Development of South Texas Germplasm sideoats grama and comparison to previous releases

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Sideoats grama is a widespread native bunchgrass in North America, which is often used in reclamation plantings. Eleven seed releases of *Bouteloua curtipendula* have been made through the work of the USDA NRCS Plant Materials Program and their collaborators. In addition to these released materials, a number of wild-harvested seed sources of sideoats grama are offered for sale by commercial seed companies. However, no regionally adapted or locally originating (e.g. ecotypic) seed source of sideoats grama has been available for restoration projects in the region known as south Texas. As a result, we began work to collect, evaluate, and develop a seed release of a blend of ecotypic populations for use in the area.

South Texas Germplasm sideoats grama (*Bouteloua curtipendula* [Michx.] Torr. Var. *caespitosa* Gould&Kapadia) was cooperatively released in 2012 as a Texas Selected Native Plant Germplasm. This germplasm is a blend of six selected native populations originating from the Rio Grande Plains and Edwards Plateau Ecoregions of south Texas. Following initial evaluation, selection, and isolated seed increase of each component, South Texas Germplasm was compared to sideoats grama cultivars originating from nearest the area of intended use of the germplasm. South Texas Germplasm was compared to 'Haskell', 'Premier' and 'Vaughn' in a 6-site variety trial utilizing transplanted and seeded experimental plots. South Texas Germplasm exhibited significantly higher 90-day seedling emergence than available cultivars at planting sites within the area of intended use, as well as superior performance in the transplant experiment at 2 of 3 experimental sites in south Texas.

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Plant Materials Program

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Objective

To develop an ecotypic, genetically diverse restoration seed source of the appropriate botanical variety of sideoats grama for south Texas. Our goal was to develop a seed source derived from multiple native populations and with similar or superior performance to available cultivars in restoration applications and commercial seed production settings. We based our approach on the theoretical and scientific basis that such a seed source would closely mirror the natural makeup of sideoats grama populations in the region, and result in superior practical and ecological performance in comparison to available seed sources of the plant that originate from other ecosystems.

Selection Information

- 47 collections from native populations across south Texas
- Selected 6 to include in the release
- Selections originate from the Rio Grande Plains and Edwards Plateau Ecoregionsof Texas

Evaluation trials of sideoats grama sources at South Texas Natives Farms, Kingsville, TX
Evaluation included transplanted plots for characteristic evaluation, and seeded 10'X10' squares to evaluate seedling emergence.
Letters (A,B) indicate statistical differences within categories at the .05 level

Evaluation category	Haskell	Premier	South Texas Germplasm	Vaughn
Survival (p=0.4283)	98% A	94% A	94% A	97% A
*Plant Vigor (p=0.0081) Rank 1= most desirable 10= least desirable	3.60 AB	3.40 AB	3.07 A	4.13 B
Foliage density score (p=0.0535) Rank 1= most desirable 10= least desirable	3.13	3.46	3.33	4.13
Uniformity score (p=0.2577) Rank 1= most desirable 10= least desirable	3.33	3.07	3.87	3.80
*Development stage score (p=0.0087) Rank 1= seedling 10= senesced plant	5.93 AB	5.40 AB	5.00 A	6.07 B
*Seed production score (p=0.0049) Rank 1= most desirable 10= least desirable	3.71 AB	3.50 B	3.21 A	4.40 B
*Forage production score (p=0.0075) Rank 1= most desirable 10= least desirable	3.26 A	3.26 A	3.13 A	4.47 B
*30 day seedling emergence (plants/ft2)(p<0.001)	1.00 B	1.16 B	3.91 A	0.66 B
60 day seedling emergence (plants/ft2) (p=0.0601)	1.25	0.75	1.75	0.43
*90 day seedling emergence (plants/ft2)(p=0.0001)	1.46 B	2.13 B	5.82 A	0.75 B
*Height at maturity (cm) (p<0.0001)	68 C	98 A	88 AB	81 BC
*Cover at maturity (p=0.0026)	97% AB	100% A	83% B	100% A
*Seed germination (p<0.0001)	17% A	2% B	4% B	9% B
Tetrazolium test (not statistically analyzed)	43%	15%	14%	38%
Live seed yield (grams produced/10 plants) (not statistically analyzed)	1.72	0.73	0.45	1.48

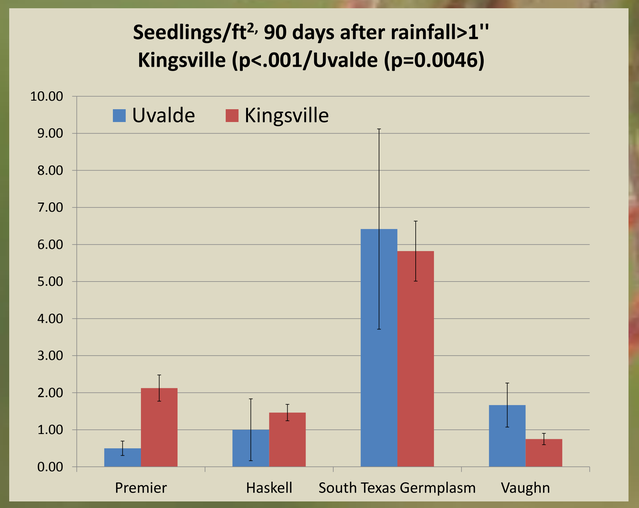
Evaluation trials of sideoats grama sources at Texas AgriLife Research Center Uvalde, TX
Evaluation included transplanted plots for characteristic evaluation, and seeded 10'X10' squares to evaluate seedling emergence.
Letters (A,B) indicate statistical differences within categories at the .05 level

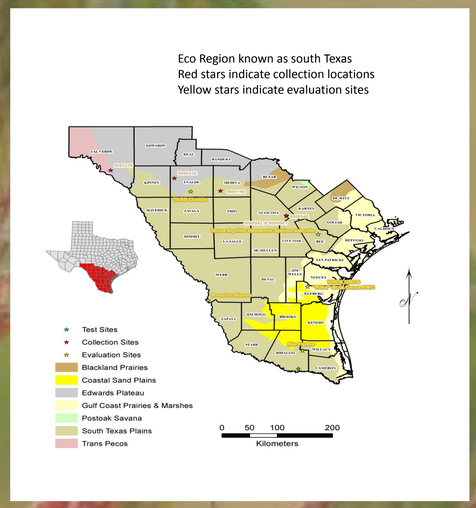
Evaluation category	Haskell	Premier	South Texas Germplasm	Vaughn
*Survival (p<0.0001)	60% B	86% A	98% A	89% A
Plant vigor score (p=0.1769) Rank 1= most desirable 10= least desirable	4.25	4.12	3.50	4.33
*Foliage density score (p=0.0084) Rank 1= most desirable 10= least desirable	3.83 AB	3.86 AB	2.75 A	4.08 B
*Uniformity score (p<0.0001) Rank 1= most desirable 10= least desirable	5.33 C	3.75 BC	2.58 A	4.83 AB
Development stage score (p=0.5863) Rank 1= seedling 10= senesced plant	3.33	3.25	3.00	3.50
Seed production score (p=0.7939) Rank 1= most desirable 10= least desirable	3.67	3.75	3.33	3.75
*Forage production score (p=0.0318) Rank 1= most desirable 10= least desirable	3.75 AB	3.88 AB	3.17 A	4.17 B
*30 day seedling emergence (plants/ft^2) (p<0.0001)	0.00 B	0.33 B	0.25 B	1.16 A
*90 day emergence (plants/ft^2) (p=0.0046)	1.00 B	0.50 B	6.42 A	1.67 B
*Height at maturity (cm) (p=0.0422)	65 AB	61 AB	66 A	50 B
*Cover at maturity (p=0.0020)	79% AB	77% AB	92% A	55% B
*Seed germination (p<0.0001)	15% A	2% BC	0% C	5% B
Tetrazolium test (not statistically analyzed)	8%	5%	5%	0%
Live seed yield (grams produces/10 plants) (not statistically analyzed)	0.98	0.42	0.63	0.00

Seed Production, Harvest, and Cleaning

South Texas Germplasm sideoats grama is extremely drought hardy, and will produce seed with modest irrigation after establishment. The recommended seeding rate for a solid stand of South Texas Germplasm sideoats grama is 5lbs. pls/acre. Frequent cultivation stimulates seed production, and dormant season prescribed fire results in greater seedhead density in the year following fire in comparison to unburned or mowed plots. Standard fertilization regimes for grasses are compatible with sideoats grama seed production. Frequent pests in seed fields include thrips (*Thripidae spp.)* and rice stink bugs (*Oebalus pugnax*). Control of either pest is difficult and requires repeated insecticide applications from the boot stage through seed maturity. South Texas Germplasm sideoats grama will be produced and sold by Douglass Kings Seed Company of San Antonio.

Transplant evaluation plot





Commercial Seed Field of South Texas Germplasm sideoats grama

For more information http://www.ckwri.tamuk.edu/research-programs/south-texas-natives/

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