006

Annex (sandy soil)

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*	Plant Growth Form
9086200	Starr	68	5.0	5.0	5.0	5.0	5.0	tall upright

Cultivar - PMC (clay soil)

Name	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Seed Production*	Plant Growth Form
“Pogue”	66	5.0	5.0	5.0	5.0	-	short mound
“Premier”	100	4.5	4.5	5.0	5.0	-	-

Table 2. Study STPMC-P-0347- RA Sideoats Grama Initial Field Evaluation April 2006 (continued)

PMC (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*	Growth Form
9086152	Karnes	100	10	5.0	5.0	5.0	5.0	-	tall upright
9088634	Frio	94	25	4.0	5.0	5.0	5.0	-	short mound
9088730	Jim Hogg	78	25	4.0	5.0	6.0	5.0	-	mix of both
9088942	Atascosa	100	10	5.0	5.0	5.0	5.0	-	tall upright
9089065	Uvalde	100	25	4.0	5.0	5.0	5.0	-	tall upright
9088518	Duval	94	25	5.0	4.0	5.0	5.0	-	short mound
9088948	Frio	100	25	4.0	5.0	5.0	5.0	-	tall upright
9089167	Uvalde	98	25	4.0	4.0	5.0	5.0	-	tall upright
9089178	Medina	100	25	4.0	5.0	5.0	5.0	-	tall upright
9088961	Atascosa	96	25	4.0	3.0	5.0	5.0	-	tall upright
9089156	Jim Hogg	76	20	6.0	5.0	6.0	7.0	-	short mound
9086200	Starr	96	50	4.0	4.0	4.0	5.0	-	tall upright
9088685	Bee	100	25	5.0	3.0	5.0	5.0	-	spread-ing
9090402	Kinney	100	25	5.0	5.0	5.0	5.0	-	-
9089187	Medina	100	25	5.0	5.0	5.0	5.0	-	-
9089190	Medina	98	25	5.0	5.0	5.0	5.0	-	-
9090389	Kinney	98	25	5.0	5.0	5.0	5.0	-	-
9090404	Kinney	98	25	5.0	5.0	5.0	5.0	-	-
9090408	Kinney	100	25	4.0	5.0	5.0	5.0	-	-
9088541	Medina	100	25	5.0	5.0	5.0	5.0	-	-
9090510	Frio	100	25	5.0	5.0	5.0	5.0	-	-
9091894	Maverick	100	25	5.0	5.0	5.0	5.0	-	-
9090392	Kinney	98	25	5.0	5.0	5.0	5.0	-	-
9090652	Kinney	98	25	5.0	5.0	5.0	5.0	-	-
9090651	Kinney	100	25	5.0	4.0	5.0	5.0	-	-
9093162	Bexar	34	25	8.0	8.0	8.0	5.0	-	-
9090401	Kinney	100	25	5.0	5.0	5.0	5.0	-	-
9093190	McMullen	100	25	5.0	4.0	5.0	5.0	-	-

*Ocular estimate (1= Best)

Study Number: STPMC-P-0348- RA

Study Title: Assembly and Evaluation of Engelmann's Daisy (*Engelmannia peristenia*)

Introduction: Engelmann's daisy (*Engelmannia peristenia)*, also known as cutleaf daisy, was previously known under the name *Engelmannia pinnatifida*. This perennial species grows up to 75 cm. tall (Jones, 1982). It is a showy member of the Asteraceae family, with loosely clustered yellow heads from February to November (Jones, 1982). Cattle readily eat Engelmann's daisy, and it has been grazed-out from much of its original range (Ajilvsgi, 1984). White-tailed deer also eat the leaves and several species of birds eat the seeds (Everitt, Drawe, and Lonard, 1999). It frequently occurs on the better-drained sands or caliche in prairies, openings, and waste places (Jones, 1982). It is most common in north central Texas and the Edwards Plateau, but occurs throughout the state, except in the forested sandy areas of East Texas (Correll and Johnston, 1996). Its range extends into Nebraska, Colorado, Kansas, Oklahoma, New Mexico, and Mexico (Correll and Johnston, 1996).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of Engelmann's daisy. Engelmann's daisy collections will be evaluated for adaptation in the mixed soil region known as the Rio Grande Plain.

Discussion: There were nine accessions in the Rio Grande Plains Ecoregion plot at the end of 2006. The plot was evaluated for field performance in April of 2006 (Table 1) just before the seed was ripe and again in November of 2006 (Table 2) while the plants were dormant. One accession, 9088649-Karnes Co. had above average performance in both evaluations. No new accessions were available for seeding in December of 2006. This project will be put on hold until collections are made from more counties.

Table 1. Study STPMC-P-0348- RA Engelmann's Daisy Initial Field Evaluation April 2006

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9088582	Bee	94	75	5.0	5.0	5.0	5.0	-
9088575	Bee	96	75	5.0	5.0	5.0	5.0	-
9088581	Bee	82	75	6.0	6.0	5.0	5.0	-
9088667	Goliad	64	75	5.0	6.0	5.0	7.0	-
9088662	Goliad	94	75	5.0	4.0	5.0	5.0	-
9088668	Goliad	100	75	4.0	4.0	5.0	5.0	-
9088649	Karnes	86	75	4.0	4.0	5.0	5.0	-
9088677	Karnes	72	75	5.0	5.0	5.0	5.0	-
9086287	Jim Wells	41	75	5.0	5.0	5.0	7.0	-

*Ocular estimate 1-9 (1 = Best)

Table 2. Study STPMC-P-0348- RA Engelmann's Daisy Initial Field Evaluation Nov. 2006

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9088582	Bee	94	10	5.0	5.0	5.0	5.0	-
9088575	Bee	94	10	5.0	5.0	5.0	5.0	-
9088581	Bee	82	10	6.0	6.0	5.0	5.0	-
9088667	Goliad	64	10	7.0	7.0	6.0	5.0	-
9088662	Goliad	94	10	5.0	4.0	5.0	5.0	-
9088668	Goliad	96	10	5.0	5.0	5.0	5.0	-
9088649	Karnes	86	10	4.0	4.0	5.0	5.0	-
9088677	Karnes	72	10	5.0	5.0	5.0	5.0	-
9086287	Jim Wells	41	10	7.0	7.0	5.0	6.0	-

*Ocular estimate 1-9 (1 = Best)

Study Number: STPMC-P-0349- RA

Study Title: Assembly and Evaluation of Awnless Bush-sunflower (*Simsia calva*)

Introduction: Awnless bush-sunflower (*Simsia calva*) is a perennial, herbaceous (woody below) member of the Asteraceae family (Correll and Johnston, 1996). It is abundant through Southeast Texas, the Rio Grande Plain, Trans-Pecos, North Central Texas, the Edwards Plateau, and the Plains Country, with its range extending into Mexico (Correll and Johnston, 1996). It grows to 75 cm. tall (Jones, 1982), and has harshly pubescent leaves (Correll and Johnston, 1996). Yellow flowers bloom in solitary heads from February to December (Jones, 1982). Disk flowers are perfect, but the ray flowers are infertile (Correll and Johnston, 1996). White-tailed deer eat the leaves of this species (Everitt, Drawe, and Lonard, 1999).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of awnless bush-sunflower. Awnless bush-sunflower collections will be evaluated for adaptation in the mixed soil region known as the Rio Grande Plain.

Discussion: There were 19 accessions still alive in the Rio Grande Plains ecoregion plot in 2006. These were evaluated for field performance in April 2006 (Table 1). The evaluation plot of this species was taken out at the end of 2006 due to poor survival on the clay soils. This species seems to have poor resistance and vigor after the fall rains, when the “heavy” clay soils of the PMC exhibited slow water infiltration and poor root oxygenation. Seed that was collected in 2005 will be germination tested in 2007. Then field evaluations and germination results will be compared and selections will be made for an ecotype release.

STN also has awnless-bush sunflower under offsite evaluation, with five accessions at Rio Farms and six accessions at TAES Uvalde since 2005.

In 2006, awnless-bush sunflower plants were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas. The plants sent to Bentsen State Park were still alive, and were said to be attractive when blooming, but not after blooming ceased.

Table 1. Study STPMC-P-0349- RA Awnless Bush-Sunflower - PMC Block C - Initial Field Evaluation 2006

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9089208	Uvalde	12	100	5.0	5.0	5.0	5.0	5.0
9088770	Webb	0	-	-	-	-	-	-
9088549	Zavala	0	-	-	-	-	-	-
9090532	Duval	10	25	5.0	5.0	5.0	5.0	5.0
9088588	Bee	6	25	5.0	5.0	6.0	5.0	6.0
9089191	Uvalde	8	5	6.0	7.0	6.0	5.0	6.0
9089007	Dimmit	12	25	5.0	5.0	5.0	5.0	5.0
9090642	Dimmit	4	5	7.0	7.0	7.0	5.0	7.0
9089030	Dimmit	0	-	-	-	-	-	-
9088546	Frio	10	20	6.0	6.0	6.0	5.0	5.0
9088590	Bee	28	50	5.0	5.0	5.0	5.0	5.0
9090501	Frio	8	5	8.0	8.0	8.0	5.0	7.0
9088713	Webb	4	10	6.0	6.0	6.0	5.0	6.0
9088605	Frio	12	25	5.0	5.0	5.0	5.0	5.0
9089015	LaSalle	12	25	6.0	7.0	6.0	5.0	6.0
9088578	Bee	46	25	4.0	5.0	4.0	5.0	4.0
9088601	Live Oak	33	25	4.0	5.0	5.0	5.0	4.0
9093181	Bexar	21**	25	5.0	4.0	5.0	5.0	4.0
9091936	Live Oak	36**	25	5.0	4.0	5.0	5.0	4.0
9091816	Bee	38**	25	5.0	4.0	5.0	5.0	4.0
9093165	Dimmit	26**	10	5.0	5.0	5.0	5.0	5.0

*Ocular estimate (1 = Best)

** Planted in 2005. Others planted in 2004.

The Study Number: STPMC-P-0350- RA

Study Title: Assembly and Evaluation of Big Bluestem (*Andropogon gerardii*)

Introduction: Big bluestem (*Andropogon gerardii*) is a native, perennial grass that forms dense clumps (Gould, 1975). It grows 0.8-2 meters tall, and may or may not form rhizomes (Gould, 1975). The inflorescence blooms mainly from August to November and consists of 2-7 spike-like branches bearing sessile spikelets (Gould, 1975). This species has three varieties, but only one (*Andropogon gerardii* var. *gerardii*) occurs in the South Texas region (Gould, 1975). This variety is found associated with other tall grasses in prairies and wooded areas having sandy or loamy soils throughout the State (Gould, 1975). This variety's range extends from Southern Canada, through the United States from Montana, Colorado, and Arizona, into Mexico where it is infrequent in the northern and central highlands (Gould, 1975).

Big bluestem is one of the four most important forage grasses in the tallgrass prairies region (Gould, 1975). The other three important, widespread grasses are switchgrass, indiangrass, and little bluestem (Gould, 1975). Big bluestem was once a climax dominant in the Gulf Coast, but it decreases with livestock grazing (Hutch, Schuster & Drawe, 1999). It has good quality for livestock, and fair value to wildlife (Hutch, Schuster & Drawe, 1999). Big bluestem is even a more important constituent of prairie hay in the states of the Mississippi Valley than in Texas (Correll & Johnston, 1979).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of big bluestem. Big bluestem collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005 there were 17 accessions in the Texas Coastal Prairie plot, 7 in the Rio Grande Plain plot, and 12 in the South Texas Sand Plain plot. Due to very dry conditions the plants had poor performance and did not produce seed in 2005.

These plots were evaluated for field performance in April 2006 (Table 1-3). In September 2006, 3 accessions were added to the Texas Coastal Prairie ecoregion plot. This brought the number of accession in that plot to 20. One accession was also added to the South Texas Sand Plain plot, bringing the number of accessions in that plot to 13. The Texas Coastal Prairie was also evaluated again in November as it was the only plot to produce significant seed (Table 4). The seed that was harvested will be germination tested in 2007.

In previous years, the seed harvests of big bluestem from the PMC plots has had poor seed fill. To test if this is due to location, plants will be sent to Katy and Stephenville, TX in 2007. These plants will be harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

In December 2006, three new accessions (1 for the Texas Coastal Prairie plot and 1 for a Rio Grande Plain plot) and four replant accessions were seeded in the greenhouse (Table 5). Accessions with enough plants will be transplanted into the appropriate ecoregion plot and the

offsite plot in the spring of 2007. The State NRCS Office will be requesting Field Offices to send in more collections of this species in 2007. Accessions will be added to the plots as received.

Offsite Evaluations: South Texas Natives (STN) had 35 accessions and one cultivar "Earl" under evaluation at Rio Farms in 2006.

In 2006, big bluestem plants of accessions 9086165 and 9086160 were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas.

At Bentsen State Park the plants were considered to be only fair to poor performers. The plants sent to TAES Dallas were judged to not perform as well as the commercial line they also had in the garden.

Table 1. Study STPMC-P-0350- RA Big Bluestem PMC Initial Field Evaluation April 2006

Rio Grande Plains Ecotype – PMC Block G (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086226	Goliad	98	10	6.0	6.0	6.0	5.0	-
9090265	Goliad	96	10	6.0	6.0	6.0	5.0	-
9086169	Kenedy	96	10	7.0	7.0	6.0	5.0	-
9086164	Kenedy	98	10	7.0	7.0	6.0	5.0	-
9089235	Brooks	93	10	6.0	6.0	6.0	5.0	-
9089228	Kenedy	94	15	5.0	5.0	6.0	5.0	-
9086165	Kenedy	70	5	6.0	7.0	6.0	5.0	-

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0350- RA Big Bluestem PMC Initial Field Evaluation April 2006

South Texas Sand Plain Ecotype - ANNEX (sandy soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086164	Kenedy	74	5	8.0	8.0	8.0	5.0	-
9086169	Kenedy	92	5	8.0	8.0	8.0	5.0	-
9090276	Kleberg	82	5	8.0	8.0	8.0	5.0	-
9090263	Kleberg	68	5	8.0	8.0	8.0	5.0	-
9089228	Kenedy	80	10	7.0	7.0	7.0	5.0	-
9090752	Kleberg	92	10	6.0	6.0	6.0	5.0	-
9093239	Kenedy	98	10	6.0	6.0	6.0	5.0	-
9093240	Kenedy	100	10	6.0	6.0	6.0	5.0	-
9093242	Kenedy	70	5	8.0	8.0	8.0	5.0	-
9093237	Kenedy	97	5	8.0	8.0	8.0	5.0	-
9093243	Brooks	100	5	8.0	8.0	8.0	5.0	-
9093244	Kenedy	100	5	8.0	8.0	8.0	5.0	-

*Ocular estimate (1= Best)

Table 3. Study STPMC-P-0350- RA Big Bluestem PMC Initial Field Evaluation April 2006

Texas Coastal Prairie Ecotype – PMC Block B (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086160	San Patricio	100	25	6.0	6.0	6.0	5.0	-
9086167	San Patricio	100	25	5.0	5.0	5.0	5.0	-
9086168	San Patricio	100	25	5.0	5.0	5.0	5.0	-
9088691	Aransas	100	25	5.0	5.0	5.0	5.0	-
9086170	San Patricio	100	25	6.0	5.0	6.0	5.0	-
9086223	Galveston	96	25	6.0	5.0	6.0	7.0	-
408928	Victoria	53	25	5.0	5.0	5.0	7.0	-
9090269	Victoria	70	25	5.0	5.0	5.0	5.0	-
9090333	Refugio	98	25	5.0	5.0	5.0	6.0	-
9090263	Kleberg	100	25	5.0	5.0	5.0	5.0	-
9090276	Kleberg	100	25	5.0	5.0	5.0	5.0	-
9090754	Nueces	92	5	5.0	5.0	5.0	5.0	-
9090759	Nueces	64	5	7.0	7.0	7.0	5.0	-
9090752	Kleberg	96	10	5.0	5.0	5.0	5.0	-
9090341	Victoria	27	5	7.0	7.0	7.0	5.0	-
9090757	Kleberg	100	25	5.0	5.0	5.0	5.0	-

*Ocular estimate (1= Best)

Table 4. Study STPMC-P-0350- RA Big Bluestem PMC Initial Field Evaluation Nov. 2006

Texas Coastal Prairie Ecotype – PMC Block B (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086160	San Patricio	100	100	5.0	5.0	5.0	5.0	5.0
9086167	San Patricio	100	100	5.0	5.0	5.0	5.0	5.0
9086168	San Patricio	100	90	5.0	6.0	5.0	5.0	7.0
9088691	Aransas	100	100	5.0	5.0	5.0	5.0	6.0
9086170	San Patricio	100	100	5.0	4.0	5.0	5.0	4.0
9086223	Galveston	96	100	6.0	6.0	6.0	7.0	7.0
408928	Victoria	53	100	5.0	5.0	5.0	8.0	6.0
9090269	Victoria	70	100	5.0	5.0	5.0	5.0	6.0
9090333	Refugio	98	100	5.0	6.0	5.0	5.0	5.0
9090263	Kleberg	100	100	6.0	5.0	5.0	6.0	6.0
9090276	Kleberg	100	100	5.0	5.0	5.0	5.0	4.0
9090754	Nueces	92	100	6.0	6.0	5.0	6.0	7.0
9090759	Nueces	64	100	7.0	7.0	7.0	5.0	7.0
9090752	Kleberg	96	100	5.0	5.0	5.0	5.0	5.0
9090341	Victoria	27	100	7.0	7.0	7.0	5.0	4.0
9090757	Kleberg	100	100	5.0	5.0	5.0	5.0	7.0

*Ocular estimate (1= Best)

Table 5. Study STPMC-P-0350- RA Big Bluestem

PMC Greenhouse Germination Winter 2006

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %
9090330*	San Patricio	14.8	14.8	14.8
9090269*	Victoria	0.4	0.6	0.6
9090341*	Victoria	1.2	1.2	1.2
9090757*	Kleberg	2.6	3.0	3.0
9093342	Harris	0.1	0.1	0.1
9093163	Bexar	0	0	0
9093238	Goliad	1.1	1.1	1.1

* Accessions for replants.

Study Number: STPMC-P-0351- RA

Study Title: Assembly and Evaluation of Prairie Clover (*Dalea spp.*)

Introduction: White prairie clover is a perennial member of the Legume family (Correll and Johnston, 1996). Stems three to ten dm. long grow out from a woody base and its white flowered spikes bloom from May to September (Correll and Johnston, 1996). This species occurs in East, South East, and North Central Texas, and rarely occurs in Western Texas (Correll and Johnston, 1996).

Problem: There is a need for perennial native legumes for range restoration, wildlife habitat, and xeriscaping in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of white prairie clover. White prairie clover collections will be evaluated for adaptation in the region along the Texas coast known as the Texas Coastal Prairie.

Discussion: At the end of 2005 there was one accession each of white prairie clover (9088887-Brazoria) and roundhead prairie clover, *Dalea multiflora*, (9086123-Austin) in an evaluation plot. Seed was harvested from both accessions in 2005. In addition, a seed increase row of accession 9086123-Austin was planted in June of 2004. Seed was harvested from this row in August of 2006. The seed harvests will be germination tested in 2007.

Both accessions were evaluated for field performance in April and September of 2006 (Table 1). Plants were observed to be dormant in November. A late seed harvest was collected from both accessions in September and will be germination tested in 2007. New collections received had little to no seed fill and none had enough seedlings to add to the plot in 2006.

Plants from commercially available seed from Native American Seed of each species was planted in an isolated plot in June of 2006. In 2007, these will be used to compare to the two accessions under evaluation. The State NRCS Office requested Field Offices to send in more collections of these two species in 2006. Accessions will be added to the plot as received.

Table 1. Study STPMC-P-0351- RA White & Roundhead Prairie Clover Initial Field Evaluation 2006

Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086123	Austin	26	5.0	5.0	5.0	5.0	5.0
9088887	Brazoria	66	5.0	5.0	5.0	5.0	5.0

*Ocular estimate (1= Best)

Study Number: STPMC-P-0352- RA

Study Title: Assembly and Evaluation of Florida Paspalum (*Paspalum floridanum*)

Introduction: Florida paspalum (*Paspalum floridanum*) is a native, perennial bunchgrass that grows in grassy areas and open woodlands (Gould, 1975). It grows 2-4 meters tall and forms thick rhizomes (Gould, 1975). Its inflorescence consists of 2-5 branches, each with 4 rows of spikelets on a branched rachis, and blooms mainly from August to November (Gould, 1975). This species has two varieties *Paspalum floridanum* var. *floridanum* (hirsute leaves) and *Paspalum floridanum* var. *glabratum* (glabrous leaves) separated by the presence or absence of coarse hairs on the leaves (Gould, 1975). Both species occur in the Pineywoods, Gulf Prairies and Marshes, and Post Oak Savannah regions of Texas, but var. *glabratum* also occurs in the Blackland Prairies and Cross Timbers and Prairies regions. The range of this species extends from Maryland and Florida, west to Illinois, and in eastern Kansas and eastern Texas (Gould, 1975). Florida paspalum usually occurs on clay or sandy loam soils (Correll & Johnston, 1979). In the eastern portion of the range var. *floridanum* is more common, and in the western portion of the range var. *glabratum* is more common (Gould, 1975). Florida paspalum provides fair to good quality forage for livestock and is a good producer of seed for wildlife (Hutch, Schuster & Drawe, 1999).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of Florida paspalum. Florida paspalum collections will be evaluated for adaptation in the region along the Texas coast known as the Texas Coastal Prairie.

Discussion: There were five accessions of Florida paspalum in a Texas Coastal Prairie ecoregion plot at the end of 2005. Two accessions were added in April of 2006, bringing the total number of accessions to seven. The plot was evaluated for field performance in April and November of 2006 (Table 1). The plot was not harvested in 2006 since little seed was produced.

Two replant and two new accessions were seeded in the greenhouse in December of 2006 (Table 2). Neither of the new accessions had sufficient germination to be added to the field plot. New accessions will be added to the plot as received.

Due to good field performance and lack of original seed, rootstock of accession 9088889 was dug out of the plot and used to start a seed increase row in 2005. A significant seed harvest was not produced in 2005 or 2006.

In previous years, the seed harvests of Florida paspalum has had poor seed fill. To test if this is due to location, plants will be sent to Katy, TX in 2007. These plants will be harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

Table 1. Study STPMC-P-0352- RA Florida Paspalum Initial Field Evaluation 2006

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086204	Harris	44	100	6.0	6.0	5.0	5.0	6.0
9086122	Austin	40	100	5.0	5.0	5.0	5.0	5.0
9089165	Montgomery	52	100	6.0	5.0	5.0	5.0	5.0
9088889	Brazoria	26	100	5.5	6.0	5.0	5.0	6.0
9090342	Victoria	80	5.5	5.0	6.0	5.0	5.0	-
9093300	Ft. Bend	97	new	5.5	5.0	5.0	5.0	5.0
9093292	Ft. Bend	100	new	5.0	5.0	5.0	5.0	6.0

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0352- RA Florida Paspalum

Greenhouse Germination Winter 2006

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9093292*	Ft. Bend	27	27	29	29
9093300*	Ft. Bend	1	1	1	1
9093316	Aransas	1	1.5	1.5	1.5
9093344	Harris	0	0	0	0

* Accessions for replants.

Study Number: STPMC-P-0353- RA

Study Title: Assembly and Evaluation of Yellow Indiangrass (*Sorghastrum nutans*)

Introduction: Yellow indiangrass (*Sorghastrum nutans*) is a rhizomatous, native perennial grass (Hutch, Schuster & Drawe, 1999). It grows 0.8 to 2.3 meters tall, and forms short, stout rhizomes (Gould, 1975). Its inflorescence is a loosely contracted panicle covered with 6-8 mm long spikelets (Gould, 1975). It blooms mostly from September to November (Gould, 1975) and is one of the most attractive fall blooming grasses in Texas (Correll & Johnston, 1979). It grows in all regions of the State, but is most common in the tall-grass prairie regions of central and coastal Texas (Gould, 1975). Its range extends from south-central Canada, throughout the U.S. east of the Rocky Mountains, and into Northern Mexico (Gould, 1975).

Yellow indiangrass is one of the four important forage grasses in the tallgrass prairies regions (Gould, 1975). The other three important grasses are switchgrass, big bluestem, and little bluestem (Gould, 1975). The presence of these four species indicates a range in good condition (Gould, 1975). Yellow indiangrass provides good quality forage for livestock and good cover for wildlife (Hutch, Schuster & Drawe, 1999).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of yellow Indiangrass. Yellow Indiangrass collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005, there were 7 accessions of yellow Indiangrass planted in the Texas Coastal Prairie ecoregion plot, 8 accessions in a Rio Grange Plain ecoregion plot, and 2 in a South Texas Sand Plain ecoregion plot.

In April 2006, two new accessions were added to the Texas Coastal Prairie ecoregion plot. All three ecoregion plots were evaluated for field performance in 2006 (Table 1-3). Overall, all plots had less regrowth and/ or density than in previous years due to dry conditions. Seed was harvested from the Rio Grande Plain and Texas Coastal Prairie plots and will be germination tested in 2007.

In December 2006, five replant accessions, 2 second-tries, and 8 new accessions were seeded in the greenhouse (Table 4). All but one of the accessions had poor germination and were reseeded in an attempt to get enough plants. Accessions with enough plants will be transplanted into the appropriate ecoregion plot and the offsite plot in the spring of 2006. The State NRCS Office will be requesting Field Offices to send in more collections in 2007. Accessions will be added to the plot as received.

Off-Site Evaluations: STN has 22 accessions and 2 cultivars in an off-site observation plot at Rio Farms.

In 2006, yellow Indiangrass plants of accession 9089224 were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives

(STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas.

At Bentsen State Park the plants were considered to be good performers, but useful mainly as a mass planting as it is not particularly interesting as a specimen plant. The plants sent to TAES Dallas were judged to have a good green color and to be the best fall performers.

In previous years, the seed harvests of yellow Indiangrass from the PMC plots has had poor seed fill. To test if this is due to location, plants will be sent to Katy and Stephenville, TX in 2007. These plants will be harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

Table 1. Study STPMC-P-0353- RA Yellow Indiangrass PMC Initial Field Evaluation 2006

Texas Coastal Prairie Ecotype – PMC Block B (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086124	Kleberg	32	100	8.0	9.0	8.0	5.0	5.0
9088693	Aransas	94	100	4.5	5.0	4.5	5.0	5.0
9086221	Galveston	84	100	4.5	5.0	5.0	5.0	5.0
9090335	Victoria	100	100	5.0	5.0	5.5	5.0	5.0
9090287	Kleberg	100	100	5.5	6.0	5.5	5.0	5.0
9090300	Kleberg	100	100	5.0	6.0	5.5	5.0	5.0
9089164**	Montgomery	43	100	5.0	5.0	5.5	5.0	5.0
9093273	Aransas	100	new	4.5	5.0	5.0	5.0	3.0
9067253	Matagorda	67	new	5.5	5.5	5.5	5.0	5.0

*Ocular estimate (1= Best)
** Determined to be big bluestem

Table 2. Study STPMC-P-0353- RA Yellow Indiangrass PMC Initial Field Evaluation 2006

Rio Grande Plains Ecotype – PMC Block G (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9090271	Wilson	94	100	5.5	6.0	5.5	5.0	5.0
9090272	Goliad	98	100	5.5	5.5	5.5	5.0	5.0
9089224	Wilson	100	100	5.5	5.5	5.5	5.0	5.0
9090294	Brooks	50	100	7.0	7.0	6.0	5.0	5.0
9068187	Kenedy	100	100	5.5	5.5	5.5	5.0	5.0
9086188	Kenedy	94	100	5.5	5.5	5.5	5.0	5.0
9093164	Bexar	92	100	6.0	5.5	5.5	5.5	6.0
9093170	Bexar	86	100	5.0	5.0	5.0	5.0	6.0

*Ocular estimate (1= Best)

Table 3. Study STPMC-P-0353- RA Yellow Indiangrass PMC Initial Field Evaluation 2006

South Texas Sand Plain Ecotype – PMC Annex (sandy soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086124	Kleberg	96	75	7.0	7.0	7.0	5.0	-
9090300	Kleberg	83	90	6.0	6.0	6.0	5.0	-

*Ocular estimate (1= Best)

Table 4. Study STPMC-P-0353- RA Yellow Indiangrass

PMC Greenhouse Germination 2006

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %
9090294*	Brooks	0	0	0
9090300*	Kleberg	0	0	0
9090335*	Victoria	0.4	0.6	0.6
9090287*	Kleberg	0	0	0
9093273*	Aransas	0	0.1	0.3
9093223	Fort Bend	0.4	0.5	0.6
9090760	Nueces	0	0.1	0.2
9093304	Harris	0.4	0.7	1.5
9093318	Aransas	1.3	7.0	11.6
9093230	Gonzales	0	0	0
9093231	Kenedy	0	0	0.3
9093232	Kenedy	0	0	0.1
9093233	Brooks	0	0	0.3
9093234	Kenedy	0	0	0
9093235	Brooks	0	0.1	0.1

* Accessions for replants.

Study Number: STPMC-P-0354- RA

Study Title: Assembly and Evaluation of Eastern Gamagrass (*Tripsacum dactyloides*)

Introduction: Eastern gamagrass (*Tripsacum dactyloides*) is a rhizomatous, native perennial grass (Hutch, Schuster & Drawe, 1999). It grows 1.5 to 3 meters tall, and forms large clumps (Gould, 1975). Its inflorescence consists of a single spicate raceme 12-25 cm long (or 2-3 erect spikelike racemose branches) with staminate spikelets above and pistillate spikelets below (Gould, 1975). Eastern gamagrass blooms summer thru fall (Correll & Johnston, 1979). It provides good livestock forage and is used as a pasture grass on bottomlands and prairies (Hutch, Schuster & Drawe, 1999). It also provides good wildlife cover and seed (Hutch, Schuster & Drawe, 1999). It grows in all regions of the State, but is most common in the eastern portions in low, moist, little-disturbed grassland sites (Gould, 1975). The range of eastern gamagrass extends throughout the eastern half of the United States, west to Nebraska, Kansas, Oklahoma, and Texas, south to northern Mexico, and in the West Indies (Gould, 1975).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat along the Texas Coastal Prairie.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of eastern gamagrass. Eastern gamagrass collections will be evaluated for adaptation in the region along the Texas coast known as the Texas Coastal Prairie.

Discussion: At the end of 2005 there were six accessions in the Texas Coastal Prairie ecoregion plot. Seed was harvested in August 2005 and germination ranged from 1-5%. The low germination may be due to a lack of seed fill and/ or mechanical dormancy caused by the hard layers covering the seeds.

This plot was evaluated for field performance in April and November of 2006 (Table 1). Field performance of all the accessions was good, but again seed production was minimal and no harvest was collected. Accession 9088888-Brazoria is a smaller, thinner leaved form of eastern gamagrass. No new accessions were available for seeding in the greenhouse in 2005. The State NRCS Office will be requesting Field Offices to send in more collections in 2008. Accessions will be added to the plot as received.

In 2006, eastern gamagrass plants of accession 9088888 were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas.

At Bentsen State Park the plants were considered to be good performers and interesting as a specimen plant. The plants sent to TAES Dallas were said to be open in the center with a sprawling habit.

Table 1. Study STPMC-P-0354- RA Eastern Gamagrass PMC Initial Field Evaluation 2006

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Seed Production*
Jackson	Jackson	100	5.0	5.0	5.0	5.0	few
9088872	San Patricio	100	5.0	5.0	5.0	5.0	few
9088878	San Patricio	100	5.0	5.0	5.0	5.0	few
9086254	San Patricio	100	5.0	5.0	5.0	5.0	few
9089126	San Patricio	100	5.0	5.0	5.0	5.0	few
9088888	Brazoria	100	5.0	5.0	5.0	5.0	little

*Ocular estimate (1= Best)

Study Number: STPMC-P-0355- RA

Study Title: Assembly and Evaluation of Prairie Acacia (*Acacia angustissima*)

Introduction: Prairie acacia (*Acacia angustissima*), also known as fern acacia, is a perennial member of the Legume family (Correll and Johnston, 1996). It is a rounded sub-shrub and often forms colonies from woody rhizomes (Correll and Johnston, 1996). Prairie acacia's white to cream flowers occur in 1 cm wide heads (Correll and Johnston, 1996), and those are formed into terminal clusters (Ajilvsgi, 1984). It blooms from May to September (Correll and Johnston, 1996). This species is frequent in grasslands and open shrubby vegetation in the eastern two-thirds of the state, and rarely occurs west to the Plains Country (Correll and Johnston, 1996). It also occurs in Oklahoma, Arkansas, Montana, Florida, and Mexico (Correll and Johnston, 1996). Prairie acacia is high in protein and is eaten by cattle (Ajilvsgi, 1984). As it decreases under heavy grazing, it is a good indicator of range conditions (Ajilvsgi, 1984).

Problem: There is a need for perennial native legumes for range restoration, wildlife habitat, and xeriscaping in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of prairie acacia. Prairie acacia collections will be evaluated for adaptation in the South Texas region.

Discussion: Fourteen accessions were in the initial evaluation plot at the end of 2005. Seed was collected in December of 2005 and was germination tested with and without 1 second of scarification in a sandpaper scarifier (Table 1). With scarification, all accessions had germination that exceeded 70%.

Four accessions were added to the initial observation plot in June of 2006. This plot was evaluated for field performance in April and November of 2006 (Table 2). Three accessions have consistently stood out since 2004 with the tallest growth form, best forage production, good seed production, and good seed germination. These three were selected for a seed release: 9089174-McMullen Co., 9090706-Webb Co., and 9090685-Dimmit Co. No original seed is left of these accessions, so runners will be rooted and planted for seed increase rows starting in spring 2007. The release will be pursued as soon as sufficient breeder seed is produced.

Table 1. Study STPMC-P-0355- RA Prairie Acacia 2005 PMC Harvest Germination

Accession Number	Grams Harvested	Scarification	3 Days %	14 Days %	28 Days %
9029653	16	0	3.3	10.7	21.3
		1 sec	60.0	83.3	84.7
9076907	37	0	2.7	6.0	6.7
		1 sec	53.3	69.3	70.0
9076909	71	0	1.3	4.7	6.7
		1 sec	68.0	84.7	85.3
9085305	40	0	0.7	3.3	8.0
		1 sec	48.7	77.3	78.7
9085672 (Knox City)	5	0	4.0	29.0	62.0
		1 sec	61.3	88.5	88.5
90888941	27	0	0.7	6.0	8.0
		1 sec	52.0	88.7	89.3
9089174*	241	0	1.3	6.7	10.7
		1 sec	23.3	80.7	81.3
9090706*	183	0	3.3	10.0	10.7
		1 sec	47.3	85.3	87.3
9090685*	48	0	2.7	16.7	22.7
		1 sec	51.3	77.3	78.0
9093283	2	0	11.4	62.9	74.3
		1 sec	28.6	91.0	91.0
9093278	5	0	0.0	7.3	12.0
		1 sec	64.4	80.0	80.0
9093279	2	0	14.0	26.0	30.0
		1 sec	37.5	80.0	80.0

***12 hours dark 16°C (60°F) / 12 hours light 30°C (86°F)
**Accessions 9093277 & 9093284 had no seed production in 2005.
*Selected for release.

Table 2. Study STPMC-P-0355- RA Prairie Acacia PMC Initial Field Evaluation 2006

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9029653	Motley	98	100	5.0	5.5	5.0	5.0	5.0
9076907	LaSalle	82	100	6.0	6.0	5.0	7.0	6.0
9076909	Frio	98	100	5.0	4.0	5.0	5.0	5.5
9085305	Burleson	96	100	5.0	5.0	5.0	6.0	5.0
9085672	Knox City	90	50	9.0	9.0	9.0	5.0	7.0
9088941	Frio	100	100	6.5	6.5	6.0	6.0	6.5
9089174**	McMullen	98	100	4.0	3.0	4.0	5.0	4.5
9090706**	Webb	98	100	4.0	4.0	4.0	5.0	4.5
9090685**	Dimmit	90	100	5.0	4.0	5.0	5.0	5.0
9093283	La Salle	89	100	5.5	6.0	5.0	5.0	veg. only
9093278	Webb	100	100	5.0	5.0	5.0	5.0	5.0
9093279	Bee	100	10	5.0	5.5	5.0	5.0	4.0
9093277	Jim Hogg	100	100	5.0	5.5	5.0	5.0	veg. only
9093284	Atascosa	0	-	-	-	-	-	-
9064952	DeWitt	68	first year	6.0	6.0	6.0	5.0	veg. only
9064962	Austin	44	first year	7.0	7.0	7.0	5.0	veg. only
PMT-2466	Frio	78	first year	6.0	6.00	5.0	5.0	veg. only
PMT-3131	Frio	100	first year	7.0	7.0	7.0	5.0	veg. only

*Ocular estimate (1= Best)

** Selected for release

Study Number: STPMC-P-0356- RA

Study Title: Assembly and Evaluation of Golden Dalea (*Dalea aurea*)

Introduction: Golden dalea is a perennial member of the Legume family (Correll and Johnston, 1996). One to several stems 3-5 dm long grow out from a semi-woody base (Correll and Johnston, 1996). The leaflets are dotted with glands containing a fragrant, volatile oil (Ajilvsgi, 1984). Its dense spikes are 2-5 cm long, and bloom with bright yellow flowers from May to July (Correll and Johnston, 1996). These flowers have a strong odor and produce a pod-like legume (Everitt, Drawe, & Lonard, 1999). White-tailed deer eat the leaves and flowers of this species (Everitt, Drawe, & Lonard, 1999). Golden dalea occurs in East to North Central Texas, and occasionally on the Gulf Coastal Plain (Correll and Johnston, 1996). Its range extends from South Dakota to Wyoming and south to Mexico (Correll and Johnston, 1996).

Problem: There is a need for perennial native legumes for range restoration, wildlife habitat, and xeriscaping in South Texas.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of golden dalea. Golden dalea collections will be evaluated for adaptation in the South Texas region.

Discussion: Eight accessions of yellow daleas were observed in an initial evaluation plot for two years. One accession of golden dalea (*Dalea aurea*), 9086308-Kenedy Co., and one accession of pussyfoot (*Dalea obvata*), 9076947-Victoria Co., were chosen for seed increase and release. These two accessions were seeded in the greenhouse in December of 2006. They will be planted in seed increase rows in the spring of 2007. Due to the weak perennial nature of these species, it is likely that they will be treated like annuals. Seed harvested in 2007 will be used to plant larger seed increase rows in 2008.

Study Number: STPMC-P-0357- WL

Study Title: Assembly and Evaluation of Rattlesnake Master (*Eryngium yuccifolium*)

Introduction: Rattlesnake master is a perennial member of the parsley family, Apiaceae (Correll and Johnston, 1996). Its 3-18 dm stems return each year from a group of tuberous woody roots (Correll and Johnston, 1996). Its slender stems grow from a group of basal leaves, which have bristles along the margin and sharp points at the ends (Correll and Johnston, 1996). The small white flowers bloom from July to August in 1-2.5 cm circular heads (Correll and Johnston, 1996). Each of the flowers, as well as the entire head, is subtended by sharp bracts (Ajilvsgi, 1984). The common name comes from the use of this plant as a remedy for snakebite (Ajilvsgi, 1984). Rattlesnake master occurs in the Timber Belt, Blackland Prairies, and Coastal Prairies of Texas (Correll and Johnston, 1996). Its range extends from Georgia and Florida, west to Texas and Oklahoma (Correll and Johnston, 1996).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of rattlesnake master. Rattlesnake master collections will be evaluated for adaptation in the region along the Texas coast known as the Texas Coastal Prairie.

Discussion: It was agreed by both the PMC and South Texas Natives that this species would not be pursued for release at this time. A plant fact sheet will be written and submitted in 2008.

Study Number: STPMC-P-0358- RA

Study Title: Assembly and Evaluation of Little Bluestem (*Schizachyrium scorparium*)

Introduction: Little bluestem (*Schizachrium scoparium*) is a native, perennial bunchgrass (Gould, 1975). *Schizachrium scoparium var. scoparium* is the variety commonly known as little bluestem. It grows 0.5-2 meters tall, and does not produce creeping rhizomes (Gould, 1975). The inflorescence blooms mainly from August to December and consists of numerous racemes 2.5-5 cm long (Gould, 1975). It occurs in tallgrass prairies, wood openings, rocky slopes of lightly grazed pastures, and rangeland throughout the State except in the Pineywoods region (Gould, 1975).

Little bluestem is one of the four most important forage grasses in the tallgrass prairies regions (Gould, 1975). The other three important, widespread grasses are switchgrass, indiangrass, and big bluestem (Gould, 1975). Little bluestem provides good quality forage for livestock, has poor value for wildlife forage, but provides good cover (Hutch, Schuster & Drawe, 1999).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of little bluestem. Little bluestem collections will be evaluated for adaptation in two South Texas Ecoregions: the sandy soil regions along the Texas coast known as the Texas Coastal Prairie and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005, there were 9 accessions of little bluestem planted in the Texas Coastal Prairie Ecotype field plot, 32 accessions in the Rio Grande Plain Ecotype field plot, and 7 accessions in the "unknown bluestem" Rio Grande Plain Ecotype field plot.

In May of 2005, 4 accessions were added to the Texas Coastal Prairie field plot, 1 accession was added to the Rio Grande Plain plot, and 2 cultivars planted for comparison in an isolated plot. The Rio Grande Plains and Texas Coastal Prairie plots were evaluated for field performance in April of 2006 and the Texas Coastal Prairie plot was evaluated again in November 2006 (Table 1-3). Seed was not harvested in 2006 because little seed was produced in 2006 due to dry conditions.

In December 2006, 6 replant accessions, 3 second-try accessions, and 1 new accession were seeded in the greenhouse (Table 4). Accessions with enough plants will be transplanted into the appropriate ecoregion plots in the spring of 2007. Additional accessions will be added to field plots as received.

Offsite Evaluations: STN has 77 accessions of little and seacoast bluestem at Rio Farms in Monte Alto, Texas and 43 accessions at Bladerunner Farms in Poteet, Texas for offsite evaluation.

In previous years, the seed harvests of little bluestem has had poor seed fill. To test if this is due to location, plants will be sent to Katy and Stephenville, TX in 2007. These plants will be harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

Table 1. Study STPMC-P-0358- RA Little Bluestem PMC Initial Field Evaluation 2006

Texas Coastal Prairie Plot (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086219	Harris	86	100	5.5	3.5	5.5	5.0	5.0
9086224	Colorado	70	50	7.0	7.0	7.0	5.0	6.0
9089221	San Patricio	98	100	3.5	2.5	5.0	5.0	2.0
9089161	Montgomery	60	25	7.0	7.5	7.0	5.0	7.0
9090334	Victoria	98	100	5.5	4.5	5.5	5.0	5.0
9090749	Matagorda	74	100	5.0	5.0	5.0	5.0	5.0
9089242	Victoria	62	100	5.5	6.0	5.0	5.0	5.0
9090748	Matagorda	64	100	5.5	6.0	6.0	5.0	6.0
9093224	Fort Bend	48	80	7.0	7.0	6.0	5.0	7.0
9067251	Matagorda	90	first year	6.0	6.0	5.0	5.0	6.0
9067352	Matagorda	96	first year	5.0	5.0	5.0	5.0	5.0
9067252	Matagorda	92	first year	5.0	4.0	5.0	5.0	5.0
9093274	Aransas	96	first year	5.0	4.0	5.0	5.0	4.0

*Ocular estimate (1= Best, 5 average)

Table 2. Study STPMC-P-0358- RA Little Bluestem PMC Initial Field Evaluation April 2006

Rio Grande Plains Plot (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9090266	Goliad	90	5	8.0	8.0	8.0	5.0	-
9090289	Wilson	94	5	8.0	8.0	8.0	5.0	-
9086176	Bexar	86	5	7.0	7.0	7.0	5.0	-
9090371	Medina	84	5	7.0	7.0	7.0	5.0	-
9086178	Karnes	94	5	7.0	7.0	7.0	5.0	-
98086225	Goliad	98	5	7.0	7.0	7.0	5.0	-
9086180	Jim Wells	98	5	5.0	5.0	5.0	5.0	-
9086179	Atascosa	98	5	6.0	6.0	6.0	5.0	-
9089226	Wilson	100	5	7.0	7.0	7.0	5.0	-
9090487	Jim Wells	88	5	7.0	7.0	7.0	5.0	-
9090424	Kinney	90	5	6.0	6.0	6.0	5.0	-
9090288	Wilson	62	5	8.0	8.0	8.0	5.0	-
9086177	Atascosa	48	5	7.0	7.0	7.0	5.0	-
9089229	Wilson	80	5	8.0	8.0	8.0	5.0	-
9064474	DeWitt	84	5	7.0	7.0	7.0	5.0	-
9089245	Wilson	93	5	7.0	7.0	7.0	5.0	-
9090283	Goliad	87	5	5.0	5.0	5.0	5.0	-
9089231	Wilson	86	5	8.0	8.0	8.0	5.0	-
9090295	Wilson	76	5	6.0	6.0	6.0	5.0	-
9064461	Zavala	59	5	6.0	6.0	6.0	5.0	-
9089245	Wilson	78	5	8.0	8.0	8.0	5.0	-
9090751	Bee	88	5	5.0	5.0	5.0	5.0	-
9091775	Atascosa	90	5	7.0	7.0	7.0	5.0	-
9089226	Wilson	64	5	8.0	8.0	8.0	5.0	-
9090371	Medina	88	5	7.0	7.0	7.0	5.0	-
9091777	Atascosa	100	5	5.0	5.0	5.0	5.0	-
9091952	Bexar	100	5	8.0	8.0	8.0	5.0	-
9091954	Bexar	96	5	7.0	7.0	7.0	5.0	-
9091779	Atascosa	88	5	7.0	7.0	7.0	5.0	-
9091789	Atascosa	74	5	7.0	7.0	7.0	5.0	-
9091780	Atascosa	72	5	7.0	7.0	7.0	5.0	-
9091843	Zapata	86	5	6.0	6.0	6.0	5.0	-

*Ocular estimate (1= Best, 5 average)

Table 3. Study STPMC-P-0358- RA Little Bluestem PMC Initial Field Evaluation April 2006

"Unknown Bluestem" Plot (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9091805	Jim Hogg	82	10	5.0	5.0	5.0	5.0	-
9090346	Jim Hogg	96	10	5.0	5.0	5.0	5.0	-
9086180	Jim Wells	64	10	5.0	5.0	5.0	5.0	-
9090280	Brooks	83	5	6.0	6.0	6.0	5.0	-
9090464	Jim Wells	81	5	5.0	5.0	5.0	5.0	-
9091812	Jim Hogg	70	5	6.0	6.0	6.0	5.0	-
9090262	Brooks	89	5	6.0	6.0	6.0	5.0	-

*Ocular estimate (1= Best, 5 average)

Table 4. Study STPMC-P-0358- RA Little Bluestem Greenhouse Germination 2006

Accession Number	Origin (County)	Ecoregion	15 Days %	30 Days %	45 Days %
9093224*	Ft. Bend	Gulf	6.6	13.0	17.4
9090464*	Jim Wells	Rio	10.2	11.4	11.5
9091812*	Jim Hogg	Rio	5.0	6.8	6.8
9090262*	Brooks	Rio	4.4	6.2	7.0
9090346*	Jim Hogg	Sand	9.2	10.2	10.2
9090349*	Willacy	Sand	1.2	2.0	2.2
9089232	Wilson	Rio	22.8	32.0	34.3
9093226	Zavala	Rio	0.5	0.5	0.5
9093227	Dimmit	Rio	0.5	1.3	1.8
9093301	Ft. Bend	Gulf	0.9	1.6	2.2

* Replant accessions

Study Number: STPMC-P-0359- RA

Study Title: Assembly and Evaluation of Switchgrass (*Panicum virgatum*)

Introduction: Switchgrass (*Panicum virgatum*) is a native, perennial grass that occurs in clumps (Gould, 1975). It grows 0.6-3 meters tall, and forms scaly, creeping rhizomes (Gould, 1975). The inflorescence blooms mainly from late August to October and consists of open panicles 15-55 cm long bearing spikelets (Gould, 1975). Switchgrass is found in moist lowlands throughout all regions of the State (Gould, 1975). Its range extends from Southeastern Canada, through the United States except on the Pacific coast, into northern Mexico, and Cuba (Gould, 1975).

Switchgrass is one of the four most important forage grasses in the tallgrass prairies regions (Gould, 1975). The other three important, widespread grasses are big bluestem, Indiangrass, and little bluestem (Gould, 1975).

Switchgrass was once a climax dominant on lowlands of coastal prairie (Hutch, Schuster & Drawe, 1999). It provides good quality forage for livestock, is a good seed producer, and provides good cover for ground nesting birds (Hutch, Schuster & Drawe, 1999). It is also good for shoreline stabilization and barriers to control wind and water erosion (Hutch, Schuster & Drawe, 1999).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of switchgrass. Switchgrass collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005 there were two accessions in the Texas Coastal Prairie ecoregion plot, five accessions in the South Texas Sand Plain plot, and eight accessions in the Rio Grande Plains plot. Three more accessions were added to the Rio Grande Plains plot and one accession was added to the South Texas Sand Plain plot in August 2006. All plots were evaluated for field performance in April 2006 and the Texas Coastal Prairie plot was evaluated again in November 2006 (Tables 1-3). All accessions performed well. Seed was collected from the Texas Coastal Prairie plot in December 2006 and will be germination tested in 2007.

Two replant accessions and 2 new accessions were seeded in the greenhouse in December of 2006 (Table 4). These accessions will be added to the appropriate field plot in 2007. The State NRCS Office will be requesting Field Offices to send in more collections of switchgrass in 2007. New accessions will be added to the plots as received.

In previous years, the seed harvests of switchgrass has had poor seed fill. To test if this is due to location, plants will be sent to Katy and Stephenville, TX in 2007. These plants will be harvested and the seed will be tested for fill. Until the seed fill issue has been solved, this project will be on hold for selections.

King Ranch Seed Evaluation: The King Ranch brought in seed harvested from an observation plot in 2004. This plot was grown from seed collected from multiple populations of switchgrass on the King Ranch. The PMC was asked to assist with improving the germination and selection of this collection. Seed was planted in a flat in the greenhouse and seedlings that emerged by the seventh day were transferred to another tray. One hundred of these earlier germinating seedlings were planted in an observation plot in June of 2005 at the King Ranch Norias Division. The plot performed well, but plants were highly variable for multiple traits. Seed was collected from this plot in November and December and was germination tested in 2006. After seed was screened with a South Dakota seed blower for heavy seed, the November harvest had 65.9% germination and the December harvest had 95.5%.

In March of 2006, the 100 plants were evaluated for field traits. Only 43 were kept and the rest were removed. Seed was collected from these 43 plants individually in October and again in November 2006. These will be evaluated for fill and germination in 2007.

Table 1. Study STPMC-P-0359- RA Switchgrass Initial Field Evaluation 2006

Texas Coastal Prairie Ecoregion (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9088695	Aransas	100	100	4.5	4.5	5.0	5.0	4.0
9090297	San Patricio	100	100	5.0	5.0	5.0	5.0	5.0

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0359- RA Switchgrass Initial Field Evaluation 2005

South Texas Sand Plain Ecoregion (sandy soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086194	Kenedy	98	10	6.0	6.0	5.0	5.0	-
9086193	Kenedy	100	10	6.0	6.0	5.0	5.0	-
9086191	Kenedy	100	25	4.0	4.0	4.0	5.0	-
9089241	Brooks	100	25	4.0	4.0	4.0	5.0	-
9086192	Kenedy	64	20	5.0	5.0	5.0	7.0	-

*Ocular estimate (1= Best)

Table 3. Study STPMC-P-0359- RA Switchgrass Initial Field Evaluation April 2006

Rio Grande Plain Ecoregion (clay soil)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086194	Kenedy	98	10	6.0	6.0	5.0	5.0	-
9090293	Goliad	96	15	5.0	5.0	5.0	5.0	-
9089243	Wilson	100	20	5.0	5.0	5.0	7.0	-
9089251	Wilson	100	25	4.0	4.0	5.0	5.0	-
9086191	Kenedy	100	25	4.0	3.0	5.0	5.0	-
9089241	Brooks	100	20	6.0	6.0	5.0	5.0	-
9093168	Bexar	100	20	5.0	5.0	5.0	5.0	-
9089249	Wilson	96	15	5.0	5.0	5.0	5.0	-
9086193	Kenedy	-	-	-	-	-	-	-
9090383	La Salle	-	-	-	-	-	-	-
9086192	Kenedy	-	-	-	-	-	-	-

*Ocular estimate (1= Best)

Table 4. Study STPMC-P-0359- RA Switchgrass Greenhouse Germination 2006

Accession Number	Origin (County)	Ecoregion	15 Days %	30 Days %	45 Days %
9086191*	Kenedy	Sand	0.8	1.0	1.2
9086192*	Kenedy	Sand	1.4	1.6	1.6
9093314	Aransas	Gulf	3.0	3.0	3.0
9093341	Harris	Gulf	0	0	0

* Replant accession

Study Number: STPMC-P-0564- RA

Study Title: Assembly and Evaluation of Crinkleawn (*Trachypogon secundus*)

Introduction: Crinkleawn (*Trachypogon secundus*) is a native, perennial grass that occurs in dense tufts or bunches (Gould, 1975). It grows 60-120 centimeters tall (Gould, 1975). The inflorescence blooms mostly from September to November, and consists of a spikelike raceme 10-18 cm long (Gould, 1975). The lemma awn is 4-6 cm long, loosely twisted, and hairy (Gould, 1975). The common name crinkleawn refers to these awns (Hatch, Schuster, and Drawe, 1999). Crinkleawn is good livestock forage and wildlife cover, but it decreases under livestock grazing (Hatch, Schuster, and Drawe, 1999). Crinkleawn is found mostly in loose, sandy soils in the Gulf Prairies and Marshes, South Texas Plains, and the Trans-Pecos, Mountains and Basins regions of Texas (Gould, 1975). Its range extends from Southern Texas, New Mexico and Arizona, south through Mexico and also into Argentina (Gould, 1975).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of crinkleawn. Crinkleawn collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Fourteen accessions of crinkleawn were seeded in the greenhouse by South Texas Natives (STN) in August of 2004. The germination was 0% for seven accessions and <20% for the rest. Thirteen accessions have been under evaluation at Rio Farms for 2 years. Mean germ of 2005 harvest was 16.85 %, significantly higher than the 5.33 % observed in the original seed collections. To date, accessions 9090264- Goliad, 9090338-Victoria, 9090449-Jim Hogg, and 9091796-Jim Hogg have shown the best performance in the field evaluation and in terms of active seed germination. Of these accession 9091796 has shown the best overall performance. Seed harvested from the plots in 2006 will be germination tested in 2007. In 2007, 3-4 accessions will be selected for seed increase and advanced evaluation.

One accession of crinkleawn is also being evaluated for use as in golf course roughs by Bladerunner Farms. This accession was selected because of its adaptation to very sandy soils, dense foliage, and blue green color.

Table 1. Study STPMC-P-0564- RA Crinkleawn STN Initial Field Evaluation 2005

Rio Farms

Accession Number	Source (County)	Survival %	Plant Vigor*	Foliage Density*	Uniformity *	Seed Production*	Forage Production*	Plant Height*	Harvest Germ. %
9089236	Brooks	54	2.5	2.7	2.7	3.0	2.6	2.5	13.33
9086258	Kenedy	44	2.0	2.6	2.4	6.0	2.6	2.2	9.33
9089227	Brooks	56	2.4	2.7	3.0	3.0	2.5	2.4	16.00
9090264	Goliad	82	2.1	2.2	2.1	1.5	2.1	2.1	14.67
9090285	Victoria	90	3.0	2.7	2.7	2.0	3.4	3.0	9.56
9090296	Goliad	87	2.5	2.6	2.7	3.0	2.9	2.6	12.00
9090302	Goliad	95	2.5	2.2	2.7	3.0	2.6	2.4	6.67
9090338	Victoria	100	2.4	2.5	2.2	1.5	2.5	2.5	22.00
9090449	Jim Hogg	91	1.8	2.4	2.5	1.5	2.0	1.8	22.67
9090452	Jim Hogg	93	2.0	2.7	2.6	1.5	2.0	2.0	18.00
9090453	Jim Hogg	36	2.3	3.1	2.7	2.5	2.7	2.5	32.00
9091796	Jim Hogg	96	1.2	2.2	2.0	2.0	1.2	1.4	26.00
9093254	Kenedy	-	-	-	-	-	-	-	-
Mean	**-**	**77**	**2.2**	**2.6**	**2.5**	**2.5**	**2.4**	**2.3**	**16.85**

*Ocular estimate (1-9, 1= best)

Table 2. Study STPMC-P-0564- RA Crinkleawn STN Initial Field Evaluation 2006

Rio Farms

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Uniformity *	Seed Production*	Forage Production*	Plant Height*
9089236	Brooks	62	2.7	1.7	2.1	1.5	2.8	2.6
9086258	Kenedy	40	3.0	2.6	1.6	4.0	3.2	3.0
9089227	Brooks	70	1.9	1.5	1.5	2.5	1.9	2.0
9090264	Goliad	86	2.3	1.6	1.8	3.0	2.4	2.4
9090285	Victoria	97	2.6	1.9	1.6	1.5	2.7	2.5
9090296	Goliad	88	2.5	1.7	2.1	3.0	2.5	2.5
9090302	Goliad	98	2.9	2.1	2.5	2.5	2.7	2.5
9090338	Victoria	96	2.5	2.0	1.6	2.5	2.6	2.6
9090449	Jim Hogg	96	2.2	1.9	2.0	3.0	2.2	2.2
9090452	Jim Hogg	92	2.0	1.7	2.0	1.5	2.1	2.0
9090453	Jim Hogg	38	1.9	1.9	1.4	1.5	2.0	1.8
9091796	Jim Hogg	100	1.4	1.6	1.6	1.0	1.4	1.4
9093254	Kenedy	40	5.5	5.0	5.5	-	5.5	5.5
Mean	**-**	**77.2**	**2.6**	**2.1**	**2.1**	**2.3**	**2.6**	**2.5**

*Ocular estimate (1-9, 1= best)

Study Number: STPMC-P-0565- RA

Study Title: Assembly and Evaluation of Slim Tridens (*Tridens muticus*)

Introduction: Slim tridens (*Tridens muticus*) is a native, perennial grass that occurs in tufts (Gould, 1975). It grows 20-80 centimeters tall (Gould, 1975). The inflorescence blooms mostly from August to November, and consists of elongated and narrow panicles (Gould, 1975). Slim tridens is fair forage and its seeds are eaten by birds and rodents (Hatch, Schuster, and Drawe, 1999). Slim tridens is found mostly on dry, open slopes in sandy or clayey soils in the South Texas Plains, Edwards Plateau, Trans Pecos, and southern portions of the Gulf Prairies and Marshes. It is also occasionally found in the Post Oak Savannah, Blackland Prairies, Cross Timbers and Prairies, Rolling Plains, and High Plains portions of Texas (Gould, 1975). Its range extends from Texas to southern Utah, Nevada and California, and south into Mexico (Gould, 1975).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of slim tridens. Slim tridens collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: South Texas Natives (STN) has had 58 accessions under evaluation for 2 years at TAES-Uvalde and Rancho Blanco in Larado, Texas. They have found that the collections include both slim tridens (*Tridens muticus* var. *muticus*) and rough tridens (*Tridens muticus* var. *elongatus*). Mean active seed germ of seed collected in 2005 was 77.99% from Uvalde, and 78.52% from Rancho Blanco. Several accessions have shown active seed germination greater than 90%. No seed was collected in 2006 from the evaluation locations because of severe drought conditions.

The tridens species seem to be very susceptible to infestations of bermudagrass, making production difficult. Competition with common weed species is also very poor. These species also appear to be poorly adapted to moderately or poorly drained soils. Collectively, this could make commercial seed production very difficult. Opportunities seem best for choosing producers in the west where rainfall is less and weeds tend not to be as difficult.

Table 1. STPMC-P-0565- RA Tridens 2005 Harvest Germination – Mean % Germination

Accession #	Rancho Blanco	Uvalde ES	Mean % Germ
9090429	65.33	86.67	76.00
9089247	88.67	88.67	88.67
9088967	83.33	89.33	86.33
9089050	56.00	94.00	75.00
9090505	88.00	88.00	88.00
9090479	69.33	84.67	77.00
9088641	85.33	91.33	88.33
9088568	56.00	81.33	68.67
9089064	78.00	80.00	79.00
9090558	70.67	78.00	74.34

Table 1. STPMC-P-0565- RA Tridens 2005 Harvest Germination – Mean % Germination (continued)

Accession #	Rancho Blanco	Uvalde ES	Mean % Germ
9090425	86.00	81.33	83.67
9088572	72.67	77.33	75.00
9090406	83.33	81.33	82.33
9090311	74.67	78.67	76.67
9090415	89.33	88.67	89.00
9089068	78.00	80.00	79.00
9089078	90.00	79.33	84.67
9088756	82.00	86.67	84.33
9090649	na	73.33	73.33
9089185	78.67	85.33	82.00
9089087	76.00	54.67	65.33
9088536	93.33	83.33	88.33
9090456	72.00	72.00	72.00
9088635	54.00	68.67	61.33
9090641	74.67	68.67	71.67
9085316	96.00	92.67	94.33
9089195	69.33	81.33	75.33
9088583	76.00	78.67	77.33
9086303	96.67	78.00	87.34
9090703	79.33	66.67	73.00
9089203	76.67	89.33	83.00
9089046	60.67	75.33	68.00
9090409	85.33	75.33	80.33
9091837	92.00	55.33	73.67
9091806	88.00	82.00	85.00
9093214	81.33	94.00	87.67
9093217	80.00	87.33	83.67
9093219	54.00	65.33	59.67
9093218	55.33	54.00	54.67
9088919	94.67	71.33	83.00
9093216	86.67	78.00	82.34
9093215	69.33	71.33	70.33
9088907	77.33	88.00	82.67
9088917	60.67	55.33	58.00
9088829	88.00	94.00	91.00
9088926	90.67	81.33	86.00
9088901	75.33	70.00	72.67
9088826	80.00	82.67	81.33
9088734	77.33	90.67	84.00
9088750	83.33	78.67	81.00
9091851	63.33	31.33	47.33
9088791	84.00	80.67	82.33
9089002	75.33	82.67	79.00
9091870	64.67	71.33	68.00
ST-326	90.67	90.67	90.67
9090509	92.00	90.67	91.33
9093221	na	66.00	66.00
9093222	na	82.67	82.67
Mean % Germ	**77.99**	**78.52**	**78.15**

* 12 hrs. light 85°F, 12 hrs dark 65°F

Study Number: STPMC-P-0566- RA

Study Title: Assembly and Evaluation of Indian Blanket (Firewheel) (*Gallardia pulchella*)

Introduction: Indian blanket (*Gallardia pulchella*) is also known as firewheel. It is an annual or weak perennial member of the Asteraceae family (Lehman, O'Brien, and White, 2005). It is often found in sandy areas and is common throughout the state, with its range extending from Nebraska, Colorado, and Arizona, rarely east into Arkansas, and south into Mexico (Correll and Johnston, 1996). It grows to 60 cm. tall, with aromatic leaves 2-8 cm. long (Lehman, O'Brien, and White, 2005). Ray flowers vary from red to red tipped with yellow to solid yellow and bloom from February to December (Lehman, O'Brien, and White, 2005). White-tailed deer eat the leaves of this species (Everitt, Drawe, and Lonard, 1999).

Problem: There is a need for native, adapted seed of forbs and legumes available at a reasonable price for restoration and reclamation of wildlife habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of Indian blanket. Indian blanket collections will be evaluated for adaptation in two South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Twenty-four accessions of Indian blanket were seeded in the greenhouse in December 2004. All twenty-four accessions were transplanted into two field plots in the spring of 2005. The plot in Block G was used to observe the accessions on a clay soil. The plot at the Annex was used to observe the accessions on a sandier soil. These plots were evaluated in 2005 for survival, foliage density, plant vigor, seed production, and other desirable agronomic characteristics that would make it a desirable range plant for South Texas.

The growth form of the plants fell into five groupings. Nineteen of the twenty-four accessions were *Gaillardia pulchella* (indicated with "r" on charts). Eight of these accession had a taller and more upright growth form (indicated with "-tall" on charts). These accessions also produced most of their seed earlier in the season and had a shorter lifespan. Seven of the accessions had a shorter, mounded growth form (indicated with "-short" on charts). These accessions lived longer and produced seed throughout the summer. Two accessions seemed to be an intermediate of these two forms (indicated with "-mix" on charts). One *Gaillardia pulchella* accession (9093225) had thicker, green-blue leaves, more yellow to the tips of the ray flowers, lived longer, produced more seed and bloomed constantly for the entire year on the clay soil. This accession will be pursued separately as a potential cultivar release. A small seed increase plot was started in 2006 and will be expanded in 2007.

Six of the accessions were actually *Gaillardia aestivalis* (indicated with "y" on charts). These are smaller plants, produce less flowers, and considerably less seed. They also release their seed more easily and so seed shatter is a problem with this species. Overall they had less volunteer seedlings the following spring. One accession (9086242) of the six had a spreading form and may have potential as a native groundcover.

Seed was collected throughout the summer of 2005 and was germination tested in the spring of 2006 (Table 1). The field evaluations and seed germination results will be compared to select accessions for three potential releases in 2009.

A new accession from Galveston County was collected in 2006 that looked very similar to the top performing accession in 2005 (9093225). This accession was seeded in the greenhouse in December of 2006 and had a 19% germination rate. It will be planted in the field in the spring of 2007.

Off-Site Evaluations: In 2006, Indian blanket plants of accession 9093225 were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas.

At Bentsen State Park only one of the three plants sent survived. It did not have great performance, but was still blooming in November. Only one of the three plants sent to TAES Dallas survived and was judged to not perform as well as commercial selections already in the garden.

Table 1. Study STPMC-P-0566- RA Indian Blanket 2005 Harvest Germination

ANNEX (sandy soil)

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9091934	Live Oak	r-short	5-18-05	166.0	0.7	1.3	1.3
9090492	Frio	r-tall	5-18-05	312.1	2.7	4.7	5.3
9091905	Dimmit	r-short	5-18-05	74.9	6.7	6.7	6.7
9086286	Atascosa	r-tall	5-18-05	165.0	4.7	6.7	8.7
9088663	Karnes	r-tall	5-18-05	247.8	11.3	14.0	18.0
9088589	Bee	r-tall	5-18-05	189.0	5.3	6.7	6.7
9088768	Jim Hogg	r-short	5-18-05	275.3	14.0	15.3	16.0
9086298	Duval	r-short	5-18-05	271.3	4.0	4.0	4.0
9088519	Jim Hogg	r-short	5-18-05	175.0	6.0	8.7	8.7
9086309	McMullen	r-tall	5-18-05	167.0	4.0	7.3	9.3
9088748	Jim Hogg	r-short	5-18-05	285.6	3.3	4.0	4.0
9089104	Goliad	y-reg	5-18-05	20.4	12.0	24.0	38.7
9091910	Duval	r-half	5-18-05	336.6	2.7	2.7	2.7
9091903	Duval	r-short	5-18-05	300.6	6.0	6.7	7.3
9090539	Duval	r-half	5-18-05	252.6	0.7	2.0	3.3
9090458	Jim Hogg	y-reg	5-18-05	15.7	3.3	10.0	17.3
9089106	Goliad	y-reg	5-18-05	22.9	26.7	31.3	39.3
9090494	Frio	r-tall	5-18-05	64.2	14.0	18.7	20.0
9086242	Kenedy	y-spread	5-18-05	10.4	18.7	38.0	49.3
9091918	Jim Hogg	y-reg	5-18-05	10.6	5.3	6.7	8.0
9086284	Live Oak	r-tall	5-18-05	108.4	7.3	9.3	9.3
9093225	Cameron	r-thick	5-18-05	41.9	3.3	12.0	18.7
9089107	Goliad	y-reg	5-18-05	14.3	12.0	12.0	12.0
9088533	Frio	r-tall	5-18-05	0.4	0	44.0	56.0

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9091934	Live Oak	r-short	6-16-05	31.7	0.7	0.7	0.7
9090492	Frio	r-tall	6-16-05	5.9	0.7	2.0	2.0
9091905	Dimmit	r-short	6-16-05	82.1	5.3	6.7	6.7
9086286	Atascosa	r-tall	6-16-05	39.8	7.3	10.7	11.3
9088663	Karnes	r-tall	6-16-05	38.2	4.0	7.3	8.0
9088589	Bee	r-tall	6-16-05	97.7	6.0	9.3	10.0
9088768	Jim Hogg	r-short	6-16-05	177.3	4.7	4.7	4.7
9086298	Duval	r-short	6-16-05	163.1	5.3	5.3	6.7
9088519	Jim Hogg	r-short	6-16-05	150.1	0.7	0.7	0.7
9086309	McMullen	r-tall	6-16-05	31.7	10.7	12.0	12.0
9088748	Jim Hogg	r-short	6-16-05	100.7	0.7	1.3	2.0
9089104	Goliad	y-reg	6-16-05	24.9	1.3	4.7	6.0
9091910	Duval	r-half	6-16-05	45.9	0.7	1.3	1.3
9091903	Duval	r-short	6-16-05	19.8	6.0	7.3	7.3
9090539	Duval	r-half	6-16-05	107.4	4.0	4.0	4.7
9090458	Jim Hogg	y-reg	6-16-05	6.2	2.7	10.0	6.7
9089106	Goliad	y-reg	6-16-05	11.5	5.3	6.7	9.3
9090494	Frio	r-tall	6-16-05	5.1	6.7	10.7	12.0
9086242	Kenedy	y-spread	6-16-05	13.8	12.7	23.3	26.7
9091918	Jim Hogg	y-reg	6-16-05	9.9	4.7	10.7	11.3
9086284	Live Oak	r-tall	6-16-05	9.2	6.0	8.7	10.7
9093225	Cameron	r-thick	6-16-05	147.6	5.3	12.7	13.3
9089107	Goliad	y-reg	6-16-05	12.1	5.3	8.0	10.7
9088533	Frio	r-tall	6-16-05	25.9	17.3	20.7	21.3

Table 1. Study STPMC-P-0566- RA Indian Blanket 2005 Harvest Germination (continued)

ANNEX (sandy soil)

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9091934	Live Oak	r-short	7-27-05	6.6	4.0	5.3	6.0
9090492	Frio	r-tall	7-27-05	-	-	-	-
9091905	Dimmit	r-short	7-27-05	23.9	6.7	7.3	7.3
9086286	Atascosa	r-tall	7-27-05	-	-	-	-
9088663	Karnes	r-tall	7-27-05	2.3	0.7	0.7	0.7
9088589	Bee	r-tall	7-27-05	-	-	-	-
9088768	Jim Hogg	r-short	7-27-05	50.9	0.7	2.0	2.0
9086298	Duval	r-short	7-27-05	51.6	0	1.3	1.3
9088519	Jim Hogg	r-short	7-27-05	40.1	1.3	2.0	2.0
9086309	McMullen	r-tall	7-27-05	-	-	-	-
9088748	Jim Hogg	r-short	7-27-05	53.9	0	0	0
9089104	Goliad	y-reg	7-27-05	6.3	17.3	30.7	35.3
9091910	Duval	r-half	7-27-05	6.3	1.3	3.3	3.3
9091903	Duval	r-short	7-27-05	-	-	-	-
9090539	Duval	r-half	7-27-05	2.8	2.7	5.3	5.3
9090458	Jim Hogg	y-reg	7-27-05	2.9	11.3	18.0	20.7
9089106	Goliad	y-reg	7-27-05	2.3	1.3	9.3	12.7
9090494	Frio	r-tall	7-27-05	-	-	-	-
9086242	Kenedy	y-spread	7-27-05	3.7	18.0	22.7	25.3
9091918	Jim Hogg	y-reg	7-27-05	3.5	6.0	12.0	14.0
9086284	Live Oak	r-tall	7-27-05	1.4	1.3	6.0	8.0
9093225	Cameron	r-thick	7-27-05	154.5	5.3	11.3	12.7
9089107	Goliad	y-reg	7-27-05	1.5	2.0	2.0	2.0
9088533	Frio	r-tall	7-27-05	-	-	-	-

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9086242	Kenedy	y-spread	10-7-05	0.8	15.3	17.3	22.7
9093225	Cameron	r-thick	10-7-05	118.6	14.7	16.7	17.3
9089107	Goliad	y-reg	10-7-05	0.4	12.0	14.0	15.3

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9086242	Kenedy	y-spread	10-21-05	0.7	12.8	14.9	14.9
9091918	Jim Hogg	y-reg	10-21-05	1.5	3.3	5.3	5.3
9093225	Cameron	r-thick	10-21-05	23.9	21.3	24.0	24.0
9089107	Goliad	y-reg	10-21-05	0.2	9.3	9.3	9.3

*Missing accessions did not have a seed harvest on that date.

Table 1. Study STPMC-P-0566- RA Indian Blanket 2005 Harvest Germination (continued)

PMC (clay soil)

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9091934	Live Oak	r-short	5-18-05	201.0	0	0.7	0.7
9090492	Frio	r-tall	5-18-05	208.0	0.7	2.0	2.0
9091905	Dimmit	r-short	5-18-05	87.0	0	0	0
9086286	Atascosa	r-tall	5-18-05	258.4	0.7	2.0	4.7
9088663	Karnes	r-tall	5-18-05	192.0	0.7	2.7	6.0
9088589	Bee	r-tall	5-18-05	110.0	0	2.0	3.3
9088768	Jim Hogg	r-short	5-18-05	164.0	0.7	0.7	0.7
9086298	Duval	r-short	5-18-05	199.0	0.7	1.3	1.3
9088519	Jim Hogg	r-short	5-18-05	101.0	0.7	2.0	2.0
9086309	McMullen	r-tall	5-18-05	242.0	5.3	10.0	12.0
9088748	Jim Hogg	r-short	5-18-05	160.0	1.3	1.3	1.3
9089104	Goliad	y-reg	5-18-05	9.2	6.7	9.3	21.3
9091910	Duval	r-half	5-18-05	229.6	1.3	1.3	2.0
9091903	Duval	r-short	5-18-05	122.3	4.0	4.0	4.0
9090539	Duval	r-half	5-18-05	197.0	0.7	2.0	2.7
9090458	Jim Hogg	y-reg	5-18-05	16.5	5.3	8.0	12.7
9089106	Goliad	y-reg	5-18-05	18.9	6.0	8.0	15.3
9090494	Frio	r-tall	5-18-05	66.0	1.3	4.0	4.7
9086242	Kenedy	y-spread	5-18-05	9.1	17.3	28.0	36.0
9091918	Jim Hogg	y-reg	5-18-05	14.8	4.0	6.7	6.7
9086284	Live Oak	r-tall	5-18-05	230.0	7.3	9.3	11.3
9093225	Cameron	r-thick	5-18-05	20.8	0.7	1.3	3.3
9089107	Goliad	y-reg	5-18-05	8.0	2.0	2.7	4.0
9088533	Frio	r-tall	5-18-05	31.3	0	0	0.7

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9091934	Live Oak	r-short	6/15/05	71.3	0	0	0
9090492	Frio	r-tall	6/15/05	204.0	6.7	8.0	8.7
9091905	Dimmit	r-short	6/15/05	227.0	3.3	4.0	4.7
9086286	Atascosa	r-tall	6/15/05	330.0	8.7	15.3	16.7
9088663	Karnes	r-tall	6/15/05	366.0	3.3	9.3	12.7
9088589	Bee	r-tall	6/15/05	286.0	14.0	17.3	18.7
9088768	Jim Hogg	r-short	6/15/05	383.0	1.3	2.7	2.7
9086298	Duval	r-short	6/15/05	464.0	2.0	2.7	3.3
9088519	Jim Hogg	r-short	6/15/05	296.0	8.0	9.3	9.3
9086309	McMullen	r-tall	6/15/05	193.0	6.7	6.7	7.3
9088748	Jim Hogg	r-short	6/15/05	230.0	2.7	2.7	3.3
9089104	Goliad	y-reg	6/15/05	15.4	5.3	11.3	18.0
9091910	Duval	r-half	6/15/05	124.6	6.7	8.7	9.3
9091903	Duval	r-short	6/15/05	285.0	4.7	6.0	6.0
9090539	Duval	r-half	6/15/05	156.5	6.0	8.0	8.7
9090458	Jim Hogg	y-reg	6/15/05	17.1	15.3	24.0	35.3
9089106	Goliad	y-reg	6/15/05	19.9	5.3	16.0	22.7
9090494	Frio	r-tall	6/15/05	202.0	1.3	4.0	4.0
9086242	Kenedy	y-spread	6/15/05	21.9	16.7	22.0	28.7
9091918	Jim Hogg	y-reg	6/15/05	22.4	3.3	6.7	9.3
9086284	Live Oak	r-tall	6/15/05	81.4	28.0	33.3	33.3
9093225	Cameron	r-thick	6/15/05	115.3	2.7	5.3	6.7
9089107	Goliad	y-reg	6/15/05	22.1	6.0	12.0	20.7
9088533	Frio	r-tall	6/15/05	41.7	0.7	0.7	2.0

Table 1. Study STPMC-P-0566- RA Indian Blanket 2005 Harvest Germination (continued)

PMC (clay soil)

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9086286	Atascosa	r-tall	9-14-05	1.2	1.3	1.3	1.3
9088663	Karnes	r-tall	9-14-05	2.3	2.0	2.7	2.7
9088768	Jim Hogg	r-short	9-14-05	44.5	4.7	5.3	5.3
9086298	Duval	r-short	9-14-05	2.0	0.7	2.0	2.0
9088519	Jim Hogg	r-short	9-14-05	27.3	2.0	2.7	2.7
9086309	McMullen	r-tall	9-14-05	8.4	6.7	6.7	6.7
9088748	Jim Hogg	r-short	9-14-05	20.4	4.0	4.7	5.3
9090539	Duval	r-half	9-14-05	0.9	0	1.0	1.0
9093225	Cameron	r-thick	9-14-05	94.0	2.7	4.7	4.7

*Missing accessions did not have a seed harvest on that date.

Study Number: STPMC-P-0567- RA

Study Title: Assembly and Evaluation of Mexican Hat (*Ratibidia columnaris*)

Introduction: Mexican hat (*Ratibidia columnaris*) is also known as prairie coneflower. It is a perennial member of the Asteraceae family (Lehman, O'Brien, and White, 2005). The name *R. columnifera* is sometimes used by authors, but is botanically unrecognized (Correll and Johnston, 1996). It is abundant in open usually calcareous soils over the western two-thirds of the state and absent only in extreme East Texas, with its range including North Dakota, South Dakota, Illinois, Missouri, Arkansas, Minnesota, Nebraska, Kansas, Oklahoma, Texas, Montana, Colorado, Wyoming, New Mexico, and south into Mexico (Correll and Johnston, 1996). It grows to 20-75 cm. tall (Lehman, O'Brien, and White, 2005). Ray flowers vary from red-brown tipped with yellow to solid red-brown or yellow and bloom from April to June and sparingly in the fall (Lehman, O'Brien, and White, 2005). White-tailed deer and cattle eat the leaves of this species and Rio Grande turkeys eat the seeds (Everitt, Drawe, and Lonard, 1999).

Problem: There is a need for native, adapted seed of forbs and legumes available at a reasonable price for restoration and reclamation of wildlife habitat in the South Texas region. .

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of Mexican hat. Mexican hat collections will be evaluated for adaptation in two South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Three accession of Mexican hat were seeded in the greenhouse in February of 2002. These were planted at the Annex in June of 2002. The plot performed well but survival over the winter into 2003 was poor due to root rot. This plot was evaluated and seed was collected in 2002 and 2003. Due to poor survival, the plot was discontinued in February 2004. It was decided that this species would have to be grown as an annual.

Twenty-nine accessions of Mexican hat were seeded in the greenhouse in December 2004. Twenty-four accessions were transplanted into two field plots in the spring of 2005. The plot in Block G was used to observe the accessions on a clay soil. The plot at the Annex was used to observe the accessions on a sandier soil. The plots were evaluated for field performance during 2005. Two main growth forms were observed. One was a taller and more upright form with the flower heads on long stems above the leaves. The other form was shorter and rounder with flower heads just above the leaves. Accession 9090317 contained mixed color types including red, yellow, and a rust orange. It would be a good accession for color selection. Seed was collected from both plots in 2005 and was germination tested in 2007 (Table 1). Volunteer seedlings were not seen in the plot during the evaluation period, but volunteer seedling emergence was observed in March 2006. Accessions varied greatly in the number of original plants survival and the number of seedlings in the plots. There were no apparent insect or disease problems. The field evaluations and seed germination results will be compared to select accessions for three potential releases in 2009.

Table 1. Study STPMC-P-0567- RA Mexican Hat 2005 Harvest Germination

PMC (clay soil)

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9088714	Bee	short	7/5/05	214.3	21	27	35
9088670	Karnes	short	7/5/05	125.0	31	41	46
9089027	Webb	short	7/5/05	207.2	4	13	17
9088701	Bee	short	7/5/05	218.3	23	39	46
9088769	Webb	short	7/5/05	142.3	57	61	63
9088600	Bee	short	7/5/05	166.7	19	24	28
9088700	Duval	short	7/5/05	103.4	30	55	59
9088674	Karnes	short	7/5/05	35.9	17	35	38
9088702	Bee	short	7/5/05	90.1	17	41	43
9091942	Starr	tall	7/5/05	91.8	15	21	22
9091904	Jim Hogg	tall	7/5/05	83.5	20	33	39
9089031	Uvalde	short	7/5/05	59.0	19	33	39
9090317	Hidalgo	short	7/5/05	79.1	39	61	63
9088602	Bee	short	7/5/05	62.5	14	29	34
9090709	Bexar	short	7/5/05	37.3	38	52	57
9088762	Webb	short	7/5/05	233.0	3	15	23
9089134	Uvalde	short	7/5/05	85.2	23	31	33
9091957	Bexar	short	7/5/05	42.0	54	62	63
9086300	Kenedy	tall	7/5/05	12.9	30	57	74
9091907	Jim Hogg	tall	7/5/05	64.6	21	37	43
9088781	Jim Hogg	short	7/5/05	2.9	11	19	21
9086158	Kleberg	tall	7/5/05	37.8	35	54	58
9088523	Kenedy	tall	7/5/05	97.3	30	60	72
9086159	Kenedy	tall	7/5/05	63.5	17	38	58

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9088714	Bee	short	8-26-05	23.9	26	33	36
9088670	Karnes	short	8-26-05	102.7	38	40	40
9089027	Webb	short	8-26-05	57.2	37	46	47
9088701	Bee	short	8-26-05	39.4	49	53	55
9088769	Webb	short	8-26-05	297.3	63	63	63
9088600	Bee	short	8-26-05	69.5	37	47	52
9088700	Duval	short	8-26-05	319.1	65	66	67
9088674	Karnes	short	8-26-05	37.7	49	52	52
9088702	Bee	short	8-26-05	33.7	30	35	37
9091942	Starr	tall	8-26-05	79.7	35	41	41
9091904	Jim Hogg	tall	8-26-05	85.8	53	62	63
9089031	Uvalde	short	8-26-05	359.9	46	47	48
9090317	Hidalgo	short	8-26-05	132.0	65	70	70
9088602	Bee	short	8-26-05	1.3	45	53	55
9090709	Bexar	short	8-26-05	276.8	49	49	49
9088762	Webb	short	8-26-05	20.6	27	29	31
9089134	Uvalde	short	8-26-05	254.1	29	33	34
9091957	Bexar	short	8-26-05	392.5	56	57	57
9086300	Kenedy	tall	8-26-05	19.0	51	54	54
9091907	Jim Hogg	tall	8-26-05	60.5	44	55	57
9088781	Jim Hogg	short	8-26-05	159.1	55	56	57
9086158	Kleberg	tall	8-26-05	51.7	64	83	83
9088523	Kenedy	tall	8-26-05	97.3	71	75	75
9086159	Kenedy	tall	8-26-05	73.5	43	59	68

Table 1. Study STPMC-P-0567- RA Mexican Hat - Initial Field Evaluation 2005 (continued)

Annex (sandy soil)

Accession Number	Origin (County)	Growth Form	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9088714	Bee	short	7/26/05	84.2	35	44	48
9088670	Karnes	short	7/26/05	160.9	34	43	46
9089027	Webb	short	7/26/05	206.0	27	29	29
9088701	Bee	short	7/26/05	77.9	37	39	48
9088769	Webb	short	7/26/05	259.0	23	32	53
9088600	Bee	short	7/26/05	97.2	20	27	47
9088700	Duval	short	7/26/05	196.3	42	54	64
9088674	Karnes	short	7/26/05	175.8	31	44	51
9088702	Bee	short	7/26/05	94.8	28	37	41
9091942	Starr	tall	7/26/05	50.2	32	38	42
9091904	Jim Hogg	tall	7/26/05	111.4	55	57	58
9089031	Uvalde	short	7/26/05	298.0	52	53	55
9090317	Hidalgo	short	7/26/05	127.4	45	50	54
9088602	Bee	short	7/26/05	55.4	11	14	21
9090709	Bexar	short	7/26/05	245.8	31	33	33
9088762	Webb	short	7/26/05	122.5	15	18	19
9089134	Uvalde	short	7/26/05	272.0	19	25	28
9091957	Bexar	short	7/26/05	343.0	43	45	48
9086300	Kenedy	tall	7/26/05	11.1	66	69	70
9091907	Jim Hogg	tall	7/26/05	85.7	39	45	45
9088781	Jim Hogg	short	7/26/05	210.0	23	33	34
9086158	Kleberg	tall	7/26/05	24.4	53	63	65
9088523	Kenedy	tall	7/26/05	69.5	55	68	71
9086159	Kenedy	tall	7/26/05	46.0	40	46	46

Study Number: STPMC-P-0568- RA

Study Title: Assembly and Evaluation of Partridge Pea (*Chaemaecrista fasciculata*)

Introduction: Partridge pea (*Chaemaecrista fasciculate*) is an annual member of the Fabaceae family (Lehman, O'Brien, and White, 2005). It is mainly found in sandy soils of open woods and fields in the eastern and central portions of the state. Its range extends into much of the Eastern United States (Correll and Johnston, 1996). It grows to 20-90 cm. tall, with pinnate leaves (Lehman, O'Brien, and White, 2005). The yellow flowers are solitary or paired and bloom from June to December (Lehman, O'Brien, and White, 2005). The seeds of this species are eaten by bobwhite quail, and white-tailed deer occasionally eat the leaves (Everitt, Drawe, and Lonard, 1999).

Problem: There is a need for native, adapted seed of forbs and legumes available at a reasonable price for restoration and reclamation of wildlife habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of partridge pea. Partridge pea collections will be evaluated for adaptation in the sandy soil region known as the South Texas Sand Plain.

Discussion: Ten accessions of partridge pea were seeded in the greenhouse in December 2004. Five accessions were transplanted into a field plot at the Annex in the spring of 2005. The plot was evaluated for field performance during 2005. Accession 9091774 had a lower survival due to harvester ants. There were no other apparent insect problems. All of the other accessions had similarly good performance. Seed is produced indeterminately on this species and pods open readily when dry, so seed shatter is a problem. Limited seed was collected due to seed shatter after a rainstorm. Seed was germination tested in 2006 (Table 1). Volunteer seedlings were not seen in the plot during the evaluation period, but volunteer seedling emergence was observed in March 2006. None of the original plants survived, but accession 9091921 in particular had numerous seedlings. More collections for this species will be requested by the State Office in 2008 in order to represent a wider geographic area.

Table 1. Study STPMC-P-0568- RA Partridge Pea - 2005 Harvest Germination

ANNEX (sandy soil)

Accession Number	Origin (County)	Harvest Date	Grams Harvested	Scari-fication	7 Days %	14 Days %	28 Days %
9091774	Nueces	6-12-05	-	-	-	-	-
9091931	Kenedy	6-12-05	2	0 sec	2	2	3
				1 sec	93	94	97
9091908	Kenedy	6-12-05	-	-	-	-	-
9091917	Kenedy	6-12-05	1	0 sec	1	2	4
				1 sec	89	97	97
9091921	Kenedy	6-12-05	-	-	-	-	-

*Missing accessions did not have a seed harvest on that date.

ANNEX (sandy soil)

Accession Number	Origin (County)	Harvest Date	Grams Harvested	Scari-fication	7 Days %	14 Days %	28 Days %
9091774	Nueces	12-21-05	1	0 sec	8	14	18
				1 sec	50	62	62
9091931	Kenedy	12-21-05	1	0 sec	24	29	33
				1 sec	74	74	75
9091908	Kenedy	12-21-05	1	0 sec	11	13	20
				1 sec	70	71	74
9091917	Kenedy	12-21-05	1	0 sec	3	10	17
				1 sec	63	64	64
9091921	Kenedy	12-21-05	1	0 sec	13	18	24
				1 sec	68	70	73

Study Number: STPMC-P-0569- RA

Study Title: Assembly and Evaluation of Clammyweed (*Polanisia* spp.)

Introduction: Clammyweed (*Polanisia* spp.) is an annual member of the Capparidaceae family (Lehman, O'Brien, and White, 2005). There are five species native to North America with two of these native to South Texas, *Polanisia dodecandra* and *Polanisia erosa* (Correll and Johnston, 1996). Both are further divided into subspecies. They are found in sandy soils of open woods and fields or in deep sands (Lehman, O'Brien, and White, 2005). *Polanisia dodecandra* grows to 60 cm high and has pink to purple blooms from April to October. *Polanisia erosa* grows to 50 cm high and has yellow flowers blooming from April to November (Lehman, O'Brien, and White, 2005). The name clammyweed refers to the sticky residue left on hands after the plant is handled (Ajilvsgi, 1984). Seeds of this species may be eaten by bobwhite quail.

Problem: There is a need for native, adapted seed of forbs and legumes available at a reasonable price for restoration and reclamation of wildlife habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of clammyweed. Clammyweed collections will be evaluated for adaptation in the sandy soil region known as the South Texas Sand Plain.

Discussion: Six accessions of clammyweed were seeded in the greenhouse in December 2004. All six accessions were transplanted into a field plot at the Annex in the spring of 2005. The PMC plot was evaluated for field performance during 2005. Accession 9090738 was particularly weak, produced no seed, and died during the evaluation period. All of the other accessions had similar, good performance. The entire plot was regularly attacked by leaf eating insects. Seed is produced indeterminately on this species and so seed shatter is a problem. Volunteer seedlings were seen in and outside the plot during the evaluation period, but not the following spring. Seed was collected and was germination tested in 2006 (Table 1). The May harvest had very good germination, but the June-October harvests had particularly low germination.

Offsite Evaluation: The accessions were also planted and evaluated at Rio Farms in 2005 by South Texas Natives (Table 2). Seed was collected and bulked for the year. This was germination tested in January 2006 (Table 3). Most of the germination occurred quickly as 82% germinated on days 2-5 and no seeds germinated after day 15. STN will select accessions and pursue a release of this species for 2008.

In 2006, clammyweed plants were sent along with other species to several locations for evaluation for horticultural use. Plants were sent by South Texas Natives (STN) to the San Antonio Botanic Gardens, the Corpus Christi Botanic Gardens, the World Birding Center at Bentsen State Park, TAES Uvalde, and TAES Dallas. Both Bentsen State Park and TAES Dallas thought the species was attractive but had too short of a blooming period and too short lived to be of horticulture use. Its use would be restricted to wildlife gardens.

Table 1. Study STPMC-P-0569- RA Clammyweed 2005 Harvest Germination

ANNEX (sandy soil)

Accession Number	Origin (County)	Harvest Date	Grams Harvested	3 Days %	14 Days %	28 Days %
9093169	Dimmit	5-4-05	20	39	52	52
9091926	Zapata	5-4-05	46	58	73	73
9089005	Dimmit	5-4-05	35	37	53	54
9089004	Webb	5-4-05	14	31	65	66
9091944	Dimmit	5-4-05	43	47	67	67
9090738	unknown	5-4-05	3	6	13	13

Accession Number	Origin (County)	Harvest Date	Grams Harvested	3 Days %	14 Days %	28 Days %
9093169	Dimmit	6-16-05	19	0	0	0
9091926	Zapata	6-16-05	45	0	0	0.7
9089005	Dimmit	6-16-05	21	0	0	0
9089004	Webb	6-16-05	14	0	0.7	2
9091944	Dimmit	6-16-05	36	0	0	0
9090738	unknown	6-16-05	-	-	-	-

Accession Number	Origin (County)	Harvest Date	Grams Harvested	3 Days %	14 Days %	28 Days %
9093169	Dimmit	7-28-05	30	0	0	0
9091926	Zapata	7-28-05	49	0.7	3	3
9089005	Dimmit	7-28-05	49	0	0	0
9089004	Webb	7-28-05	26	0	0	1.3
9091944	Dimmit	7-28-05	60	0	0	0
9090738	unknown	7-28-05	-	-	-	-

Accession Number	Origin (County)	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9093169	Dimmit	9-28-05	36	0	0.7	0.7
9091926	Zapata	9-28-05	33	0.7	1.3	1.3
9089005	Dimmit	9-28-05	17	0	0.7	0.7
9089004	Webb	9-28-05	4	0	0.7	1.3
9091944	Dimmit	9-28-05	30	0	0.7	0.7
9090738	unknown	9-28-05	-	-	-	-

Accession Number	Origin (County)	Harvest Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9093169	Dimmit	10-21-05	17	0	0	0
9091926	Zapata	10-21-05	10	0	0.7	3
9089005	Dimmit	10-21-05	11	0	1.3	1.3
9089004	Webb	10-21-05	4	0	2	3
9091944	Dimmit	10-21-05	21	0	0.7	0.7
9090738	unknown	10-21-05	-	-	-	-

*Missing accessions did not have a seed harvest on that date.

Table 2. Study STPMC-P-0569- RA Clammyweed STN Initial Field Evaluation 2005

Rio Farms

Accession Number	Source (County)	Survival %	Plant Vigor*	Foliage Density*	Uniformity *	Seed Production*	Forage Production*	Plant Height*
9093169	Dimmit	44	2.8	2.8	4.3	2.7	2.8	2.7
9091926	Zapata	59	2.3	2.3	3.6	3.0	2.1	2.4
9089005	Dimmit	49	3.0	2.8	4.1	2.8	3.1	2.6
9089004	Webb	55	4.2	3.7	4.7	3.0	3.7	3.3
9091944	Dimmit	55	3.4	2.9	3.9	2.5	3.3	3.0
9090738	unknown	83	3.5	5.0	4.0	3.3	4.0	3.5
Mean	-	**57.3**	**3.2**	**3.2**	**4.1**	**2.9**	**3.2**	**2.9**

*Ocular estimate (1-9, 1= best)

Table 3. Study STPMC-P-0569- RA Clammyweed 2005 Harvest Germination –Rio Farms

Accession Number	Origin (County)	% Active Germ
9093169	Dimmit	6.67
9091926	Zapata	23.33
9089005	Dimmit	12.67
9089004	Webb	12.67
9091944	Dimmit	5.33
Average	**-**	**12.13**

*21 days- 12 hrs. light 85°F, 12 hrs dark 65°F

Study Number: STPMC-P-0570- RA

Study Title: Assembly and Evaluation of Plains Lovegrass (*Eragrostis intermedia*)

Introduction: Plains lovegrass (*Eragrostis intermedia*) is a native, perennial grass that occurs in tufts or dense clumps (Gould, 1975). Its culms grow 55-90 centimeters tall (Gould, 1975). The inflorescence blooms mainly from June to November and consists of open panicles 20-40 cm long bearing spikelets (Gould, 1975). It provides good to fair forage and provides bird nesting cover (Hatch, Schuster, and Drawe, 1999). Plains lovegrass is often found on disturbed soil in sand, clay or rocky ground throughout all regions of the State except the Pineywoods, Rolling Plains, and High Plains (Gould, 1975). Its range extends from southern Arizona through southern and eastern Texas, Alabama to southwest Arkansas, and also in the mountainous portions of Mexico and Guatemala (Gould, 1975).

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of plains lovegrass. Plains lovegrass collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Due to poor overwinter survival, all accessions and one additional new accession were seeded in the greenhouse in December of 2005 in order to move the plot to a sandier site. A cultivar of sand lovegrass “Mason” (*Eragrostis trichodes*) was also seeded to compare to the plains lovegrass accessions. Six accession of plains lovegrass and the sand lovegrass were transplanted into an initial evaluation plot in July of 2006. This plot was evaluated for field performance in November of 2006 (Table 1). All of the accessions performed better than the sand lovegrass. One accession (9090664-Maverick Co.) was much greener and denser than the other accessions. It may be a different lovegrass species. Seed was harvested in November and will be germination tested in 2007. No new accessions were received in 2006.

More collections for this species will be requested by the State Office in 2008 in order to represent a wider geographic area. Accessions will be added to the field plots as received.

Table 1. STPMC-P-0570- RA Plains Lovegrass - Initial Field Evaluation 2006

Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Seed Production*
9088814	Duval	92	5.0	5.0	5.0	5.0	4.0
9090565	Frio	100	4.0	4.0	5.0	5.0	5.0
9090593	Atascosa	90	5.0	5.0	5.0	5.0	5.0
9090664	Maverick	100	2.0	2.0	2.0	5.0	5.0
9091765**	Kleberg	100	5.0	5.0	5.0	5.0	4.0
9091868	Hidalgo	100	4.0	4.0	5.0	5.0	4.0
“Mason”	sand lovegrass	78	6.0	5.0	6.0	5.0	6.0

*Ocular estimate (1 = Best)

** From a Gulf Coast county, but planted for observation and comparison.

Study Number: STPMC-P-0571- RA

Study Title: Assembly and Evaluation of Gayfeather (*Liatris* spp.)

Introduction: Gayfeather (*Liatris* spp.) is a perennial member of the Asteraceae family (Lehman, O'Brien, and White, 2005). There are forty species confined to North America with twelve of these native to Texas and seven native to South Texas (Correll and Johnston, 1996). The plants form corms underground (Correll and Johnston, 1996). The flowers are usually purple and rarely white, with ray flowers absent and disk flowers numerous (Correll and Johnston, 1996). They can be found on sand, clay, caliche, or loam soils depending on the species (Correll and Johnston, 1996 & Lehman, O'Brien, and White, 2005). White-tailed deer eat the leaves of this species (Everitt, Drawe, and Lonard, 1999). The fall transplanted corms of gayfeathers do well under cultivation (Ajilvsgi, 1984). Corms have also been used to treat sore throat and rattlesnake bites resulting in another common name, button-snakeroot (Ajilvsgi, 1984).

Problem: There is a need for native, adapted seed of forbs and legumes available at a reasonable price for restoration and reclamation of wildlife habitat in the South Texas region. .

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of gayfeather. Gayfeather collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: At the end of 2005, there were 5 accessions of gayfeather in Block C to observe the accessions on a clay soil and three accessions in a plot at the Annex to observe the accessions on a sandier soil. Both plots were evaluated for field performance in April of 2006 and the clay plot was evaluated again in November (Table 1). For the third year, accession 9086149-Kleberg Co. outperformed the other accessions. No new accessions were added in 2006.

Two replant accessions and six new accessions were seeded in the greenhouse in December of 2006 (Table 2). Germination was poor. One accession had enough seedlings to add to the evaluation plots in 2007.

More collections for this species will be requested by the State Office in 2008 in order to represent a wider geographic area. New accessions will be added to the plots as received.

Table 1. Study STPMC-P-0571- RA Gayfeather Initial Field Evaluation 2006

ANNEX (sandy soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Seed Production*
9086149	Kleberg	24	25	5.0	5.0	5.0	5.0	-
9086222	Galveston	20	20	5.0	5.0	5.0	5.0	-
9089162	Montgomery	0	0	-	-	-	-	-

*Ocular estimate (1 = Best)

PMC (clay soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity*	Seed Production*
9086222	Galveston	20	50	7.0	7.0	7.0	5.0	6.0
9089101	Brazoria	0	0	-	-	-	-	-
9086149	Kleberg	69	100	4.0	3.5	4.0	5.0	3.0
9089162	Montgomery	50	100	5.5	5.5	5.5	5.0	5.0
9090733	Brazoria	36	100	6.5	6.0	6.5	5.0	6.0

*Ocular estimate (1 = Best)

Table 2. Study STPMC-P-0571- RA Gayfeather Greenhouse Germination Winter 2006

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9090733*	Brazoria	0	0	0	0
9089162*	Montgomery	0	0	0	0
9093275	Calhoun	0	0	0	0
9093298	Ft. Bend	0	0	0	0
9093303	San Patricio	0.1	0.2	0.2	0.3
9093311	Aransas	0	0	0	0.5
9093312	Aransas	0.5	1	2	2.5
9093340	Harris	2.6	4.6	5.6	5.6

*Replant accession

** Decrease in germination due to death loss.

Study Number: STPMC- P-0672-RAWL

Study Title: Assembly and Evaluation of Southwestern Bristlegrass (*Setaria scheelei*)

Introduction: Southwestern bristlegrass [Setaria scheelei (Steud.) A.S. Hitchc.] is a warm-season, perennial bunch grass that is native from Texas and Arizona, south to Northern Mexico (Gould, 1975). In Texas, southwestern bristlegrass is found in the South Texas Plains, Edwards Plateau, Rolling Hills, High Plains, Trans Pecos, and the southern portions of the Blackland Prairies and Gulf Prairies and Marshes regions (Gould, 1975). It is a coarse grass with tall, spreading culms growing to 125 cm (Gould, 1975 & Hatch, Schuster, and Drawe, 1999). It is a shade tolerant species and is often abundant in shaded canyons and open woodlands (Gould, 1975). It is a good forage species and produces a large seed useful to wildlife (Hatch, Schuster, and Drawe, 1999). The objective of this study is to seek out accessions of southwestern bristlegrasss with good germination for further evaluation as a warm-season forage for south Texas. Other factors will be compared, such as plant hardiness, forage production, seed production, and other characteristics that would make southwestern bristlegrass desirable to include in south Texas range and wildlife mixes. Future studies will examine southwestern bristlegrass's ability to compete with shade tolerant exotic species.

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of southwestern bristlegrass. Southwestern bristlegrass collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Two accessions (9088950-Atascosa Co. & 9089155-Medina) were brought in as southwestern bristlegrass and planted in an IEP plot at the PMC in 2003. Two other accessions of southwestern bristlegrass were found in the IEP of plains bristlegrass (9088959-Atascosa & 9089059-LaSalle Co.) Harvest germination from 2003 was initially low (0-4%). Seed from all four accessions were then screened for filled seed with a South Dakota seed blower. Germination was greatly improved in accession 9088950 (45%). Poor fill (15 seeds) but better germination (20%) was seen in accession 9088950. While the other two accessions continued to exhibit poor germination (3-4%).

A seed increase plot of accession 9088950 was established from original seed in August of 2006. Seed was not harvested in 2006. No new accessions of southwestern bristlegrass have been received.

Advanced Evaluation Projects

Study Number: 77IO11HPJ

Study Title: Assembly and Evaluation of Bristlegrass (*Setaria* spp.)

Introduction: Plains bristlegrass is a warm-season, perennial bunch grass that is native from South Texas to New Mexico, Colorado and Arizona, and down into central Mexico (Gould, 1975; Hitchcock, 1971). Its current scientific name is *Setaria vulpiseta* although in the past *Setaria leucopila* and *Setaria texana* have been included under this common name (Correl & Johnston, 1996; Gould, 1975). Plains bristlegrass is found on open dry ground and in dry woods (Hitchcock, 1971) and "on well drained soils along gullies, stream courses, and other areas occasionally with abundant moisture" (Gould, 1975, p.557). It provides moderate to high quality forage for all types of grazing livestock (Gay, Dwyer, Allison, Hatch, and Schickendanz, 1980), and makes up "an appreciable part of the forage on southwestern ranges" (Hitchcock, 1971, p.718).

Other species in this genus also occur in SouthTexas including *Setaria leucopila, S. texana, S. firmula, S. ramesetii, S. reverchonii,* and *S. scheelei.* These species show promise as plants for multiple uses, although our main emphasis is on range restoration and wildlife uses. The objective of this study is to seek out accessions of any species of bristlegrass with good germination for further evaluation as a warm-season grass for south Texas. Future studies will examine factors such as plant hardiness, forage production, seed production, and other characteristics that would make bristlegrass desirable to include in south Texas range and wildlife mixes.

Problem: There is a need for native, adapted seed available at a reasonable price for the restoration and reclamation of habitat in the South Texas Region.

Objective: The objective is to assemble, evaluate, select and release, and/or provide information on the propagation of bristlegrass. Bristlegrass collections will be evaluated for adaptation in two South Texas Ecoregions, the sandy soil region known as the South Texas Sand Plain and the broad mixed soil region known as the Rio Grande Plain.

Discussion: In 2006, four accessions (9038820-Willacy Co., 9029677-Karnes Co., 9038819-Bexar Co., and 9029648-Webb Co.) were released. Each accession was released separately (Kika820, Kika677, Kika819, and Kika648) and will be sold as a mechanical blend under the name Catarina Germplasm bristlegrass. Catarina bristlegrass is a native perennial bunch grass growing 2 to 4 feet tall. It is a blend of four bristlegrass, three from clay soils and one from a sandy soil. It is recommended for upland wildlife plantings and in range seeding mixes. It produces desirable seed for upland game birds, provides good forage for domestic livestock, and cover for wildlife. It has excellent seed germination and good 3-day germination. The individual plants are long-lived. The plants produce multiple harvests of seed from May through November. Catarina bristlegrass is a cooperative release by *South Texas Natives,* TAES, and the E. "Kika" de la Garza Plant Materials Center.

Seed Increase Plots: Seed increase plots of accessions 9038820-Willacy Co., 9038715-Duval Co., 9029677-Karnes Co., 9038819-Bexar Co., and 9029648-Webb Co. were established at TAES Beeville in May of 2005. Seed was collected from these plots in 2005 and sent to MidWest Seed Service for testing. Active germination percentages were low, but it is hoped that this number will increase as the seed after-ripens. Seed was collected from these plots in 2006 and will be germination tested in 2007.

Small seed increase plots were established at the PMC in 2006 using the 2005 harvest from the Beeville plots. No harvest was made from these plots in 2006 due to late planting and dry conditions. These plots will be expanded in 2008.

AEP Plantings: A seed emergence AEP plot was planned for 2006 consisting of the 4 released accessions and the common bristlegrass seed available from Douglas King Seed Co. Due to dry conditions at the PMC, it was postponed until spring of 2007. STN planted their plot at TAES Uvalde in April of 2006. The plot was evaluated on July and September, but no seedlings were observed from any of the accessions. Approximately 5" of rain was received at the site from the planting date till the second evaluation.

Study Number: 77I049H

Study Title: Assembly and Evaluation of Brownseed Paspalum (*Paspalum plicatulum*)

Introduction: Brownseed paspalum (*Paspalum plicatulum*) is a native, warm-season, slightly rhizomatous perennial bunchgrass. It is native to Georgia, Florida, and Texas, south to Argentina, and in the West Indies (Hitchcock, 1971). In Texas, it is common in east and southeast Texas, and in the coastal part of the Rio Grande Plain. It is occasionally found west to North Central Texas, and the northern Rio Grande Plain (Correll & Johnston, 1996). It prefers sandy to sandy loam soils (Gould, 1975), and can be found in open woods and on prairies (Correll and Johnston, 1996). *Paspalum texanu*m, previously recognized as its own species is now included under *Paspalum plicatulum* (Gould, 1975). Gould (1975) notes that although there are some differences between the two, the morphological variability and wide range of adaptability of *Paspalum plicatulum* could easily account for the character differences. Therefore, he does not recognize *Paspalum texanum* as a separate taxon. Hitchcock (1971) includes the Brazilian native, *Paspalum nicorae*, under *Paspalum plicatulum* for similar reasons. *Paspalum plicatulum* flowers throughout most of the year (Gould, 1975). Its fruit turns dark brown at maturity (Correll and Johnston, 1996), thereby earning its common name of brownseed paspalum.

Problem: There is a need for native, adapted seed available at a reasonable price for the restoration and reclamation of native habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of brownseed paspalum. Brownseed paspalum collections will be evaluated for adaptation in three South Texas Ecoregions: the sandy soil region known as the South Texas Sand Plain, the region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Five accessions showed good spring green-up and volunteer seedling emergence in the field in Beeville in 2004. These accessions were 9088647-Victoria, 9088651-Victoria, 9088681-Goliad, 9088644-Victoria, 9089219-San Patricio. A tetrazolium chloride (TZ) test, used to check for live but un-germinated seed, revealed that seed fill not seed dormancy was the largest factor in the seemingly low germination numbers. All five of these accessions were selected to move into advanced evaluation in 2005.

Seed Increase Plots: STN planted small seed increase plots at Rio Farms near Monte Alto, Texas in June of 2005. Seed harvested in July of 2005 had less than 5% seed fill across all accessions. STN made a hand harvest of these plots in April of 2006, but again germination was poor (0.7-8%). These plots will be discontinued in 2007.

AEP Plots: The PMC planted an advanced evaluation plot at the King Ranch, Norias Division in June of 2005. This consisted of the 5 accessions chosen from Beeville and a collection of Brownseed that the King Ranch brought in that they had been working with. This plot was evaluated for field performance in 2005. The King Ranch collection had the best performance. Accessions 9088644-Victoria and 9088681-Goliad also had good performance. Ergot was seen on all the accessions in November 2005. Seed was harvested in September 2005. This seed was germination tested in 2006 (Table 1). The King Ranch had a much higher harvest total. Although it had the lowest germination percentage, it still had significantly more PLS than the other accessions.

This plot was evaluated again for field performance in 2006 (Table 2). The King Ranch collection, acessions 9088644-Victoria, and 9088681-Goliad all had good performance. Two attempts were made to harvest seed, in September and October, but all seed had shattered due to rainstorms.

Another AEP was planted at the East Texas PMC in Nacogdoches, Texas in July 2005. The plot was evaluated in November of 2005. They also reported ergot on all accessions, but to a lesser degree on the King Ranch collection. The plot performed well and had no other apparent disease or insect problems. A small sample of seed was collected in December, but this was after most of the harvest had shattered. This seed was germination tested in 2006 (Table 3). The plot was evaluated for field performance again in July of 2006 (Table 4). Accession 9088644-Victoria had the best performance. A small seed harvest was made in May and another in July. These will be germination tested in 2007.

New Accessions: Six new accessions, that were received after the AEP plots were established, were planted at the Norias for initial evaluation in June of 2006. This plot was evaluated for field performance in 2006 (Table 5), but no seed was harvested due to shattering. All accessions performed well. Seed quality will be determined in 2008 with 2007 harvest seed. One new accession (9093343-Harris Co.) was seeded in the greenhouse in December 2006. Its germination was poor (0.8%), but it was reseeded in an effort to get enough plants to add to the plot in the spring of 2007.

Table 1. Study Number: 77I049H Brownseed Paspalum 2005 Norias Harvest Germination – Averages Across All Four Field Reps

	Harvest (grams)	% Germ (adjusted for fill)
King Ranch	140.7g	33
9089219	15.5	57
9088644	15.2	48
9088647	9.0	45
9088681	21.0	39
9088651	8.7	52

*12 hours dark at 20 ^{o}C, 12 hours light at 30 ^{o}C

Table 2. Study Number: 77I049H Brownseed Paspalum Advanced Field Evaluation 2006

Norias Plot (sandy soil)

Accession Number	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*	Seed Shatter*
9089219	40	6.0	6.1	5.7	5.0	-	8.0
9088644	95	3.5	3.5	4.0	5.0	-	8.0
9088647	43	5.8	6.0	5.3	5.0	-	8.0
9088681	88	3.6	3.8	4.3	5.0	-	8.0
9088651	28	5.7	5.8	5.2	5.0	-	8.0
King Ranch	100	3.5	3.5	4.0	5.0	-	8.0

*Ocular estimate (1 = Best & 5 = Average)

Table 3. Study Number: 77I049H Brownseed Paspalum 2005 East TX PMC Harvest Germination – Averages Across All Four Field Reps

	Harvest (grams)	% Germ (adjusted for fill)
King Ranch	2.5	33
9089219	2.9	50
9088644	5.0	88
9088647	3.1	45.3
9088681	4.3	37
9088651	4.1	47.5

*12 hours dark at 20 ^{o}C, 12 hours light at 30 ^{o}C

Table 4. Study Number: 77I049H Brownseed Paspalum Advanced Field Evaluation 2006

East TX PMC (sandy soil)

Accession Number	% Survival	% Seedling Recruitment	Plant Vigor*	Seed Production*
9089219	94	17	5.0	5.0
9088644	94	23	1.5	3.0
9088647	96	60	4.0	5.0
9088681	79	25	4.0	4.5
9088651	92	33	5.0	5.0
King Ranch	not evaluated		-	-

*Ocular estimate (1 = Best & 5 = Average)

Table 5. Study Number: 77I049H Brownseed Paspalum Initial Field Evaluation 2006

Norias Plot (sandy soil)

Accession Number	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*	Seed Shatter*
9089252	100	4.0	4.0	5.0	5.0	-	7.0
9093293	100	5.0	5.0	5.0	5.0	-	7.0
9093294	100	4.5	4.5	5.0	5.0	-	7.0
9090327	100	5.0	4.0	5.5	5.0	-	7.0
9090344	100	4.5	4.5	5.0	5.0	-	7.0
9090268	100	4.5	4.5	5.0	5.0	-	7.0

*Ocular estimate (1 = Best & 5 = Average)

Study Number: 770I52H

Study Title: Assembly and Evaluation of Windmillgrass (*Chloris* spp.)

Introduction: Hooded Windmillgrass (*Chloris cucullata*) is a native, perennial, warm-season grass that is often stoloniferous (Gould, 1975). Also known as 'Hooded Fingergrass', it can be found in prairies on sandy or gravelly soils, and occasionally on clayey soils (Correll and Johnston, 1996). It is native throughout Texas, Oklahoma, and New Mexico (Hitchcock, 1971) and the northeast portion of Mexico (Gould, 1975). In Texas, hooded windmillgrass is most abundant in the Rio Grande Plain, although it can be found throughout most of the state. It is rarest in the western plain, Trans-Pecos region, eastern, and southeastern Texas. Hooded windmillgrass has been known to hybridize with other *Chloris* species, particularly *Chloris verticillata*. Hybridization has been most common in the Rio Grande Plain, and hybrids have been given the names *Chloris latisquamea* or more currently *C. subdolichostachya*. Hitchcock (1971, p.29) provides excellent illustrations that may assist in differentiation of the species. The windmillgrasses provide fair quality forage for livestock, and tend to increase with heavy grazing. The strongly stoloniferous characteristic of shortspike windmillgrasss makes this an extremely desirable plant, especially for roadside plantings.

Problem: There is a need for native, adapted seed available at a reasonable price for restoration and reclamation of habitat in the South Texas region.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of hooded and shortspike windmillgrass. Hooded and shortspike windmillgrass collections will be evaluated for adaptation in two SouthTexas Ecoregions: the sandy soil region known as the South Texas Sand Plain and the broad mixed-soil region known as the Rio Grande Plain.

Discussion:

Seed Increase Plots: Seed increase rows of accessions 313, 260, and 283 were planted by division at the PMC in 2004. A seed increase plot of accession 301 was started in 2005 to use for comparison to accession 313 in advanced evaluations. Seed harvested in 2006 will be tested in 2007.

Seed increase fields of accessions 313 and 260 were also planted at Rio Farms in 2006. The plots got plenty of rain after planting and did well in 2006. Seed was harvested in the fall and will be germination tested in 2007.

Advanced Evaluation Plots: In June and July 2005, Advanced Evaluation Plots of transplants of hooded windmillgrass (accessions 313 and 301) and shortspike windmillgrass (accessions 260 and 283) were planted at the Kingsville, Knox City, and Nacogdoches Texas PMCs. Evaluations were conducted at the Kingsville and Nacogdoches PMCs in November of 2005. Plants performed well at both locations. Seed was harvested at the Kingsville PMC in November of 2005. This seed will be compared to the 2006 harvests.

The Kingsville and Nacogdoches plots were evaluated for field performance in 2006 (Tables 1&2). Seed was harvested from the Kingsville plot and will be germination tested in 2007. A seedling emergence trial is planned for the Norias in the spring of 2007.

STN also planted AEP plots of transplants at Rio Farms and at TAES Uvalde in April of 2006. These were evaluated twice in 2006 (Tables 3&4). Seed was harvested from the Uvlade plot and will be tested in 2007. A seed emergence plot was also planted at Uvalde, but no emergence was observed. The site received only 5 inches of rain from the planting in April till September.

Seed Releases: In 2006, two accessions were released. Accession 9085260 was released under the name Welder Germplasm shortspike windmillgrass. It is a native grass hybrid that is strongly stoloniferous. It will be able to compete with introduced sod-forming grasses. Mature foliage height ranges from 30 to 90 centimeters (1.0 to 3.0 feet) tall. It is recommended for roadside plantings and critical site revegetation. It is from a sandy clay loam soil type in San Patricio Co. Welder Germplasm is drought tolerant and has a very high 3-day germination rate (around 60%) with some dormant seed (20-30%). It produces seed only one time a year at around late September or early October with fairly good seed retention. Welder Germplasm shortspike windmillgrass was a cooperative release by South Texas Natives, TAES, and the E. “Kika” de la Garza Plant Materials Center in 2006.

Accession 9085313 was released under the name Mariah Germplasm hooded windmillgrass. It is a native, perennial bunch grass. Mature foliage height ranges from 0.5 to 2.0 feet tall. This selection is moderately stoloniferous, and is recommended for roadside plantings, critical site revegetation and in range seeding mixes. It is from a loamy fine sand soil type in Kenedy Co. Mariah Germplasm is drought tolerant and has a very high 3-day germination rate (>90%). Hooded windmillgrass will flower multiple times over the growing season, and multiple seed harvests can be produced from May through October. Mariah Germplasm hooded windmillgrass was a cooperative release by South Texas Natives, TAES, and the E. “Kika” de la Garza Plant Materials Center in 2006.

Table 1. Study 77I052H Windmillgrass Advanced Field Evaluation 2006

Kingsville PMC (sandy soil)

Accession Number	% Survival	% Cover (veg. spread)	Plant Vigor*	Seed Production*
313	100	58	2.0	2.4
301	100	40	2.5	2.3
260	100	98	1.6	2.0
283	99	75	2.0	1.0

*Ocular estimate (1 = Best & 5 = Average)

Table 2. Study 77I052H Windmillgrass Advanced Field Evaluation 2006

East TX PMC (sandy soil)

Accession Number	% Survival	% Cover (veg. spread)	Plant Vigor*	Seed Production*
313	100	18	4.0	4.0
301	98	15	4.0	4.5
260	100	38	2.8	3.5
283	100	43	2.8	3.3

*Ocular estimate (1 = Best & 5 = Average)

Table 3. Study 77I052H Windmillgrass Advanced Field Evaluation 2006

Rio Farms (clay soil)

Accession Number	% Survival	% Cover (veg. spread)	Plant Vigor*	Seed Production*
313	91	94	2.0	1.5
301	68	100	1.8	2.5
260	90	93	1.8	4.8
283	93	93	2.0	5.5

*Ocular estimate (1 = Best & 5 = Average)

Table 4. Study 77I052H Windmillgrass Advanced Field Evaluation 2006

TAES Uvalde (sandy soil)

Accession Number	% Survival	% Cover (veg. spread)	Plant Vigor*	Seed Production*
313	88	58	3.5	4.5
301	87	61	4.0	5.0
260	90	68	3.5	7.4
283	80	66	3.5	7.8

*Ocular estimate (1 = Best & 5 = Average)

Study Number: STPMC-P-0126-WE

Study Title: Advanced Evaluation of Gulf Cordgrass (*Spartina spartinae*)

Introduction: Gulf cordgrass (*Spartina spartinae* (Trin.)Merr. Ex A.S. Hitch.) is a robust, perennial grass up to 1.2 meters tall (Stutzenbaker, 1999). Gulf cordgrass is found from Florida to Texas and eastern Mexico (Gould and Box, 1975). It flowers from spring to summer and rarely in the fall (Correll and Johnston, 1979). In Texas, it is frequent to abundant throughout the Gulf Coast on moist saline soils, on elevated ridges, and in intermediate to saline coastal marshes (Stutzenbaker, 1999). This species tends to form extensive, dense bunches which provides suitable nesting habitat for waterfowl (Hatch, Schuster, and Drawe, 1999).

Problem: There are over 3,000 miles of coastal shoreline along the Texas Coastal Prairie. Many of these miles have eroding bluffs that need adapted plant material for stabilization. These bluffs along with coastal wetland berms and dredge spoil islands are all in need of low-cost planting techniques to provide an economical method of vegetatively stabilizing and enhancing these sites.

Most coastal revegetation projects are established with expensive transplants. If a seeded variety of a salt-tolerant grass could be developed, it would provide a low-cost technique for stabilization and enhancement of Texas coastal shorelines. Seeded plants along with turf-reinforcement matting may provide a low-cost and environmentally friendly stabilizing system for miles of eroding shorelines.

Objective: The objective is to assemble, evaluate, select and release and/or provide information on the propagation of gulf cordgrass. Gulf cordgrass collections will be evaluated for adaptation along the Texas Coastal Prairie.

Discussion: In 2004, accessions 201 and 191 were chosen for advanced evaluation. Neither had original seed and had to be divided for seed increase plots. In May of 2005, 9 of the 10 original plants of accession 201 were dug up, divided, and planted out in a seed increase row of 650 plants. A harvest of this plot was made in September of 2006. This seed will be germination tested in 2007. Due to dry conditions in 2006, the seed increase plot of 889 was put off until 2007. Advanced Evaluation plots of these two accessions is planned for 2008.

Technology Development Projects

Study Number: **STPMC-T-0673-CR**

Study Title: Evaluation of construction methods for sand dune establishment

Introduction: The Texas General Land Office (GLO) did a study for Brazoria and Galveston counties that projected erosion into the year 2056. The study predicted that a large stretch of state Highway 87, as well as hundreds of expensive houses will be under water. Along most of the Texas Gulf Coast there is an estimated shoreline erosion of 2 to 10 feet per year. About 5.4 million people live along the Texas Gulf Coast and this area accounted for $6.6 billion of Texas tourism dollars in 2001. And thus, there is a lot of pressure to find economically and environmentally acceptable solutions to this problem.

Problem: There is a need for economical and environmentally sound methods for dune creation and coastal shoreline protection.

Objective: The objective of this study is to evaluate different dune construction methods and plant establishment techniques of adapted South Texas species.

Discussion: In January 2005, the PMC coordinated with The Nature Conservancy (TNC), the South Padre Island Parks Department (SPIPD), and the U.S. Fish and Wildlife Service to form 300 feet of encapsulated soil in order to construct and vegetate a 4 foot high by 40 foot wide sand dune.

The dune was constructed by having a front-end loader and operator provided by SPIPD level out a 300 foot-long area. The PMC along with TNC volunteers placed down 300 feet of biodegradable coir fabric. The fabric was staked down and then folded over batter boards. The batter boards form a temporary framing for the sand used to make the lift layers. Sand was brought in by SPIPD and placed on the fabric to a height of 12 inches and then watered and compacted. Then the extra fabric was pulled back over the sand and secured with 24 inch stakes.

Once a lift was completed, the batter boards were removed and used for the next lift. The outer edge of the next lift was set back 2 feet from the previous lift. A total of 4 lifts were constructed. The distribution of the fabric lift was 3 feet on the bottom, 12 inches on the edge and 3 feet on the top. Additional sand was also needed to form the 3:1 dune backslope.

The dune was planted with PMC supplied plant material. The beach front was planted with 2 rows with alternating spacing of containerized bitter panicum and seaoats, as well as with bare-root bitter panicum and seaoats. Plants were spaced 1 foot apart. Alternating species were planted every foot into the exposed shelf of the soil lifts. The 20 foot area on top of all the soil lifts was planted as 9 staggered rows with the rows 2 feet apart. An alternating sequence of the 2 grass species was planted every 2 feet. The 3:1 back slope was planted as 4 staggered rows with the rows 2 feet apart. An alternating sequence of the 2 species was used at a 2 foot spacing.

The PMC conducted an as-built survey once the dune had been constructed.

Hurricanes Emily and Rita in 2005 destroyed most of this dune. The fortunate aspect of the destruction of the dune is that it allowed the PMC to evaluate some new construction methods. The PMC reconstructed a dune 220 feet long on the same site in 2006. The new dune included the use of coconut fiber bales, coconut fiber blocks with matting, and also “concertainers,“ metal

cages filled with sand and covered with coconut fiber. The dune was also used to compare the success of plant material from a population near Corpus Christi and from a population near the dune. The effect of irrigation and hydrogel techniques on plant survival was also looked at.

The dune was constructed, planted, and watered in March 2006. PVC tubing and hydrogel treatments were installed in April. A second watering was applied in May. The site was evaluated in November of 2006. All of the dune construction methods worked very well. We were especially pleased with the speed and ease in using the “concertainers.” However, only 32 plants survived of the 400 planted. Drought conditions were just too severe for the plants to survive with out irrigation. Even the hydrogel treatments were inadequate to maintain plant survival. From January through May 2005, the site received on only 2.6” of rainfall, and January through August of 2005 the site only received 8.25”. In 2006, the rainfall pattern was even worse with 0.87” received from January through May and only 5.5” from January through August. Because of the unreliability of rainfall that we encountered over the past 2 years in South Texas, we recommend that any additional plantings at this site should have an irrigation system established in order to assure that any dune planting will have adequate water to survive.

Study Number: STPMC-T-0675-OT

Study Title: Fungicide treatments to improve establishment of coastal plantings

Introduction: Smooth cordgrass is a perennial, warm-season marsh grass that grows from 3 to 9 feet in height. It is a native plant in South Texas and is found in other parts of the Gulf of Mexico and Atlantic coastal areas. In Texas, smooth cordgrass is found from the mouth of the Sabine River south along the Texas Gulf Coast to the mouth of the Rio Grande. Smooth cordgrass grows in the inter-tidal area on sand, organic mucks, and oyster shell soils. This grass provides excellent inland coastal shoreline erosion protection and improves water quality by trapping nutrients. The trapped nutrients provide food for phytoplankton, and the physical structure of smooth cordgrass stands creates nursery and breeding habitats for shellfish and finfish.

Problem: Smooth cordgrass has been susceptible to sheath blight, stem rot, and rust which can prevent the establishment of healthy stands of cordgrass.

Objectives: The objective of this study is to evaluate the effectiveness of fungicide and insecticide treatments for improving the establishment of smooth cordgrass.

Discussion: A second study was conducted at the Palacios study site in 2005. One day prior to planting, smooth cordgrass was sprayed at the PMC with a mixture of Karate and Quilt, a fungicide and insecticide. An evaluation of the planting in September of 2005 seemed to indicate a better survival and vigor from the sprayed cordgrass. However, a follow-up evaluation in April 2006 did not indicate any better survival of the treated cordgrass plants.

Study Number: STPMC-T-0676-CR

Study Title: Evaluation of native grasses and erosion control matting for highway right-of-ways

Introduction: Roadsides are commonly seeded with vegetation to reduce erosion, which typically includes introduced species. The Texas Department of Transportation (TxDOT) published the revision of their standard mixture for revegetating soils on Texas right-of-ways in their manual, *A Guide to Roadside Vegetation Establishment*. Although many introduced species were replaced with native species, some required seed mixtures still include aggressive, exotic grasses such as bermudagrass.

The USDA-NRCS, Kika de la Garza Plant Materials Center, has conducted extensive research on 2 grasses that are native to Texas: hooded windmillgrass and shortspike windmillgrass. Both grasses possess characteristics needed to compete with introduced species. These native grasses can reach full height within 6 months, germinate quickly, and succeed in south Texas temperatures with minimal resource input. Bermudagrass, an introduced grass species with aggressive growth traits, is currently listed in the Texas Department of Transportation's (TxDOT) standard seed mixture for revegetating Texas roadside right-of-ways.

Problem: There is a need for adapted drought tolerant, native South Texas plants that can provide erosion control for roadsides and other critical areas.

Objective: The objective of this study is to compare establishment of 4 accessions (hooded WMG: 9085301 and 9085313, and shortspike WMG: 9085260 and 9085283) with the establishment of bermudagrass during a 2 year study. This study will also compare the standard mixture of species required by TxDOT to native hooded and shortspike windmillgrasses

Discussion: The experiment is being conducted along roadsides in Andrews, Kleberg, and Baylor counties. One component of the study has study sites consisting of 5 plots, each seeded with a single species, which were replicated 4 times on clay and sandy soils. Following seedling emergence, percent canopy cover will be estimated using the point intercept method at 30, 60, and 90 days.

A second component of the study consists of 4 standard mixture plots, 4 plots containing native species only, and 4 additional plots combining both standard and native mixes. The point intercept method will be used to evaluate ground cover of each plot at 30, 60, and 90 days, to guarantee TxDOT's standard of 70% of the adjacent land cover is obtained at the study sites within 90 days.

Because windmillgrasses germinate quickly, spread vegetatively, and survive in xeric conditions, we predict that hooded and shortspike windmillgrasses will out-compete introduced species, particularly bermudagrass. Data were collected in 2006 and additional evaluations will be conducted during summer 2007. Information from this research will help facilitate changes to TxDOT's current standard mixture used to revegetate roadside right-of-ways throughout Texas by replacing introduced grass species with native species that can establish and succeed along the harsh roadway conditions in Texas. Hopefully, windmillgrasses adapted to climate conditions and regular maintenance by TxDOT may prove more conducive to Texas roadside right-or-ways than exotics.

Study Number: STPMC-T-0677-WL

Study Title: Evaluation of interseeding into grass pastures for improved wildlife habitat

Introduction: Buffelgrass, a native of Africa, is a common component of exotic grasslands in semiarid environments. This species covers millions of acres in South Texas, Arizona, Mexico, and Australia. Areas dominated with buffelgrass support lower abundance and variety of grassland birds, including bobwhites.

Problem: Restoring native vegetation in areas dominated by introduced species is often difficult due to lack of available native vegetation material and the difficulty of removing buffelgrass.

Objective: Our objective is to improve large areas dominated by buffelgrass for bobwhites by planting patches of native forbs and legumes.

Discussion: In October 2004, we planted 4, 10-hectare patches of BeeWild Bundleflower within a 600-acre ungrazed Conservation Reserve Program (CRP) buffelgrass stand at the El Panal Ranch in Starr County. We are testing the hypothesis that availability of patches of bundleflower will increase use of the buffelgrass field by quail. We are trapping and maintaining radio collars on 30-50 bobwhites to track movements and to determine habitat use. Drought conditions prevailed in 2005, with the area receiving a yearly total of just over 3.5 inches and continued throughout 2006 (Figure 1). The bundleflower has had sporadic germination and plants did not establish.

Quail movements have been projected onto a Geographic Information Systems (GIS) map of the study site. Findings indicate that they prefer to stay in brushy areas around the buffelgrass stand during midday, but readily move from the brush areas into the buffelgrass to roost and nest. Our findings also appear to show that they begin moving into the buffelgrass stands up to 2 hours before dark and after sunrise possibly to forage before and after roosting.

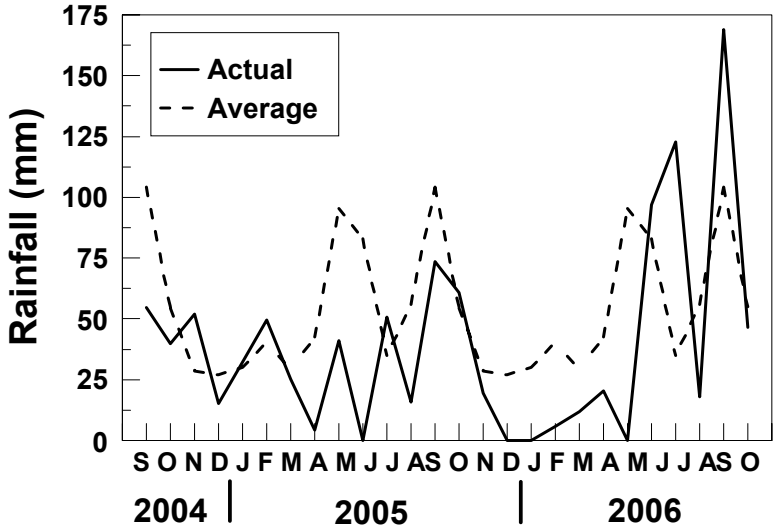


Figure 1. Rainfall data taken from Benavides, Texas, USA (Duval County) weather station during study period. Average monthly rainfall calculated from 1966 – 2006 data.

Study Number: STPMC-T-0678-RA

Study Title: Herbicide treatments to improve native grass establishment into introduced grass pastures

Introduction: Reestablishment of native species has been very difficult in South Texas. Aggressive introduced grasses have made it extremely difficult for native plantings to become established because of the highly competitive abilities of these introduced grasses. Furthermore, there are very few native species that are available on the commercial market for replanting. However, the E. "Kika" de la Garza Plant Materials Center has been working on evaluation and producing several native species for reseeding in the South Texas Area.

What are the aggressive, introduced species that make it challenging to establish native species in South Texas? They can be broken down into 3 categories: 1) short, sod-like exotics such as bermudagrass, KR bluestem, and crabgrass, 2) mid/tall exotics such as buffelgrass, Kleberg bluestem, Johnsongrass, and bahiagrass, and 3) shady habitat species such as guineagrass and ryegrass.

The planting strategies are the same except that the species selected are different for the sod-like grasses versus the tall grasses. One first starts out with a heavy grazing, burning, or mowing-bailing to remove the existing vegetation. Then any regrowth is killed by spraying with a selective herbicide. Then the site is either tilled in preparation for planting or a no-till planting is used. Depending on how bad the infestation of introduced species is, the landowner may decide to go with a legume cover-crop prior to planting the native grasses. Following the cover-crop, the site will either get plowed or it will get sprayed and planted with a no-till drill. The selected native grasses must be quick germinating and growing in order to get established and be capable of competing with any introduced species that have survived the employed treatments or get blown in from surrounding property.

Problem: Restoring native grasses in areas dominated by introduced species is often difficult due to the lack of available native vegetative material and the difficulty of removing the introduced species.

Objective: The objective of this study is to develop planting strategies for establishing native species in introduced grass pastures.

Discussion: Plots were established and mowed in October 2004 at the Bomer Wildlife Management Area in Duval County, Texas. The herbicide imazapyr (Arsenal®) was sprayed on the buffelgrass pasture when it reached a height of about 6 inches. In spring 2005, a native grass seed mix of silver bluestem, shortspike windmillgrass, and four-flowered trichloris was broadcast on selected plots.

Reducing buffelgrass canopy cover by applying imazapyr resulted in an increased canopy cover of only one planted species, shortspike windmillgrass, possibly because it is better adapted to drought than silver bluestem and four-flower trichloris. The drought conditions were especially severe during summer 2005 and 2006, when temperatures were at their highest and seedlings were most susceptible to dehydration (Figure 1).

Imazapyr initially killed most buffelgrass plants and effectively kept seedlings from resprouting until spring 2005. As residual effects of the herbicide diminished, buffelgrass seeds germinated and soon dominated the plots. Planted grasses had a brief window in which to take advantage

of reduced competition from buffelgrass and become established; shortspike windmillgrass was the only plant that was able to do this. Grasses from the genus Chloris appear to be resistant to tebuthiuron (N-[5-(1,1-dimethyethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea) (Scifres & Mutz 1978; Tjelmeland et al. in press) and one possible explanation is a resistance to imazapyr. Resistance to imazapry along with the ability to establish in the adverse conditions present during this study may have given this grass the advantage it needed to establish quickly before buffelgrass seedlings were able to develop and dominate. Four-flower trichloris may also be resistant, but may not establish as well in drought conditions. Four-flower trichloris established in the current study area but did so during more mesic conditions (Tjelmeland et al. in press).

Imazapyr was applied at a very high rate in this study to ensure an effective kill on buffelgrass. To make applications of the herbicide more cost effective, further research should be conducted to determine the optimal rate. Ferrell et al. (2005) found that an equivalent rate (1.12 kg ai/ ha) resulted in a 97% postemergence control of hybrid bermundagrass (Cynadon transvaalensis × Cynadon dactylon) and an 88% control at half the rate. Other studies that have effectively employed imazapyr to control invasive grasses or woody plants commonly used rates of 0.28 – 0.84 kg ai/ ha in 0.28 kg ai/ ha (1 quart/ acre) increments (Patten 2002, Masters et al. 1996, Masters et al. 1994).

The ability of shortspike windmillgrass to grow quickly and in adverse conditions makes it an ideal plant to include in grass mixtures to establish in buffelgrass-dominated grasslands. The long-term persistence of the grass is questionable, however, when buffelgrass cannot be eliminated or substantially reduced since shortspike windmillgrass only reaches a height of 0.3-0.4 m (leaf height), while buffelgrass can reach heights of 1.2 m or more. Tjelmeland et al. (In Press) recommended that delaying the planting of seeds and devoting more time to the elimination of buffelgrass plants and seedlings may be an effective use of time when performing restoration activities.

Grass species from the genus Chloris seem to generally show promise in studies where herbicides are used (Scifres and Mutz 1978, Tjelmeland et al. in Press,). While these species display desirable restoration characteristics, structural similarities of a single genus may limit the usefulness of grasslands comprised entirely of this suite of grasses to wildlife, such as northern bobwhite quail (Colinus virginianus) and other grassland birds, which heavily depend on structurally diverse herbaceous communities to fulfill habitat requirements (Lehmann 1984).

In addition to selecting proper species, the accession selected may be equally important. The accession of shortspike windmillgrass used in this study took 4 years to develop from harvesting of native ecotypes to selection as 1 of 4 top competitors based on desirable agronomic characteristics (Herrera-Cedano 2006). As illustrated in this study, these characteristics become very important when establishing native grasses in semiarid environments that buffelgrass can dominate and where frequent droughts often occur.

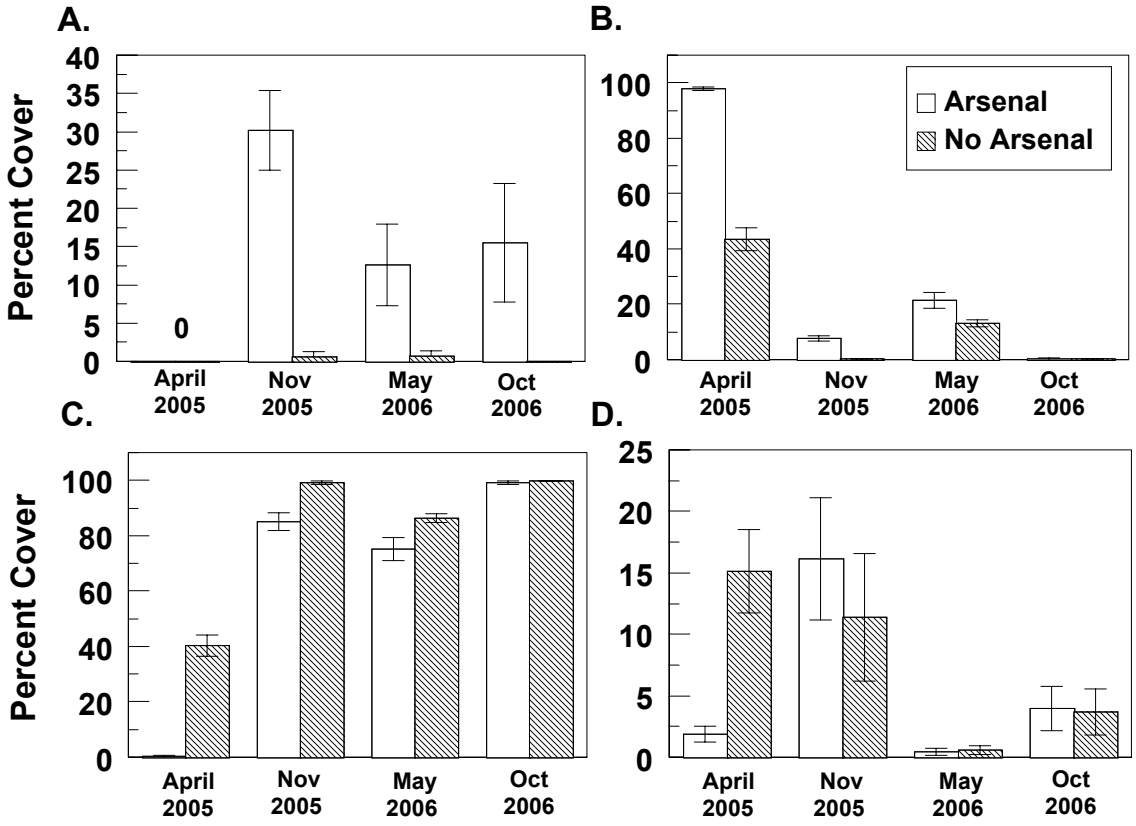


Figure 1. Percent canopy cover of A) Chloris subdolichostachya, B) bare ground, C) Pinnisetum ciliare, and D) forbs during vegetation sampling at Bomer Wildlife Management Area, Duval county, Texas.

Study Number: STPMC-T-0679-RA

Study Title: Herbicide treatments to improve forb and legume establishment into introduced grass pastures

Introduction: Reestablishment of native species has been very difficult in South Texas. Aggressive introduced grasses have made it extremely difficult for native plantings to become established because of the highly competitive abilities of these introduced grasses. Furthermore, there are very few native species that are available on the commercial market for replanting. However, the E. "Kika" de la Garza Plant Materials Center has been working on evaluation and producing several native species for reseeding in the South Texas Area.

We have three strategies for dealing with these categories. There is a forb planting strategy, a sod-grass strategy, and tall grass planting strategy. The establishment of forbs or legumes starts with a heavy grazing, burning, or mowing-baling to remove as much of the existing vegetation as possible. Then any regrowth is killed by spraying with a selective herbicide. Then the site is either tilled in preparation for planting or a no-till planting is used. The site is then planted with selected forbs and legumes. Selective grass-specific herbicides are then used to help the forbs become established.

Problem: Restoring native grasses in areas dominated by introduced species is often difficult due to the lack of available native vegetative material and the difficulty of removing the introduced species.

Objective: The objective of this study is to develop planting strategies for establishing native species in introduced grass pastures.

Discussion: Plots were established and mowed in October 2004 at the Bomer Wildlife Management Area in Duval County, Texas. The herbicide imazapyr (Arsenal®) was sprayed on the buffelgrass pasture when it reached a height of about 6 inches. Applying imazapyr reduced the canopy coverage of the buffelgrass, but did not result in a successful establishment of bundleflower. The drought conditions were especially severe during summer 2005 and 2006, when temperatures were at their highest and seedlings were most susceptible to dehydration (Figure 1).

BeeWild bundleflower was developed and is marketed for its ability to establish in hot and dry conditions, however, it did not tolerate the drought conditions experienced in this study. Initially, it was able to establish and many seedlings were observed in spring 2005, however, it did not grow quickly and many seeds did not break dormancy until after buffelgrass had begun to re-establish. Many later seedlings, that did not have time to develop adequate root systems, were lost to drought and to competition from buffelgrass. At the end of the study, several plants had persisted and continued to grow. The 2-year period of this study may have been too brief to allow establishment of this species because of the setback from drought. South Texas landscapes experience drought (< 90% of median rainfall) 36% of the time (Norwine and Bingham 1986). Therefore, attempting to establish plant species that are intolerant of drought has a high likelihood of failure. BeeWild bundleflower may have value as a plant to improve wildlife habitat in buffelgrass-dominated areas if more effective methods of controlling buffelgrass can be developed or if more mesic conditions were present.

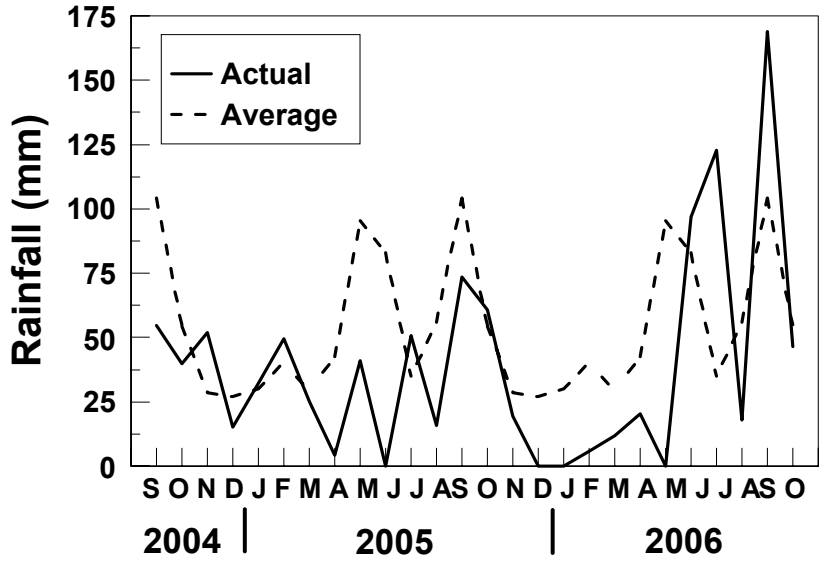


Figure 1. Rainfall data taken from Benavides, Texas, USA (Duval County) weather station during study period. Average monthly rainfall calculated from 1966 – 2006 data.

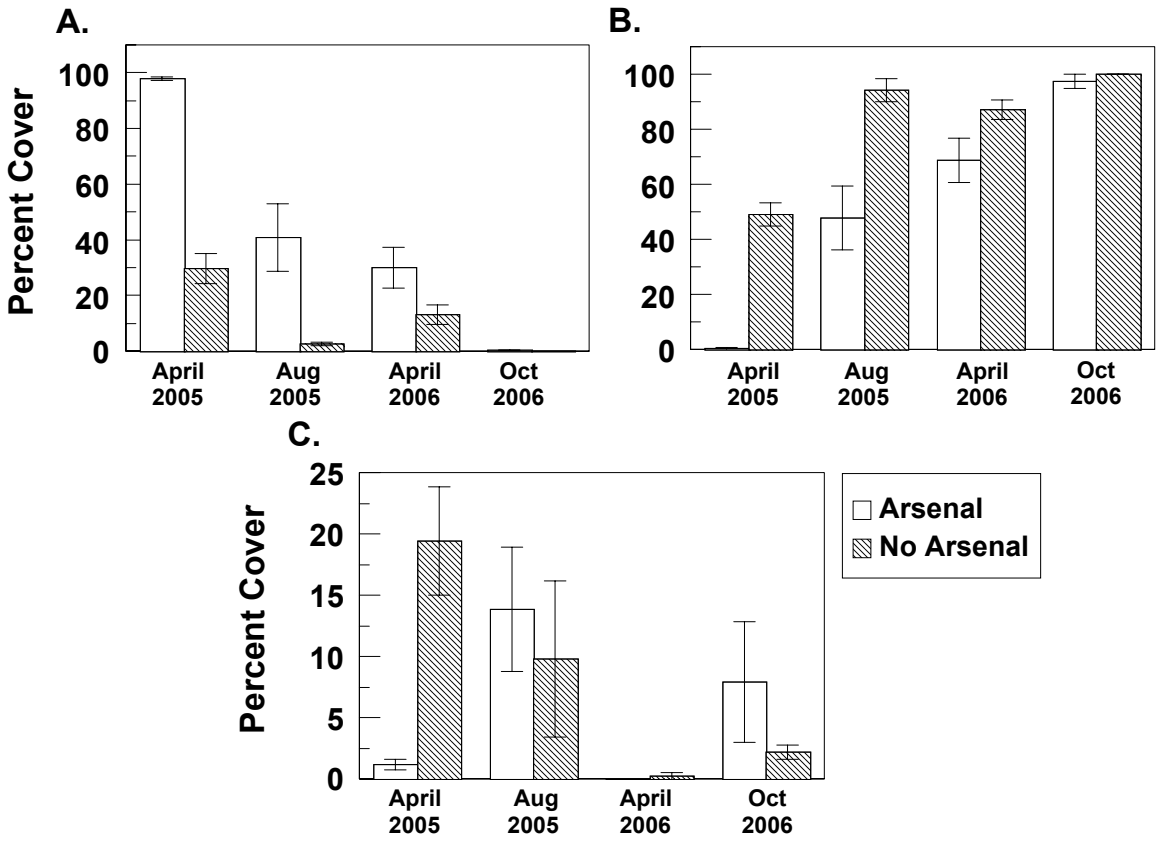


Figure 2. Percent canopy cover of A) bare ground, B) *Pinnisetum ciliare*, and C) forbs during vegetation sampling at Bomer Wildlife Management Area, Duval county, Texas.

Study Number: STPMC-T-0681-OT

Study Title: Activated-carbon seed treatment to improve plant establishment

Introduction: Reestablishment of native species has been very difficult in South Texas. Aggressive introduced grasses have made it extremely difficult for native plantings to become established because of the highly competitive abilities of these introduced grasses. Furthermore, there are very few native species that are available on the commercial market for replanting. However, the E. "Kika" de la Garza Plant Materials Center has been working on evaluation and producing several native species for reseeding in the South Texas Area.

Activated carbon has shown signs that it can deactivate some herbicides. In practical terms this means, a landowner could seed his pasture and over spray the seed row with activated carbon to protect the seeding. He could then follow with a herbicide to control weeds. Spraying at planting time would extend the weed-free period for seedling emergence giving the native species a better chance of establishment.

Problem: Restoring native species in areas dominated by introduced species is often difficult due to the lack of available native vegetative material and the difficulty of removing the introduced species.

Objective: The objective of this study is to evaluate the effects of activated carbon and seven herbicides on the seedling emergence of three species of legumes.

Discussion: A greenhouse study was conducted in June and July of 2006 on three legumes with the help of Dr. Bill Ocumpaugh and Dr. James Grichar of the Texas Agriculture Experiment Station at Beeville, Texas. Seeds of prairie acacia (*Acacia angustissima*), roundhead prairie clover (*Dalea multiflora*), and BeeWild bundleflower (*Desmanthus bicornutus*) were planted in two rows each in trays of sterilized and sifted Raymondville clay loam. One row of each species was then spayed with a strip of activated carbon. The entire tray was then sprayed with one of seven herbicides at either full or half strength. A control of no herbicide was also included. Each herbicide treatment was replicated with four trays.

None of the BeeWild seeds emerged, but data was taken on the other two species. The number of seedlings that emerged was recorded weekly for six weeks. Average seedling height was taken at three, five, and six weeks. The number of leaf nodes and total aboveground, dry biomass was also taken at six weeks.

Cadre at both the full and half rates saw considerably more biomass production for both legumes with the use of activated carbon. The half rate, especially on the prairie acacia, showed dramatic differences between the control and the carbon treatment. The 2,4-D treatment at the full rate showed an appreciable increase of biomass production with the use of activated carbon for both legume species. It was also the only herbicide that showed dramatic differences in the seedling emergence counts between treatments. *Valor* and *First Rate* also showed some effect at the full rate. Overall, there seemed to be an upward trend in biomass production in the activated carbon strips and a downward trend in the unprotected strips.

This greenhouse study will be followed with a field planting that will focus on the promising herbicides *Cadre, Valor*, 2,4-D, and *First Rate* with activated carbon.

Study Number: STPMC-T-0682-RA

Study Title: Techniques for evaluating seedlings for salt tolerance

Introduction: There is an estimated 600 thousand acres in South Texas that are effected by saline and alkaline conditions. Many of these acres are damaged by past oil field activity. These sites are characterized by soils with high salinity, little soil structure, lack of vegetation, and excessive erosion. Establishment of vegetation in saline sites by direct seeding poses a challenge. The high concentration of dissolved salt in the soils, in particular Na ions, hinders seed germination. Temperature and soil moisture also interact with salinity, producing a significant but highly variable environmental window for seed germination and seedling survival.

Problem: Adapted plant varieties and tested technology are needed to address the erosion problems on these critical sites. Adapted plant varieties need to be evaluated for salinity tolerance for seed germination and at the young seedling stage.

Objective: Assess seed germination characteristics under saline conditions for 21 adapted South Texas species.

Discussion: Starting in June of 2005, LeeRoy Rock, a student at Texas A&M Kingsville, began seed germination trials at the Plant Material Center (PMC.) Tests were done on 21 plant species. These trials were performed using a Hoffman “Controlled Environment Chamber”. The first trial was run at 5 salinity levels; 0, EC-5, EC-10, EC-20, EC-30 at a constant temperature of 68˚F with 12 hrs light /12 hrs of dark. The second trial was run in the same manner as above, but with constant temperature of 86 ˚F. the third trial was run in the same manner as the others, but with alternating temperatures of 61˚F and 86˚F.

Germination was recorded at 2-day intervals for 28 days. Seeds were placed in covered clear plastic boxes on blotter paper underlain by a layer of creped cellulose. The substrate was moistened with 100 ml of treatment solution and remoistened when necessary. Each treatment was conducted 4 times with 100 seeds per box. Most of the species germinated better under the higher temperatures even when the salinity levels were high (Figures 1-5). Six plant species responded better than the other tested species at salt levels with an EC of 20 or greater. These were bundleflower, (*Desmanthus virgatus*), orange zexmenia (*Zexmenia hispida*), two-flowered trichloris (*Chloris crinita*), and sorghum with greater than 30% germination with a constant temperature at 86˚ F and alkali sacaton (*Sporobolus airoides*), big sacaton (*Sporobolus wrightii*), and plains bristlegrass (*Setaria leucopila*) at alternating temperatures of 61˚F and 86˚F. Arizona cottontop (*Digitaria californica*), and bermudagrass had greater than 20% germination with a constant temperatures at 86˚F. Results form this study will provide valuable information on seed germination characteristics of South Texas plant species which should improve revegetation efforts on saline impacted sites.

Figure 1

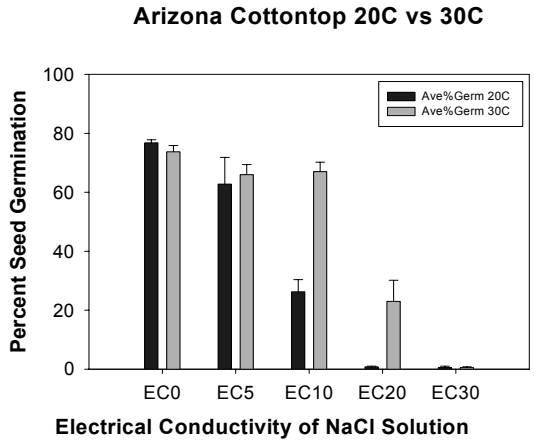


Figure 2

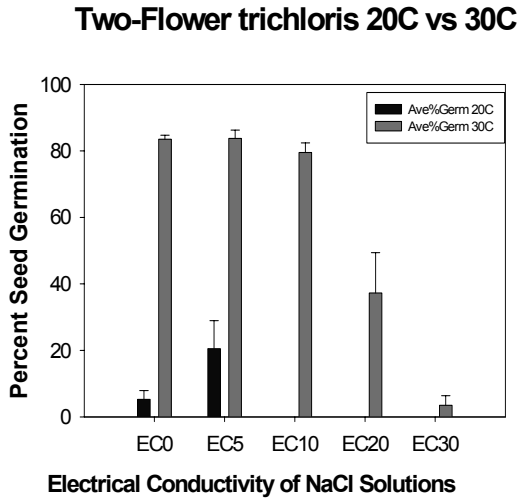


Figure 3

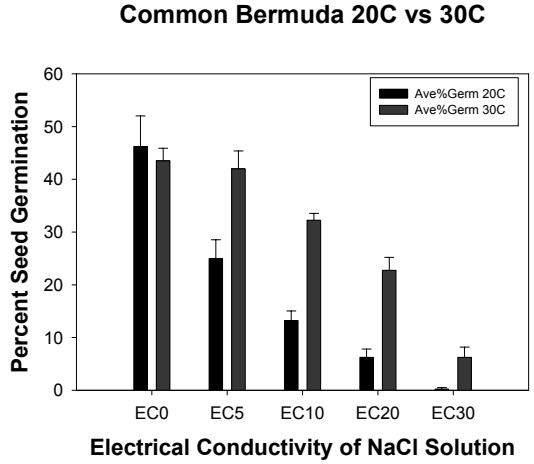


Figure 4

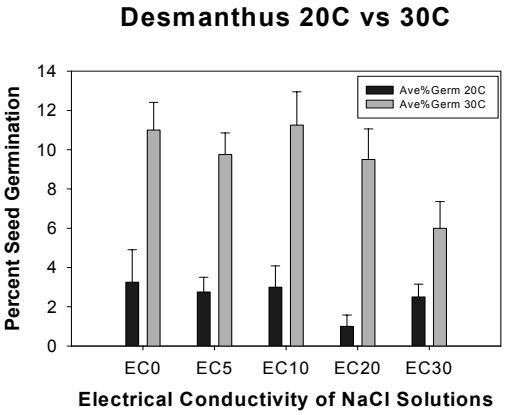
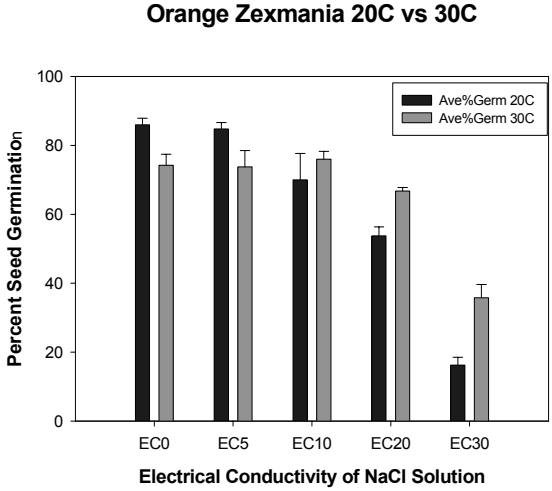


Figure 5



Study Number: STPMC-T-0686-OT

Study Title: Fertilization and humic acid treatments to improve seed production

Introduction: Rangeland use has changed over the years. Landowners and land managers today seek to diversify their operations with multiple uses for added income and to optimize the use of their natural resources. To accomplish their goals they may use combinations of ecotourism, hunting or multiple species of livestock. Recent trends have shown rangeland purchases have decreased in acreage per sale and that it is being purchased by nontraditional agricultural users, mainly urban dwellers. These new landowners are interested in the recreational and aesthetic value of the land and are often concerned about restoring native flora and fauna to benefit both wildlife and small livestock operations such as sheep and goats.

Both these new landowners and the traditional rancher, however, face a paucity of species diversity as they launch practices aimed at increasing rangeland biodiversity. Government agencies such as Texas Parks and Wildlife (TPWD), Texas Department of Transportation (TxDOT), Texas Cooperative Extension (TCE), and Natural Resource Conservation Services (NRCS) are likewise interested in species diversity as they procure or recommend native seed mixes. Commercial range seed mixes presently available for such efforts as the Conservation Reserve Program (CRP), Environmental Quality Incentive Program, or wildlife plantings, however, are without “True Native” Natives. Often what is sold as a native plant in Texas is from another region of Texas or, worse, from some other region of the country. Experience has taught us that there is a limit as to how far a plant can be moved from its point of origin and still expect it to adapt. Furthermore, TxDOT has made a commitment to plant natives on Texas roadsides if we can develop a suite of native species that will have good seed traits, reduce mowing frequency by reducing overall height of the vegetation, and can be offered at an acceptable price. With this change by TxDOT, we will reduce the spread of exotic species that will then spread onto neighboring lands where exotics are not desired.

Problem: The availability of native species is highly dependent on bringing the seeds of these plants to the market place at a price and quality that will be acceptable. If the seed quality is so poor that satisfactory stands cannot be obtained or if the seed production is so low that the individuals and agencies that desire to plant natives cannot afford the seed, then these native species will fail in their commercialization.

While some of the same native species are already being marketed from other parts of the country, some of the species we are working on have never been commercially produced before. Some species have serious seed dormancy issues, some have very poor seed fill, and we have not even begun to investigate all the issues of seed production and seed conditioning. We have no desire to genetically alter these plants to fix problems such as seed dormancy, but there has to be a seed treatment protocol that will effectively reduce the dormancy to a reasonable level to permit seeds to germinate in roadside applications and rangeland restoration seedings.

Objective: To evaluate the effects of fertilization and humic acid treatments to improve seed production of native species.

Discussion: In 2005, experiments were established to document seed production response to nitrogen fertilization and humic acids levels on four plains bristlegrass accessions. Experiments were established in two locations with different annual mean temperatures. The plains bristlegrass accessions 648, 677, 715 and 820 were planted at Beeville and Stephenville,

Texas. Nitrogen fertilization treatments imposed consisted of 0, 45, 67, 89 and 125 lbs / acre. At Beeville, application of humid acids was tested vs. a control. Humic acids were applied to the soil and also sprayed onto the plants. Experiments at both locations were conducted under irrigation.

Accessions differed in their response to increasing nitrogen levels and to location. The plains bristlegrass selections response to the increasing nitrogen fertilizer levels was contrasting. Accession 677 responded with increasing seed yields with nitrogen levels (Figure 1). However, accession 820 responded with decreasing seed yields with nitrogen levels (Figure 2). Spring seed production increased up to 50% over the fall production at Beeville.

Accessions 819 and 820 could not tolerate winter temperatures at Stephenville, Texas. They did not regrow in 2007. However, both accessions are still productive at Beeville.

Figure 1. Plains bristlegrass (accession 677) response to nitrogen fertilizer. Spring 2006. Beeville, TX.

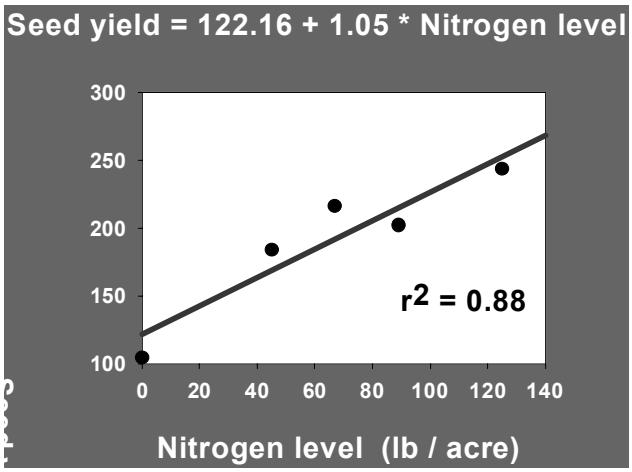
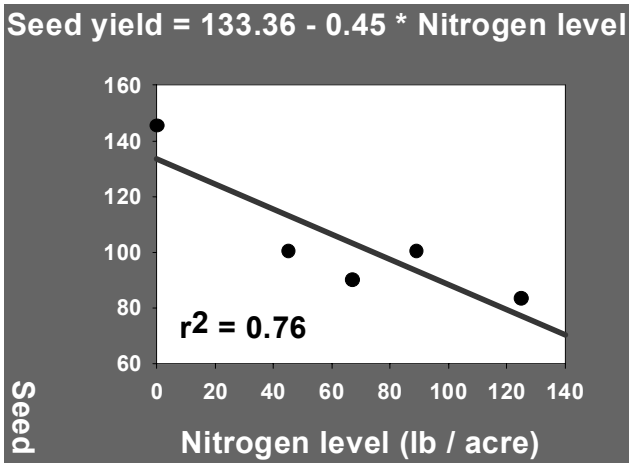


Figure 2. Plains bristlegrass (accession 820) response to nitrogen fertilizer. Spring 2006. Beeville, TX.



Study Number: STPMC-T-0690-OT

Study Title: Evaluation of small plot seeding techniques

Introduction: There are vast areas of unimproved, low producing pasture in the United States. Much of the range pasture land could benefit from interseeding to achieve a diversity of species. Introducing species into pastures has been recognized as beneficial for increasing forage production and quality, seasonal distribution of forage production, and wildlife habitat. Many of these pasture areas can not be planted by conventional tillage methods. The soils are often rocky and shallow and / or the topography is sloping, irregular, and uneven. Equipment used for pasture planting must meet some technical demands that typical row crop equipment does not. However, the scale and economics involved cannot usually support costs of seeding even at row crop rates.

Problem: Many pasture seeders are available, but these are ineffective on rocky and uneven land, unable to seed at a row spacing of less than 44 cm, are too expensive for the typical renovation system, and require a tractor for operation.

Objective: The objective of this study is to investigate the development of an ATV drill that will be an economical seeder capable of effectively seeding into established pasture.

Discussion: The measure of success of this type of planting is the establishment of the planted species. In Texas, surface seeding without soil or mulch cover is not consistently successful. Yearly variations in climate may contribute to this lack of success. Surface seedlings may fail due to extreme temperature and moisture fluxes at the surface.

Our seeder was designed specifically for interseeding into pastures and allows for a maximum furrow-opening depth of 2.5 cm. To increase the uniformity of seeding in rocky soil and uneven pastures, an individual unit suspension system was used. This seeder has a 22.5 cm row spacing with 4 units mounted to the chassis.

Plantings were done in Kingsville, Odessa, and Seymour, Texas in 2006. Results of these trials should provide us information on the ultimate performance and utility of this seed drill. We feel the cost and simplicity of this unit will appeal to farmers and ranchers that wish to interseed small areas. Unlike most commercially seeders, ours is towed with an ATV. This will conserve energy and allow use by those who do not have a tractor available.

Study Number: STPMC-T-0693-OT

Study Title: Evaluation of ergot on Plains Bristlegrass

Introduction: Sorghum, *Sorghum bicolor* (L.) Moench, is the world's fifth most important cereal crop, cultivated on about 45 million hectares for food, feed, beverage, and fodder. Ergot is a serious disease that affects the production of F1 hybrid seed. Ergot is particularly severe in male-sterile lines (A-lines) when either nonsynchronous flowering of A-line and restorer lines (R-lines) or adverse environmental conditions result in a lack of viable pollen and delayed seed set.

In India, losses of 10 to 80% have been reported in hybrid seed production fields. Similarly, ergot epiphytotics in Zimbabwe result in regular annual losses of 12 to 25% and occasionally in total losses. Hybrid seed losses in seed production fields can be offset by the application of fungicides to panicles, but this is an uneconomic control measure in most other sorghum production situations, and possible fungicide residues in grain complicate its use. Under normal conditions, the disease is of little consequence in well-adapted male-fertile cultivars, but widespread damage to male-fertile cultivars subjected to unfavorable weather conditions in farmers' fields has been documented.

Sorghum ergot affects ovaries. Instead of normal pollination, fertilization, and production of seed, ovaries are colonized by fungal hyphae that develop into sporebearing fungal masses (sphacelia). Less obvious but still substantial losses in seed quality occur when honeydew oozing from infected florets contaminates surrounding grains, which are then colonized by fungal saprophytes. Such seed may have decreased germination and seedling emergence and may be predisposed to other diseases. Infected late tillers or side branches may continue to produce honeydew when the main crop is mature, making combine harvesting difficult. Since the presence of dried honeydew, ergot sclerotia, or sphacelia on seeds increases the risk of disease transmission, contaminated seed may require further sanitation. Dried honeydew on seeds also interferes with the application of chemical seed dressing.

Problem: Ergot reduces seed yields both directly and indirectly and increases seed production costs through such alterations in seed production practices as chemical applications, reduction in number of seed-producing A-lines to accommodate more R-lines, modifications in harvesting, threshing, and seed handling, and sanitation.

However, none of these practices increases seed quality to that normally achieved in the absence of ergot. Because ergot is a disease of quarantine importance, international seed trade has been complicated by the recent sudden changes in the global distribution of the disease.

Objective: To evaluate the infection of plains bristlegrass by ergot and determine its implications for impacting seed yields of plains bristlegrass and sorghum.

Discussion: Dr. Gary Odvody, Texas A&M Research and Extension Center in Corpus Christi, investigated plains bristlegrass plots at the PMC in November of 2006. At Kingsville he found the plots had lots of old and new infection. He sampled heavily to get a larger amount of sclerotia to send to Dr. Pazoutova for alkaloid analysis. Dr. Pazoutova is working on the description for this previously undescribed species and it will also be important for us to determine the potential problems with alkaloids. Their susceptibility may have more to do with their low stature which provided favorable humidity compared to taller ones and their flowering pattern/ seed production may favor continual increase of the disease.

At Beeville, South of Kingsville, and at the Corpus Christi Center he collected an additional ergot from Kleberg bluestem. He collected a small number of heads SW of Corpus Christi in December of last year and sent them to Dr. Pazoutova. Morphologically, the macroconidia and secondary conidia are similar to *Claviceps africana*, the sorghum ergot pathogen. However, just recently, he could get no infection of male-sterile sorghum or pearl millet using a spore suspension from this ergot. And, Dr. Pazoutova mentioned in a recent email that her initial thoughts about this being *C. africana* from the '04 collections were not borne out either by her RAPD analysis or by her DNA sequencing data. Therefore it appears to be a different species despite its morphological similarity to *C. africana*. Back in 1997-98 some scientists from Mexico reported Kleberg bluestem as an alternate host of *C. africana*. He warned them that a report of alternate hosts should not be based solely on morphological data. And even proven ability to infect via inoculation does not indicate that any grass actually serves as a natural alternate host; the latter should be demonstrated by observation. Therefore, it will be a good contribution in itself if it can be proven that this morphologically similar ergot is distinct from *C. africana*.

Dr. Odvody also analyzed samples of brownseed paspalum from November 2006 collections and determined that they are *Claviceps paspali* as near as he can tell. The material had a very heavy colonization by a single *Fusarium* species and he noted that typical colonization in some environments going back to 1997. He wondered about it's involvement in producing some other deleterious compounds that several Fusarium species might produce. Typically, the alkaloids are primarily within sclerotia and are of little or no consequence in sphacelia. Therefore the degree to which an ergot can successfully produce sclerotia is at least part of the potential problem associated with the ergot occurrence. If other fungi degrade or colonize the sphacelia before sclerotia can develop then there might be reduced risk although the seed heads will not look or be very good.

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