

TEXAS A&M UNIVERSITY-KINGSVILLE
CAESAR KLEBERG WILDLIFE RESEARCH INSTITUTE
SOUTH TEXAS NATIVES
KINGSVILLE, TEXAS

And

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
E. "KIKI" DE LA GARZA PLANT MATERIALS CENTER
KINGSVILLE, TEXAS

NOTICE OF RELEASE OF STARR GERMPLASM LONGSPIKE SILVER BLUESTEM
SELECTED CLASS OF NATURAL GERMPLASM

Texas A&M University-Kingsville, Caesar Kleberg Wildlife Research Institute, *South Texas Natives* and the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), E. "Kika" de la Garza Plant Materials Center announce the release of a selected class of longspike silver bluestem [*Bothriochloa longipaniculata* (Gould) Allred & Gould] for the South Texas Ecoregion.

This plant will be referred to as Starr Germplasm longspike silver bluestem and is released as a selected class of certified seed (natural track). Starr Germplasm was tested under the USDA NRCS accession numbers 9086151, 9086214, 9086217, 9086274 and 9086299. Seed of Starr Germplasm longspike silver bluestem release will be identified by USDA NRCS accession number 9112614.

This alternative release procedure is justified because there are no existing Texas commercial sources of tested and adapted longspike silver bluestem. The potential for immediate use is high, especially for upland wildlife plantings, highway rights-of-way revegetation, reclamation of energy exploration sites and for inclusion in range seeding mixes.

A. Proposed Variety Name and Temporary Designation:

STARR GERMPLASM LONGSPIKE SILVER BLUESTEM

B. Family, kind, genus and species:

Family: Poaceae

Tribe: Andropogoneae

Kind: Longspike silver bluestem, longspike beardgrass

Genus and species: *Bothriochloa longipaniculata* (Gould) Allred & Gould (see NFGEL lab report on verification).

C. Origin and breeding history of the variety:

Collection Site Information: Accession 9086151 was collected by Forrest Smith on December 4, 2001 from native plants located along county road 433 in Jim Wells County, Texas at 27° 28' 09" N. latitude and 98° 07' 31" W. longitude (MLRA 83). Soil type of the collection site is a Runge fine sandy loam (USDA NRCS Web Soil Survey).

Accession 9086214 was collected by Forrest Smith on November 11, 2001 from native plants located at the La Poloma Ranch in Kenedy County, Texas at 27° 07' 20" N. latitude and 97° 57' 17" W. longitude (MLRA 83). Soil type of the collection site is a Sauz loamy fine sand (USDA NRCS Web Soil Survey).

Accession 9086217 was collected by Paula Maywald on October 18, 2001 from native plants located at the King Ranch in Kleberg County, Texas (MLRA 83).

Accession 9086274 was collected by Forrest Smith and Cody Lawson on May 9, 2002 from native plants located at the Peeler Ranch in Atascosa County, Texas at 28° 43' 25" N. latitude and 98° 29' 40" W. longitude (MLRA 83). Soil type of the collection site is an Imogene fine sandy loam (USDA NRCS Web Soil Survey).

Accession 9086299 was collected by Forrest Smith on April 13, 2002 from native plants located along FM 649 west of La Gloria in Starr County, Texas at 26° 41' 14" N. latitude and 98° 44' 42" W. longitude (MLRA 83). Soil type of the collection site is a McAllen fine sandy loam (USDA NRCS Web Soil Survey).

Breeding history: Plants evaluated in all trials were grown from the original seed collections. Breeder seed of each of the accessions was also grown from isolated increase plots established using the original seed collection of each accession. All seed increase plots were grown in isolation from other *Bothriochloa longipaniculata* accessions, and from wild populations of the species. No intentional breeding, selection or genetic manipulation has been carried out on these accessions.

D. Objective description of the variety:

Description:

Longspike silver bluestem is a native, perennial bunch grass with glabrous culms, branched near the base, ranging from 70-115 cm tall. Culms are usually greater than 2 mm wide and leaves are well distributed on the culm. It has a ligule that is 1.8-2.4 mm long, glabrous and truncate at the tip. Leaf blades are 15-25 cm long, 4-6 mm wide, glabrous and frequently rolled. The inflorescence is a contracted panicle 10 to 17 cm long and roughly 1.5-2.2 cm broad. Panicle branches are appressed or ascending, one per node, with densely villous, white hairs obscuring spikelets. The pedicels have silky-white villous hairs up to 1 cm long. Pedicellate spikelets are

sterile and reduced to a linear membrane. Fertile sessile spikelets are 3-4 mm long and 1.0-1.3 mm wide. Glumes shiny green, blunt, and as long as the spikelet but unequal in length. Lemmas have one awn, 1.0-1.8 cm long, bent near the base. Caryopsis is yellow and 1.6-2.0 mm long. Chromosome number is $2n=120$ (Gould 1975). The plants produce seed mostly from May through November. Longspike silver bluestem has an average of 527,472 seeds per pound.

Potential Uses: Starr Germplasm longspike silver bluestem is recommended for upland wildlife plantings, highway rights of way revegetation, energy exploration reclamation and for inclusion in range seeding mixes. It is a fair to good livestock forage and competes well with exotic grasses such as buffelgrass (*Pennisetum ciliare*). Meyer and Brown (1985) reported in-vitro dry matter digestibility (IVDMD) at 44.6% and crude protein (CP) at 7.5% for silver bluestem (*Bothriochloa sacchariodes*) a closely related species. Willard and Schuster (1973) found that crude fiber was generally high (between 32% and 38%) in silver bluestem (*Bothriochloa sacchariodes*). Longspike silver bluestem provides nesting cover for birds, foraging habitat for raptors and fawning cover for deer (Hatch et al, 1999).

E. Evidence

Method of Breeding and Selection:

Initial Evaluation

As part of an effort to collect, evaluate, and release germplasms of a variety of plants native to South Texas, personnel from E. "Kika" de la Garza Plant Materials Center and South Texas Natives obtained seed of silver bluestem (*Bothriochloa* spp.) from 41 field locations in South Texas. Initial evaluations began in 2002 at the USDA NRCS E. "Kika" de la Garza Plant Materials Center (PMC), Kingsville, Texas. In February of 2002, seven accessions of silver bluestem were seeded in the greenhouse and all accessions had good germination. Five accessions were transplanted to the PMC field plot representing the Rio Grande Plains ecoregion and four accessions were transplanted to the Annex field plot representing the South Texas Sand Plains ecoregion. Both field plots were evaluated for plant performance from June to December of 2002 (Table 1). Accession 9086217 exhibited above average performance in all characteristics at the PMC field plot and accession 9086214 performed above average at the Annex field plot. Seed was collected from all accessions throughout the summer and fall of 2002 and germination tests were performed in March 2003 (Table 2). Accession 9086214 produced the most seed from the 2002 harvest with the highest seed germination (44%) after 28 days from the annex field plot, and the highest seed germination (20%) after 28 days from the PMC plot.

In December of 2002, 30 new accessions were seeded in the greenhouse and 27 of those accessions were added to the field plots bringing the total number of accessions being evaluated to 32. Both field plots were evaluated for plant performance in the field from May to August of 2003 (Table 3). Evaluations were based on percent of plants that survived, the amount of regrowth after dormancy, vigor based on leaf color as well as height and width of plant and the abundance of leaves, density of leaves per height of plant, resistance to diseases and insects, and tolerance to cold, heat and drought, uniformity in timing and height of plant vegetation and

inflorescence development, and the developmental stage of the plants. Twelve of the accessions planted at the PMC field plot exhibited above average performance in one or more characteristics in 2003. At the Annex field plot, accessions 9086214 and 9086217 again exhibited the best performance among the collections being evaluated on the Delfina fine sandy loam soil. Seed was collected from all accessions throughout the summer and fall of 2003 and germination tests were run in 2004 (Table 4).

Both field plots were evaluated for plant performance in July of 2004 (Table 5). Most accessions exhibited good performance with a few accessions showing slightly better seed production or foliage density. South Texas Natives (STN) germination tested the 2004 seed harvest from the PMC field plot. Seed germination was very low for all accessions ranging from only 0-2%. The PMC germination tested the Annex harvest from 2004 (Table 6). Accession 9086217 had the highest seed germination at 8%. The low germination rates are probably more of an indication of poor seed fill rather than inherent germination potential.

Nine new accessions were added to the PMC field plot in May of 2005, bringing the total number under evaluation to 40. A seed harvest was made in June of 2005 and germination tested in 2006 (Table 7). The field plots were not evaluated in 2005 as it had become apparent that the assembly included more than one species of *Bothriochloa*. A taxonomic evaluation determined 4 different species: longspike silver bluestem (*Bothriochloa longipaniculata*), silver bluestem (*Bothriochloa laguroides* sub. *torreyana*), pinhole bluestem (*Bothriochloa barbinodis* var. *perforata*) and cane bluestem (*Bothriochloa barbinodis* var. *barbinodis*). Upon review of this information, only the evaluations of longspike silver bluestem continued. The accessions of longspike silver bluestem had the greatest range in geographic locations and types of soils. There were more accessions of longspike silver bluestem with above average performance in one or more plant characteristics. Longspike silver bluestem also has shade tolerance, a characteristic not noted in the other species.

Field evaluations were conducted on longspike silver bluestem in both 2006 and 2007 (Table 8 and 9). Following evaluation, we selected five accessions for seed increase and further review. We chose accessions 9086214 and 9086217 because of their excellent performance on sandy soils. We then selected 9086299 from Starr county because it had been consistently the best performing accession of longspike silver bluestem. Then to get good geographic coverage we needed two more accessions, one for the central portion of south Texas and one for the northwest portion. We chose 9086151 from Jim Wells County to represent the central portion. This accession consistently performed better than average on both clay and sandy soils over a five-year evaluation period. And for the northwest, we chose 9086274 from Atascosa County.

Table 1. Plant performance of *Bothriochloa* spp. from the PMC and Annex field plots in 2002.

PMC (Cranell sandy clay loam)

Accession Number	Source (County)	% Survival	Foliage Density*	Resistance*	Seed Production*
9086151	Jim Wells	100	5.0	5.0	5.5
9086214	Kenedy	96	6.0	6.0	6.0
9086215	Atascosa	100	5.0	5.0	3.5
9086216	Kenedy	96	5.5	5.8	4.5
9086217	Kleberg	100	3.5	4.0	5.5

*Ocular estimate (1= Best)

Annex (Delfina fine sandy loam)

Accession Number	Source (County)	% Survival	Foliage Density*	Resistance*	Seed Production*
9086151	Jim Wells	58	8.5	8.5	8.0
9086214	Kenedy	91	4.5	4.3	4.5
9086216	Kenedy	91	5.5	5.8	5.5
9086217	Kleberg	88	5.8	5.8	6.5

*Ocular estimate (1= Best)

Table 2. Grams harvested and percent germination of *Bothriochloa* spp. accessions from the PMC and Annex field plots in 2002.

PMC (Cranell sandy clay loam)

Accession Number	Source (County)	Grams Harvested	7 Days %	14 Days %	28 Days %
9086151	Jim Wells	74.9	10	10	14
9086214	Kenedy	79.2	14	20	20
9086215	Atascosa	84.2	8	10	12
9086216	Kenedy	70.3	2	6	6

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

Annex (Delfina fine sandy loam)

Accession Number	Source (County)	Grams Harvested	7 Days %	14 Days %	28 Days %
9086151	Jim Wells	9.3	26	30	32
9086214	Kenedy	96.8	42	44	44
9086216	Kenedy	38.2	34	38	42
9086217	Kleberg	92.4	14	16	16

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

Table 3. Plant performance of *Bothriochloa* spp. from the PMC and Annex field plots in 2003.

Annex (Delfina fine sandy loam)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086151	Jim Wells	84	70	7.5	7.5	7.5	6.5	6.5
9086214	Kenedy	93	80	5.8	5.8	5.8	5.0	5.5
9086216	Kenedy	96	60	6.8	7.0	6.5	5.0	6.8
9086217	Kleberg	100	80	5.5	5.0	5.5	5.0	5.3

*Ocular estimate (1= Best)

PMC (Cranell sandy clay loam)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance*	Uniformity*	Seed Production*
9086151	Jim Wells	100	100	5.3	5.3	5.3	5.0	6.0
9086214	Kenedy	100	90	5.7	5.3	6.0	5.0	6.0
9086215	Atascosa	100	90	6.0	6.0	5.0	5.0	4.3
9086216	Kenedy	100	90	6.7	6.3	5.3	5.7	5.7
9089094	LaSalle	100	90	5.7	6.0	5.3	5.3	6.0
9086270	Jim Hogg	98	90	5.3	4.3	5.3	5.0	4.5
9086299	Starr	100	90	5.7	5.7	5.3	5.0	4.5
9088678	Goliad	96	90	7.6	8.0	8.0	5.7	7.5
9088983	LaSalle	100	90	6.0	6.0	6.0	5.0	7.0
9088573	Zavala	100	90	5.3	5.3	5.3	5.0	4.0
9088656	Wilson	100	90	5.0	5.3	5.3	5.3	3.7
9088570	Zavala	100	90	6.0	6.0	5.7	5.7	8.0
9089003	Uvalde	100	90	6.3	6.0	6.3	6.7	7.0
9088741	Jim Hogg	100	90	5.0	5.0	5.0	5.0	6.5
9088830	Jim Wells	100	90	6.5	6.5	6.5	5.0	4.5
9088833	Jim Wells	100	90	7.0	6.0	7.0	7.0	7.0
9088931	Dimmit	100	90	5.0	5.3	5.0	5.0	8.5
9088906	Dimmit	100	90	4.6	4.6	5.0	5.0	6.5
9086310	Duval	98	90	5.3	5.0	5.3	5.0	5.0
9088592	Bee	100	90	5.3	5.0	5.0	5.0	5.0
9088613	Frio	100	90	5.0	4.3	5.0	5.0	6.0
9088764	Duval	100	90	4.0	4.0	5.0	5.0	4.0
9088585	Bee	100	90	4.0	4.0	5.0	5.0	4.0
9088669	Goliad	100	90	6.3	6.0	6.7	5.0	6.5
9086274	Atascosa	100	90	4.7	5.7	5.0	5.0	7.0
9089186	Medina	100	90	4.3	4.3	5.0	5.0	7.0
9088973	Frio	100	90	4.7	4.7	5.0	5.0	4.0
9088945	Atascosa	100	90	5.6	5.6	6.0	5.0	8.0
9088801	Webb	96	90	5.3	5.6	5.3	5.0	6.5
9088724	Webb	100	90	5.7	5.7	5.7	5.0	6.5
9045834	Webb	34	90	10	10	10	5.0	10

*Ocular estimate (1= Best)

Table 4. Percent germination of *Bothriochloa* spp. accessions from the PMC and Annex field plots in 2003.

Annex (Delfina fine sandy loam)

Accession Number	Origin (County)	7 Days %	14 Days %	28 Days %
9086151	Jim Wells	2	2	3
9086214	Kenedy	0	0	2
9086216	Kenedy	2	2	2
9086217	Kleberg	2	5	6

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

PMC (Cranell sandy clay loam)

Accession Number	Origin (County)	7 Days %	14 Days %	28 Days %
9086151	Jim Wells	1	1	3
9086214	Kenedy	4	5	6
9086215	Atascosa	2	2	2
9086216	Kenedy	2	2	2
9086217	Kleberg	4	4	4
9089094	LaSalle	3	3	3
9086270	Jim Hogg	1	1	1
9086299	Starr	1	3	3
9088678	Goliad	5	5	5
9088983	LaSalle	0	0	0
9088573	Zavala	3	3	5
9088656	Wilson	1	1	1
9088570	Zavala	2	3	3
9089003	Uvalde	2	3	3
9088741	Jim Hogg	3	3	3
9088830	Jim Wells	2	2	2
9088833	Jim Wells	4	4	4
9088931	Dimmit	4	4	4
9088906	Dimmit	4	4	4
9086310	Duval	3	3	3
9088592	Bee	4	4	4
9088613	Frio	8	8	8
9088764	Duval	4	4	4
9088585	Bee	4	4	4
9088669	Goliad	4	5	5
9086274	Atascosa	1	1	1
9089186	Medina	1	1	1
9088973	Frio	8	8	8
9088945	Atascosa	1	1	1
9088801	Webb	8	8	8
9088724	Webb	5	5	5

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

Table 5. Plant performance of *Bothriochloa* spp. from the PMC and Annex field plots in 2004.

PMC (Cranell sandy clay loam)

Accession Number	Source (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	Medina	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)

Annex (Delfina fine sandy loam)

Accession Number	Source (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

*Ocular estimate (1= Best)

Table 6. Grams harvested and percent germination of *Bothriochloa* spp. accessions from the Annex field plot in 2004.

Annex (Delfina fine sandy loam)

Accession Number	Origin (County)	Grams Harvested	7 Days %	14 Days %	28 Days %
9086151	Jim Wells	30	2.0	2.7	2.7
9086214	Kenedy	37	0.7	2.0	2.0
9086216	Kenedy	36	2.7	2.7	2.7
9086217	Kleberg	35	6.7	8.0	8.0

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

Table 7. Grams harvested and percent germination of *Bothriochloa* spp. accessions from the PMC and Annex field plots in 2005.

PMC (Cranell sandy clay loam)

Accession Number	Origin (County)	Species	Date Harvested	Grams Harvested	7 Days %	14 Days %	28 Days %
9086151	Jim Wells	longspike	6/21/2005	27.0	4.7	4.7	4.7
9086214	Kenedy	longspike	6/21/2005	25.0	4.7	4.7	4.7
9086215	Atascosa	silver	6/21/2005	32.0	0.7	0.7	1.3
9086216	Kenedy	silver	6/21/2005	54.0	1.3	1.3	1.3
9089094	LaSalle	pinhole	6/21/2005	33.0	2.0	2.7	2.7
9086270	Jim Hogg	cane	6/21/2005	52.0	4.7	4.7	4.7
9086299	Starr	longspike	6/21/2005	28.0	6.0	6.0	6.0
9088678	Goliad	silver	6/21/2005	28.0	4.0	4.7	4.7
9088983	LaSalle	pinhole	6/21/2005	34.0	4.0	4.0	4.0
9088573	Zavala	silver	6/21/2005	59.0	0.0	0.7	1.3
9088656	Wilson	pinhole	6/21/2005	47.0	4.0	4.0	4.0
9088570	Zavala	silver	6/21/2005	21.0	6.0	6.0	6.0
9089003	Uvalde	silver	6/21/2005	38.0	10.0	10.7	10.7
9088741	Jim Hogg	cane	6/21/2005	44.0	2.0	2.0	2.0
9088830	Jim Wells	cane	6/21/2005	48.0	0.7	0.7	0.7
9088833	Jim Wells	cane	6/21/2005	60.0	3.3	4.0	4.0
9088931	Dimmit	cane	6/21/2005	33.0	1.3	1.3	1.3
9088906	Dimmit	pinhole	6/21/2005	17.0	2.0	2.7	2.7
9086310	Duval	silver	6/21/2005	35.0	9.3	10.7	12.0
9088592	Bee	longspike	6/21/2005	52.0	9.3	10.0	10.7
9088613	Frio	pinhole	6/21/2005	36.0	9.3	10.7	11.3
9088764	Duval	cane	6/21/2005	76.0	3.3	4.0	4.0
9088585	Bee	longspike	6/21/2005	31.0	1.3	1.3	2.0
9088669	Goliad	silver	6/21/2005	37.0	3.3	3.3	3.3
9086274	Atascosa	longspike	6/21/2005	20.0	4.7	4.7	4.7
9089186	Medina	silver	6/21/2005	66.0	6.0	6.7	6.7
9088973	Frio	pinhole	6/21/2005	56.0	6.7	7.3	8.0
9088945	Atascosa	cane	6/21/2005	23.0	2.0	2.0	2.0
9088801	Webb	cane	6/21/2005	51.0	9.3	9.3	9.3
9088724	Webb	pinhole	6/21/2005	31.0	6.7	6.7	7.3
9045834	Webb	silver	6/21/2005	38.0	5.3	5.3	5.3
9093177	Bexar	longspike	6/21/2005	no seed	-	-	-
9090730	Wilson	pinhole	6/21/2005	no seed	-	-	-
9090613	Maverick	pinhole	6/21/2005	no seed	-	-	-
9090665	Maverick	cane	6/21/2005	no seed	-	-	-
9090644	Kinney	silver	6/21/2005	no seed	-	-	-
9089204	Uvalde	pinhole	6/21/2005	no seed	-	-	-
9090698	Bexar	silver	6/21/2005	no seed	-	-	-
9088660	Karnes	silver	6/21/2005	no seed	-	-	-
9090309	Cameron	longspike	6/21/2005	no seed	-	-	-

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

Table 7 cont'd. Grams harvested and percent germination of *Bothriochloa* spp. accessions from the PMC and Annex field plots in 2005.

Annex (Delfina fine sandy loam)

Accession Number	Origin (County)	Species	Date	Grams Harvested	7 Days %	14 Days %	28 Days %
9086151	Jim Wells	longspike	6/17/2005	20.0	0.7	0.7	0.7
9086214	Kenedy	longspike	6/17/2005	31.0	2.0	2.7	2.7
9086216	Kenedy	silver	6/17/2005	37.0	0.7	1.3	1.3
9086217	Kleberg	longspike	6/17/2005	36.0	2.7	2.7	2.7

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

Table 8. Plant performance of *Bothriochloa longipaniculata* from the PMC and Annex field plots in 2006.

PMC (Cranell sandy clay loam)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *
9086151	Jim Wells	100	40	4.0	4.0	5.0	5.0
9086214	Kenedy	94	25	5.0	5.0	5.0	5.0
9086299	Starr	100	40	3.0	3.0	5.0	5.0
9088592	Bee	96	50	3.0	4.0	5.0	5.0
9088585	Bee	100	30	4.0	3.0	5.0	6.0
9086274	Atascosa	100	25	4.0	5.0	5.0	5.0
9093177	Bexar	100	30	4.0	4.0	5.0	5.0
9090309	Cameron	80	40	4.0	5.0	5.0	5.0

*Ocular estimate (1= Best)

Annex (Delfina fine sandy loam)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *
9086151	Jim Wells	92	25	4.0	4.0	5.0	5.0
9086214	Kenedy	98	20	4.0	5.0	5.0	5.0
9086217	Kleberg	94	20	5.0	5.0	5.0	5.0

*Ocular estimate (1= Best)

Table 9. Plant performance of *Bothriochloa longipaniculata* from the PMC and Annex field plots in 2007.

PMC (Cranell sandy clay loam)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086151	Jim Wells	100	50	4.0	3.0	5.0	5.0	4.0
9086214	Kenedy	94	25	5.0	4.0	5.0	5.0	6.0
9086299	Starr	100	50	3.0	3.0	5.0	5.0	3.0
9088592	Bee	96	50	3.0	4.0	5.0	5.0	4.0
9088585	Bee	100	50	3.0	3.0	5.0	6.0	3.0
9086274	Atascosa	100	25	5.0	5.0	5.0	5.0	5.0
9093177	Bexar	100	50	4.0	4.0	5.0	5.0	4.0
9090309	Cameron	80	50	4.0	4.0	5.0	5.0	3.0

*Ocular estimate (1= Best)

Annex (Delfina fine sandy loam)

Accession Number	Source (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Resistance *	Uniformity *	Seed Production*
9086151	Jim Wells	92	75	4.0	4.0	5.0	5.0	4.0
9086214	Kenedy	98	75	4.0	5.0	5.0	5.0	4.0
9086217	Kleberg	94	75	4.0	4.0	5.0	5.0	4.0

*Ocular estimate (1= Best)

Advanced Evaluation

In March 2009, we initiated a seed increase of the five selected accessions of longspike silver bluestem. We also sent seed of the five accessions to the East Texas PMC in Nacogdoches, Texas for evaluation of cold tolerance survival. Over a two year period, three of the accessions had a 90% survival. The accession 9086299 from Starr County had the lowest survival at 70%.

Three replications with 10 plants each were transplanted at 6 locations across Texas. Transplants were planted in May 2011 at Kingsville, Rio Farms, Stephenville and Knox City. In June, 2011 transplants were planted at Imperial and Uvalde, Texas. Plants were evaluated in July, September, October and December of 2011, in April, June, September and December of 2012 and May and August of 2013. No plants survived at the Imperial location. At the Knox City location, only 2 replications were planted. One replication had a 20% survival with only a 10% canopy coverage. The other replication had a 70% survival and a 94% canopy coverage. There was an 80% survival from all three replications at Stephenville, the plants exhibited good vigor and provided 52% canopy coverage. Moving south to the Uvalde location, there was a 93% survival of the transplants 26 months after planting when evaluated in August of 2013. The plants were vigorous with good foliage density and provided 100% canopy coverage. In Kingsville, there was 100% survival from all three replications. The plants showed excellent vigor and productivity and provided 100% canopy coverage. And at Rio Farms, there was also

100% survival 18 months after planting revealing good forage productivity and 97% canopy coverage.

Selection

Seeding trials

At the 6 locations where the transplants were planted, seeding trials were also conducted. Starr Germplasm longspike silver bluestem was seeded on three small plots (10 ft. by 10 ft.) at a 20 PLS/ft² rate at each location in 2011. The results 2 years later were no establishment at Rio Farms, 0.3 plants/ft² at Knox City, 0.8 plants/ft² at both Kingsville and Uvalde and 1 plant/ft² at Stephenville. 2011 and 2012 were severe drought years in Texas with 2011 receiving only 40% of its normal precipitation and 2012 receiving only 70% of its normal precipitation. This may be the reason why the establishment was so poor.

Starr Germplasm longspike silver bluestem was planted on 4 small plots (20 ft. by 20 ft.) at a 40 PLS/ft² rate on June 27, 2012 at the PMC in Kingsville, TX. There was an average 85% coverage across the 4 plots (>1 plant / ft²) when evaluated on December 20, 2013.

A composite collection from the PMC evaluation plots was planted by STN in the spring of 2006 at Rancho Blanco in Laredo, TX. The plots (10 ft. by 10 ft.) had three treatments based on seeding rate (10 PLS/ft², 20 PLS/ft² and 30 PLS/ft²). Each treatment consisted of 4 replications. These plots were evaluated one year after the spring planting. The plots that had a 20 PLS/ft² and a 30 PLS/ft² seeding rate had 25% of the plots established and successful. The 10 PLS/ft² seeding rate had 50% of its plots considered established and successful. A plot was considered established and successful if its cover exceeded 50%, there was at least 1 plant/ft² and it was producing seed. The overall evaluation of silver bluestem at this location was that silver bluestem can grow, reproduce and maintain itself while surrounded by buffelgrass.

Seed Increase

Transplants of these 5 accessions were grown from the original seed collections and planted as isolated seed increase rows at the PMC for evaluation of harvest characteristics, seed set and timing, and adaptability to agronomic production. All accessions performed well in this evaluation, with similar growth rates and seed maturity dates.

Longspike silver bluestem can be harvested two times per year. There is a spring harvest which is generally considered the months of April - June, and a fall harvest which is generally late September - October. Occasionally, a summer harvest in August can be done but it is almost always poor yielding with low germination.

Accession 9086151 had its best yielding harvests at the PMC in June of 2010 at 1.8 lbs. (30 lb/ac) with 16% germination and in April of 2011 at 1.4 lbs. (23 lb/ac) with 41% germination. The best harvest at Rio Farms was in May of 2013 at 8.2 lbs. (55 lb/ac) with 37% germination. The other harvests were generally poor ranging from a 3 lb/ac to a 13 lb/ac rate with germinations of 0 to 19%.

Accession 9086214 had its best yielding harvests at the PMC in June of 2010 at 0.8 lbs. (20 lb/ac) with 27% germination and in April of 2011 at 5.6 lbs. (140 lb/ac) with 61% germination. The best harvest at Rio Farms was in June of 2013 at 5.0 lbs. (39 lb/ac) with 28% germination. The other harvests were generally poor ranging from a 3 lb/ac to a 13lb/ac rate with germinations of 0 to 19%.

Accession 9086217 had its best yielding harvests at the PMC in June of 2010 at 3.6 lbs. (51 lb/ac) with 18% germination, April of 2011 at 1.2 lbs. (17 lb/ac) with 53% germination and in June of 2013 at 1.0 lbs. (14 lb/ac) with a 34% germination. The best harvests at Rio Farms was in May and June of 2013 at 14.2 lbs. (57 lb/ac) with 24% germination and 10.4 lbs. (42 lb/ac) with 33% germination. The other harvests were generally poor ranging from a 3 lb/ac to a 14 lb/ac rate with germinations of 0 to 11%.

Accession 9086274 had its best yielding harvests at the PMC in April of 2011 at 2.2 lbs. (44 lb/ac) with 59% germination and in May of 2013 at 7.8 lbs. (156 lb/ac) with a 65% germination. The best harvests at Rio Farms was in May of 2013 at 10.0 lbs. (67 lb/ac) with 31% germination and in May of 2014 at 6.4 lbs. (43 lb/ac). The other harvests were generally poor ranging from a 1 lb/ac to a 12 lb/ac rate with germinations of 0 to 39%.

Accession 9086299 had its best yielding harvests at the PMC in June of 2010 at 4.5 lbs. (56 lb/ac) with 27% germination and in April of 2011 at 3.8 lbs. (48 lb/ac) with 53% germination. The best harvests at Rio Farms was in May and June of 2013 at 7.4 lbs. (74 lb/ac) with 48% germination and 11.4 lbs. (114 lb/ac) with 47% germination. The other harvests were generally poor ranging from a 5 lb/ac to a 15 lb/ac rate with germinations of 0 to 51%.

The trend in seed production is for both better seed yields and germination during the cooler temperatures of spring provided there is good soil moisture. However, it is not consistent by month ranging anytime from April through June, nor is it consistent by year as was seen in 2012 with poor seed yields and germination. Fall (September – October) can occasionally produce good seed yields and good germination. Accession 9086299 yielded 12 lb/ac with 51% germination in October of 2010 and 48 lb/ac with 4% germination in September of 2012. But there is even more variability in the fall harvests than the spring harvests.

Seed Production, Harvest, and Cleaning

Irrigated seed fields of the five selected accessions of longspike silver bluestem were evaluated at Rio Farms, Hidalgo County, TX in 2010. Plantings were established using transplants spaced at one foot apart on 36 inch bedded rows. Fields were harvested with a flail vac. The tractor rpm was at 1500 and the ground speed ranged from 2.5 – 4 mph. The use of slow travel and RPM speeds while harvesting results in relatively clean seed, needing little cleaning or processing. Handpicking the stems and chaff can be done to further clean the seed or the seed can be run through a Westrup brush machine and then through a Clipper seed cleaner.

F. Area of adaptation

The best performance of Starr Germplasm will be predominantly in the Rio Grande Plains and Sand Plain ecoregion (MLRA 83) as well as the Gulf Prairies and Marshes ecoregion (MLRA 150) of Texas. It is common along roadsides and field borders of the lower and mid Gulf Coast. It is a shade tolerant grass frequent on fine-textured upland clay soils.

G. Procedure for maintaining stock classes of seed

Generation 0 seed will be produced and maintained by *South Texas Natives*. Seed will be released to a single commercial producer for 7 years following release, and thereafter according to any subsequently negotiated licensing agreement. Interested producers are asked to submit detailed production proposals regarding the release to the releasing agency for consideration of selection for production rights.

H. Description of how variety is to be constituted, etc.

Starr Germplasm Longspike silver bluestem is released as a Selected Texas Native Ecotype. G0 seed of Starr Germplasm Longspike silver bluestem is a composite of five individual accessions, grown in isolation from one another, and maintained by the breeder. G1 seed is that harvested by isolated plantings of G0 seed by commercial seedsmen and G2 seed is that harvested from plantings of G1 seed. Increase from Generation 2 seed is prohibited. Generation 0 seed will be made up of equal amounts (by percent PLS, +/-10%) of each of the five accessions.

I. Additional restrictions, etc.

G1 and G2 seed fields have a 7 year production limit, after which time, fields must be replanted using the appropriate seed generation (G0 or G1).

Will application be made to the Plant Variety Protection Office? YES__ NO X

If yes will the application specify that the variety is to be sold by variety name only as a class of certified seed? YES__ NO__

Ecological Considerations and Evaluation: An Environmental Evaluation of Plant Materials Releases was completed using guidelines established by NRCS, and the best available information for this species. Results of this evaluation determined that Starr Germplasm was suitable for release based on the criterion contained in this document. This conclusion is mainly because Starr Germplasm is a naturally occurring species in Texas and planting it would therefore not constitute an introduction of an exotic species into local ecosystems. Any negative impacts on other native plant species would likely be minimal to non-existent. Also, release of this species will make available an additional native species for rangeland planting, will provide a good seed source to upland avian wildlife species and provide unknown benefits by maintaining and contributing habitat that harbors beneficial insects and butterflies.

Conservation Use: Starr Germplasm longspike silver bluestem will provide a native plant species for rangeland planting and wildlife habitat improvement.

Availability of Plant Materials: Generation 0 seed will be maintained by *South Texas Natives*. Generation 0 seed will be available by September 2015. At this time, release of the germplasm will be limited to a single commercial grower, who must grow the seed within the Rio Grande Plain Ecoregion.

References:

Gould, F.W. 1975. *The Grasses of Texas*. Texas A&M University Press. College Station, Texas.

Hatch, S. L., J.L. Schuster and D. L. Drawe. 1999. *Grasses of the Texas Gulf Prairies and Marshes*. Texas A&M University Press. College Station, Texas.

Meyer, M.W., and R.D. Brown. 1985. Seasonal trends in the chemical composition of ten range plants in south Texas. *J. Range Manage.* 38:154-157.

USDA NRCS. 2009. Web soil survey. <http://websoilsurvey.nrcs.usda.gov>.

Willard, E. Earl and Joseph L. Schuster. 1973. Chemical composition of six southern Great Plains grasses as related to season and precipitation. *J. Range Manage.* 26:37-38.

Prepared by:

John Reilley

And

Shelly Maher
USDA-NRCS E. "Kika" de la Garza Plant Materials Center
3409 N. FM 1355
Kingsville, TX 7841

In Cooperation With:

Forrest S. Smith, Director

And

Anthony Falk, Research and Evaluation Coordinator
South Texas Natives
Caesar Kleberg Wildlife Research Institute
Texas A&M University-Kingsville
MSC 218, 700 University Blvd.
Kingsville, TX 78363

Signatures for release of:

**Starr Germplasm Longspike Silver Bluestem
[*Bothriochloa longipaniculata* (Gould) Allred & Gould]**

Dr. David Hewitt
Leroy Denman, Jr. Director of Wildlife Research
Caesar Kleberg Wildlife Research Institute
Texas A&M University-Kingsville
Kingsville, TX

Date

Dr. Shad Nelson
Dean
Dick and Mary Lewis Kleberg College of
Agriculture, Natural Resources and Human Sciences
Texas A&M University-Kingsville
Kingsville, TX

Date

Salvador Salinas
Texas State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
Temple, TX

Date

Terrell Erickson
Director
Ecological Sciences Division
United States Department of Agriculture
Natural Resources Conservation Service
Washington, D.C.

Date