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Plant Materials Center

KIKA DE LA GARZA PLANT MATERIALS CENTER KINGSVILLE, TEXAS

2004 ANNUAL TECHNICAL REPORT

E. "Kika" de la Garza
Plant Materials Center

2004

Annual Technical Report

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2004 Annual Technical Report
Kika de la Gaza Plant Materials Center
Kingsville, Texas

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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.

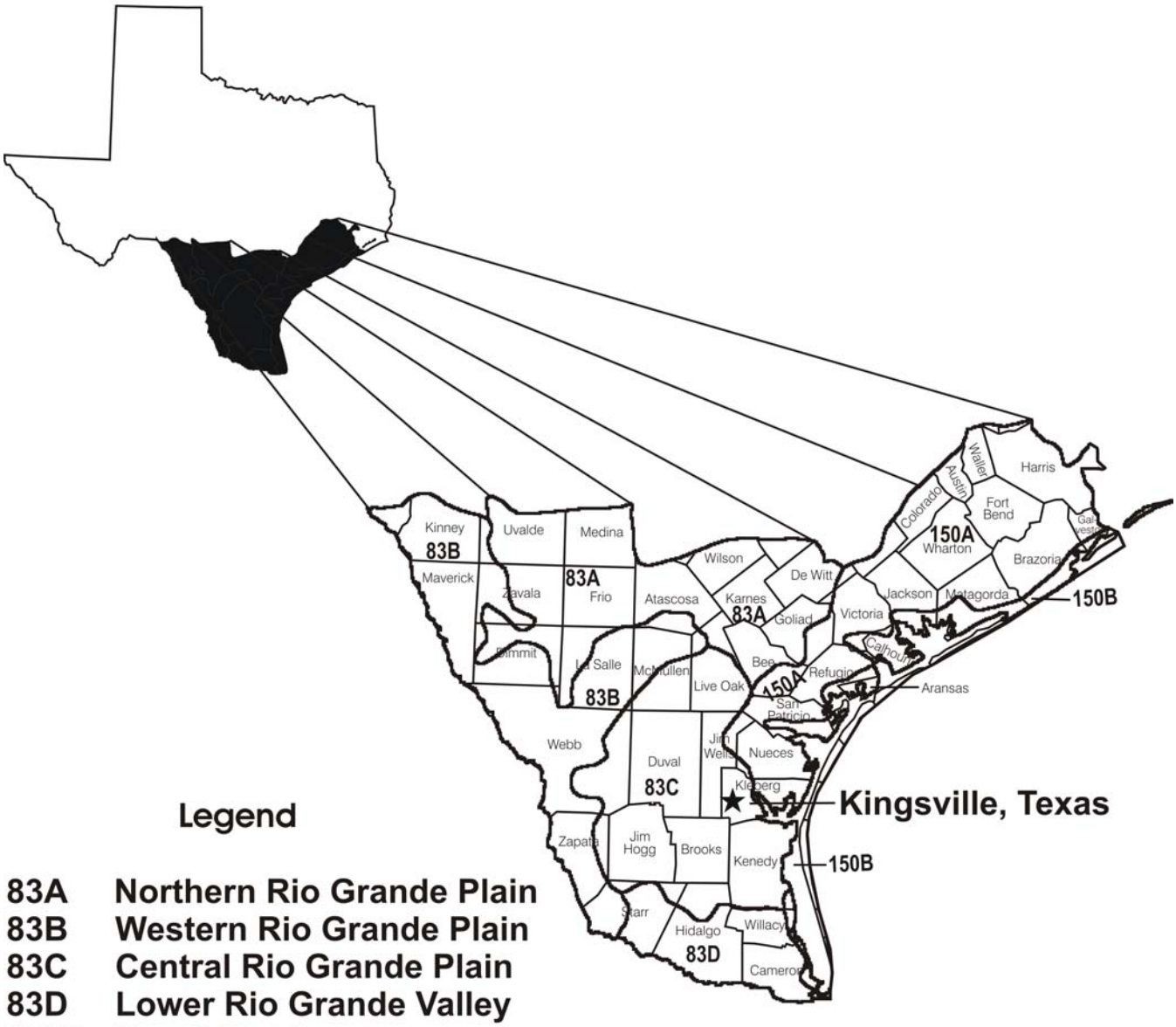
Facilities consist of an office, greenhouse, seed cleaning barn, seed storage building, shop and equipment storage barn, and a fuel and pesticide storage complex. Limited irrigation water is available from a shallow pond located at the PMC and is for furrow irrigation. Specialized hydroponic tanks are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



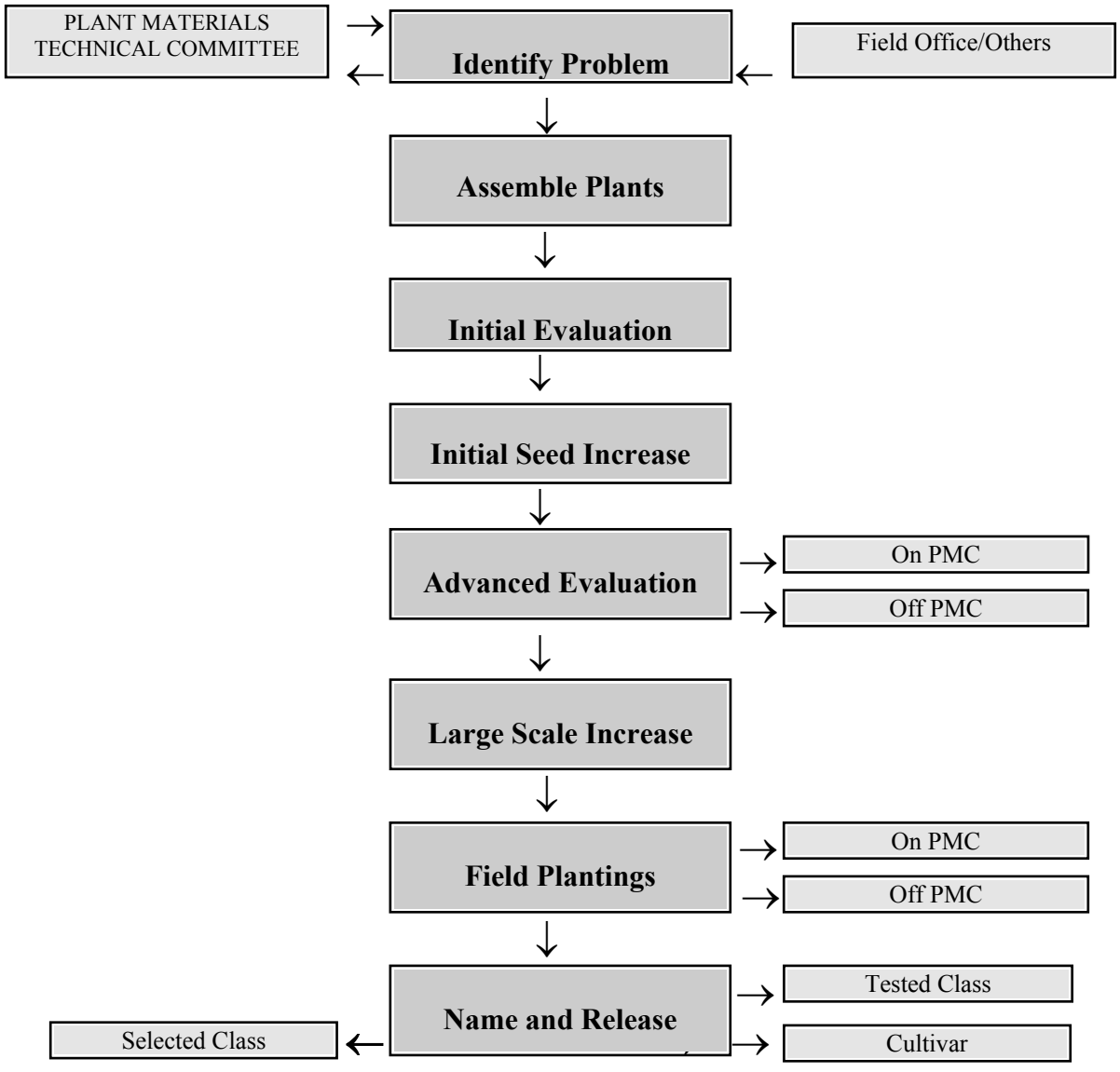
CLIMATE DATA

TEMPERATURE °F | RAINFALL (INCHES)

MONTH	HISTORICAL AVG.	2004 MONTHLY AVG.	2004 MAX	2004 MIN	HISTORICAL AVG.	2004 MONTHLY TOTAL
JANUARY	56.8	59	84	32	1.71	1.06
FEBRUARY	60.2	58	82	33	1.62	1.35
MARCH	66.9	70	85	47	0.86	1.94
APRIL	73.4	71	85	43	1.50	3.59
MAY	78.4	77	97	49	2.58	7.04
JUNE	82.9	83	96	70	3.05	5.32
JULY	84.9	83	99	66	2.13	0.64
AUGUST	84.9	84	100	63	2.72	3.35
SEPTEMBER	81.3	80	95	64	4.47	6.71
OCTOBER	73.8	80	96	64	3.17	2.21
NOVEMBER	65.0	65	89	41	1.26	1.66
DECEMBER	58.8	56	85	22	1.13	0.27
			TOTAL		**26.20**	**35.14**

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

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: ***Ecoregion Field Plot:*** Twenty-two collections of bristlegrass from the Rio Grande Plain were seeded in the greenhouse in March 2001. Only four of these collections had good seed germination (based on the number of cells containing plants, not the number of seeds planted) within 33 days in the greenhouse. All trays were then reseeded with an excess amount of seed to get more plants. Nine of these collections were transplanted to the Rio Grande Plain Ecoregion plot in April and May 2001. Seed was collected from these nine accessions at the end of 2001 and germination tests were performed in June 2002. All nine accessions exhibited very poor germination results. Another 5 accessions were added to the Rio Grande

Plain field nursery in November 2001. Thirteen of the fourteen accessions had good field survival and growth.

Seeds were collected from all fourteen of the 2001 plantings during the summer of 2002. A germination test was run on this harvest in March 2003. All accessions exhibited poor germination.

The Ecoregion field plot was evaluated for performance in the field from May to December of 2002. Only five of the fourteen collections planted in the Ecoregion plot exhibited above average performance in field characteristics (Acc# 9029605- Val Verde, 9029636- Live Oak, 9038715-Duval, 9038819- Bexar, and 9038833-Frio). Only accession 9038819-Bexar exhibited above average seed retention, but it also exhibited above average lodging problems. All accessions exhibited average seed shattering problems. In addition, all seed heads in the field plot became infested with fungi in October 2002. No seed was harvested from the Ecoregion plot after this occurred. No new accessions were added to the Ecoregion field plot in 2002, so the total number of field accessions remained at 14.

Twenty-four bristlegrass collections were seeded in the greenhouse in February 2002. Only eight of these collections had good germination results (based on the number of cells containing plants, not based on seed count).

Forty bristlegrass accessions were seeded in the greenhouse in December 2002. All exhibited poor germination. These trays were reseeded in February 2003 in an attempt to get enough plants for field plantings. Sixteen of these collections were transplanted to the Rio Grande Plain Ecoregion plot in April 2003, increasing the total number of field accessions to 30. Two accessions of Southwestern bristlegrass were planted in a separate Rio Grande Plain Evaluation plot in June 2003.

The Rio Grande Plain Ecoregion field plot of plains bristlegrass was evaluated for performance in the field from May to August of 2003. Two of the collections planted in 2001 in the Ecoregion plot exhibited above average seed production (Acc# 9038708-Goliad & 9029667-La Salle), and two of the new accessions planted in 2003 (Acc# 9088932-Duval & 9086210-Kenedy) exhibited above average resistance and vigor. All accessions exhibited average seed shattering problems. All seed heads in all of the field plot became infested with fungi again in October 2003. The seed heads were cut off in an effort to get another clean harvest in 2003, but the plants did not produce another significant crop of seeds after October.

The field plot of Southwestern bristlegrass was evaluated in August 2003. Both accessions seemed to have very good field performance and seed production. This species however, seems to have a non-uniform ripening of seed heads that could make harvesting difficult. This plot also became

infested with fungi in October 2003. Seed was collected from this plot in 2003 and 2004 and will be germination tested in 2005.

Two new accessions of bristlegrass were seeded in the greenhouse in December 2003. These two were reported to have good seed retention in the wild. Both accessions exhibited poor germ. These accessions were reseeded then added to the Rio Grande Plain Ecoregion plot in June of 2004.

In March of 2004, 67 accessions of Setaria were seeded in the greenhouse. The accessions were either new or old accessions that never produced enough plants to be planted in the field. Due to old seed and known poor germination, trays were over seeded and no germination records were kept. Thirty-two of these accessions produced 10 or more plants and were planted in Block F. This plot will be used to screen for accessions with superior seed retention or high germination.

Beeville Field Plot: In February of 2003, South Texas Natives took half of the 2002 seed harvest from the 14 accessions in the Rio Grande ecotype field plot and seeded it in the greenhouse. The resulting plants were taken to the Beeville Agriculture Experiment Station and planted out that spring on weed mat. Seed was harvested from these accessions in 2003 by three different methods: (1) fallen seed was swept off the weed mat (referred to as mat harvest), (2) the seed heads were cut off the plants and allowed to dry on tarps, then fallen seed was collected (referred to as tarp harvest), and (3) seed that still remained on the plants after drying on the tarp was stripped off the plants using a brush machine (referred to as plant harvest). Dr. Ocumpaugh evaluated these accessions at Beeville and chose 6 accessions he thought warranted further study (Acc# 9038820-Willacy, 9038715-Duval, 9029677-Karnes, 9029667-LaSalle, 9038819-Bexar, and 9029648-Webb).

In order to test which harvesting method collected the highest quality seed, a germination chamber and greenhouse experiment was run on two accessions (see Table 1). Germination of both experiments was low (0-6% and 0-13% respectively). A tetrazolium viability test was done on the seeds from the germination chamber experiment. Seeds collected from either the tarp or weed mat had much better germ and viability than the seeds stripped off the plants. One sample had 42% viability with no germination, and all of the samples had higher viability than germination.

Seed was collected in 2004 from the Beeville plot. Up to half of the seed from accessions 9038820-Willacy, 9038715-Duval, 9029677-Karnes, 9029667-LaSalle, 9038819-Bexar, and 9029648-Webb will be sent to Speeding (a seedling production company) in the spring of 2005 by STN. These transplants will be used for seed increase blocks of the promising accessions at Beeville.

Seed Dormancy: In 2003 and early 2004, several attempts were made with different techniques to increase the germination or break the seed dormancy of bristlegrass. None of the attempts were successful. The following is a brief summary of the techniques tried. Unless noted otherwise all germination chamber experiments were run at 16 hours dark at 10°C / 8 hours light at 30°C.

- Captan Fungicide Treatment – 2002 PMC Harvest
  Fungus was seen on almost all seeds in the germination chamber. To test if fungus was decreasing germination of viable seeds, one tray of 50 seeds from 14 accessions of the 2002 harvest were dusted with captan and one tray of each accession was not treated as a control. The experiment was run under all dark conditions. Germination ranged from 0-4%, with no difference seen among treatments.

- Mechanical Scarification – 2002 & 2003 PMC Harvest
  Seeds of accession 820 were mechanically scarified in a sandpaper scarifier for 0 to 5 minutes in 30 sec intervals. Two trays of the harvest years 2002 and 2003 were included at each interval, one tray of green colored seeds and one tray of tan colored seeds. Germination was 0% for all trays.

- After-ripening – 2003 PMC Harvest
  Seeds of eight accessions that were both freshly harvested and had been stored in the seed vault were germination tested to look for effects of after-ripening of seeds. Two reps of 50 seeds were done per treatment. Germination ranged from 0-8% with no difference due to storage.

- After-ripening – 2002 PMC Harvest
  100 seeds of accessions 9038820 and 9038715 from the 2002 harvest were tested to see if storage for a year increased germination by after-ripening. Germination was done in all dark conditions and results were 0% germination.

- Drip Leaching
  A net bag of bristlegrass seeds was hung under a dripping faucet to attempt to leach out germination inhibitors. Seeds were tested after 1, 4, 6, 8, 11, and 13 days of leaching, all resulting in 0% germination.

- Warmer Temperature
  Four trays of seed were run at a higher temperature to determine effects on germination. Two trays were run at 16 hours dark at 10°C / 8 hours light at 30°C, and the other two

trays were run at the same temperature, but 24 hour dark. Results were 0% germination in all trays.

- Tetrazolium Viability Test – 2003 PMC Harvest

Accession	Viability
9038715	27%
9029677	42%
9029648	21%
9038819	48%
9038820	31%

- Acid Scarification

  Seeds harvest from Beeville of accession numbers 677 and 820 were scarified in 18M sulfuric acid for times of 0, 1, 2, 5, 10, and 15 minutes. Two reps of 100 seeds of each accession were done. Results were 0-9.3% germination with no time having a consistent increase in germination.

- Chemical Inhibitor

  Lettuce seeds were germination tested with an equal number of bristlegrass seeds in the tray, a leachate of bristlegrass seeds, and alone to test for the presence of germination inhibitors. There was no effect on the germination of the lettuce seeds in any of the trays.

- Aeration

  Bristlegrass seeds were aerated in 1 liter of reverse osmosis water with an aquarium pump for 0-15 days to provide an excess of highly oxygenated water for imbibtion. The water was changed daily. Fifty seeds were tested at each daily interval. Results were 0-2% germination, but there was little fungal growth on the seeds.

- Mechanical Scarification

  Accession 820 from the Beeville harvest was mechanically scarified from 0-5 minutes at 30 second intervals. Three trays of 50 seeds were tested at each interval. Only 2 trays had any germination (2% and 6%).

- Acid Scarification – Trial 2

  Seeds harvested from Beeville of accession 820 were scarified in 18M sulfuric acid for times of 0, 1, 2, 5, 10, and 15 minutes. Two reps of 100 seeds of each time were done. Results were 0-1% germination.

- Boiling Water

  A cup of reverse osmosis water was brought to a boil and 50 bristlegrass seeds were added and allowed to cool. Another 50 seeds were added to boiling water twice and allowed to cool. These seeds were then germination tested resulting in 0% germination with an excess of fungal growth on the seeds.

- Tetrazolium Viability Test – MidWest Seed Lab

  Seeds of 4 bristlegrass collections were sent to a commercial seed testing lab to confirm viability tests done by the PMC.

Acc#	Viability
820, tarp, 8-4-03 Beeville	71%
677, tarp, 8-24-03 Beeville	63%
819 Block E PMC 2003	86%
King Seed – Commercial 1999	61%

- Moist Heat Treatment

  Seeds from the 4 accessions sent to Midwest Seed Lab were germinated under 3 moist heat treatments: five days at 40^{o}C light, five days at 45^{o}C dark (oven), or 16 hours dark at 20^{o}C / 8 hours light at 30^{o}C (control). After the 5 days all the treatments were moved to the control conditions. Neither treatment improved the germination over the control conditions.

- Inhibitor Indicator Test

  An attempt was made to test for the presence of a water soluable germination inhibitor. 100 mL of *Setaria* seed was aerated in 1 L water for 24 hours. The resulting solution was strained and used to hydrate germination trays. Lettuce seeds were germinated with and without the solution. No effect was seen. Lettuce seeds were also germinated with 50 Setaria seeds in the tray and no effect was seen. Setaria seeds leached for 24 and 48 hours were also tested, and germination was 0%.

- Mechanical Scarification – 2003 Beeville Harvest

  Seeds of accession 820 were mechanically scarified in a sandpaper scarifier for 0 to 5 minutes in 30 sec intervals. Three reps of 50 seeds per time were run for each treatment. Germination was 0% for all but 2 trays (2 & 6%). No pattern was seen.

- Accelerated After-ripening – 2003 Beeville Harvest

  Seeds of accession 820 & 677 were subjected to 0, 3, 7, and 4 days in a 50^{o}C oven, then moved to a germination chamber. It was hoped that the high temperatures would hasten the

breakdown of any chemical germination inhibitors. The seeds were germinated with either 24 hours dark or 8 hours of light. No effect was seen.

- Move Along Germination

  Seeds of accession 820 and 677 - 2003 Beeville, accession 819 - 2003 PMC, and commercial seed - King were subjected to a germination experiment that simulated the changes of temperature by seasons. Some trays were left at each seasonal temperature and other were moved from season to season. This was done to see if temperature shifts would break seed dormancy. No significant spike in germination was seen. Germination continued to scatter across weeks. This test was also coupled with a look at fungus controls. A 1% bleach solution, 3% hydrogen peroxide solution, a fungicide mix (thiram, captan, and dividend), and a control were used. The bleach and hydrogen peroxide did not control the fungi over the control. The fungicide mix controlled the fungi but also greatly reduced germination.

- Fungicide Test

  Seeds of accession 820 and 677 - 2003 Beeville, were germinated to further look at fungus controls. A thiram, a thiram plus GA_3, and a control were used. Germination over 14 weeks was minimal, but the thiram did not appear to inhibit germination. The GA_3 did not appear to have an effect.

After so many tests to increase germination failed to produce results, South Texas Natives hired Mid-west Seed Lab to look into the dormancy of bristlegrass. A list of all tests performed by the PMC was sent to them to aid in the study. Thus far, they have also been unsuccessful in breaking seed dormancy in bristlegrass.

Table 1. Study 77IO11HPJ Bristlegrass Tetrazolium Viability Test – Beeville Seed

Accession Number	Harvest Type	Harvest Date	Germination	Non-Germ. Viable	Total Viable
9029677	Tarp	8-24-03	6.0%	10.0%	16.0%
9029677	Mat	8-25-03	5.3%	9.3%	14.6%
9029677	Plant	8-24-03	3.3%	14.0%	17.3%
9038820	Tarp	8-4-03	0.0%	42.0%	42.0%
9038820	Mat	8-4-03	0.0%	14.7%	14.7%
9038820	Plant	8-5-03	1.3%	8.0%	9.3%
9038820	Tarp	9-8-03	0.0%	11.3%	11.3%
9038820	Mat	9-8-03	0.0%	14.0%	14.0%
9038820	Plant	9-8-03	0.0%	4.0%	4.0%

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: Fourteen collections of four flower trichloris from the Rio Grande Plain were seeded in the greenhouse in March 2001. Four collections had 88-100% seed germination within the first 15 days in the greenhouse. These were transplanted to the Rio Grande Plain Ecoregion plot in April 2001. Seed was collected from these four accessions at the end of 2001 and germination tests were performed in June 2002. Another 5 accessions were added to the Rio Grande Plain field nursery in November 2001. All accessions had good field survival and growth.

Nine four-flower trichloris collections were seeded in the greenhouse in February 2002. Four of these collections had over 86% germination within the first 15 days and eight of the collections had over 98% germination by the 45th day in the greenhouse. Five collections were added to the Rio Grande Plain Ecoregion field plot in April through June of 2002. Seeds were collected from three of these new additions and the previous plantings throughout the summer. A germination test was run on this harvest in March 2003. All accessions showed 20% germination or over, with 2 accessions having over 40% germination. This brings the total number of four flower field plantings at the end of 2002 to 14 for the Rio Grande Plain. Six collections for the South Texas Sand Plain Ecoregion were planted at the annex in June 2002.

Both of the Ecoregion field plots were evaluated for performance in the field from May to December of 2002 (or beginning the month after planting). Two of the fourteen collections planted for the Rio Grande Plain Ecoregion exhibited above average performance in all characteristics. One of the six collections planted for the South Texas Sand Plain Ecoregion also performed above average. All collections in both field plots were seen to have minor lodging problems ranging from 1-10%. No serious insect, fungal, or fertility problems were observed.

In 2002, the collection 9043300-Frio planted in clay soil stood out in both field performance and seed germination. The collection 9086212-Kleberg planted for the South Texas Sand Plain Ecoregion stood out in field performance.

No new accessions were added to the field plots in 2003. Seeds were collected from both the previous plantings throughout the summer. A germination test was performed on these seeds in February 2004 (Table 1). One accession in particular (9086185 – Jim Wells) had very high germination for both the Annex and the Block E plots.

Both of the Ecoregion field plots were evaluated for performance in the field from May to August of 2003. Four of the fourteen collections planted for the Rio Grande Plain Ecoregion exhibited higher foliar density. Three of the six collections planted for the South Texas Sand Plain Ecoregion also performed above average in density with one of those having above average resistance also. All collections in both field plots were seen to have minor lodging problems ranging from 1-10%. No serious insect, fungal, or fertility problems were observed.

No new accessions were added to the field plots in 2004. Seeds were collected from both the previous plantings throughout the summer. A germination test will be performed on these seeds in 2005.

Both of the Ecoregion field plots were evaluated for performance in the field in July of 2004 (Table 2). All collections in both field plots had fairly uniform performance, with only a few accessions ranking one point higher or lower. No serious insect, fungal, or fertility problems were observed.

In March of 2004, three of the top performing accessions (8252-Willacy Co., 9043207-La Salle, & 9086185-Jim Wells) from the Rio Grande Ecoregion were chosen for an Advanced Evaluation plot. As the original seed collection for accession 8252 was collected in 1970, and had poor germination, plants from this accession will be dug up and isolated for seed production in 2005. This will allow for transplants to be produced for an AEP in 2006.

In December 2004, nineteen accessions of four-flower trichloris were seeded in the greenhouse to fill in missing counties for the Rio Grande Plain Ecoregion plot (Table 3). Accessions with enough plants will be transplanted into the ecoregion plot in the spring of 2005.

Table 1. Study 77IO16H Four Flower Trichloris 2003 Harvest Germination

PMC (clay soil)

Accession Number	Origin (County)	Grams Harvested	5 Days %	14 Days %	28 Days %
9038717	Jim Wells	55.7	2.7	4.7	15.0
8252	Willacy	119.8	3.0	6.0	15.7
9045782	Starr	59.4	4.0	10.7	19.0
9064432	Starr	64.9	0.7	1.7	7.0
9052756	Duval	94.9	1.3	2.3	7.0
9043300	Frio	86.8	0.0	1.0	5.0
9043207	La Salle	83.2	1.3	5.3	18.7
9043279	Cameron	82.3	0.7	3.7	15.3
9045811	Karnes	72.5	0.7	3.3	9.7
9086181	Jim Wells	77.6	4.0	6.0	10.7
9086182	Zavala	87.2	0.3	1.3	3.3
9086184	JimWells	79.2	0.3	1.0	2.0
9086185	JimWells	75.2	15.7	18.7	28.0
9086186	JimWells	77.7	1.3	2.0	3.3

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

ANNEX (sandy soil)

Accession Number	Origin (County)	Grams Harvested	5 Days %	14 Days %	28 Days %
9086181	Jim Wells	166.6	2.7	3.7	5.3
9086183	Kleberg	149.9	8.0	12.0	18.7
9086184	JimWells	94.3	5.3	8.3	17.3
9086185	JimWells	150.4	28.7	32.0	35.0
9086211	Kleberg	140.5	1.0	3.7	7.7
9086212	Kleberg	245.3	5.3	8.0	18.7

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

Table 2. Study 77IO16H Four Flower Trichloris Initial Field Evaluation 2004

PMC (clay soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9038717	Jim Wells	100	100	5.0	5.0	5.0	5.0	5.0
8252	Willacy	100	100	5.0	5.0	5.0	5.0	5.0
9045782	Starr	100	90	5.0	6.0	5.0	5.0	6.0
9064432	Starr	100	85	6.0	6.0	6.0	5.0	6.0
9052756	Duval	98	90	6.0	6.0	6.0	5.0	5.0
9043300	Frio	100	100	4.0	4.0	4.0	5.0	4.0
9043207	La Salle	100	100	5.0	5.0	5.0	5.0	5.0
9043279	Cameron	100	100	5.0	4.0	5.0	5.0	5.0
9045811	Karnes	100	100	5.0	4.0	5.0	5.0	5.0
9086181	Jim Wells	98	90	6.0	6.0	6.0	5.0	5.0
9086182	Zavala	100	100	5.0	5.0	5.0	5.0	5.0
9086184	JimWells	100	100	5.0	5.0	5.0	5.0	5.0
9086185	Jim Wells	100	90	5.0	5.0	5.0	6.0	5.0
9086186	Jim Wells	98	100	5.0	5.0	5.0	5.0	5.0

ANNEX (sandy soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086181	Jim Wells	98	100	5.0	5.0	5.0	5.0	5.0
9086183	Kleberg	100	100	5.0	4.0	5.0	5.0	5.0
9086184	Jim Wells	100	100	5.0	6.0	5.0	5.0	6.0
9086185	Jim Wells	100	100	5.0	5.0	5.0	5.0	5.0
9086211	Kleberg	98	100	5.0	5.0	5.0	5.0	5.0
9086212	Kleberg	100	100	5.0	5.0	5.0	5.0	5.0

*Ocular estimate (1 = Best)

Table 3. Study 77IO16H Four Flower Trichloris Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %
9045770	Cameron	0.0%	0.0%	0.0%
9088560	Dimmit	29.0%	26.6%	25.7%
9088772	Webb	39.4%	33.7%	29.2%
9089091	Dimmit	37.2%	35.7%	32.5%
9089128	Medina	13.2%	14.7%	16.0%
9090281	Hidalgo	29.8%	34.0%	22.9%
9090315	Wilson	38.7%	40.0%	34.0%
9090364	Willacy	27.6%	27.4%	23.8%
9090413	Medina	50.2%	48.1%	40.5%
9090548	Duval	5.2%	4.8%	4.4%
9090579	La Salle	52.3%	48.5%	37.3%
9090594	Maverick	19.1%	18.5%	18.0%
9090655	Live Oak	21.9%	35.4%	27.0%
9090721	Wilson	54.2%	52.4%	49.8%
9091809	Jim Hogg	24.7%	26.1%	20.8%
9091844	Hidalgo	20.2%	19.5%	16.6%
9091883	Kenedy	22.2%	21.0%	17.1%
9091884	Brooks	25.1%	23.9%	20.9%
9093192	Webb	49.8%	49.1%	38.8%

***Germination count based on actual seed count.
** 60 day germination not counted because plants were already moved out to plant in the field.

Study Number: 77IO23HR

Study Title: Assembly and Evaluation of Virginia Wildrye (*Elymus virginicus)*

Introduction: *Elymus virginicus* (Virginia Wildrye) is a native, cool season, perennial bunchgrass that grows two to three feet in height, and reproduces by tillering and seed. The distribution of this species is distributed throughout the United States except for Nevada, California, and Oregon (Hitchcock, 1935). It is commonly found scattered along fencerows, shaded banks, and open woodlands. It prefers moister soil, higher soil fertility, heavier soil textures, and is more shade tolerant than *Elymus canadensis* (Phillips Petroleum Company, 1963). Phillips Petroleum Company (1963) further reports that it is very palatable, nutritious, and is eaten readily by all classes of livestock in spring and fall when it is green. It is a strongly self-fertilized species (Fryxell, 1957).

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

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

Discussion: Twenty-six collections of Virginia wildrye from the Texas Coastal Prairie were seeded in the greenhouse in March 2001. Twenty-five of these collections were collected in the early 1980's and had 0% germination. One collection (9086125 – Colorado) was collected in 2001 and had high germination.

This accession was transplanted to the Texas Coastal Prairie field plot in April 2003. The plot was evaluated, but this was late in the season to transplant a cool season grass and field performance was poor (Table 2). By September, the plants were all dead. Only a few small seed heads were produced. This accession was reseeded in the greenhouse in September 2003 and the plot was replanted in November 2003.

This accession was evaluated for field performance in June and July of 2004 (Table 1), but by December 2004 was dead again. Lodging was seen to be a problem in July when the seeds were harvested. Almost half of the seedheads were bent over and covered with dirt. Seven grams of seed was collected in 2004 from this accession, but when examined for germination there was no seed fill. It was decided not to replant this accession until more accessions were collected for this project.

Table 1. Study 77IO23HR Virginia Wildrye Initial Field Evaluation 2004

Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086125	Colorado	80	7.0	7.0	6.0	6.0	5.0

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 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: Seven accessions were seeded in the greenhouse in December 2001 for the Rio Grande Plains ecotype. Two accessions of seacoast bluestem were

planted at the Annex in 2001. These accessions were evaluated for field performance from May to December 2002. Both accessions had poor field performance and showed signs of iron chlorosis. Seed was collected from these throughout the summer of 2002 and germination tests were run in February 2003 (9064474- 8% & 9064461 – 20%).

Seventeen seacoast bluestem accessions were germinated in the greenhouse in Spring 2002, but none were planted in the field. Eight accessions of seacoast bluestem were seeded in the greenhouse in December of 2002. Seven of these accessions were planted in the Texas Coastal Prairie field plot in 2003. Both ecoregion plots were evaluated for field performance in 2003. Two accessions (9076885 & 9076886 – Calhoun) stood out with high field performance in the Texas Coastal Prairie field plot. Both plots showed slight signs of chlorosis (the sand plot more so), but no disease or insect problems were apparent. Seed was collected in the fall from both field plots and was germination tested in January of 2005 (Table 1).

One accession was added to the Rio Grande Plains ecotype plot in 2004. Both ecoregion plots were evaluated for field performance in July of 2004 (Table 2). Once again, both plots showed slight signs of chlorosis, but no disease or insect problems were apparent. Seed was collected in the fall from both field plots. A germination test will be performed on these seeds in 2005.

In December 2004, seventeen accessions of seacoast bluestem (8 for the Texas Coastal Prairie plot and 11 for a South Texas Sand Plain plot) and twenty accessions that may be seacoast or little bluestem (all for a South Texas Sand Plain plot) were seeded in the greenhouse (Tables 3 & 4). Accessions with enough plants will be transplanted into the ecoregion plots in the spring of 2005. Accessions that have more than 50 plants will be given to South Texas Natives for off-site Initial Evaluation plots in 2005.

Table 1. Study 77IO28CL Seacoast Bluestem 2003 Harvest Germination

ANNEX (sandy soil)

Accession Number	Origin (County)	Grams Harvested	6 Days %	14 Days %	28 Days %
9064474	DeWitt	26.3	2.7	6.0	10.0
9064461	Zavala	0.8	0.0	0.0	0.0

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

PMC (clay soil)

Accession Number	Origin (County)	Grams Harvested	6 Days %	14 Days %	28 Days %
9088694	Aransas	88.7	0.0	4.0	5.3
9076899	Calhoun	97.6	2.0	8.7	9.3
9076898	Calhoun	114.5	2.6	2.7	9.0
9076885	Calhoun	144.0	0.0	7.3	12.7
9076886	Calhoun	164.9	0.7	5.3	7.3
9086175	Kleberg	71.7	0.0	1.3	1.3
9076894	Nueces	45.6	0.0	2.0	2.0

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

Table 2. Study 77IO28CL Seacoast Bluestem Initial Field Evaluation 2004
Rio Grande Ecotype

ANNEX (sandy soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9064474	DeWitt	94	100	5.0	5.0	5.0	5.0	-
9064461	Zavala	25	90	5.0	5.0	5.0	5.0	-
9090280	Brooks	98	-	5.0	5.0	5.0	5.0	-

PMC (clay soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9088694	Aransas	98	100	5.0	5.0	5.0	5.0	-
9076899	Calhoun	100	100	5.0	5.0	5.0	5.0	-
9076898	Calhoun	100	100	5.0	5.0	5.0	5.0	-
9076885	Calhoun	100	100	5.0	5.0	5.0	5.0	-
9076886	Calhoun	100	100	5.0	5.0	5.0	5.0	-
9086175	Kleberg	100	100	5.0	5.0	5.0	5.0	-
9076894	Nueces	98	100	5.0	5.0	5.0	5.0	-

*Ocular estimate (1 = Best)

Table 3. Study 77IO28CL Seacoast Bluestem Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9086174	Kenedy	0.0	2.6	4.4	4.4
9086173	Kenedy	0.7	3.8	5.0	5.1
9086172	Kenedy	0.7	10.3	15.3	15.0
9086171	Kenedy	6.6	22.1	24.2	23.3
9090347	Willacy	0.0	2.0	2.0	2.0
9090348	Willacy	0.5	3.8	4.0	4.1
9090349	Willacy	0.5	2.3	3.7	3.5
9090351	Willacy	0.2	4.9	5.9	6.0
9090299	Kleberg	0.0	2.3	7.2	7.1
9091764	Kleberg	0.0	0.1	0.4	0.4
9090332	San Patricio	0.7	11.4	13.2	12.4
9091766	Nueces	0.0	0.0	0.1	1.3
9091767	Nueces	0.0	3.5	4.1	4.6
9091771	Nueces	0.0	0.2	1.0	1.3
9091772	Nueces	0.0	0.0	0.1	0.1
9076892	Kenedy	0.0	1.3	1.9	1.9
9089221	San Patricio	0.3	13.7	14.9	13.9

***Germination count based on actual seed count.

Table 4. Study 77IO28CL Unknown Bluestem Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9089244	Brooks	0.0	0.4	0.6	0.7
9090262	Brooks	0.5	3.8	4.0	5.3
9090277	Brooks	0.2	2.3	2.9	2.8
9090280	Brooks	0.1	3.2	4.6	4.6
9090346	Jim Hogg	9.6	12.3	12.3	11.1
9090350	Jim Hogg	0.0	0.4	0.4	0.3
9090373	Jim Hogg	0.5	0.7	0.8	1.1
9090375	Jim Hogg	0.0	0.6	0.7	0.6
9090376	Jim Hogg	2.0	3.7	3.8	3.8
9090381	Jim Hogg	0.7	1.5	1.7	1.6
9090382	Jim Hogg	0.0	0.7	0.7	0.7
9090388	Jim Hogg	0.1	0.5	0.4	0.4
9090464	Jim Wells	3.0	6.0	6.0	5.6
9091799	Brooks	0.1	0.4	0.6	0.5
9091800	Jim Hogg	0.1	0.3	0.3	0.5
9091803	Brooks	0.1	1.2	1.4	1.4
9091805	Jim Hogg	7.6	14.9	15.8	14.6
9091808	Brooks	0.0	0.5	0.9	1.1
9091812	Jim Hogg	1.0	5.6	7.4	7.1
9086180	Jim Wells	7.4	9.1	8.8	8.4

***Germination count based on actual seed count.

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: Fifteen collections of orange zexmenia from the Rio Grande Plain were seeded in the greenhouse in March 2001. No accession had over 38% germination after 60 days in the greenhouse. The 12 accessions with nine or more plants surviving were transplanted to the Rio Grande Plain Ecoregion plot in May 2001. Seed was collected from these accessions at the end of 2001. A germination test was performed on this seed in March 2003. Four of the accessions had over 50% germination in 28 days.

These 12 accessions were evaluated for performance in the field from May to December of 2001. Four of the twelve collections (9064342-Gonzales, 9064423–Goliad, 9064362-McMullen, 9064430- Starr) exhibited above average performance in uniformity and seed production, but all accession had poor foliage density and resistance (plant vigor in response to environmental conditions). No serious insect, fungal, or fertility problems were observed.

During seed cleaning, orange zexmenia was observed to have 2 different shapes of seed. One more triangular in shape, and the other also triangular, but having wings along the sides of the seed coat. The seeds with wings were more difficult to separate out, as the wings cause the seed to blow away with the chaff during separation with air. A germination test was performed in August 2002 to determine if the seeds with wings had good enough germination to warrant the added effort to keep them during cleaning. Two

accessions that had good germination during a greenhouse germination test (Acc# 9064403 – 99% & Acc# 9064423 – 100% by day 45) were selected for observation. One hundred seeds (50 regular and 50 winged) were tested for each accession. Since the germination percentages were very close by accession, (Acc# 9064403 – regular 60%, winged 68% & Acc# 9064423 – regular 36%, winged 36%) it was determined that both forms of seed should be kept during cleaning.

The original 15 orange zexmenia collections were reseeded in the greenhouse in February 2002. Two more collections were added to the Rio Grande Plain Ecoregion field plot in May 2002 and plants were added to existing accessions. Seeds were collected from these plantings throughout the summer. A germination test was run on the 2002 harvest in March 2003. Three accessions, 9061276-Goliad, 9064356-Medina, and 9064365-Medina all had over 50% germination in 28 days. This brought the total number of orange zexmenia field plantings to 14 at the end of 2002 for the Rio Grande Plain.

The 14 accessions were evaluated for performance in the field from May to December of 2002. Four of the fourteen collections (9064342-Gonzales, 9064456–Goliad, 9064362-McMullen, 9064430- Starr) exhibited above average performance in density and seed production, but all accession had poor uniformity and resistance. No serious insect, fungal, or fertility problems were observed, but after prolonged rainstorms in the Fall of 2002 all plants seemed to show decreased vigor.

No new accessions were added to the field plot in 2003, so the total number of orange zexmenia field plantings remained at 14 for the Rio Grande Plain. Seeds were collected from the field plot throughout the summer of 2003. A germination test was run on these seeds in January 2005 (see Table 1).

The 14 accessions were evaluated for performance in the field from May to October of 2003. One accession (9064456–Goliad) remained much greener than all others throughout the year. Again, after prolonged rainstorms in the fall, all plants seemed to show decreased vigor.

In January of 2004, four accessions of orange zexmenia were chosen for advanced evaluation, 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.

Due to a lack of original seed, vegetative cuttings were made of the four accessions in April 2004. Unfortunately, this species does not seem to survive the moist soil conditions needed to root cuttings. South Texas Natives attempted to find the original collection sites, but little seed was available in

the field. Further attempt to collect this seed will have to be made in 2005. The rest of the accessions not selected for advanced evaluation were plowed out of the field in April 2004.

Table 1. Study 77I034J Orange Zexmenia 2003 Harvest Germination

Accession Number	Origin (County)	Grams Harvested	3 Days %	14 Days %	28 Days %
9061261	Goliad	18.2	43.0	45.3	46.7
9061276	Val Verde	56.6	20.7	27.3	29.3
9064342	Gonzales	113.6	46.0	49.3	54.7
9064356	Medina	140.4	47.3	58.0	58.7
9064361	Goliad	62.4	25.3	30.0	32
9064362	McMullen	46.9	34.7	41.3	42.7
9064365	Medina	48.7	74.0	85.3	85.3
9064366	Karnes	50.5	34.7	38.7	38.7
9064386	Gonzales	58.0	35.3	49.3	54.0
9064403	Frio	93.5	41.3	52.7	54.0
9064414	DeWitt	59.0	24.7	34.0	36.0
9064423	Goliad	45.5	39.3	52.0	52.7
9064430	Starr	50.1	21.3	42.0	48.0
9064456	Goliad	58.9	36.0	39.3	40.0
9086143	San Patricio	35.9	20.7	28.0	30.7

* 12 hours dark 20^{o}C (68^{o}F) / 12 hours light 30^{o}C (86^{o}F).

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: The PMC has collected and evaluated over 30 species of wetland plants. There are four species that have shown good adaptation to the harsh South Texas environment. California bulrush (*Scirpus californicus*), Olney bulrush (*Scirpus americanus*), American bulrush (*Scirpus pungens*) and soft-stem bulrush (*Scirpus tabernaemontani)* have been grown at the PMC for several years and appear to be good candidates for constructed wetlands.

The PMC has evaluated many wetland plants over the year for waterfowl habitat enhancement. There are four species that have promising potential for use in improving this type of habitat. Gulfcoast spikerush (*Eleocharis*

cellulosa), squarestem spikerush (*Eleocharis quadrangulata*), saltmarsh bulrush (*Scirpus robustus*) and creeping rivergrass (*Echinochloa polystachya*) have shown good survival and adaptation characteristics for South Texas. These species produce an abundance of seeds and/or tubers that make them highly desirable for waterfowl.

The Loma Alta shrimp aquaculture facility, near Raymondville, has begun to use constructed wetlands as a method for wastewater treatment. A series of five wetland cells of alternating depths were constructed in 2003. Wetland cells 2 and 4 are deep water (1 meter) cells used for remixing and were not planted. Cells 1, 3, and 5 are shallow water (0.5 meter) cells and were planted with a variety of emergent wetland vegetation in June 2003.

Research data on plant survival and water quality parameters was collected by Brian Dyson, a graduate student in Environmental Engineering at Texas A&M University-Kingsville. Water temperatures ranged from 32.0^{o}C in July to 26.0^{o}C in November. Water salinity ranged from 8.5 ppt in July to 6.1 ppt in November. The pH averaged about 8.8 during the year, dissolved oxygen was 12.3, nitrate levels averaged 0.48 mg/L, and ammonium nitrate averaged 0.06 mg/L. The total phosphorus levels averaged 0.58 mg/L with soluble reactive phosphorus measuring 0.08mg/L. There was no significant difference between input and output parameter levels. This is probably due to the newness and sparse vegetative cover during the first year.

One of the major focuses of this project was to determine vegetative response to the saline conditions encountered. Plant survival ranged from 43% in cell 1 to 75% in cell 5. Cell 5 had the best plant survival as well as the best plant growth. Cell 5 was the only cell to have 4 inches of topsoil replaced in to the cell after construction. Olney bulrush (*Schoenoplectus americanus* (Pers.) Volk. ex Schinz & R. Keller) had a 75% survival rate, saltmarsh bulrush (*Schoenoplectus robustus* (Pursh) M.T. Strong) had a 58% survival rate, and black mangrove (*Avicennia germinans* (L.) L.) had a 93% survival rate. The average water depth for this cell was around 10 cm.

In cell 1, Olney bulrush had a 42% survival rate, saltmarsh bulrush had a 8% survival rate, and California bulrush (*Schoenoplectus californicus* [C.A. Mey.] Palla) had an 80% survival rate. The water level averaged 10 cm for cell 1. Cell 3 had the poorest survival and growth. Where Olney bulrush had a 42% survival rate in cell 1, in cell 3 it only had a 4% survival rate. California bulrush however, continued to have a good survival rate even in cell 3 with 83%. The biggest difference between cell 3 and cell 1 was the water level was deeper in cell 3, averaging 25 cm.

This initial evaluation indicates that these four wetland species, Olney bulrush, saltmarsh bulrush, California bulrush, and black mangrove are adapted to the saline conditions (about 7.3 ppt) of this shrimp aquaculture

facility. Continued monitoring of this project should provide further guidance on plant performance and water quality performance for this saline wetland facility.

Two collections of saltmarsh bulrush were germination tested in December 2003 under a range of scarification (see Table 1). It was hoped that scarification in a sandpaper scarifier would increase the germination of this species. If a sufficient methods can be found to harvest and increase germination of wetland species, constructed wetland projects may be seeded instead of transplanted. This would be a much less costly process. Accession 9076931 was collected in 1999 from plants in the wetland area at the PMC. The other collection was made in 2003 from the plants at El Sauz. The scarification times ranged from 0 to 5 minutes. Twenty seconds appeared to be the optimal time for the PMC seed, and 3 minutes for the El Sauz seed. However, when 600 seeds of each collections were seeded in the greenhouse in March of 2005 after scarification at these times, germination rates were <1%. Simultaneous germination chamber and greenhouse seeding will be done in 2005 to test scarification of this species again.

Table 1. Study 7710450W Saltmarsh Bulrush Scarification Trial 2004

Collection	Year Harvested	Time Scarified	7 Days %	14 Days %	28 Days %
PMC	1999	0 sec	0	0	6
PMC	1999	1 sec	0	0	0
PMC	1999	5 sec	0	4	4
PMC	1999	10 sec	0	0	0
PMC	1999	20 sec	0	2	10
PMC	1999	30 sec	0	0	2
PMC	1999	1 min	0	0	0
PMC	1999	1.5 min	0	0	0
PMC	1999	2 min	0	0	0
PMC	1999	3 min	0	0	0
PMC	1999	4 min	0	0	0
PMC	1999	5 min	0	0	0
El Sauz	2003	0 sec	0	0	0
El Sauz	2003	1 sec	0	0	0
El Sauz	2003	5 sec	0	0	0
El Sauz	2003	10 sec	0	0	0
El Sauz	2003	20 sec	0	0	0
El Sauz	2003	30 sec	0	4	4
El Sauz	2003	1 min	0	0	2
El Sauz	2003	1.5 min	0	0	2
El Sauz	2003	2 min	0	2	8
El Sauz	2003	3 min	0	6	14
El Sauz	2003	4 min	0	4	14
El Sauz	2003	5 min	0	2	8

*10 hours dark 21^{o}C (70^{o}F) / 14 hours light 38^{o}C (100^{o}F)

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: Twenty-seven accessions of brownseed paspalum were collected and seeded in the greenhouse on January 2000. Twenty-two accessions were transplanted to the field in April 2000. Evaluations of the transplants occurred throughout 2000 and 2001. Three accessions stood out as top performers during this two-year evaluation (9064475-Burleson, 9064483-Gonzales, & 9076967-Goliad). Four other accessions also revealed good survival and production characteristics (9076888-Goliad, 9064467-Lavaca, 9085314-Kenedy & 9085315-Kenedy). Greenhouse seed germination results from both winter 2000 and winter 2001 also show that accessions 9085314, 9085315, 9064475, and 9076888 have both good total germination after 60 days as well as early seed germination within 15 days of initial seeding.

Ecoregion Field Plots: A seed nursery to develop a Rio Grande Plain ecotype of brownseed paspalum was initiated in the spring of 2001. Nine

accessions were transplanted to the Rio Grande Plain Ecoregion plot in May 2001. Seed was collected from these nine accessions at the end of 2001 and germination tests were performed in March 2002. Only four accessions exhibited germination results at or above 10% (9076937-Kenedy, 9085314-Kenedy, 9085272-Hidalgo, and 9085315-Kenedy). The Ecoregion field plot was evaluated for performance in the field from May 2001 to January 2002. Only one of the nine collections (9076967-Goliad) planted in the Ecoregion plot exhibited above average performance in all field characteristics.

Seeds were collected from all nine of the 2001 plantings during the summer of 2002. A germination test was run on this harvest in March 2003. None of the accessions exhibited good germination (0-2%). The Ecoregion field plot was evaluated for performance in the field from May to December of 2002. Only one of the nine collections planted in the Ecoregion plot exhibited above average performance in all field characteristics (9076967-Goliad). No new accessions were added to the Ecoregion field plot in 2002, so the total number of field accessions remained at nine. All accessions exhibited iron deficiency problems.

Accession 9064475-Burleson exhibited above average field results from both years. It is not part of any South Texas Ecoregion, but remains under consideration for inclusion in Breeder Blocks due to its good field performance.

Fifteen brownseed paspalum collections were seeded in the greenhouse in February 2002. Five of these collections had excellent germination results at or above 98% (based on the number of cells containing plants, not based on seed count). Six of these fifteen accessions were transplanted to the Gulf Coast Ecoregion plot in sandy soil at the Annex in August 2002. These accessions were planted in the field too late in the season to produce enough seed for harvest, but they were evaluated for field performance from August to December 2002. Two of the six accessions (9076881-Calhoun & 9064466-Matagorda) exhibited above average performance in all field characteristics. All but two accessions (9064466-Matagorda & 9064466-Jackson) showed signs of iron deficiency. The Rio Grande and Gulf Coast ecoregion plots at the PMC were discontinued at the end of 2002.

PMC Field Plot: The Kika de la Garza PMC is working in conjunction with Dr. Ocumpaugh from the Texas A&M Agricultural Experiment Station in Beeville to evaluate accessions of brownseed paspalum for early germination and seedling emergence. Since brownseed paspalum is an apomitic species (producing seed without fertilization), selections must be made that already possess the desired characteristics. Six accessions were selected and put in a evaluation block in sandy soil at the Annex in May 2002. The seedheads in only this plot were affected with smut fungus throughout the summer and fall of 2002. The smut affected all accessions. Seed was collected form these

accessions in 2002, and a germination test was run in March 2003. No accessions showed any germination within eighteen days. These accessions were also evaluated for field performance from May to December 2002. One accession, 9085294-Nueces, stood out with above average field performance.

Two of the accessions in the evaluation block did not show regrowth after the winter and were plowed under in June 2003. The remaining accessions in the evaluation block were evaluated for field performance from May to August 2003. None of the accessions seemed to perform well. The evaluation block at the PMC was discontinued in March 2004.

Beeville Field Plot: Ten brownseed paspalum accessions were seeded in the greenhouse in December 2002. All exhibited poor germination. These trays were reseeded in February 2003 in an attempt to get enough plants for field plantings. Due to the poor field performance and seed production of brownseed paspalum on the soils at the PMC, these 10 accessions and 9 other accessions seeded in the 2001 greenhouse planting were sent to the Agriculture Experiment Station in Beeville. These accessions were planted in 2003 and evaluated for field performance and seed production in 2004.

In March of 2004, Dr. Ocumpaugh saw five accessions with good spring green-up and volunteer seedling emergence in the field, accessions 9088647-Victoria, 9088651-Victoria, 9088681-Goliad, 9088644-Victoria, 9089219-San Patricio. A small amount of seed was collected from these accessions in May 2004 and will be germination tested in 2005. Remaining seed will be used for small seed increase plots.

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.

Two new legume species were evaluated in 2004 to see if either would fit the project needs. One accession of calliandra (*Calliandra conferta*) and four accessions of low prairie clover (*Dalea scandens*) were seeded in the greenhouse in December 2003 (Table 1). Half of the calliandra seeds were scarified for 5 seconds and half were not scarified. The scarification did not increase or decease the germination over the control.

All of the low prairie clover seeds were scarified 5 seconds to increase germination. Two of the accessions were the wrong species. This misidentified species was very low growing and so was not planted into the field plot.

The calliandra accession was planted in the field in May 2004. This accession was evaluated for field performance in June and July (see Table 1). Field performance was good, only one seeding was lost during the year. This is a very slow growing woody species. It did very well in the clay soil despite being from a caliche soil. Seed was harvested in November 2004 and will be germination tested in 2005. 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.

One low prairie clover accession was planted in the field in May 2004. This accession was evaluated for field performance in July (see Table 1). Field performance was good. This is a fairly tall (3 feet) prairie clover species. Foliage production and density were very good. Seed was produced and harvested in December and will be germination tested in 2005. No seed shatter was seen with this species.

Table 1. Study 77I050JH Native Legume Field Evaluation

Accession Number	Species	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9090489	Calliandra	98	5.0	5.0	5.0	5.0	Few
9090731	Low Prairie Clover	100	5.0	5.0	5.0	5.0	-

*Ocular estimate (1 = Best)

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.

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: Hooded windmillgrass typically refers to *Chloris cucullata* and is identified as being a perennial bunchgrass with culms 15-60cm tall producing 14-18 spikelets per centimeter of rachis. The seeds tend to be smooth and black. According to Gould (1975) hooded windmillgrass hybridizes with *Chloris verticillata* and *Chloris andropogonoides* in areas where their ranges overlap. The hybrids are generally intermediate morphologically between the parents. Tetraploid populations with regular meiosis and good seed set have been sampled in San Patricio and Brazos counties. These hybrids make up the species *Chloris subdolichostachya*, commonly called shortspike windmillgrasss. This species is a strongly stoloniferous perennial grass with culms 30-70cm tall. The stoloniferous characteristic makes this an extremely desirable plant, especially for roadside plantings.

Forty-three accessions of windmillgrass were collected and seeded in the greenhouse in January 2000. Thirty-six accessions were transplanted to the field in April 2000. Evaluations of the transplants occurred on both clay soils

and sandy soils at the PMC throughout 2000 and 2001. Six accessions stood out as top performers for survival, vigor and foliage density, disease resistance and seed production. Four of these accessions appear to be shortspike windmillgrass: 9085289, 9085260, 9085262, and 9085283. Accessions 9085265 and 9085316 were the best performing hooded windmillgrass collections. Accessions 9085313 and 9085300 also showed good survival and growth characteristics. Seed germination results from the winter 2000 and winter 2001 greenhouse plantings and germination chamber (2001 seed harvest) trials revealed poor germination from the shortspike windmillgrass collections. The hooded windmillgrass accession 9085300 consistently showed the highest germination of the collections.

Ecoregion Field Plots: A seed nursery to develop a Rio Grande Plain ecotype of hooded windmillgrass was initiated in the spring of 2001. Fifteen accessions were transplanted to the Rio Grande Plain Ecoregion plot at the Annex in 2001. Seed was collected from ten of these fifteen accessions at the end of 2001 and germination tests were performed in March 2002. Only four accessions exhibited germination results at or above 10%.

This plot began to decline due to excessively wet conditions in the fall of 2001. Only five accessions survived and exhibited regrowth in the spring of 2002. Seeds were collected from remaining five accessions during the summer of 2002. A germination test was run on this harvest in March 2003, with none of the accessions showing good germination (0-8%). The Ecoregion field plot was also evaluated for performance in the field from May to December of 2002. None of the collections exhibited above average performance in all field characteristics. No new accessions were added to the Ecoregion field plot in 2002, so the total number of field accessions remained at five.

Thirteen hooded windmillgrass collections were seeded in the greenhouse in February 2002. Four of these collections had excellent germination results (9076946-Kleberg, 9085259-Kleberg, 9085271-Hidalgo, and 9086135-Zavala). Germination counts were based on the number of cells containing plants, not based on seed count.

Nine new hooded windmillgrass accessions were seeded in the greenhouse in December 2002. One accession (9086308-Kenedy) exhibited 40% germination in 30 days (based on actual seed counts). The other trays were reseeded in February 2003 in an attempt to get enough plants for field plantings in the Spring of 2003.

Due to the decrease in vigor of the original Rio Grande Plain Ecoregion plot, a new plot of 28 accessions was planted in May 2003, and the old plot was discontinued. The new Ecoregion field plot was evaluated for performance in the field from May to December of 2003. Almost all of the accessions had

very similar, good field performance until the fall rains. By November and December, most of the plants were dead. The few accessions that remained seemed due to their position in the field for drainage, not a difference due to resistance. Due to the die off, this plot was discontinued early in 2004. It is likely that this species would do better in a site with better drainage. Seed was collected from this plot throughout the summer, and was germination tested in June of 2004 (see Table 1). This time, bare caryopsis were used and a much better idea of the true germination was observed. Previous low germination numbers were likely a result of poor seed fill.

Breeder Block Field Plot – Hooded Windmillgrass: The Kika de la Garza PMC is also working with Dr. Ocumpaugh from the Texas A&M Agricultural Experiment Station in Beeville to evaluate accessions of windmillgrass for stolon growth, early germination and seedling emergence. Three breeder blocks were established at the PMC in 2002: one in field block C to evaluate three top performing accessions of hooded windmillgrass, one in field block F to evaluate four top performing accessions of shortspike windmillgrass, and one in field block K to evaluate how field management (including irrigation, cultivation, and fertilization) effects seed production.

Seed was collected from breeder blocks C and F by both accession and location in 2002, and a germination test was run in March 2003. No accession exhibited high germination (0-8%). These accessions were also evaluated for field performance from May to December 2002. One accession in each breeder block stood out with above average field performance (313 in breeder block C and 260 in breeder block F).

Seed was collected from breeder blocks C and F by both accession and location again in 2003, and a germination test will be run in 2005. Field performance was evaluated from March to October 2003. Accessions in each breeder block stood out with above average field performance (313 in breeder block C and 260 & 283 in breeder block F).

Block K was not under management practices in 2002 or 2003, so it was not evaluated. Seed was collected from block K and bulked by accession.

In order to understand the cause of the low germination results from harvested seed, samples of the 2002 harvest from accessions 313 and 260 were sent to two seed labs. Hulsey got 58.5% germination and 26.0% dormant seed for accession 260, and 90.5% germination for accession 313 in May 2003. Giddings TDA Seed Lab got 37.0% germination and 15.0% dormant seed for accession 260, and 24.0% germination and 1% dormant seed for accession 313 in August 2003. After discussing the results, it was discovered that the majority of the spikelets did not contain a filled seed. The poor germination results were a result of poor seed fill, not of non-viable caryopses. Germination tests had thus far been run on spikelets (apparently mostly

empty), not bare caryopses. The hooded windmillgrass has higher immediate germination. The shortspike appears to have higher dormancy, but within an acceptable and perhaps useful range.

Due to a lack of original seed, plants from the breeder blocks were divided to make isolated seed increase plots of accessions 260, 283, and 313 in March of 2004. The remaining plants in the breeder blocks were plowed under in April 2004. Seed was harvest by combine from these plots in the fall of 2004. This seed will be germination tested in 2005.

Field Plot Beeville: Dr. Ocumpaugh also established 2 field plots in Beeville in 2002. Instead of blocks, each plant was randomized separately. The hooded windmillgrass plot consisted of accessions 301, 313, and 316 (45 plants per accession). The shortspike windmillgrass plot consisted of accessions 260, 262, 283, 289, and 300 (48 plants per accession).

These plots were evaluated by Dr. Ocumpaugh in 2002 and he ranked the accessions by averages. For the hooded plot accession 316 was the top accession, 313 a close second, and 301 third. For the shortspike plot the accessions ranked as 260 (top performer), 283, 262, 289, then 300.

Seed was collected from each plant separately in 2003. These bags were grouped into replications of 5 bags by size of the harvest. This harvest was tested in February 2004. All of the accessions appear to have good germination. Based on the results from the seed labs, those accessions with lower germinations may contain dormant, but viable seeds.

Due to the choosing of top accessions, this plot was discontinued in 2004.

Field Plot Knox City: In order to get an idea of how climate might effect harvest germination in hooded windmillgrass, seed from accession 313, 2002 harvest, was sent to the PMC in Knox City, Texas. This seed was sent before it was discovered that the problem in germination was due to seed fill, not actual germination of the actual caryopses.

They planted four 60 foot rows in May 2002, and harvested seed in August. About ¾ a pound of cleaned caryopsis was collected from the 4 rows. This seed was germination tested in December 2003 (4 months after harvest and cleaning). Germination of the bare caryopses was 92%. The seed was tested again in February 2004 (6 months) to see the effects of storage on the bare seed. Germination after storage under office conditions for 6 months was 97%, 9 months was 94%, 15 months 95%, and after 18 months 83%. Starting at 6 months after harvest, some seed was split out and subjected to different storage conditions (office, seed vault, and seed barn) to see the effects on germination (see Table 2). It seems that this species hold up to storage well. This storage study will be continued into 2005.

Seed was harvested from this plot again in 2004. This seed will be germination tested in 2005.

Field Emergence Plots: Two types of plots were seeded in May of 2004 to observe seed emergence in the field. Shortspike accession 260 and 283 and hooded accession 313 were used in both tests. Ten by twenty foot flat plots were seeded at a rate of 20 PLS/ ft^2 and replicated three times for each accession. These plots were not irrigated. Ten foot long rod rows also seeded at a rate of 20 PLS/ ft^2 and replicated three times per accession. The rod rows were irrigated.

These plots were evaluated in November 2004 (Table 3 & 4). In the flat plots, accession 260 had the densest cover and foliage production based on ocular estimates. Statistical data will be collected on this plot in 2005. In the rod rows one replication of 260 had particularly high emergence and field performance.

Table 1. Study 77I052H Hooded Windmillgrass 2003 Harvest Germination New Rio Grande Ecotype Plot

Accession Number	Grams Harvested	3 Days %	14 Days %
9085271	291.0	88.0	90.5
9085276	235.0	56.3	63.0
9085291	170.0	73.3	76.5
9086135	146.0	76.3	84.3
9086134	132.0	73.0	81.8
9088597	220.0	91.8	93.8
9085240	84.0	44.3	49.0
9076951	118.0	77.0	82.0
9085255	202.0	81.0	83.3
9085329	126.0	83.5	86.5
9088584	214.0	48.8	60.0
9088617	191.0	45.0	61.5
9088766	333.0	54.8	63.5
9088823	206.0	61.8	70.0
9088732	165.0	52.3	60.5
9088817	307	54.0	65.8
9088822	110	82.3	85.8
9088722	109	75.3	80.8
9089036	139	76.3	84.0
9089056	104	78.5	82.3
9088543	178	59.8	67.5
9088845	88	65.5	68.5
9088654	164	94.3	95.3
9088655	143	80.0	86.8
9089032	58	70.3	77.8
9088952	70	76.3	86.3
9085258**	79	40.0	52.5
9086133**	79	29.0	39.0

* 12 hours dark 15.5º C (60º F) / 12 hours light 26.5º C (80º F)
** Shortspike Windmillgrass

Table 2. Study 77I052H Hooded Windmillgrass Accession 313 Storage Germination

Months in Storage Condition (+ 6 months originally stored in office)	Seed Vault	Office	Barn
3 months	95%	93%	89%
9 months	95%	91%	78%
12 months	93%	91%	47%

* 12 hours dark 15.5º C (60º F) / 12 hours light 26.5º C (80º F)

Table 3. Study 77I052H Hooded Windmillgrass Field Emergence Evaluation 2004 Flat Plots

Accession Number	Rep	% Cover	Plant Vigor*	Foliage Density*	Foliage Production*	Resistance*	Uniformity*	Development Stage
260	1	50	4.0	4.0	4.0	4.0	4.0	Seed
260	2	60	4.0	4.0	4.0	4.0	4.0	Seed
260	3	70	2.0	2.0	2.0	3.0	2.0	Seed
283	1	35	4.0	4.0	4.0	4.0	4.0	Seed
283	2	30	5.0	5.0	5.0	5.0	5.0	Seed
283	3	70	3.0	3.0	3.0	3.0	3.0	Seed
313	1	15	6.0	6.0	6.0	6.0	6.0	Seed
313	2	35	5.0	6.0	6.0	5.0	5.0	Seed
313	3	15	6.0	6.0	6.0	6.0	6.0	Seed

*Ocular estimate (1= Best)

Table 4. Study 77I052H Hooded Windmillgrass Field Emergence Evaluation 2004 Rod Rows

Accession Number	Rep	% Cover	Plant Vigor*	Foliage Density*	Foliage Production*	Resistance*	Uniformity*	Development Stage
260	1	9 plants	5.0	5.0	5.0	5.0	5.0	Seed
260	2	20 plants	2.0	2.0	2.0	2.0	2.0	Seed
260	3	5 plants	5.0	5.0	5.0	5.0	5.0	Seed
283	1	4 plants	5.0	5.0	5.0	5.0	5.0	Seed
283	2	7 plants	5.0	5.0	5.0	5.0	5.0	Seed
283	3	8 plants	5.0	5.0	5.0	5.0	5.0	Seed
313	1	9 plants	5.0	5.0	5.0	5.0	5.0	Seed
313	2	11 plants	5.0	5.0	5.0	5.0	5.0	Seed
313	3	5 plants	5.0	5.0	5.0	5.0	5.0	Seed

*Ocular estimate (1= Best)

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: Five accessions of pink pappusgrass were collected and seeded in the greenhouse in January 2000. Three accessions were transplanted to the field in April 2000 in a random plot design. Evaluations of the transplants occurred throughout 2000 and 2001. Results from the evaluations indicated that there was no significant difference between the three collections.

Four accessions were seeded in the greenhouse in February 2002 including two of the previous accessions and two new accessions. All of these accessions exhibited high germination based on cells containing plants (not actual seed numbers). These accessions were added to the existing field plot in June 2002. Seed was collected from all accessions from May to August 2002. This harvest was germination tested in February 2003. Germination ranged from 8% to 30% with accession 9085241-Dimmit showing consistently higher germination. The accessions were evaluated for performance in the field from May to December of 2002. All accessions performed well and only slight differences could be seen. This bought the total number of different pink pappusgrass field plantings to 5 at the end of 2002 for the Rio Grande Plain.

Seed was collected from the new plantings and the old planting of accession 257 from May to August 2003. This harvest was germination tested in February 2004 (Table 1) by South Texas Natives. Overall the germination

was lower than the 2002 harvest. Accession 9086195-Zavala had much higher germination than the other accessions at 12.7%. The accessions were evaluated for performance in the field from May to October of 2003. Again, all accessions performed well. Two accessions (9086195-Zavala & 9086196-Zavala) had higher overall performance, more regrowth, and higher seed production.

Seed was collected from the new plantings and the old planting of accession 257 in June and again in July of 2004. This harvest will be germination tested in 2005. The accessions were evaluated for performance in the field in July 2004 (Table 2). Again, all accessions performed well. One accessions (9086195-Zavala) had higher overall performance. No new accessions of pink pappusgrass were added to the field plantings in 2004, so the total number of accessions remains at 5 for the Rio Grande Plain.

South Texas Natives germinated 72 new accessions of pink pappusgrass in the greenhouse in December of 2004. Exact germination counts were not kept, however 20 accessions had 0% germination before they were replanted. Accessions with enough plants will be planted in IEP plots at the PMC and the STN offsite locations at Rancho Blanco and TAES Uvalde in the spring of 2005.

Table 1. Study 77I053H Pink Pappusgrass 2003 Harvest Germination

Accession Number	Origin (County)	Grams Harvested	5 Days %	10 Days %	28 Days %
9085241 (50 plants)	Dimmit	62.8	0.7	3.3	6.7
9085302 (50 plants)	Duval	40.6	1.3	1.3	1.3
9086195 (50 plants)	Zavala	29.1	1.3	10.7	12.7
9086196 (50 plants)	Zavala	30.6	0.0	0.0	0.7
9085257 (30 plants)	Starr	34.7	1.3	2.0	2.0

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

Table 2. Study 77I053H Pink Pappusgrass Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Seed Production*	Seed Shatter*
9085257	Starr	100	100	5.0	5.0	5.0	5.0	5.0
9085241	Dimmit	100	100	5.0	5.0	5.0	5.0	5.0
9085302	Duval	100	100	5.0	5.0	5.0	5.0	5.0
9086195	Zavala	100	100	4.0	4.0	4.0	5.0	5.0
9086196	Zavala	100	100	5.0	5.0	5.0	5.0	5.0

*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: Seventy-three accessions of *Desmanthus* spp. were seeded in the greenhouse in January 2001. Fifty-seven accessions were transplanted to the field in April 2001. Seven accessions stood out as top performers during our evaluations in 2001, #9076962 (Cameron County), 322411 (Brazil), 4704A (Waller County), 2407B (Victoria County), 2408 (Texas), 29698R (Caldwell County), and 900538 (Val Verde County). Accession #9076962 was particularly impressive with not only good survival and vegetative production but also good seed production and seed germination.

All accessions were again evaluated for field performance in 2002. Seed was collected from the 16 top performers from 2001. The top two accessions were germination tested in March 2003 (9076962-Cameron 22% and 9085381-Hildalgo 28%). Four trays of these two accessions were also planted in the greenhouse in December 2002 for advanced evaluation in 2003.

An new evaluation plot was planted in 2003 of the top 2 accessions of 2002. Both the old and new plot were evaluated for field performance of the 2 top accessions in 2003. The original plants in the initial evaluation plot did not

show much regrowth, however numerous seedling emerged in the plots from fallen seeds. The accessions had good field performance in both plots. In the new plot accession 9085381-Hidalgo had more growth, higher density, and better seed production.

Seed was harvested from the new evaluation plot and scarification was used to try to increase the germination of one accession. Scarification was done from 0 to 90 seconds in 10 second intervals in a sandpaper scarifier. Both light and dark seeds were tested to see if there was a difference in germination. Seeds started to split open after 60 seconds in the scarifier. Ten seconds was all that was needed to significantly increase the germination of the seeds. Ten seconds of scarification increased the germination from 16 % to 90%. Twenty seconds of scarification increased the germination to 100%, but caused damage to the seedlings. The color of the seed did not have a great effect on germination. The initial evaluation plot was discontinued early in 2004 due to the lack of regrowth of the original plants.

One new accession of desmanthus was seeded in the greenhouse in December 2003. The seed was scarified 5 seconds to increase germination (81.5%). This accession was added to the new initial evaluation plot in April 2004.

In June of 2004, seed of accession 9076962 that had fallen on the weed mat in 2003 and over wintered there was collected and germination tested. After 5 seconds of scarification, germination was 95% in 4 days and 96% after 28 days. This was actually higher than the 2003 harvest collected off the plants and stored in the vault over winter (58.3%). It is unknown if the increase in germination is due to rhyzobium colonization or just weathering of the seed coat. In either case, it appears that seed can be collected off the mat after exposure to rain or irrigation.

The new initial evaluation plot was evaluated for field performance in July of 2004 (Table 1). While the new accession and accession 9076962 performed well, accession 9085381-Hidalgo had outstanding growth, density, and better seed production. Seed was harvested from the evaluation plot and will be germination tested in 2005. Accession 9085381-Hidalgo was chosen for advanced evaluation and the other two accessions will be taken out of the plot in the spring of 2005 to allow for isolated seed increase.

Table 1. Study STPMC-P-0134-WL *Desmanthus* spp. 2004 Field Evaluation

Initial Evaluation Plot

Accession Number	Source (County)	% Regrowth*	Plant Vigor*	Foliage Density*	Resistance *	Seed Production*
9076962	Cameron	100	5.0	5.0	5.0	5.0
9085381	Hidalgo	100	3.0	3.0	3.0	3.0
9090608	Maverick	new	5.0	6.0	5.0	6.0

*Ocular estimate (1= Best)

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: Seven accessions of Texasgrass were seeded in the greenhouse in January 2001 (Table 1). Three accessions were transplanted to the field in May 2001. All three accessions had 100% survival at the Plant Materials Center the first year. Seed was collected form the plants in 2001 and was germination tested in June of 2002. None of the accessions had any germination. These three accessions were evaluated for field performance in 2002 from May to December. The plants do not seem to be well suited to the soil fertility or conditions at the Annex as they could not successfully compete with weeds. Seed was collected form these accessions throughout 2002 and germination tested in February 2003. Germination ranged from 8-26%.

Four more accessions from the 2001 greenhouse germination were added to the plot in June 2003, bringing the total number of accessions to 7. This plot was evaluated for field performance from May to August 2003. The old plants had even poorer performance than in 2002. The new accessions performed better than the old accessions, but also seemed poorly adapted to the soil. One accession (9086136-Kleberg) had the poorest looking plants of the new accessions, but appeared to have the highest seed production.

However when the seed was examined it was seen to have no fill. Seed was collected from the accessions. This harvest was germination tested in June of 2004 (Table 1). Germination was much higher with this harvest.

Three more accessions were added to the plot in June 2004, bringing the total number of accessions to 10 (one was a 50 plant addition of one of the 2001 10 plant accessions). This plot was evaluated for field performance in July 2004 (Table 2). Again, the new accessions performed better than the old accessions, but also seemed poorly adapted to the soil. Seed was collected from the accessions in June and November of 2004 and will be germination tested in 2005.

In December 2004, thirteen new accessions of Texasgrass were seeded in the greenhouse (Table 3). Several accessions had around 50% germination. Accessions with enough plants will be transplanted into the ecoregion plot at the Annex and into a new plot at the Norias Division of the King Ranch in the spring of 2005. It is hoped that the Texasgrass will perform better at the Norias site, as it is a deep sand soil.

Table 1. Study STPMC-P-0135-RA Texas Grass 2003 Harvest Germination

Accession Number	Origin (County)	Grams Harvested	7 Days %	14 Days %	28 Days %
9043289 (10 plants)	Starr	9.8	4.0	8.7	20.0
9045785 (10 plants)	Starr	7.2	3.3	11.3	14.7
9053724 (10 plants)	Jim Hogg	0.4	10.0	52.0	74.0
9086162 (50 plants)	San Patricio	38.6	40.7	78.0	86.0
9086218 (50 plants)	Kleberg	48.5	16.0	44.7	60.0
9086136 (50 plants)	Kleberg	14.4	no fill	-	-
9086161 (50 plants)	Kleberg	16.9	49.3	88.0	90.0

*12 hours dark 20^{o}C (68^{o}F) / 12 hours light 30^{o}C (86^{o}F)

Table 2. Study STPMC-P-0135-RA Texasgrass Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9043289	Starr	70	100	7.0	7.0	7.0	5.0	7.0
9045785	Starr	80	100	6.0	6.0	6.0	5.0	7.0
9053724	Jim Hogg	40	100	6.0	6.0	6.0	5.0	6.0
9086162	San Patricio	100	100	5.0	5.0	5.0	5.0	5.0
9086218	Kleberg	94	100	5.0	5.0	5.0	5.0	4.0
9086136	Kleberg	60	100	7.0	7.0	7.0	5.0	3.0
9086161	Kleberg	90	100	5.0	5.0	5.0	5.0	5.0
9090337	San Patricio	**	**	**	**	**	**	**
9090279	Kleberg	**	**	**	**	**	**	**
43289	Starr	**	**	**	**	**	**	**

*Ocular estimate (1= Best)

** Too many weeds at evaluation to get an accurate evaluation.

Table 3. Study STPMC-P-0135-RA Texasgrass Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9090292	Brooks	16.4	16.3	14.0	in field
9090355	Willacy	53.9	53.4	50.4	in field
9090446	Jim Hogg	32.4	32.9	29.8	in field
9090756	Victoria	50.7	53.5	47.7	in field
9091761	Victoria	44.2	50.1	49.1	in field
9091768	Nueces	44.1	46.4	40.3	in field
9091798	Jim Hogg	44.9	42.7	41.4	in field
9091802	Starr	36.4	32.8	29.7	in field
9091814	Brooks	50.0	48.9	44.6	in field
9091866	Zapata	62.2	57.4	52.0	in field
9093203	Jim Hogg	26.4	25.9	23.8	in field
9093205	Jim Hogg	52.1	51.0	52.2	in field
9093207	Jim Hogg	63.9	58.0	55.0	in field

*Germination count based on number of cells with plants, not number of seeds per cell.

** Decrease in germination due to death loss.

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 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*). Field evaluations and germination test results for these species are discussed under the individual species' project.

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 includes 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. Seed was also collected from an existing accession of both slim tridens and lovegrass tridens accessions in 2002 and germination tested in the spring of 2003. Slim tridens 9085326-Uvalde had a germination rate of 76% in 28 days and lovegrass tridens 9085372-Hidalgo had a germination rate of 42%. Field evaluations and germination test results for the other species are discussed under the individual species' project.

In the winter of 2002, twenty-three species were seeded in the greenhouse for the Rio Grande Plain Ecotype project. The results for red grama, plains lovegrass (*Eragrostis intermedia*), curly mesquite (*Hilaria berlangeri*), vine mesquite (*Panicum obtusum*), and Texas panicum (*Urochloa texana*) are included here. Discussion of the 2002 germination and 2003 field evaluation information for 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*), and several species of bristlegrass can be found under the individual species' project.

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.

One accession of plains lovegrass and one accession of Texas panicum was added to the field plantings in May 2003. These accessions as well as the existing plots of lovegrass tridens and slim tridens were evaluated for field performance From May to October 2003. The plains lovegrass performed well until the fall rain. It showed signs of root rot and did not recover the following spring. The plot was then discontinued. The Texas panicum showed signs of chlorosis and seed shattered readily while still green. This plot was also discontinued. The lovegrass and slim tridens did not regrow well and had poor performance. This plot was discontinued. Seed was harvested from all four accessions and will be germination tested in 2005.

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, 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*), and Texas grass. Germination charts are included under the individual species' project. The results for plains lovegrass, lovegrass tridens and Blackfoot daisy (*Melampodium cinerum*) are discussed here. All of the accessions exhibited poor germination, but were reseeded in an attempt to get enough plants for transplanting to field plots.

A new accession of lovegrass tridens, 9086199-Starr, was planted in Block F in June of 2004. Four new accession of plains lovegrass were planted in Block C in June of 2004. Twelve plants of one accession of Blackfoot daisy, 9090490-Jim Hogg, were planted in Block C in May of 2004. These plots were evaluated for field performance in July (Table 1) and seed was harvested in November. This seed will be germination tested in 2005.

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 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, lovegrass tridens and Blackfoot daisy. All accessions of Brownseed are still located at Beeville.

In the winter of 2004, twenty species were seeded in the greenhouse for the Rio Grande Ecotype project. Germination charts for the following species are included under the individual species' project: awnless bush-sunflower, frostweed, 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, and slender grama. The results for plains lovegrass, Blackfoot daisy (*Melampodium cinerum*), Indian blanket (*Gallardia pulchella*), and Mexican hat (*Ratibidia columnaris*) are included here (Tables 2, 3 & 4). Accessions with enough plants will be transplanted to field plots in the spring of 2005.

Bladerunner Farms: The hairy grama (11 accessions, 138 plants), slender grama (5 accessions, 709 plants), Texas grama (12 accessions, 1,011 plants), red grama (22 accessions, 344 plants), curly mesquite (14 accessions, 138 plants), and vine mesquite (7 accessions, 449 plants) accessions seeded in the greenhouse in 2002 were sent to Bladerunner Farms in Poteet, Texas. An Arizona cottontop composite (made up of 5 accessions) seeded in the greenhouse by STN was also sent. These species were sent for evaluation as sod and landscape grasses. Seed was collected by Bladerunner employees from some of the accessions in 2003 and was germination tested by STN in January 2004 (Table 5).

On April 30, 2004 a field evaluation was done of the Bladerunner plots to pick out the top performing accessions. Top performers were as follows: hairy grama 6154, Texas grama #1–8599, #2–8514, #3-6281, and #4-6282, vine mesquite 8630, red grama 8638, curly mesquite #1-8612, #2-8843, and #3-8839, and slender grama #1-9049, #2-8905, and #3-8914. STN plans to pick out and seed increase their top performing pick in 2005.

Table 1. Study STPMC-P-0137- RA Rio Grande Ecotype Project Initial Field Evaluation 2004

Species	Accession Number	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
Lovegrass Tridens	9086199 Starr	100	-	5.0	5.0	5.0	6.0	-
Plains Lovegrass	9090565 Frio	98	-	5.0	5.0	5.0	5.0	5.0
Plains Lovegrass	9090664 Maverick	90	-	5.0	5.0	5.0	5.0	5.0
Plains Lovegrass	9090593 Atascosa	90	-	6.0	5.0	6.0	5.0	5.0
Plains Lovegrass	9088814 Duval	96	-	5.0	5.0	5.0	5.0	5.0
Blackfoot Daisy	9090490 Jim Hogg	68.4	-	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 2004

Species	Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
Plains Lovegrass	9091868	Hidalgo	3.5	5.1	4.7	4.5
* Plains Lovegrass	9091765	Kleberg	0.6	2.5	2.3	2.3
Blackfoot Daisy	9090695	Bexar	0.0	0.0	0.5	0.5

***Germination count based number of seeds planted.
** Decrease in germination due to death loss.
* From a Gulf Coast county, but planted for observation and comparison.

Table 3. Study STPMC-P-0137- RA Rio Grande Ecotype Project

Greenhouse Germination Winter 2004 – Mexican Hat

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9086157	Kenedy	14.5	14.5	14.5	14.5
9086158	Kleberg	25.5	27.0	25.5	24.5
9086159	Kenedy	18.5	20.0	20.5	17.5
9086300	Kenedy	43.5	44.5	42.0	30.0
9088517	Kenedy	51.0	51.0	50.0	44.5
9088523	Kenedy	37.0	42.0	41.0	41.0
9088600	Bee	5.5	7.0	6.5	6.5
9088602	Bee	1.0	2.0	3.0	3.5
9088670	Karnes	4.0	7.0	7.0	8.0
9088674	Karnes	10.5	12.0	12.0	11.5
9088700	Duval	12.5	19.0	18.0	18.5
9088701	Bee	12.0	12.0	13.5	13.5
9088702	Bee	4.5	7.0	7.5	8.0
9088714	Bee	17.5	20.0	20.0	19.5
9088762	Webb	5.0	5.0	5.0	5.0
9088769	Webb	6.0	12.0	12.0	12.0
9088781	Jim Hogg	24.0	24.0	24.0	24.0
9089027	Webb	2.5	4.0	4.0	4.0
9089031	Uvalde	4.0	6.5	6.5	7.0
9089134	Uvalde	6.5	8.0	8.5	8.5
9090317	Hidalgo	0.5	1.5	1.5	1.5
9090551	Duval	0.0	0.5	0.5	0.5
9090709	Bexar	0.5	4.0	4.0	4.0
9091904	Jim Hogg	2.5	4.0	4.0	4.0
9091907	Jim Hogg	4.0	4.5	4.5	4.5
9091911	Webb	0.0	0.0	0.0	0.0
9091940	Frio	0.0	0.0	0.0	0.0
9091942	Starr	8.5	10.0	10.0	9.5
9091957	Bexar	2.0	6.5	6.5	6.5

***Germination count based number of seeds planted.

** Decrease in germination due to death loss.

Table 4. Study STPMC-P-0137- RA Rio Grande Ecotype Project

Greenhouse Germination Winter 2004 - Indian Blanket

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %
9086242	Kenedy	6.8	6.8	6.8
9086284	Live Oak	15.6	16.0	14.6
9086286	Atascosa	19.6	20.0	22.2
9086298	Duval	12.8	14.2	14.2
9086309	McMullen	21.8	16.2	19.4
9088519	Jim Hogg	30.0	35.8	32.6
9088533	Frio	34.8	21.6	26.4
9088589	Bee	23.2	15.2	23.2
9088663	Karnes	21.8	15.2	17.0
9088748	Jim Hogg	40.8	42.4	43.0
9088768	Jim Hogg	18.4	17.0	15.6
9089104	Goliad	29.6	28.8	22.4
9089106	Goliad	21.0	20.5	20.5
9089107	Goliad	19.0	19.0	19.0
9090458	Jim Hogg	5.4	6.0	6.0
9090492	Frio	9.4	11.6	11.2
9090494	Frio	25.6	26.8	25.8
9090539	Duval	8.8	11.2	10.0
9091903	Duval	6.6	6.2	6.6
9091905	Dimmit	11.2	11.0	11.0
9091910	Duval	-	11.8	11.2
9091918	Jim Hogg	2.8	2.8	3.0
9091934	Live Oak	18.2	19.4	18.6
9093225	Cameron	1.8	2.2	2.2

***Germination count based number of seeds planted.

** Decrease in germination due to death loss.

Table 5. Study STPMC-P-0137- RA Rio Grande Ecotype Project

2003 Bladerunner Harvest Germination

Species	Accession Number	Harvest Date	Grams Harvested	28 Days %
Slender Grama	9088897	09/23/03	735	14.66%
Slender Grama	9088905	09/23/03	1148	22.66%
Slender Grama	9088914	06/26/03	26.4	10.00%
Slender Grama	9088914	09/23/03	940	32.00%
Slender Grama	9089049	09/23/03	1406	30.66%
Slender Grama	9089135	09/23/03	72	11.33%
Texas Grama	9086275	07/01/03	12.2	75.33%
Texas Grama	9086275	09/23/03	220	24.00%
Texas Grama	9086281	07/01/03	37	71.33%
Texas Grama	9086281	09/23/03	200	28.66%
Texas Grama	9086282	07/01/03	17	66.00%
Texas Grama	9086282	09/23/03	68	17.33%
Texas Grama	9086282	09/23/03	46	24.66%
Texas Grama	9086289	09/23/03	118	18.00%
Texas Grama	9088514	09/23/03	124	24.00%
Texas Grama	9088532	06/26/03	11.8	62.00%
Texas Grama	9088532	07/01/03	11.4	68.00%
Texas Grama	9088532	09/23/03	102	59.33%
Texas Grama	9088532	09/23/03	20	10.00%
Texas Grama	9088599	09/23/03	82	23.33%
Texas Grama	9088708	07/01/03	7.5	68.00%
Texas Grama	9088947	09/23/03	65	12.00%
Texas Grama	9089044	06/26/03	8	7.33%
Texas Grama	9089044	09/23/03	102	59.33%
Texas Grama	9089074	09/23/03	28	50.00%
Red Grama	9086155	09/23/03	4.4	2.66%
Red Grama	9088638	09/23/03	1.3	3.33%
Red Grama	9088699	09/23/03	6.3	0.00%
Red Grama	9089168& 9089197	09/23/03	1.2	1.33%
Red Grama	9089179& 9088537	09/23/03	5.6	3.33%
Arizona Cottontop	composite	06/26/03	60.9	not tested
Arizona Cottontop	composite	07/01/03	541	not tested
Curly Mesquite	9088835	06/26/03	0.53	0.00%

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

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, 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 and Kansas gayfeather 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. Due to the late planting date, field performance of all the accessions was poor. No seed was produced.

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. Germination information for these species can be found in the individual species' project. One new accessions of black-eyed Susan and 3 of Kansas gayfeather were also seeded.

Two new accession of gayfeather were added to the Texas Coastal Prairie plot in May of 2004 bringing the total number of accessions in the plot to five. This plot was evaluated for field performance in July of 2004 (Table 1). Seed was only produced by one accession and was harvested in November of 2004. This seed will be germination tested in 2005.

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. One new accession of Kansas gayfeather was also seeded (Table 2). Those accessions exhibiting good germination will be transplanted into the field beginning in the spring.

Table 1. Study STPMC-P-0138- RA Texas Coastal Prairie Ecotype Project
Initial Field Evaluation 2004 – Kansas Gayfeather

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086222	Galveston	100	5.0	5.0	5.0	5.0	-
9089101	Brazoria	0	-	-	-	-	-
9086149	Kleberg	88	4.0	4.0	4.0	4.0	-
9089162	Montgomery	60	7.0	7.0	6.0	5.0	-
9090733	Brazoria	78	6.0	7.0	5.0	5.0	-

*Ocular estimate (1= Best)

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

Greenhouse Germination Winter 2004

Species	Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
Gayfeather	9091769	Nueces	2.0	20.0	20.0	20.0

***Germination count based on actual seed count.

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 collections of Hall's panicum were seeded in the greenhouse in January 2001. All three accessions were transplanted to the field in May 2001. All accessions had 100% survival and performed well during the year. Two accessions: 229051 (Maverick County) and 229052 (Nuevo Laredo, Mexico) had over 40% seed germination within the first 15 days in the greenhouse. Seed was collected from these three accessions in June 2001, and was germination tested in June 2002. Accession 9085331-Atascosa had

6%, accession 9229051-Maverick had 16%, and accession 9229052-Mexico had 0% germination in 28 days.

These collections were also evaluated for field performance from May to December 2002. Seed was collected throughout the summer and germination tested in February 2003. All three accessions had good field performance, but limited seed germination.

In December, nineteen new accessions of Hall's panicum were seeded in the greenhouse. All had poor germination and were reseeded in an attempt to get enough seedlings for a field planting. Four accessions had sufficient plants and were transplanted in to the field in May and June 2003. Three of these were later determined to be the wrong species when the plants began flowering, and were removed. This brought the total number of accessions at the end of 2003 to four.

These four collections were evaluated for field performance from May to October 2003. Seed was collected throughout the summer and was germination tested in June of 2004 (Table 1). All accessions had germination over 50%. The three older accessions did not show good signs of regrowth or seed production in 2003. The new accession had excellent field performance.

In December 2003, seventeen accessions of Hall's panicum were seeded in the greenhouse. All accessions had poor germination (0-6.5%) and were reseeded in an attempt to get enough seedlings for a field planting. Two accessions were determined to be the wrong species. Three new accessions were added to the existing field plot in June of 2004. Only one previous accession survived the winter, bringing the number of accessions in the plot to four. This plot was evaluated for field performance in July of 2004 (Table 2). Seed was collected in June, August, and November 2004. This harvest will be germination tested in 2005.

In January 2005, thirteen new accessions of Hall's panicum, as well as a second try of six accessions, were seeded in the greenhouse (Table 3). All except one accession had poor germination (0-4.3% & 64%) and most were reseeded in an attempt to get enough seedlings for a field planting. Four accessions were determined to be the wrong species. Accessions with enough plants will be added to the field plot in the spring of 2005.

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

2003 Harvest Germination

Accession Number	Origin (County)	Grams Harvested	3 Days %	14 Days %	28 Days %
9085331	Atascosa	1.5	50.7	62.7	63.3
9229051	Maverick	0.7	39.3	54.0	54.0
9229052	Mexico	1.0	49.3	55.3	56.0
9089159	Cameron	8.0	54.7	63.3	64.0

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

Table 2. STPMC-P-0139- RA Hall's Panicun

Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9089200	Uvalde	90	-	6.0	6.0	6.0	5.0	6.0
9090512	Bexar	100	-	5.0	5.0	5.0	5.0	5.0
9085327	Uvalde	100	-	6.0	6.0	5.0	5.0	6.0
9089159	Cameron	100	100	5.0	4.0	5.0	5.0	4.0

*Ocular estimate (1= Best)

Table 3. Study STPMC-P-0139- RA Hall's Panicum

Greenhouse Germination Winter 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9090435	Kinney	2.0	3.5	3.5	3.5
9091807	Bee	0.1	0.5	0.6	0.6
9091817	Zapata	0.1	1.6	1.8	1.2
9091834	Zapata	0.0	0.3	0.5	0.8
9091852	Zapata	0.0	1.0	1.0	1.0
9091887	Maverick	0.1	0.5	0.5	0.5
9091888	Dimmit	0.0	0.3	0.3	0.3
9091890	Webb	0.0	0.3	0.3	0.3
9093171	Duval	0.1	0.1	0.1	0.1
9093179	Bexar	2.6	4.3	4.3	4.3
9093212	Dimmit	0.1	0.5	0.8	0.7
9091840	Zapata	-	63.3	64.0	62.7
9093195	Webb	0.0	0.1	0.3	0.3

***Germination count based on actual seed count.

** Decrease in germination due to death loss.

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*). The results for Mexican hat and hairy grama will be discussed here. The germination and field evaluation information for the other species can be found under the individual species' project.

Three Mexican hat accessions were germinated in the greenhouse in Spring 2002. They were transplanted into the field in June 2002 and evaluated for field performance from June to December 2002. All three accessions had good field performance and seed production. Seed was collected throughout the summer of 2002 and germination tested in the spring of 2003. Germination was good, ranging from 76-80%. The hairy grama had some germination (7-43% - based on number of cells containing plants, not number of seeds planted), but most of the plants died shortly after germination.

These were not planted in the field. 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.). The information for these species, other than gayfeather, can be found under the individual species' project.

Two accessions of gayfeather were transplanted into the field in July 2003. They were evaluated for field performance during July and August 2003. The gayfeather accessions had poor field performance overall, but this was due to the very late planting date. A small amount of seed was collected from accession 9086149, and it will be germination tested in 2005.

The three Mexican hat accessions were evaluated for field performance from May to August 2003. The Mexican hat accessions experienced a lot of plant death after the fall rains in 2002. Many of the plants did not recover and regrow in 2003. Those plants that did survive performed well and produced seed. This seed was collected and will be germination tested in 2004. The Mexican hat plot was removed at the end of 2003, and will be tried again when a site with more drainage is available. It appears that sufficient seed could be produced growing this species like an annual.

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. Germination results for these species are discussed under the individual species' project. Those accessions with good germination will be transplanted to field plots in the spring and summer of 2004. The seed nursery will continue to expand as more collections are received.

The three gayfeather accessions were evaluated for field performance in July of 2004 (Table 1). The two old accessions regrew even larger than the pervious year. The new accession had problems with survival and general vigor. Accession 9086149-Kleberg produced a lot of seed and the new

accession produced some in November. This seed was collected and will be germination tested in 2005.

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*), and 3 yellow Indiangrass were germinated in the greenhouse. Germination results for these species are discussed under the individual species' project. Germination information for the Mexican hat, Indian blanket (*Gallardia puchella*), gayfeather, clammyweed (*Polanisia dodecandra*), and partridge pea (*Chaemaecrista fasciculata*) are included here (Tables 2-6). Those accessions with good germination will be transplanted to field plots in the spring and summer of 2005. The seed nursery will continue to expand as more collections are received.

Table 1. Study STPMC-P-0140- RA South Texas Sand Plain Ecotype Project Initial Field Evaluation 2004

Species	Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*
Gayfeather	9086149	Kleberg	98	5.0	5.0	5.0	5.0
Gayfeather	9086222	Galveston	88	5.0	5.0	5.0	5.0
Gayfeather	9089162	Montgomery	60	7.0	7.0	7.0	5.0

*Ocular estimate (1= Best)

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

Greenhouse Germination Winter 2004 – Gayfeather

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9091769	Nueces	2.0	20.0	20.0	20.0
9093213	Duval	0.0	0.0	0.0	0.0
9093220	Duval	2.6	7.0	7.4	6.9

***Germination count based number of seeds planted.
** Decrease in germination due to death loss.

Table 3. Study STPMC-P-0140- RA South Texas Sand Plain Ecotype Project

Greenhouse Germination Winter 2004 – Clammyweed

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %
9089005	Dimmit	23.0	32.6	31.6
9090738	Unknown	0.6	0.6	0.6
9089004	Webb	42.0	34.8	31.0
9091926	Zapata	34.8	40.8	40.8
9091944	Dimmit	54.4	55.8	53.6
9093169	Dimmit	42.2	47.0	47.0

***Germination count based number of seeds planted.
** Decrease in germination due to death loss.

Table 4. Study STPMC-P-0140- RA South Texas Sand Plain Ecotype Project

Greenhouse Germination Winter 2004 – Partridge Pea

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9089151	Goliad	1.0	4.5	5.0	6.5
9089202	Medina	0.0	2.0	2.0	3.0
9089250	La Salle	10.0	10.0	10.0	15.0
9091774	Nueces	14.0	20.0	20.5	23.0
9091908	Kenedy	1.5	5.0	8.0	9.5
9091917	Kenedy	1.5	3.0	4.0	5.5
9091921	Kenedy	2.0	4.5	5.0	6.5
9091931	Kenedy	1.0	6.0	8.5	12.5
9091950	Dimmit	3.0	4.5	5.5	4.5
9089110	Atascosa	5.0	4.5	6.0	6.0

***Germination count based number of seeds planted.
** Decrease in germination due to death loss.

Table 5. Study STPMC-P-0140- RA South Texas Sand Plain Ecotype Project

Greenhouse Germination Winter 2004 – Mexican Hat

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9086157	Kenedy	14.5	14.5	14.5	14.5
9086158	Kleberg	25.5	27.0	25.5	24.5
9086159	Kenedy	18.5	20.0	20.5	17.5
9086300	Kenedy	43.5	44.5	42.0	30.0
9088517	Kenedy	51.0	51.0	50.0	44.5
9088523	Kenedy	37.0	42.0	41.0	41.0
9088600	Bee	5.5	7.0	6.5	6.5
9088602	Bee	1.0	2.0	3.0	3.5
9088670	Karnes	4.0	7.0	7.0	8.0
9088674	Karnes	10.5	12.0	12.0	11.5
9088700	Duval	12.5	19.0	18.0	18.5
9088701	Bee	12.0	12.0	13.5	13.5
9088702	Bee	4.5	7.0	7.5	8.0
9088714	Bee	17.5	20.0	20.0	19.5
9088762	Webb	5.0	5.0	5.0	5.0
9088769	Webb	6.0	12.0	12.0	12.0
9088781	Jim Hogg	24.0	24.0	24.0	24.0
9089027	Webb	2.5	4.0	4.0	4.0
9089031	Uvalde	4.0	6.5	6.5	7.0
9089134	Uvalde	6.5	8.0	8.5	8.5
9090317	Hidalgo	0.5	1.5	1.5	1.5
9090551	Duval	0.0	0.5	0.5	0.5
9090709	Bexar	0.5	4.0	4.0	4.0
9091904	Jim Hogg	2.5	4.0	4.0	4.0
9091907	Jim Hogg	4.0	4.5	4.5	4.5
9091911	Webb	0.0	0.0	0.0	0.0
9091940	Frio	0.0	0.0	0.0	0.0
9091942	Starr	8.5	10.0	10.0	9.5
9091957	Bexar	2.0	6.5	6.5	6.5

***Germination count based number of seeds planted.

** Decrease in germination due to death loss.

Table 6. Study STPMC-P-0140- RA South Texas Sand Plain Ecotype Project

Greenhouse Germination Winter 2004 - Indian Blanket

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %
9086242	Kenedy	6.8	6.8	6.8
9086284	Live Oak	15.6	16.0	14.6
9086286	Atascosa	19.6	20.0	22.2
9086298	Duval	12.8	14.2	14.2
9086309	McMullen	21.8	16.2	19.4
9088519	Jim Hogg	30.0	35.8	32.6
9088533	Frio	34.8	21.6	26.4
9088589	Bee	23.2	15.2	23.2
9088663	Karnes	21.8	15.2	17.0
9088748	Jim Hogg	40.8	42.4	43.0
9088768	Jim Hogg	18.4	17.0	15.6
9089104	Goliad	29.6	28.8	22.4
9089106	Goliad	21.0	20.5	20.5
9089107	Goliad	19.0	19.0	19.0
9090458	Jim Hogg	5.4	6.0	6.0
9090492	Frio	9.4	11.6	11.2
9090494	Frio	25.6	26.8	25.8
9090539	Duval	8.8	11.2	10.0
9091903	Duval	6.6	6.2	6.6
9091905	Dimmit	11.2	11.0	11.0
9091910	Duval	-	11.8	11.2
9091918	Jim Hogg	2.8	2.8	3.0
9091934	Live Oak	18.2	19.4	18.6
9093225	Cameron	1.8	2.2	2.2

***Germination count based number of seeds planted.

** Decrease in germination due to death loss.

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: Three collections of green sprangletop were seeded in the greenhouse in January 2001. One accession, 9053744-Cameron, was transplanted to the field in May 2001. This accession had good performance until the fall rains, when all fifty plants died suddenly. Four new accessions of green sprangletop were germinated in the greenhouse in December 2002. Three of these accessions were transplanted to the field in May of 2003. These accessions were evaluated for field performance from June to October 2003. All three accession performed well, but accession 9088972-Atascosa was better overall. Seed was also collected from these accessions and was germination tested in June of 2004 (Table 1). Germination was very low (0-1%).

Seven new accessions of green sprangletop were germinated in the greenhouse in December 2003. Five were reseeded in an effort to get enough plants for the field. All seven accessions were added to the Rio Grande Ecotype field plot. This brings the number of accessions in the plot to ten.

This plot was evaluated for field performance in July 2004 (Table 2). Again all accession performed well, but accession 9088972-Atascosa appeared more dense and to produce more seed. Seed was also collected from these accessions and will be germination tested in 2005. One new accessions of green sprangletop was germinated in the greenhouse in December 2004 (Table 3). This accession will be transplanted to the field in the spring of 2005.

Table 1. Study STPMC-P-0143- RA South Texas Green Sprangletop
2003 Harvest Germination

Accession Number	Origin (County)	Grams Harvested	7 Days %	15 Days %	28 Days %
9089102	Goliad	17.3	0.0	0.7	0.7
9052757	Duval	34.9	0.7	1.3	1.3
9088972	Atascosa	55.6	0.0	0.0	0.0

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

Table 2. Study STPMC-P-0143- RA South Texas Green Sprangletop
Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9089102	Goliad	100	5.0	5.0	5.0	5.0	5.0
9052757	Duval	100	6.0	7.0	6.0	6.0	5.0
9088972	Atascosa	100	4.0	4.0	4.0	5.0	4.0
9090435	Kinney	96	5.0	5.0	6.0	5.0	-
9090419	Kinney	100	5.0	5.0	5.0	5.0	-
9090411	Kinney	94	5.0	5.0	5.0	5.0	-
9090480	Starr	100	5.0	4.0	5.0	5.0	-
9052752	Val Verde	100	5.0	5.0	5.0	5.0	-
9088630	Dimmit	100	5.0	5.0	5.0	5.0	-
9090720	Frio	100	5.0	5.0	5.0	5.0	-

*Ocular estimate (1= Best)

Table 3. Study STPMC-P-0143- RA South Texas Green Sprangletop

Greenhouse Germination Winter 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9091858	Zapata	15.0	22.0	22.5	20.5

*Germination count based on actual seed count.
** Decrease in germination percent due to death loss.

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: Seven collections of silver bluestem were seeded in the greenhouse in February 2002. All accessions had good germination in the greenhouse based on the number of cells containing plants, not the actual number of seeds planted. Four accessions were transplanted to the Rio Grande Plain Ecoregion plot and four accessions were transplanted to the South Texas Sand Plain Ecoregion plot in June 2002. Both of the Ecoregion field plots were evaluated for performance in the field from June to December of 2002. One of the four collections planted for the Rio Grande Plain Ecoregion exhibited above average performance in all characteristics (9086215-Atascosa). One of the four collections planted for the South Texas Sand Plain Ecoregion also performed above average (9086214-Kenedy). All collections at the Annex were seen to have fertility problems due to the soil type.

Seed was collected from all accessions throughout the summer and fall of 2002 and germination tests were performed in March 2003. Though accessions in the PMC plot had much better vegetative performance, the accessions at the Annex had about double the seed germination rate.

In December 2002, thirty new silver bluestem accessions were seeded in the greenhouse. Twenty-six new accessions were added to the Rio Grange Plains Ecoregion plot in April 2003. One new accession that had been held over from the 2002 greenhouse planting was also added in May 2003, bringing the total number of accessions to 33. No new accessions were added to the South Texas Sand Plain Ecoregion plot in 2003, leaving the total number of accessions at 4.

Both of the Ecoregion field plots were evaluated for performance in the field from May to August of 2003. Twelve of the collections planted for the Rio Grande Plain Ecoregion exhibited above average performance in one or more characteristics in 2003 but 2 acccessions performed better than all others in plant vigor, plant density, and seed production (9088764-Duval and 9088585-Bee). In the plot planted for the South Texas Sand Plain Ecoregion, accession 9086217-Kleberg seemed to perform slightly better than accession 9086214-Kenedy and both were better than the others. Again, the collections at the Annex seemed to have fertility problems, but the accessions in the clay soil also showed some yellowing in 2003. The annex plot also had lower numbers for percent regrowth. Seed was collected from all accessions throughout the summer and fall of 2003 and germination tests will be performed in 2005. No new accessions were seeded in the greenhouse in December 2003. Two accessions that were not part of the Rio Grande Plain ecoregion were removed from that plot in December 2003.

Both of the Ecoregion field plots were evaluated for performance in the field in July of 2004 (Table 1). Most accessions planted for the Rio Grande Plain Ecoregion exhibited good performance with a few accessions showing slightly higher density and/or seed production. In the plot planted for the South Texas Sand Plain Ecoregion, accession 9086216-Kenedy performed slightly lower than the others. Again, the collections at the Annex seemed to have more of a fertility problem than the accessions in the clay soil. Seed was collected from all accessions in 2004 and will be germination tested in 2005. In December 2004, thirty new silver bluestem accessions for the Rio Grande Ecotype plot were seeded in the greenhouse to fill in missing counties (Table 2). Those accessions with good germination will be transplanted to Rio Grande Ecotype field plot in the spring and summer of 2005.

Table 1. Study STPMC-P-0244- RA Silver Bluestem Initial Field Evaluation 2004

ANNEX (sandy soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086151	Jim Wells	89	100	5.0	5.0	5.0	5.0	5.0
9086214	Kenedy	93	100	5.0	5.0	5.0	5.0	5.0
9086216	Kenedy	96	100	6.0	7.0	5.0	5.0	5.0
9086217	Kleberg	100	100	5.0	5.0	5.0	5.0	5.0

PMC (clay soil)

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086151	Jim Wells	100	100	5.0	5.0	5.0	5.0	7.0
9086214	Kenedy	100	100	5.0	5.0	5.0	5.0	7.0
9086215	Atascosa	100	100	5.0	5.0	5.0	5.0	5.0
9086216	Kenedy	100	100	5.0	5.0	5.0	5.0	5.0
9089094	LaSalle	100	100	5.0	5.0	5.0	5.0	5.0
9086270	Jim Hogg	98	100	5.0	5.0	5.0	5.0	5.0
9086299	Starr	100	100	5.0	5.0	5.0	5.0	5.0
9088678	Goliad	96	100	5.0	5.0	5.0	5.0	6.0
9088983	LaSalle	100	100	5.0	5.0	5.0	5.0	5.0
9088573	Zavala	100	100	5.0	5.0	5.0	5.0	5.0
9088656	Wilson	100	100	5.0	5.0	5.0	5.0	5.0
9088570	Zavala	100	100	5.0	5.0	5.0	5.0	6.0
9089003	Uvalde	100	100	5.0	5.0	5.0	5.0	7.0
9088741	Jim Hogg	100	100	5.0	5.0	5.0	5.0	5.0
9088830	Jim Wells	100	100	5.0	5.0	5.0	5.0	5.0
9088833	Jim Wells	100	100	5.0	5.0	5.0	5.0	6.0
9088931	Dimmit	100	100	5.0	5.0	5.0	5.0	7.0
9088906	Dimmit	100	100	5.0	5.0	5.0	5.0	7.0
9086310	Duval	100	100	5.0	5.0	5.0	5.0	5.0
9088592	Bee	100	100	5.0	5.0	5.0	5.0	5.0
9088613	Frio	100	100	5.0	5.0	5.0	5.0	5.0
9088764	Duval	100	100	5.0	5.0	5.0	5.0	4.0
9088585	Bee	100	100	4.0	4.0	5.0	5.0	5.0
9088669	Goliad	100	100	5.0	4.0	5.0	5.0	6.0
9086274	Atascosa	100	100	5.0	5.0	5.0	5.0	7.0
9089186	Median	100	100	5.0	5.0	5.0	5.0	6.0
9088973	Frio	100	100	4.0	5.0	5.0	5.0	4.0
9088945	Atascosa	100	100	6.0	6.0	5.0	5.0	7.0
9088801	Webb	96	100	6.0	6.0	5.0	5.0	5.0
9088724	Webb	100	100	5.0	5.0	5.0	5.0	5.0
9045834	Webb	34	100	6.0	6.0	6.0	5.0	6.0

*Ocular estimate (1 = Best)

Table 2. Study STPMC-P-0244- RA Silver Bluestem

Greenhouse Germination Winter 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9088660	Karnes	4.4	15.6	20.0	20.2
9089204	Uvalde	3.8	5.3	5.3	5.5
9090309	Cameron	32.0	34.8	32.7	33.5
9090421	Kinney	0.2	0.5	0.8	1.0
9090499	Bexar	0.0	0.3	0.5	0.6
9090529	McMullen	1.3	2.1	2.2	2.2
9090582	Frio	1.4	2.3	2.5	2.5
9090587	Medina	0.0	2.5	2.9	2.8
9090613	Maverick	27.0	29.7	29.9	29.0
9090644	Kinney	32.2	63.3	65.1	67.9
9090656	Live Oak	0.3	0.8	1.0	1.0
9090665	Maverick	10.5	12.1	11.7	11.7
9090698	Bexar	10.7	19.1	18.3	18.6
9090730	Wilson	21.8	28.9	27.6	27.9
9093177	Bexar	40.2	41.5	40.1	47.9

*Germination count based on actual seed count.
** Decrease in germination percent due to death loss.

Study Number: STPMC-P-0245- RA

Study Title: Range Plantings

Introduction: Much of south and south central Texas is rangeland planted with introduced species. Landowners are looking for new ways to improve rangeland production and wildlife habitat. Several government programs initiated by the Farm Bill, such as CRP, EQUIP, and WHIP, encourage the planting of native species. Furthermore, the CKWRI has coordinated an initiative called the South Texas Native (STN) Project to develop and promote native plants for the restoration and reclamation of habitats on private and public lands. The goal of the STN is to provide economically viable sources of plants and seeds for the restoration of South Texas plant communities.

Problem: Native plant seedings have had poor records of successful establishment. In order to get landowners to use native species and diversify their pasture plantings, improved seeding establishment must be obtained.

Objective: To evaluate range mixes, seed coating, and herbicide treatments to improve native plant establishment.

Discussion: Buffelgrass (*Pennisetum ciliare* (L.) Link) is a warm-season grass that has been introduced to South Texas from Africa. Buffelgrass is highly competitive in warm, dry environments and is resistant to heavy grazing and frequent fires. As a result, many areas in South Texas support stands of buffelgrass. However, monocultural stands of buffelgrass have been shown to support less diversity and abundances of native birds.

Aaron Tjelmeland, a graduate student at TAMUK, and the PMC are attempting to diversify dense stands of buffelgrass by interseeding native forbs and legumes. Three experiments at the Bomer Wildlife Management Area focus on using different herbicide regimes to establish native plants. In one experiment Imazapyr was used in an attempt to establish native grasses or native legumes, another experiment used glyphosate and clethodim to establish native forbs, and a third used glyphosate or Imazapic and fluazifop-P-butyl or clethodim to establish native legumes.

At the El Panal Ranch in Starr County another experiment is being conducted to determine the effect that diversifying buffelgrass will have on bobwhite quail (*Colinus virginianus*). For this experiment, BeeWild bundleflower (*Desmanthus bicornutus*) was interseeded into a monoculture buffelgrass stand. The plot was mowed and sprayed with glyphosate to clear strips in the buffelgrass and then planted into those strips. Clethodim, a grass selective herbicide, is applied when the buffelgrass begins to grow back so that the bundleflower has time to establish. Bobwhites have been collared with radio

transmitters and will continue to be monitored so that their movements may be observed as the bundleflower is establishing.

These plots were seeded in the fall of 2004. No seedling emergence occurred in 2004, but observation and data collection will continue into 2005.

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 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 sandy soil region known as the South Texas Sand Plain and the broad mixed soil region known as the Rio Grande Plain.

Discussion: Three collections of frostweed were seeded in the greenhouse in February 2001. Two accession had over 90% germination after 30 days in the greenhouse. However, germination count was based on number of cells with plants, not number of seeds per cell. All three accessions were transplanted to the same field plot at the PMC in July 2002. Seed was collected from these accessions throughout the summer of 2002. A germination test was performed on this seed in February 2003. All three accessions had over 50% germination in 15 days.

The three accessions were evaluated for performance in the field from August to December of 2002. All accessions performed well in the field. No serious insect, fungal, or fertility problems were observed.

The three accessions were again evaluated for field performance from May to October of 2003. All accessions again performed well in the field and produced seed. Accession 9086146-Frio had the thickest vegetative growth and accession 9086144-Jim Wells had the thinnest. It was noted that the plants began blooming and producing seed in March while plants in the wild did not produce seed till the fall. Seed was collected throughout the summer and fall of 2003 and will be germination tested in 2005. No insect, fungal, or fertility problems were observed. No new accessions were added to the plot

in 2003 or seeded in the greenhouse in December 2003, so the number of accessions in the plot for 2004 remained at three.

Accession 9086150-San Patricio was taken out of the plot to make it a Rio Grande Plain ecotype plot. The other two accessions were evaluated for field performance in July of 2004 (Table 1). All accessions again performed well in the field and produced seed. Seed was collected in November 2004 and will be germination tested in 2005. No insect, fungal, or fertility problems were observed. No new accessions were added to the plot in 2004. Three new accessions were seeded in the greenhouse in December 2004 (Table 2). These accessions will be added to the plot in the spring of 2005.

Table 1. Study STPMC-P-0346- RA Frostweed Initial Field Evaluation 2004

PMC (clay soil)

Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity *	Seed Production*
9086146	Frio	100	5.0	5.0	5.0	5.0	-
9086144	Jim Wells	100	5.0	5.0	5.0	5.0	-

*Ocular estimate (1 = Best)

Table 2. Study STPMC-P-0346- RA Frostweed

Greenhouse Germination Winter 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9088937	Atascosa	21.5	42.3	42.3	40.0
9089240	Wilson	8.8	14.0	14.0	13.8
9090465	Starr	0.3	10.8	10.8	12.8

*Germination count based on actual seed count.
** Decrease in germination percent due to death loss.

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 boarders, and right-of-ways on better soils and little disturbed sites (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, region along the Texas coast known as the Texas Coastal Prairie, and the broad mixed-soil region known as the Rio Grande Plain.

Discussion: Ten accessions of sideoats grama were seeded in the greenhouse in the spring of 2002. One accession (9086152-Karnes) had 98% germination, while the other 9 accessions had 0-4% germination (based on the number of cells containing plants, not actual seed numbers). This accession was transplanted into the field for the Rio Grand Plains Ecotype in June 2002. It was evaluated for field performance from July to December 2002, and had good performance and excellent seed production. Seed was collected from the plants and germination tested, resulting in 0% germination in 28 days. After discussing this problem with a local seed producer, it was learned that thrips can cause problems with seed fill in sideoats grama.

Sixteen accessions were seeded in the greenhouse in the fall of 2002. Only six accessions had germination over 8% in 60 days. The others had <2% germination. If more seed was available, the accessions with low germination were reseeded in an attempt to get enough plants for the field. Ten accessions were added to the Rio Grande Plain plot in April 2003. Another accession received as transplants from Chris Best USFW was added in May. This brought the total number of accessions in the field plot to 12 for 2003. These accessions were evaluated from May (or June) till October 2003. Two accessions stood out with higher seed production (9088948-Frio and 9086200-Starr) and one accession had higher vigor and density (9089167-Uvalde). Seed was collected from these accessions and germination tested in June of 2004 (Table 1). There were wide differences in germination by accession (0.7 – 29.3%).

Two groupings of plant growth form seemed apparent in the plot. One group (8 accessions) had a taller upright form with less lodging. The other group (3 accessions) had a rounded mound form with more lodging. One accession was a mix of both types. These two groupings should be used when combining the accessions to develop the seed production fields.

In December 2003, twelve accessions of sideoats grama (6 for the Rio Grande Plain plot, 5 for a Texas Coastal Prairie plot, and 2 for a South Texas Sand Plain plot) that had poor germination in the 2002 greenhouse seeding were seeded again along with six new accession for the Rio Grande Plain plot. Thirty-five accessions for the Rio Grande Plain were also seeded in December 2003 for an off-center initial evaluation by South Texas Natives (STN). Both greenhouse seedings showed poor germination and were reseeded in an attempt to get enough seedlings for planting.

Eight accessions from seed and one from rootstock were added to the Rio Grande Ecotype plot in June of 2004. This brought the total number of accessions in this plot to 21 in 2004. One accession was planted at the Annex for the South Texas Sand Plain Ecotype plot. One cultivar (Pogue) was planted in a separate plot for comparison. These plots were evaluated for field performance in July of 2004 (Table 2). Only the older plantings were evaluated in the Rio Grande Ecoregion plot. One accession (9088948-Frio) stood out with higher seed production and density. Seed was also harvested from all plots and will be germination tested in 2005.

Eighteen accessions were planted at Rio Farms and 21 accessions and one cultivar were planted at Rancho Blanco by STN in 2004. One accession, 9090434- Kinney, with little original seed left, but good greenhouse germination was planted for isolated seed increase at the Agriculture Experiment Station in Beeville, Texas.

In December 2004, seven accessions of sideoats grama for the Rio Grande Plain plot that had poor germination in the 2003 greenhouse seeding were seeded again along with five new accession for the Rio Grande Plain plot and an additional cultivar "Premier" (Table 3). Most accessions showed poor germination and were reseeded in an attempt to get enough seedlings for planting. Accessions with enough plants will be transplanted into the Rio Grande Plain ecoregion plot and the offsite evaluations plots in the spring of 2005.

Table 1. Study STPMC-P-0347- RA Sideoats Grama

2003 Harvest Germination

Accession Number	Origin (County)	Grams Harvested	3 Days %	15 Days %	35 Days %
9086152	Karnes	107.5	0.7	1.3	1.3
9088634	Frio	130.6	6.7	13.3	14.0
9088730	Jim Hogg	79.3	4.0	9.3	10.0
9088942	Atascosa	90.8	2.0	8.7	12.0
9089065	Uvalde	130.1	12.7	34.7	35.3
9088518	Duval	66.0	4.7	29.3	29.3
9088948	Frio	88.2	2.7	18.0	20.7
9089167	Uvalde	236.3	6.0	18.0	20.0
9089178	Medina	55.4	0.7	6.7	12.0
9088961	Atascosa	116.2	1.3	8.0	10.0
9089156	Jim Hogg	36.9	2.7	8.7	9.3
9086200	Starr	135.6	0.0	0.7	0.7

***12 hours dark 20^{o}C (68^{o}F) / 12 hours light 30^{o}C (86^{o}F)

Table 2. Study STPMC-P-0347- RA Sideoats Grama Initial Field Evaluation 2004

PMC (clay soil)

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*	Plant Growth Form
9086152	Karnes	100	5.0	5.0	5.0	5.0	7.0	tall/less lodging
9088634	Frio	100	5.0	5.0	5.0	5.0	5.0	short mound/ lodging
9088730	Jim Hogg	90	5.0	5.0	5.0	8.0	6.0	mix of both types
9088942	Atascosa	96	5.0	5.0	5.0	5.0	5.0	tall/less lodging
9089065	Uvalde	96	5.0	5.0	5.0	5.0	5.0	tall/less lodging
9088518	Duval	100	6.0	6.0	5.0	5.0	5.0	short mound/ lodging
9088948	Frio	100	5.0	4.0	5.0	5.0	4.0	tall/less lodging
9089167	Uvalde	100	5.0	5.0	5.0	5.0	6.0	tall/less lodging
9089178	Medina	98	5.0	5.0	5.0	5.0	5.0	tall/less lodging
9088961	Atascosa	79	5.0	5.0	5.0	5.0	6.0	tall/less lodging
9089156	Jim Hogg	97	7.0	7.0	7.0	6.0	6.0	short mound/ lodging
9086200	Starr	98	5.0	5.0	5.0	5.0	6.0	tall/less lodging

Annex (sandy soil)

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*	Plant Growth Form
9086200	Starr	74	5.0	5.0	6.0	5.0	5.0	tall/less lodging

Cultivar - PMC (clay soil)

Name	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*	Plant Growth Form
"Pogue"	100	5.0	5.0	5.0	6.0	6.0	tall/less lodging

*Ocular estimate (1= Best)

Table 3. Study STPMC-P-0347- RA Sideoats Grama

Greenhouse Germination Winter 2004

Accession Number	Origin (County)	Ecoregion	15 Days %	30 Days %	45 Days %	60 Days %
9089108*	Goliad	Rio	0.0	0.0	0.0	0.0
9089124*	Medina	Rio	0.0	0.0	0.1	0.1
9090392*	Kinney	Rio	9.3	8.8	8.1	8.1
9090401*	Kinney	Rio	8.0	8.6	7.9	7.7
9090650*	Live Oak	Rio	0.0	0.0	0.0	0.0
9090651*	Kinney	Rio	7.5	7.5	7.3	7.2
9090652*	Kinney	Rio	5.2	5.5	5.4	5.4
9091785	Atascosa	Rio	0.0	0.0	0.1	0.1
9091894	Maverick	Rio	24.4	26.2	23.8	24.1
9091958	Bexar	Rio	0.3	0.7	0.7	0.7
9093162	Bexar	Rio	22.7	19.7	16.1	14.9
9093190	McMullen	Rio	4.1	4.6	3.9	4.2
"Premier"	cultivar	-	53.3	52.6	55.6	55.2

***Germination count based on number of spikelet clusters planted.

** Decrease in germination due to death loss.

* Accessions tried again due to low germination in 2003.

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: In December 2002, nine accessions of Engelmann's daisy were seeded in the greenhouse in "conetainers". Germination ranged from 11.5-50.5%. After a few months the plants began looking chlorotic and had unexplained death loss. All nine accessions were transplanted into a Rio Grande Plain ecoregion plot in April 2003. The roots broke off of almost all the plants as they were removed from their containers. This caused survival to be very low for 2003. The plot was evaluated for field performance from May to October 2003. Due to low plant survival, only minimal amounts of seed were collected.

Replants for eight of the accessions (one did not have seed left) were seeded in the greenhouse in September 2003. An old accession from 1986 was also seeded. This time the accessions were seeded in 6-inch paper bands to prevent root breaking during transplanting. The germination numbers were much lower than the year before and the old accession only had one plant germinate. The plants did not seem to have the chlorosis problems seen the year before. The plot was replanted in December 2003 and all but six of the replants were still alive by March 2004 and the plot looked good.
No new accessions were added to the plot in 2004. Seed was collected from the plot in May and June of 2004 and will be germination tested in 2005. The plot was evaluated for survival in July of 2004 (Table 1). The plants had

already produced their seed and had begun to die back. Survival was much improved after using the paper bands for transplants. No new accessions were available for seeding in December of 2004. The number of accessions in the plot remained at nine.

Table 1. Study STPMC-P-0348- RA Engelmann's Daisy Initial Field Evaluation 2004

Accession Number	Origin (County)	% Survival
9088582	Bee	92
9088575	Bee	80
9088581	Bee	84
9088667	Goliad	88
9088662	Goliad	94
9088668	Goliad	82
9088649	Karnes	80
9088677	Karnes	86
9086287	Jim Wells	53

*Ocular estimate (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: Fifteen accessions of awnless bush-sunflower were seeded in the greenhouse in the winter of 2002. Germination ranged from 0-40%, and 8 accessions were reseeded. Seedlings remained very small for months and began to turn yellow. They were treated with a liquid iron fertilizer three times over six weeks. The plants recovered and began to put on new growth. Thirteen accessions were transplanted to a Rio Grande Plain ecoregion plot in June of 2003. The roots broke off of many plants as they were removed from their containers. This caused survival to be low for 2003. The plot was evaluated for field performance from August to October 2003. None of the accessions stood out with high performance. Seed was collected from July to October 2003 and will be germination tested in 2005.

In December 2003, the 15 accessions were seeded again for replants as well as 3 new accessions. Six inch paper bands were used with this seeding. Germination for the replants ranged from 5.6 to 67%. This time the plants did not stay small, and the plants grew too big and too close together by the 60 day germination count. Due to a lack of air flow, fungus began to attack the seedlings. The seedlings were thinned, treated with Captan, and moved to the shadehouse.

Four accessions were added to the Rio Grande Plain ecoregion plot in April of 2004. The plot was evaluated for field performance in July of 2004 (Table 1). Again most of the accessions appeared to have similar field performance.

Seed was collected from the plot in June, July, and August and will be germination tested in 2005.

In December 2004, the nine new accessions were seeded in the greenhouse (Table 2). Germination ranged from 2.5 to 31%. New accessions with good germination will be added to the field plot in 2005.

Table 1. Study STPMC-P-0349- RA Awnless Bush-Sunflower Initial Field Evaluation 2004

Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9089208	Uvalde	60	5.0	5.0	5.0	5.0	5.0
9088770	Webb	90	5.0	6.0	5.0	5.0	5.0
9088549	Zavala	73	6.0	7.0	6.0	5.0	6.0
9090532	Duval	58	5.0	6.0	5.0	5.0	5.0
9088588	Bee	90	6.0	5.0	7.0	6.0	5.0
9089191	Uvalde	76	5.0	5.0	6.0	5.0	5.0
9089007	Dimmit	58	6.0	6.0	7.0	5.0	6.0
9090642	Dimmit	50	6.0	6.0	6.0	5.0	6.0
9089030	Dimmit	96	5.0	6.0	5.0	5.0	5.0
9088546	Frio	80	5.0	6.0	5.0	5.0	5.0
9088590	Bee	84	5.0	5.0	6.0	5.0	5.0
9090501	Frio	84	5.0	6.0	5.0	5.0	5.0
9088713	Webb	80	6.0	6.0	7.0	5.0	5.0
9088605	Frio	94	6.0	6.0	5.0	5.0	5.0
9089015	LaSalle	88	6.0	6.0	6.0	5.0	5.0
9088578	Bee	94	5.0	5.0	5.0	5.0	5.0
9088601	Live Oak	100	5.0	5.0	5.0	5.0	5.0

*Ocular estimate (1 = Best)

Table 2. Study STPMC-P-0349- RA Awnless Bush-Sunflower Greenhouse Germination Winter 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9091816	Bee	3.0	17.0	19.0	25.0
9091899	Webb	0.0	2.3	2.0	2.5
9091928	Dimmit	2.0	4.5	4.5	5.5
9091936	Live Oak	5.5	11.5	12.0	12.5
9091945	Webb	0.0	2.0	3.0	4.0
9091947	Webb	0.0	4.0	5.0	5.0
9091948	Dimmit	0.0	2.0	2.0	3.0
9093165	Dimmit	22.0	31.5	31.5	31.0
9093181	Bexar	6.0	18.0	22.0	25.0

***Germination count based on actual seed count.
** Decrease in germination due to death loss.

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: Twenty-five accessions of big bluestem were seeded in the greenhouse in March 2002. Due to wet field conditions these were not transplanted in to the field, and were carried over for planting in 2003. In December 2002, another 10 accessions were seeded in the greenhouse for the Texas Coastal Prairie ecoregion. Germination ranged from 0-18%. In April 2003, seven accessions were planted in a Texas Coastal Prairie ecoregion plot. These accessions were evaluated from May to August 2003. The plot performed well and several accessions appeared to have high plant density. Several of the accessions were contaminated with switchgrass, and these were removed. Only minimal seed was collected and will be germination tested in 2005.

In December 2003, three accessions of big bluestem for the Texas Coastal Prairie plot that had poor germination in the 2002 were seeded again. Nine new accessions (4 for the Texas Coastal Prairie plot, 5 for a Rio Grande Plain plot, and 5 for a South Texas Sand Plain plot) were also seeded. Accessions with enough plants will be transplanted into the appropriate ecoregion plot in the spring of 2004. Seven accessions for the Rio Grande Plain were also seeded in December 2003 for an off-center initial evaluation. Accessions with good germination will be planted at Rio Farms. Both greenhouse seedings showed poor germination and were reseeded in an attempt to get enough seedlings for planting.

In June 2004, four accessions were added to the Texas Coastal Prairie ecoregion plot and one was removed. This brought the number of accession in that plot to 11. These accessions were evaluated for field performance in June and July of 2004 (Table 1). Some of the accessions were still contaminated with a few weeds. Seed was collected from this plot and will be germination tested in 2005.

In June 2004, six accessions were planted in a Rio Grange Plain ecoregion plot. Four accessions were also planted in a South Texas Sand Plain ecoregion plot. Due to the late planting date these accessions had little growth. Only minimal seed was collected from the Sand Plain plot. South Texas Natives (STN) planted seven accessions in an offsite evaluation plot at Rio Farms in the spring of 2004.

In December 2004, one accessions of big bluestem that had poor germination in the 2003 was seeded again. Six new accessions (5 for the Texas Coastal Prairie plot, 1 for a Rio Grande Plain plot, and 2 for a South Texas Sand Plain plot) were also seeded (Table 2). Accessions with enough plants will be transplanted into the appropriate ecoregion plot and the offsite plot in the spring of 2005.

Table 1. Study STPMC-P-0350- RA Big Bluestem Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086160	San Patricio	98	6.0	5.0	6.0	5.0	-
9086167	San Patricio	100	5.0	5.0	5.0	5.0	-
9086168	San Patricio	100	5.0	5.0	5.0	5.0	-
9088691	Aransas	100	5.0	6.0	6.0	6.0	-
9086170	San Patricio	98	5.0	5.0	5.0	6.0	-
9086223	Galveston	46	7.0	8.0	7.0	7.0	-
408928	Victoria	45	5.5	5.0	5.5	5.0	-
9090269	Victoria	100	5.0	5.0	5.0	5.0	-
9090333	Refugio	92	5.0	5.0	5.0	5.0	-
9090263	Kleberg	100	5.0	5.0	5.0	5.0	-
9090276	Kleberg	97	5.0	5.0	5.0	5.0	-

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0350- RA Big Bluestem

Greenhouse Germination Winter 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9086165*	Kenedy	2.1	2.3	2.2	2.4
9090341	Victoria	1.6	3.1	3.4	3.4
9090752	Kleberg	3.0	6.6	6.8	6.8
9090754	Nueces	4.2	8.7	8.9	9.4
9090757	Kleberg	2.0	3.9	4.5	4.5
9090759	Nueces	21.5	26.3	34.2	32.9
9093163	Bexar	0.0	0.1	0.1	0.1

** Decrease in germination due to death loss.
* Accessions tried again due to low germination in 2002.

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 (Correll and Johnston, 1996). 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 native, adapted seed available at a reasonable price for restoration, reclamation of habitat, and xeriscaping in the South Texas region.

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: One accession of white prairie clover (9086123-Austin) was seeded in the greenhouse in February 2002. This accession was planted in a Texas Coastal Prairie ecoregion plot in July of 2002. It performed well, but did not have adequate time to produce much seed.

In December 2002, one new accession of white prairie clover was seeded in the greenhouse (9088887-Brazoria). Germination was only 3.2% due to hard seed. This accession was added to the field plot in June 2003. Both accessions were evaluated for field performance from May to August 2003. Accession 9086123-Austin performed very well and looked to have good potential for seed production. Seed was collected from both accessions. The roundhead prairie clover produced a large amount of seed, but the new accession did not have time to establish and produce seed. After seeing both accessions side-by-side, it was determined that the first accession was actually roundhead prairie clover (*Dalea multiflora*).

Germination tests using scarification were performed in September 2003 on the seed harvested from the 9086123-Austin accession. Germination was increased from 53% germination to 85% with just 10 seconds of scarification in a sandpaper scarifier. Germination was increased to 98% with 30 seconds of scarification. In December 2003, both accessions were seeded in the greenhouse with 5 seconds of scarification. This greatly improved the germination (47% 9086123-Austin & 64% 9088887-Brazoria). No new accessions were available to add to the plot in 2004.

Both accessions were evaluated for field performance in June and July of 2004 (Table 1). Accession 9086123-Austin was a much denser species and

produced more seed. Seed was collected from both accessions and will be germination tested in 2005. A seed increase row of accession 9086123-Austin was planted in June of 2004. It did not produce seed in 2004.

In December 2004, two new accessions of roundhead prairieclover were seeded in the greenhouse with 5 seconds of scarification (Table 2). Both accessions turned out to have mostly empty pods. Neither accession produced enough surviving seedlings to transplant to the evaluation plot.

Table 1. Study STPMC-P-0351- RA White Prairie Clover Initial Field Evaluation 2004

Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086123	Austin	98	4.4	4.4	4.4	4.4	3.0
9088887	Brazoria	86	7.0	7.0	5.0	5.0	6.0

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0351- RA White Prairie Clover Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9091874	Lavaca	5.7	4.3	4.3	4.3
9091875	Lavaca	17.0	15.0	150	17.0

* Seed scarified 5 seconds in a sandpaper scarifier to increase germ.

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: Two accessions of Florida paspalum (9086204-Harris and 9086122-Austin) were seeded in the greenhouse in February 2002. These were planted in a Texas Coastal Prairie ecoregion plot in May 2002. Both accessions had good field performance in 2002 but seed harvested in 2002 had 0% germination for both accessions. In January 2003, one new accession (9089165-Montogomery) was seeded in the greenhouse. This new accession as well as 15 plants of another accession (9088889-Brazoria) received as rootstock, were added to the field plot in May 2003. These four accessions were evaluated for field performance from May (or June) till August 2003. All accessions performed relatively well. Seed was collected from accessions 9086204-Harris, 9086122-Austin, and 9088889-Brazoria. Accession 9089165-Montogomery did not produce seed in 2003. This harvest was germination tested in November 2004 (Table 1). Accession 9088889-Brazoria had comparatively high germination. A lack of seed fill or seed dormancy may be causing the low results.

In December 2003, one new accession was seeded in the greenhouse, but it had been misidentified. The plot was evaluated for field performance in June and July 2004 (Table 2). Seed was harvested from this plot in June and November of 2004. This harvest will be germination testes in 2005. No new accessions were available for seeding in December of 2004. New accessions will be added to the plot as received.

Table 1. Study STPMC-P-0352- RA Florida Paspalum 2003 Harvest Germination

Accession Number	Origin (County)	Grams Harvested	3 Days %	17 Days %	28 Days %
9086204	Harris	152.1 (50 plants)	0.0	0.7	0.7
9086122	Austin	142.6 (50 plants)	0.0	0.7	0.7
9089165	Montgomery	no seed (50 plants)	-	-	-
9088889	Brazoria	5.6 (15 plants)	0.0	10.0	11.3

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

Table 2. Study STPMC-P-0352- RA Florida Paspalum Initial Field Evaluation 2004

Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086204	Harris	100	5.0	5.0	5.0	5.0	5.0
9086122	Austin	100	5.0	5.5	5.0	5.0	5.0
9089165	Montgomery	100	5.0	5.5	5.0	5.0	6.5
9088889	Brazoria	100	5.0	5.5	5.0	5.0	5.5

*Ocular estimate (1= Best)

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: Twenty-four accessions of yellow Indiangrass were seeded in the greenhouse in March 2002. Due to wet field conditions these were not transplanted in to the field. In December 2002, another seven accessions were seeded in the greenhouse for the Texas Coastal Prairie ecoregion. Germination ranged from 0-15%. In May 2003, three accessions were planted in a Texas Coastal Prairie ecoregion plot. These accessions were evaluated from June to August 2003. The plot as a whole did not seem to perform well. Only minimal seed was collected.

In December 2003, four accessions of yellow Indiangrass for the Texas Coastal Prairie plot that had poor germination in the 2002 were seeded again. Eleven new accessions (5 for the Texas Coastal Prairie plot, 6 for a Rio Grande Plain plot, and 3 for a South Texas Sand Plain plot) were also seeded. Nine accessions for the Rio Grande Plain were also seeded in December 2003

for an off-center initial evaluation. Both greenhouse seedings showed poor germination and were reseeded in an attempt to get enough seedlings for planting. One accession (9089224-Wilson) had comparatively high germination in both seedings. Extra plants from this accession were sent to the Agriculture Experiment Station in Beeville for isolated seed increase.

In June 2004, four accessions were added to the Texas Coastal Prairie ecoregion plot. This plot was evaluated in June and July of 2004 (Table 1). One accession, 9088693–Aransas, appeared to have better field performance overall. Six accessions were planted in a Rio Grange Plain ecoregion plot. Two accessions were also planted in a South Texas Sand Plain ecoregion plot. Due to the late planting date these accessions had little growth. Only minimal seed was collected from the Sand Plain plot. South Texas Natives (STN) planted seven accessions in an offsite evaluation plot at Rio Farms in the spring of 2004.

In December 2004, four accessions of yellow Indiangrass that had poor germination in the 2003 was seeded again. Nine new accessions (6 for the Texas Coastal Prairie plot and 3 for a Rio Grande Plain plot) were also seeded (Table 2). Two accessions had comparatively high germination. Accessions with enough plants will be transplanted into the appropriate ecoregion plot and the offsite plot in the spring of 2005.

Table 1. Study STPMC-P-0353- RA Yellow Indiangrass Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086124	Kleberg	100	6.5	7.5	6.0	9.0	5.0
9088693	Aransas	90	4.0	4.0	4.0	4.0	-
9086221	Galveston	100	5.5	5.5	5.5	5.0	-
9090335	Victoria	100	5.0	5.0	5.0	5.0	-
9090287	Kleberg	100	5.0	5.0	5.0	5.0	-
9090300	Kleberg	100	5.0	5.0	5.0	5.0	-
9089164	Montgomery	85	5.0	5.0	5.0	5.0	-

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0353- RA Yellow Indiangrass Greenhouse Germination 2004

Accession Number	Origin (County)	Ecoregion	15 Days %	30 Days %	45 Days %	60 Days %
9086189*	Kenedy	Rio, Sand	0.0	0.0	0.1	0.1
9090335*	Victoria	Gulf	0.1	0.5	0.6	0.9
9090336*	San Patricio	Gulf	0.2	0.3	0.4	0.4
9090343*	Victoria	Gulf	0.1	0.1	0.1	0.1
9089230	Wilson	Rio	0.6	0.9	1.0	1.1
9093164	Bexar	Rio	35.0	40.1	48.2	48.2
9093170	Bexar	Rio	12.5	13.0	14.6	15.4
9090261	Victoria	Gulf	0.0	0.0	0.0	0.1
9090274	Victoria	Gulf	0.1	0.8	1.2	1.2
9090747	Matagorda	Gulf	0.1	0.6	1.8	2.2
9090760	Nueces	Gulf	0.0	0.3	1.5	3.2
9091763	Nueces	Gulf	0.1	0.2	0.2	0.3
9093223	Ft. Bend	Gulf	0.1	0.2	0.3	0.7

* Accessions tried again due to low germination in 2002.

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 in the South Texas region.

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: The Jackson cultivar of eastern gamagrass was seeded in the greenhouse in Feburary 2002. It was planted in a Texas Coastal Prairie Ecoregion plot in July 2002. It performed well, but did not produce seed the first year. In December 2002, 5 new accessions were seeded in the greenhouse. Four of these accession were added to the field plot in April 2003. Another accession (9088888-Brazoria), that was received as rootstock, was added in June 2003. All six accessions were evaluated for field performance from May (or planting date) to August 2003. Field performance of all the accessions was good, but only four of the accessions produced minimal seed. This seed will be germination tested in 2005. No new accessions were seeded in the greenhouse in December 2003.

The plot was evaluated for field performance in June and July of 2004 (Table 1). Field performance of all the accessions was good. Seed was harvested in August and will be germination tested in 2005. No new accessions were seeded in the greenhouse in December 2004. Accessions will be added to the plot as received.

Table 1. Study STPMC-P-0354- RA Eastern Gamagrass Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
Jackson	Jackson	90	5.0	5.0	5.0	5.0	5.0
9088872	San Patricio	100	5.0	5.0	5.0	5.0	5.0
9088878	San Patricio	100	5.0	5.0	5.0	5.0	5.0
9086254	San Patricio	100	6.0	6.0	5.0	5.0	5.5
9089126	San Patricio	100	5.0	5.0	5.0	5.0	5.0
9088888	Brazoria	90	6.0	6.0	5.0	5.0	5.5

*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 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 prairie acacia. Prairie acacia collections will be evaluated for adaptation in the South Texas region.

Discussion: Three prairie acacia accessions were planted in the field in clay soils in May 2000. The accession from LaSalle County (#9076907) had the best survival, growth, and seed production of the three collections evaluated on both clay and sandy soils in 2001. Seeds from accessions 9076909 and 9076907 were harvested in 2001 and germinated in June 2002 (4 & 16%). These accessions were not evaluated in 2002, but three accessions included in the desmanthus plot were determined to be prairie acacia during evaluations in 2002. Seed was harvested from all six accessions and germinated in March 2003. Germination ranged from 6-78%.

Four new accessions of prairie acacia were seeded in the greenhouse in December 2002. Only accession 9085672 (from the Knox City PMC) exhibited good germination (58%, others 0-5%). These trays were reseeded to obtain enough seedlings to transplant into the field in the spring of 2003. These accessions were planted in the field in May 2003, but due to the containers used, most suffered root damage during transplanting. By June 2003, most of the plants were dead (0-31% survival). All prairie acacia plots were evaluated for field performance in 2003. Accession 9076907-LaSalle performed the best in the old plot and accessions 9076907-LaSalle and 9089147-McMullen performed the best in the new plot. Seed was collected if available. This seed harvest will be tested in 2005.

A scarification trial was done on seeds of accession 9076907-LaSalle to test for a hard seed coat. For both 2002 and 2003 seed harvests, germination was increased from 6% to 96% with only 1 second scarification in a sandpaper scarifier. With this success, all the old accessions and 2 new accessions were reseeded in the greenhouse in December 2003 using 1 second of scarification first. One accession had 0% germination, but all others improved to 59-79%. It was necessary to use PMC harvest seed for some accessions that did not have original seed left.

Nine accessions were planted in a new initial evaluation plot in April of 2004. This plot was evaluated for field performance in July 2004 (Table 1). All accessions except 9085672-Knox City performed well. Only accession 9076909-Frio was producing seed that early. Seed was collected from all accessions in the fall of 2004. This harvest will be germination tested in 2005.

One new accession was seeded in the greenhouse in December 2004 (Table 2). There was only a few seeds, so despite a good germination rate, not enough seedlings survived to transplant into the field. South Texas Natives also took some rootstock collections. These will be added to the plot in 2005. This species should have good commercial opportunities because of its adaptation and growth characteristics.

Table 1. Study STPMC-P-0355- RA Prairie Acacia Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9029653	Motley	86	5.0	5.0	5.0	5.0	-
9076907	LaSalle	84	5.0	5.0	5.0	5.0	-
9076909	Frio	98	4.0	4.0	4.0	5.0	5.0
9085305	Burleson	96	4.0	5.0	5.0	5.0	-
9085672	Knox City	100	7.0	6.0	6.0	5.0	-
9088941	Frio	100	5.0	5.0	5.0	5.0	-
9089174	McMullen	100	4.0	4.0	4.0	5.0	-
9090706	Webb	96	4.0	4.0	5.0	5.0	-
9090685	Dimmit	96	5.0	5.0	5.0	5.0	-

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0355- RA Prairie Acacia Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9091831	Webb	35.5	51.6	51.6	54.8

*Decrease in germination due to death loss.

** Seed scarified 1 second in sandpaper scarifier before planting.

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 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 golden dalea. Golden dalea collections will be evaluated for adaptation in the South Texas region.

Discussion: Two accessions of golden dalea (*Dalea aurea*) were planted on the sandy loam soils at the PMC Annex in 2001. Seed was collected from these accessions in 2001 and germinated in June 2002 (56 & 78%).

Seed was also collected throughout the summer of 2002 and germinated in March 2003. When the 2002 seeds were cleaned out of the hulls, it was noticed that both immature green and mature yellow seeds were harvested. To determine if there was a difference in germination between the color of seeds, these two colors were germinated and recorded separately. It appears that while green seeds are less mature, they have a higher initial germination. This may be the result of a less developed or hardened seed coat. These accessions were also evaluated for performance in the field from May to December of 2002. Both accessions had harvester ants strip them of their leaves a couple of times throughout 2002 (especially accession 9076952). Attempts to control the ants were unsuccessful. This may have caused the poor field performance and survival.

Ten new accessions of golden dalea were seeded in the greenhouse in December 2002 (0.5 to 41% germination). Six accessions were added to the plot in May 2003. All eight accessions were evaluated for field performance from March (or May) till August 2003. After the plants grew out it was noticed that 2 accessions were *Dalea obvata* (pussyfoot) and 2 accessions were *Dalea nana* (dwarf dalea). *Dalea nana* has a low and sprawling growth

form that makes it difficult to maintain, and seed production is much lower. The *Dalea obvata* collections actually had more forage production and a larger seed harvest that *Dalea aurea* collections. There was also less seed shatter on the *D. obvata* collections. Seed was collected from all accessions and will be germination tested in 2005.

No new accessions were seeded in the greenhouse in December 2004. The plot was evaluated for field performance again in July of 2004 (Table 1). All accessions except the 2 pussyfoot had 0% survival. Survival of this species was not great, but it was better than the others. Seed was collected from all the accessions (off dead plants) in June and just the pussyfoot in November 2004. These harvests will be germination tested in 2005.

There was no original seed left of one pussyfoot accession. All accessions except 9086145-San Patricio will be taken out of the plot in 2005 to allow for an isolated seed harvest.

Table 1. Study STPMC-P-0356- RA Golden Dalea Initial Field Evaluation 2004

ANNEX (sandy soil)

Species	Accession Number	Origin (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
D. aurea	9076952	Jim Hogg	0	-	-	-	-	-
D. aurea	9076953	Jim Hogg	0	-	-	-	-	-
D. aurea	9086308	Kenedy	0	-	-	-	-	-
D. aurea	9086302	Kenedy	0	-	-	-	-	-
D. obvata	9086145	San Patricio	63	7.0	7.0	7.0	5.0	-
D. obvata	9076947	Victoria	60	8.0	8.0	8.0	5.0	-
D. nana	9088511	Jim Hogg	0	-	-	-	-	-
D. nana	9088938	Frio	0	-	-	-	-	-

*Ocular estimate (1 = Best)

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: Two accessions of rattlesnake master were seeded in the greenhouse in February 2002. These accessions were transplanted to a Texas Coastal Prairie Ecoregion plot in June 2002. They were evaluated for field performance in 2002, and both accessions did well. No seed was produced the first year.

One new accession was seeded in the greenhouse in December 2002. This accession was added to the field plot in June of 2003. The plot was again evaluated for field performance from May (or June) till August 2003. The plants began to dieback after fall rains, but came back fully from rootstock in the early spring of 2004. Seed was collected from the first two accessions and will be germination tested in 2005.

One new accession was seeded in the greenhouse in December 2003. It was added to the field plot in the June of 2004, bringing the number of accession in the plot to four. This plot was evaluated for field performance in June and July of 2004 (Table 1). All accessions again performed well. Seed was harvested from the three old accession in November 2004. The new accession was not mature enough to produce seed. This harvest will be germination tested in 2005. No new accessions were seeded in the greenhouse in 2004. New accessions will be added to the plot as received.

Table 1. Study STPMC-P-0357- WL Rattlesnake Master Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086131	Brazoria	98	5.0	5.0	5.0	5.0	5.0
9086220	Galveston	86	5.0	5.5	5.0	5.0	5.0
9088696	Aransas	100	5.0	5.0	5.0	5.0	5.0
9090737	Brazoria	96	7.0	7.0	7.0	5.0	-

*Ocular estimate (1= Best)

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). This species has five varieties, and three occur in the South Texas region (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: Two accessions of little bluestem were seeded in the greenhouse in February 2002. These were transplanted into a Texas Coastal Prairie ecoregion plot in June of 2002. These accessions were evaluated for field performance in 2002 and seemed to perform well, other than showing slight signs of chlorosis. In December 2002, one new accession was seeded in the greenhouse for the Texas Coastal Prairie ecoregion. In June 2003, this accession was added to the plot. These accessions were evaluated from May to August 2003. The plot as a whole still showed some signs of chlorosis. Only minimal seed was collected.

In December 2003, one accession of little bluestem for the Texas Coastal Prairie plot that had poor germination in the 2002 was seeded again. Fifteen new accessions (1 for the Texas Coastal Prairie plot and 14 for a Rio Grande Plain plot) were also seeded. This greenhouse seeding showed poor germination and was reseeded in an attempt to get enough seedlings for planting. Two accessions were added to the Texas Coastal Prairie plot in June of 2004. This plot was evaluated for field performance in June and July of

2004 (Table 1). One accession, 9089221-San Patricio, outperformed the others in this plot. Twenty accessions were planted in a Rio Grande Plain plot in June of 2004. This plot was planted too late to produce seed in 2004.

Twenty-four accessions for the Rio Grande Plain were also seeded in December 2003 for an off-center initial evaluation. This greenhouse seeding also showed poor germination and was reseeded in an attempt to get enough seedlings for planting. Twenty accessions were planted at Rio Farms and twenty-three accessions were planted at Bladerunner Farms by South Texas Natives. The PMC evaluated the Bladerunner plot in November of 2004 (Table 2). One accession, 9086176-Bexar, appeared to out perform all others at this site.

In December 2004, eighteen accessions of little bluestem (4 for the Texas Coastal Prairie plot and 14 for the Rio Grande Plains plot) and twenty accessions that may be seacoast or little bluestem (all for a Rio Grande Plains plot) were seeded in the greenhouse (Tables 3 & 4). Accessions with enough plants will be transplanted into the ecoregion plots in the spring of 2005. Accessions that have more than 50 plants will be given to South Texas Natives for their off-site Initial Evaluation plots in 2005. Additional accessions will be added to field plots as received.

Table 1. Study STPMC-P-0358- RA Little Bluestem Initial Field Evaluation 2004

Texas Coastal Prairie Plot (clay soil)

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086219	Harris	98	5.0	5.0	5.0	5.0	-
9086224	Colorado	78	8.0	8.0	8.0	8.0	-
9089221	San Patricio	100	4.0	4.0	4.0	5.0	-
9089161	Montgomery	90	7.0	7.0	7.0	5.0	-
9090334	Victoria	98	5.0	5.0	5.0	5.0	-

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0358- RA Little Bluestem Initial Field Evaluation 2004

Bladerunner Plot (sandy soil)
(Rep 1, Rep 2)

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9064474	DeWitt	(90, 100)	(7, 4)	(7, 5)	(5, 4)	(6, 4)	(6, 5)
9064459	Zavala	(90, -)	(6, -)	(6, -)	(5, -)	(7, -)	(5, -)
9090288	Wilson	(80, 100)	(5, 4)	(5, 4)	(6, 4)	(8, 7)	(5, 5)
9086177	Atascosa	(100, 50)	(6, 6)	(5, 5)	(6, 6)	(7, 8)	(4, 5)
9086180	Jim Wells	(100, 100)	(5, 4)	(5, 4)	(5, 5)	(5, 6)	(4, 5)
9089231	Wilson	(100, 100)	(5, 4)	(4, 4)	(5, 4)	(5, 7)	(5, 4)
9089226	Wilson	(100, 100)	(4, 4)	(4, 4)	(5, 4)	(6, 6)	(4, 4)
9064460	Zavala	(70, -)	(6, -)	(5, -)	(7, -)	(8, -)	(4, -)
9086176	Bexar	(100, 100)	(3, 3)	(2, 2)	(4, 3)	(3, 4)	(3, 3)
9090289	Wilson	(100, 100)	(5, 5)	(5, 5)	(5, 5)	(6, 6)	(5, 8)
9090295	Wilson	(100, 90)	(4, 6)	(5, 6)	(5, 5)	(7, 6)	(4, 6)
9064461	Zavala	(100, 100)	(4, 4)	(5, 4)	(5, 5)	(7, 6)	(3, 3)
9086178	Karnes	(50, 80)	(6, 5)	(6, 5)	(6, 5)	(5, 6)	(5, 4)
9090280	Brooks	(70, 100)	(3, 4)	(4, 5)	(5, 5)	(7, 8)	(4, 6)
9076892	Kenedy	(100, 100)	(3, 5)	(3, 5)	(4, 5)	(8, 8)	(4, 7)
9089225	Goliad	(100, 100)	(4, 4)	(4, 4)	(5, 4)	(7, 5)	(4, 4)
9086179	Atascosa	(80, 100)	(3, 3)	(4, 3)	(6, 4)	(8, 4)	(4, 6)
9086225	Goliad	(100, 100)	(4, 3)	(4, 3)	(4, 4)	(6, 6)	(4, 4)
9090371	Medina	(90, 100)	(4, 5)	(4, 5)	(5, 7)	(6, 7)	(5, 8)
9090283	Goliad	(90, 90)	(3, 4)	(3, 4)	(4, 4)	(5, 7)	(5, 3)
9090266	Goliad	(90, 100)	(4, 5)	(4, 5)	(5, 5)	(4, 7)	(5, 6)
9089229	Wilson	(100, 100)	(5, 4)	(5, 4)	(5, 5)	(7, 4)	(5, 6)
9089245	Wilson	(100, 100)	(4, 5)	(4, 4)	(4, 5)	(8, 7)	(3, 3)

*Ocular estimate (1= Best)

Table 3. Study STPMC-P-0358- RA Little Bluestem Greenhouse Germination 2004

Accession Number	Origin (County)	Ecoregion	15 Days %	30 Days %	45 Days %	60 Days %
9064459*	Zavala	Rio	0.0	0.0	0.0	0.0
9064460*	Zavala	Rio	0.0	0.3	0.3	0.3
9089226*	Wilson	Rio	0.1	13.5	22.6	26.5
9089245*	Wilson	Rio	0.2	13.6	16.5	17.6
9090371*	Medina	Rio	7.1	8.4	7.7	7.7
9089242	Victoria	Gulf	0.2	7.3	11.5	11.9
9090748	Matagorda	Gulf	0.0	2.4	5.3	9.7
9090749	Matagorda	Gulf	0.0	11.8	15.5	16.3
9090751	Bee	Rio	0.0	7.5	8.5	8.0
9091775	Atascosa	Rio	1.1	11.7	14.2	13.5
9091777	Atascosa	Rio	2.0	10.8	13.4	12.9
9091779	Atascosa	Rio	1.4	8.5	9.8	9.9
9091780	Atascosa	Rio	6.0	19.0	20.2	19.4
9091789	Atascosa	Rio	7.0	14.5	14.4	14.0
9091843	Zapata	Rio	0.6	6.1	8.0	7.9
9091952	Bexar	Rio	5.1	15.2	17.3	15.7
9091954	Bexar	Rio	17.0	32.8	33.2	28.6
9093224	Ft. Bend	Gulf	0.5	3.0	3.1	3.1

* Accessions tried again due to low germination in 2003.
** Decrease in germination due to death loss.

Table 4. Study STPMC-P-0358- RA Unknown Bluestem Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9089244	Brooks	0.0	0.4	0.6	0.7
9090262	Brooks	0.5	3.8	4.0	5.3
9090277	Brooks	0.2	2.3	2.9	2.8
9090280	Brooks	0.1	3.2	4.6	4.6
9090346	Jim Hogg	9.6	12.3	12.3	11.1
9090350	Jim Hogg	0.0	0.4	0.4	0.3
9090373	Jim Hogg	0.5	0.7	0.8	1.1
9090375	Jim Hogg	0.0	0.6	0.7	0.6
9090376	Jim Hogg	2.0	3.7	3.8	3.8
9090381	Jim Hogg	0.7	1.5	1.7	1.6
9090382	Jim Hogg	0.0	0.7	0.7	0.7
9090388	Jim Hogg	0.1	0.5	0.4	0.4
9090464	Jim Wells	3.0	6.0	6.0	5.6
9091799	Brooks	0.1	0.4	0.6	0.5
9091800	Jim Hogg	0.1	0.3	0.3	0.5
9091803	Brooks	0.1	1.2	1.4	1.4
9091805	Jim Hogg	7.6	14.9	15.8	14.6
9091808	Brooks	0.0	0.5	0.9	1.1
9091812	Jim Hogg	1.0	5.6	7.4	7.1
9086180	Jim Wells	7.4	9.1	8.8	8.4

***Germination count based on actual seed count.
** Decrease in germination due to death loss.

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: Two collections of switchgrass were planted in a Rio Grande Plain ecoregion plot in the winter of 2001. They both had good field performance, but harvest seed collected in 2002 had 0% germination. Twenty-two accessions of switchgrass were seeded in the greenhouse in Feburary 2002. Due to wet field conditions these were not transplanted in to the field.

In December 2002, 2 new accessions were seeded in the greenhouse. One accession was planted in a Texas Coastal Prairie ecoregion plot in April 2003. Both plots were evaluated for field performance in 2003. Field performance of all the accessions was good. Seed was collected in the fall of 2003 from the Rio Grande Plain Ecoregion plot and will be germination tested in 2005.

Seven new accessions were seeded in the greenhouse in December 2003. One accession was added to the Texas Coastal Prairie ecoregion plot and two accessions were added to the South Texas Sand Plain plot in June of 2004. Both plots were evaluated for field performance in June and/or July of 2004 (Table 1). All accessions performed well. Seed was collected from both plots in November and will be germination tested in 2005. Six accessions were planted in Rio Grande Plains plot in June 2004. Due to weed competition this plot did not produce seed in 2004.

Two accessions were seeded in the greenhouse in December of 2004 (Table 2). These accessions will be added to the Rio Grande Plains plot in 2005. New accessions will be added to the plots as received.

Table 1. Study STPMC-P-0359- RA Switchgrass Initial Field Evaluation 2004

Annex (South Texas Sand Plain Ecoregion)

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086194	Kenedy	100	5.0	5.0	5.0	5.0	-
9086193	Kenedy	100	5.0	5.0	5.0	5.0	-
9086191	Kenedy	100	5.0	5.0	5.0	5.0	-
9089241	Brooks	100	5.0	5.0	5.0	5.0	-

PMC (Texas Coastal Prairie Ecoregion)

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9088695	Aransas	100	5.0	5.0	6.0	5.0	-
9090297	San Patricio	100	5.0	5.0	5.0	5.0	-

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0359- RA Switchgrass Greenhouse Germination 2004

Accession Number	Origin (County)	Ecoregion	15 Days %	30 Days %	45 Days %	60 Days %
9089249	Wilson	Rio	7.5	18.4	18.7	in field
9093168	Bexar	Rio	70.2	78.4	82.4	in field

Study Number: STPMC-P-0460- RA

Study Title: Assembly and Evaluation of Arizona Cottontop (*Digitaria californica*)

Introduction: Arizona cottontop (*Digitaria californica*), also known as California cottontop, is a native, perennial grass that occurs in tufts or dense clumps (Gould, 1975). It grows 50-100 centimeters tall with stiffly erect culms from a firm, knotty base (Gould, 1975). The inflorescence blooms mainly from July to November and consists of densely flowered panicles 8-12 cm long bearing spikelets (Gould, 1975). Arizona cotton top is found on open, well drained soils throughout all regions of the State except the Pineywoods (Gould, 1975). Its range extends from Colorado to Texas, Arizona and northern 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 Arizona cottontop. Arizona cottontop collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: A composite block of Arizona cottontop was planted by South Texas Natives (STN) at Bladerunner Farms Poteet, Texas on in April of 2003. This plot consisted of five accessions from Webb Co. This plot performed well, but was discontinued in favor of evaluation plots of individual accessions.

Four Initial Evaluation plots were planted by STN in 2004. One is at the Plant Materials Center, consisting of 31 accessions for the Rio Grande Plains Ecotype project. Plots of these same 31 accessions were also planted by STN at Rancho Blanco near Rio Bravo (Webb Co.), Rio Farms in Monte Alto (Hidalgo Co.), and the Texas A&M Experiment Station in Uvalde, Texas in May of 2004. The plot at the Plant Materials Center was evaluated for field performance in July of 2004 (Table 1). Six accessions performed slightly above the other in density and seed production. Seed was collected in August of 2004 and will be germination tested in 2005.

The other plots are being evaluated by STN. Accessions will be added to the field plots as received.

Field Emergence Plots: Two types of plots were seeded in May of 2004 to observe seed emergence in the field. A Knox City PMC selection not coated, a South Texas composite not coated, and the same South Texas composite coated with dolemite clay were used in both tests. Ten by twenty foot flat plots were seeded at a rate of 20 PLS/ ft^2 and replicated three times for each accession. These plots were not irrigated. Ten foot long rod rows also seeded

at a rate of 20 PLS/ ft^2 and replicated three times per accession. The rod rows were irrigated.

These plots were evaluated in November 2004 (Table 2). In the flat plots, both the coated and non-coated South Texas composite had better performance and density than the Knox City selection. The seed coating did not appear to inhibit emergence. Statistical data will be collected on this plot in 2005. No seedlings emerged in the rod rows.

Table 1. STPMC-P-0460- RA Arizona Cottontop Initial Field Evaluation 2004

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9088848	Webb	100	5.0	5.0	5.0	5.0	5.0
9089095	La Salle	100	5.0	5.0	5.0	5.0	5.0
9090498	La Salle	100	5.0	5.0	5.0	5.0	5.0
9088890	Dimmit	100	5.0	5.0	5.0	5.0	5.0
9089189	Uvalde	100	5.0	5.0	5.0	5.0	5.0
9088838	Webb	94	5.0	5.0	5.0	5.0	5.0
9089181	Medina	100	5.0	4.0	5.0	5.0	4.0
9090681	Dimmit	100	5.0	5.0	5.0	5.0	5.0
9090607	Maverick	100	5.0	5.0	5.0	5.0	5.0
9089086	La Salle	100	5.0	5.0	5.0	5.0	5.0
9088930	La Salle	94	5.0	5.0	5.0	5.0	5.0
9088853	Webb	100	5.0	4.0	5.0	5.0	4.0
9088918	Dimmit	98	5.0	4.0	5.0	5.0	4.0
9090615	Duval	100	5.0	4.0	5.0	5.0	5.0
9090663	Maverick	100	6.0	5.0	5.0	5.0	5.0
9088895	Dimmit	98	5.0	5.0	5.0	5.0	4.0
9090597	Maverick	98	6.0	5.0	5.0	5.0	5.0
9085253	Jim Hogg	100	5.0	5.0	5.0	5.0	5.0
9088849	Webb	98	5.0	6.0	5.0	6.0	5.0
9090643	Dimmit	100	6.0	6.0	6.0	6.0	6.0
9090662	Maverick	96	6.0	7.0	6.0	6.0	6.0
9088957	Frio	100	5.0	5.0	5.0	5.0	5.0
9090575	La Salle	100	5.0	5.0	5.0	5.0	5.0
9088955	Frio	98	5.0	5.0	5.0	5.0	5.0
9088953	Frio	100	5.0	5.0	5.0	6.0	6.0
9086263	Zavala	98	5.0	5.0	5.0	5.0	5.0
9088857	Webb	100	5.0	6.0	5.0	6.0	5.0
9088852	Webb	100	5.0	6.0	5.0	6.0	5.0
9089084	Webb	100	5.0	6.0	5.0	5.0	6.0
9089072	Webb	96	5.0	5.0	5.0	5.0	4.0
9090619	Duval	100	5.0	6.0	5.0	5.0	5.0

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0460- RA Arizona Cottontop Field Emergence Evaluation 2004 Flat Plots

Seed	Rep	% Cover	Plant Vigor*	Foliage Density*	Foliage Production*	Resistance*	Uniformity*	Development Stage
Knox City (not coated)	1	15	5.0	5.0	5.0	5.0	5.0	Flw. & Seed
	2	20	6.0	6.0	5.0	5.0	5.0	Flw. & Seed
	3	10	7.0	7.0	6.0	6.0	6.0	Flw. & Seed
South TX Composite (not coated)	1	60	2.0	2.0	2.0	2.0	2.0	Flw. & Seed
	2	30	5.0	5.0	5.0	5.0	5.0	Flw. & Seed
	3	40	5.0	5.0	4.0	4.0	4.0	Flw. & Seed
South TX Composite (coated)	1	60	3.0	3.0	4.0	4.0	4.0	Flw. & Seed
	2	40	4.0	4.0	4.0	4.0	4.0	Flw. & Seed
	3	40	6.0	6.0	6.0	6.0	6.0	Flw. & Seed

*Ocular estimate (1= Best)

Study Number: STPMC-P-0361- RA

Study Title: Assembly and Evaluation of Slender Grama (*Bouteloua repens*)

Introduction: Slender grama (*Bouteloua repens*) is a native, perennial grass that occurs in tufts (Gould, 1975). It grows 20-45 centimeters tall with weak, slender culms (Gould, 1975). The inflorescence blooms mainly from April to December and consists of a culm bearing branches with spikelets (Gould, 1975). Slender grama is found in open or brushy pastures, road right-of-ways, and along streambanks in the South Texas Plains and lower edge of the Edwards Plateau regions of the State (Gould, 1975). Its range extends from Southern Texas, New Mexico, and Arizona south through Mexico, Central America, and the islands of the Caribbean to Venezuela and Colombia (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 slender grama. Slender grama collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: An Initial Evaluation plot of slender grama was planted by South Texas Natives (STN) at Bladerunner Farms Poteet, Texas in April of 2003. This plot consisted of five accessions. Twenty plants of accession 9088905 were also planted at the PMC for species observation. These plots are currently being evaluated for survival, foliage density, plant vigor, seed production, and other desirable agronomic characteristics that would make it a desirable range plant for South Texas. When the Bladerunner plot was evaluated by the PMC in April of 2004, all accessions seemed to be performing well. Seed will be collected by STN as available. Seed collected by STN in 2003 was germination tested in January of 2004 by STN (Table 1).

Nine accessions were seeded in the greenhouse in December of 2004 (Table 2). These will be planted in a PMC I.E.P. plot in the spring of 2005. Accessions will be added to the field plots as received.

Table 1. Study STPMC-P-0361- RA Slender Grama 2003 Harvest Germination

Accession Number	Origin (County)	Date Harvested	Total Grams	28 Days %
9088914	Dimmit	6-26-03	26.4	10.0
9088897	Webb	9-23-03	735.0	14.7
9088905	Dimmit	9-23-03	1148.0	22.7
9088914	Dimmit	9-23-03	940.0	32.0
9089049	Live Oak	9-23-03	1406.0	30.1
9089135	Medina	9-23-03	72.0	11.3

Table 2. Study STPMC-P-0361- RA Slender Grama Greenhouse Germination 2004

Accession Number	Origin (County)	15 Days %	30 Days %	45 Days %	60 Days %
9088897	Webb	59.3	60.5	61.0	57.5
9088905	Dimmit	37.0	39.5	41.8	50.3
9088914	Dimmit	73.5	78.3	78.0	77.5
9089049	Live Oak	38.0	38.0	38.0	38.0
9089135	Medina	3.0	5.5	5.0	5.0
9090634	Maverick	28.3	68.5	67.8	66.8
9090668	Maverick	37.3	58.8	57.0	58.0
9090670	Dimmit	-	13.5	17.0	17.0
9090710	Jim Hogg	25.5	34.3	34.0	34.0

** Decrease in germination due to death loss.

Study Number: STPMC-P-0362- RA

Study Title: Assembly and Evaluation of Texas Grama (*Bouteloua rigidiseta*)

Introduction: Texas grama (*Bouteloua rigidiseta*) is a native, perennial grass that occurs in dense tufts (Gould, 1975). It grows 15-40 centimeters tall with weak, slender culms (Gould, 1975). The inflorescence blooms from April to November under favorable conditions, and consists of a culm bearing branches with wedge shaped spikelet clusters (Gould, 1975). Texas grama is found in grasslands, grassy wood openings, road right-of-ways, and moist slopes in all portions of the state except the Pineywoods and extreme western portions (Gould, 1975). Its range extends from Oklahoma and Texas, and south to Coahuila and Tamaulipas, 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 Texas grama. Texas grama collections will be evaluated for adaptation in the broad mixed-soil region known as the Rio Grande Plain.

Discussion: An Initial Evaluation plot of Texas grama was planted by South Texas Natives (STN) at Bladerunner Farms Poteet, Texas in April of 2003. This plot consisted of 12 accessions. Twenty plants of accession 9089074 were also planted at the PMC for species observation. These plots are currently being evaluated for survival, foliage density, plant vigor, seed production, and other desirable agronomic characteristics that would make it a desirable range plant for South Texas. Slender grama seedlings invaded the plots, so it is possible that some seed collections may be contaminated. When the Bladerunner plot was evaluated by the PMC in April of 2004, the top four accessions were as follows: 9088599, 9088514, 9086281, and 9086282. Seed will be collected by STN as available. Seed collected by STN in 2003 was germination tested in January of 2004 by STN (Table 1).

At this time STN is continuing the evaluation of this species for release.

Table 1. Study STPMC-P-0362- RA Texas Grama 2003 Harvest Germination

Accession Number	Origin (County)	Date Harvested	Total Grams	28 Days %
9086275	Atascosa	07/01/03	12.2	75.3%
9086275	Atascosa	09/23/03	220.0	24.0%
9086281	Atascosa	07/01/03	37.0	71.3%
9086281	Atascosa	09/23/03	200.0	28.7%
9086282	Live Oak	07/01/03	17.0	66.0%
9086282	Live Oak	09/23/03	68.0	17.3%
9086282	Live Oak	09/23/03	46.0	24.7%
9086289	Atascosa	09/23/03	118.0	18.0%
9088514	Duval	09/23/03	124.0	24.0%
9088532	Zavala	06/26/03	11.8	62.0%
9088532	Zavala	07/01/03	11.4	68.0%
9088532	Zavala	09/23/03	102.0	59.3%
9088532	Zavala	09/23/03	20.0	10.0%
9088599	Bee	09/23/03	82.0	23.3%
9088708	Webb	07/01/03	7.5	68.0%
9088947	Atascosa	09/23/03	65.0	12.0%
9089044	Dimmit	06/26/03	8.0	7.3%
9089044	Dimmit	09/23/03	102.0	59.3%
9089074	Webb	09/23/03	28.0	50.0%

Study Number: STPMC-P-0363- RA

Study Title: Assembly and Evaluation of Hairy Grama (*Bouteloua hirsuta*)

Introduction: Hairy grama (*Bouteloua hirsuta*) is a native, perennial grass that occurs in dense tufts (Gould, 1975). It grows 15-40 centimeters tall with weak, slender culms (Gould, 1975). The inflorescence blooms from April to November under favorable conditions, and consists of a culm bearing branches with wedge shaped spikelet clusters (Gould, 1975). Texas grama is found in grasslands, grassy wood openings, road right-of-ways, and moist slopes in all portions of the state except the Pineywoods and extreme western portions (Gould, 1975). Its range extends from Oklahoma and Texas, and south to Coahuila and Tamaulipas, 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 hairy grama. Hairy grama 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: An Initial Evaluation plot of hairy grama was planted by South Texas Natives (STN) at Bladerunner Farms Poteet, Texas in April of 2003. This plot consisted of 11 accessions. Twenty plants of accession 9089054 were also planted at the PMC for species observation. An Initial Evaluation plot of Texas grama was planted by South Texas Natives (STN) at Bladerunner Farms Poteet, Texas in April of 2003. This plot consisted of 12 accessions. Twenty plants of accession 9089074 were also planted at the PMC for species observation. These plots are currently being evaluated for survival, foliage density, plant vigor, seed production, and other desirable agronomic characteristics that would make it a desirable range plant for South Texas. When the Bladerunner plot was evaluated by the PMC in April of 2004, most of the accessions had very poor performance. The top accession was 9086154. Seed will be collected by STN as available.

At this time STN is continuing the evaluation of this species for release.

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 wetlands 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: Nineteen accessions of gulf cordgrass were vegetatively collected in 2000. These were divided and planted in the field in October 2000. These collections were evaluated for field performance during 2001. All collections had good survival and vegetative production. Accessions 9068194 (Brazoria County) and 9076889 (Kleberg County) had the best seed production. The best overall performance was from accession 9076889. Seed was collected from all accessions and was germination tested in 2002. Based on field performance, seed production, and seed germination three accessions (9068191-Chambers, 9068201-San Patricio, and 9076889-Kleberg) were selected for continued evaluation in 2002. Seed was collected throughout 2002 from these three accessions and germinated in March 2003. Germination results for 2002 were not as high as those for the 2001 collection. All accessions were evaluated for field performance from May to

December 2002. The same three accessions were selected again for continued evaluation.

In 2003, only the top three accessions were evaluated for field performance and harvested. Field performance for all three accessions was good, but seed production in 2003 was very low (Table 1). The harvested seed was germination tested in 2004 (16-29%). No new accessions were added to the field plot in 2002.

In 2004, again only the top three accessions were evaluated for field performance and harvested. Field performance of accession 201 was much better than the others (Table 1). Seed was harvested and will be germination tested in 2005. No new accessions were added to the field plot in 2002.

Field Emergence Plots: Two types of plots were seeded in May of 2004 to observe seed emergence in the field. Gulf cordgrass accessions 201 and 889 were used in both tests. Ten by twenty foot flat plots were seeded at a rate of 20 PLS/ ft^2 and replicated three times for each accession. These plots were not irrigated. Ten foot long rod rows also seeded at a rate of 20 PLS/ ft^2 and replicated three times per accession. The rod rows were irrigated.

These plots were evaluated in November 2004 (Table 2). There was no seedling emergence in the flat plots. In the rod rows accession 201 appeared to have better emergence.

Table 1. Study STPMC-P-0126-WE Gulf Cordgrass 2004 Field Evaluation

Accession Number	Source (County)	% Survival	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production
9068191	Chambers	100	8.0	8.0	7.0	5.0	8.5
9068201	San Patricio	100	5.0	5.0	5.0	5.0	5.0
9076889	Kleberg	100	6.0	6.0	6.0	5.0	7.5

*Ocular estimate (1= Best)

Table 2. Study STPMC-P-0126-WE Gulf Cordgrass Field Emergence Evaluation 2004 Rod Rows

Accession Number	Rep	% Cover	Plant Vigor*	Foliage Density*	Foliage Production*	Resistance*	Uniformity*	Development Stage
201	1	6 plants	5.0	5.0	5.0	5.0	5.0	Veg.
201	2	7 plants	5.0	5.0	5.0	5.0	5.0	Veg.
201	3	6 plants	5.0	5.0	5.0	5.0	5.0	Veg.
889	1	5 plants	5.0	5.0	5.0	5.0	5.0	Veg.
889	2	0 plants	-	-	-	-	-	-
889	3	3 plants	5.0	5.0	5.0	5.0	5.0	Veg.

*Ocular estimate (1= Best)

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