



South Texas Natives

A publication of the Caesar Kleberg Wildlife Research Institute
at Texas A&M University-Kingsville

Fall 2010
Volume 6, Issue 2

Guest Article: Old World Bluestems are Invading the Central and Southern Great Plains

*By Mitch Greer, Gail Wilson, and
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University*

Non-native grasses such as old world bluestems (OWB) (i.e. Kleberg, Angleton, Australian, Yellow or King Ranch, and Caucasian bluestems) are present throughout the central and southern Great Plains, and are aggressively invading native rangelands. If we continue with our current policy and management practices, OWB invasion will continue far into the future. With these invasions come greater losses of native prairie, displacement or loss of native plants and wildlife, and costly restoration efforts. Because of the increased spread of non-native grasses there is a need to examine how these invasions affect the conditions and processes influencing native ecosystems, and how we can restore these systems to their original state.

To date, restoration efforts have had little success, as OWB invaded grasslands are highly resistant to change. The lack of restoration success may be, in part, attributed to native and OWB grasses being functionally similar in their growth patterns, nutrient use, and relationships with other living organisms and non-living elements. These similarities make management for natives over OWBs very difficult. OWBs may also alter their local soil environment in a way that will promote the growth of themselves over native species; this phenomenon is known



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Collecting soil for Old World bluestem control experiments.

as positive plant-soil feedback. This positive feedback of OWBs may be due to the high nitrogen use efficiency of these species, creating an environment too low in nitrogen for native grass species to survive. Positive feedback loops of OWBs may also be created by changing the soil microbial community or by infiltrating the native species root network and siphoning nutrients from it.

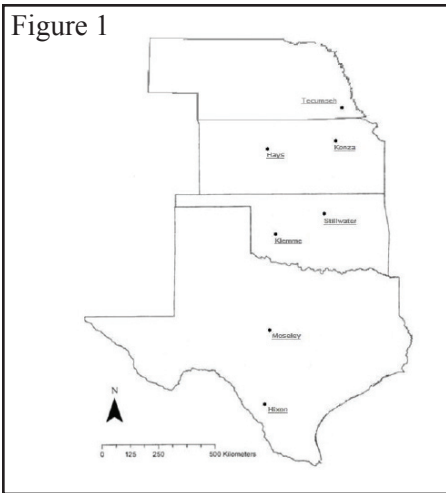
In an attempt to increase success of controlling and restoring OWB invaded grasslands we have developed a research project with the following objectives:

- 1) Determine if non-native grasses (Kleberg and Caucasian bluestem, and buffelgrass) exhibit positive plant-soil feedbacks.

- 2) Determine if the positive feedbacks (if found) exhibited by functionally similar non-native grass species are consistent across central and southern Great Plains.

Soil will be collected from seven sites across the central and southern Great Plains. We have one study site in Nebraska and two sites in Kansas, Oklahoma and Texas respectively (Figure 1). These sites were selected to represent a longitudinal gradient from north to south, which will allow us to determine similarities/differences within functionally similar species of non-native grasses across the central and southern Great Plains. Soil will be collected from directly beneath native or exotic species determined to be the dominant species within each area; we

Figure 1



Seven soil collection sites in Nebraska, Kansas, Oklahoma and Texas

refer to this soil as “field prepared”. Plant-soil feedback (PSF) experiments will then be conducted in two stages; the first stage will be referred to as the conditioning stage and the second stage as the experiment stage. In conditioning stage, the soil will be placed into greenhouse pots and planted with one seedling of the species from which soil was collected under. This conditions the soil by creating a species specific soil microbial community. The experimental stage will begin immediately following the conclusion of the conditioning stage. In the experimental stage, exotic and native grasses will be planted in pots formerly growing the same species, the representative exotic species, as well as in control pots.

Once the experimental stage is completed, shoot and root material from each species x site combination will be harvested. Live roots will be washed of soil, stained with blue dye and mycorrhizal colonization of the plant roots will be measured. We will also measure plant tissue nitrogen and phosphorus. These measurements will determine if plant-soil feedbacks exist and if non-natives of differing species use similar strategies to invade the Southern Great Plains. This knowledge will help determine mechanisms that allow OWB (and other non-native species) to invade native grasslands,

and will aid in developing restoration methods for native prairies that are currently invaded by these problematic grasses. 🌿

Mitch Greer is a PhD. candidate at Oklahoma State University (OSU). His major advisors are Dr. Karen Hickman and Dr. Gail Wilson. Questions may be emailed to Mitch Greer at: mitchell.greer@okstate.edu

TxDOT Provides Multi-Region Support for Native Seed Source Development through STN

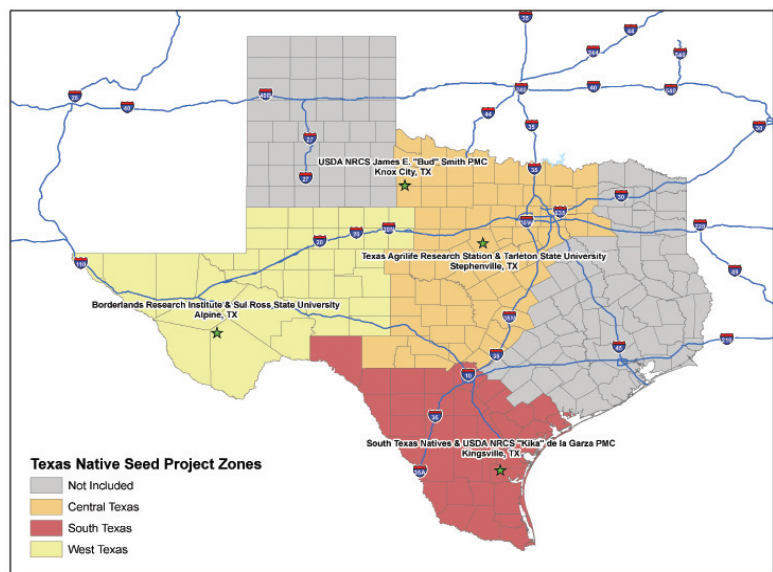
By Forrest S. Smith

South Texas Natives has gained the support of the Texas Department of Transportation for a multi-year, multi-region project to advance native seed source development in South, Central, and West Texas. This project will closely follow the successful methodology of the original STN-TxDOT project that has been ongoing since 2002. The new project is titled “TxDOT Native Plant Integration Program for South, Central, and West Texas”.

The new effort will involve collaborators at Tarleton State University, Sul Ross State University, Texas AgriLife Research, and the USDA

NRCS James E. “Bud” Smith Plant Materials Center in Knox City, Texas. Following collection of suitable number of ecotypes of each target plant species, evaluation plantings will be made at a minimum of 2 locations in each region. All past seed releases of the NRCS Plant Materials Program for these regions, as well as STN’s recent releases, and other commercial sources of native seeds will be planted for comparison and further evaluation. Goals of the new project include evaluating how adaptable existing plant materials are in these regions, and developing new native seed sources to meet the vegetation requirements of TxDOT. The new project will work closely with Dennis Markwardt and the Vegetation Management Division of TxDOT.

By determining the geographic area of adaptation of current plant material, the commercial seed industry will be aided in their production efforts by having a better idea of the potential demand for each native seed product. New germplasm seed releases will also be made, and should be beneficial to TxDOT and landowners in these regions. This project should have a positive impact on native seed availability for a large portion of the state.



TxDOT Native Seed Project - Regions of Focus

If you own or manage property in South, Central, or West Texas and would consider allowing native seed collection on your property, please contact STN Coordinator Forrest Smith at (361) 593-4525. 🌿

Release of Webb Germplasm Whiplash and Maverick Germplasm Pink Pappusgrass Finalized

By Forrest S. Smith & Keith Pawelek

STN, Texas AgriLife Research (TAR) and the NRCS Plant Materials Center (PMC) in Kingsville recently finalized release procedures for pink and whiplash pappusgrass. Pink pappusgrass was one of the top ranked species for development at the inaugural STN Technical Committee meeting in 2001. Field observations suggested that whiplash pappusgrass should also be developed as it was a common and similar widespread species. Since these plants are important habitat components in South Texas, we sought a large number of collections. By 2005, we had obtained >70 collections, and began evaluation efforts. Evaluation locations were the PMC at Kingsville, Rio Farms near Monte Alto, Rancho Blanco near Laredo, and TAR Station in Uvalde. For 3 years, plant performance and seed quality data were collected, and from these data, we made 10 selections: 7 pink pappusgrass accessions and 3 whiplash pappusgrass accessions.

Beginning in the spring of 2007, these selections were planted in isolated blocks at Rio Farms for initial seed increase. By late summer 2009, we had produced enough seed for establishment of 10-25 acres of commercial seed fields, and had documented very good performance in most field plantings of these species. At that time, we decided to release blends of the selected accessions of

each species respectively. The name Webb Germplasm was given to whiplash pappusgrass, because the primary source originated from Webb County, and likewise Maverick Germplasm was chosen for pink pappusgrass.

This spring, seed of these releases was distributed to Pogue Agri Partners (pink pappusgrass) and Douglass King Seed Company (whiplash pappusgrass) to begin large-scale commercial production. Fields were established this summer, and first harvests should be made by fall 2010. These harvests will be planted back to expand production capacity. STN continues to produce seed to distribute to the growers to supplement their efforts. The first commercial seed of these releases should be available in 2011.

Both pappusgrass releases will have great utility for restoration efforts in South Texas and beyond. Release of whiplash pappusgrass makes available an excellent seed source for use on saline and alkaline soils, as well as coastal areas, spoil islands, and other difficult planting sites. It is also a widespread component of upland rangelands and will work well in those areas. Pink pappusgrass is one of the naturally dominant components of na-



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Maverick Pink Pappusgrass seedheads (L) and Webb Whiplash Pappusgrass (R)

tive grasslands and savannahs on clay, loamy and sandy loam soils across South Texas. It contributes a major portion of the forage available to livestock on native rangelands, provides excellent wildlife cover, and since it has an upright-bunchgrass growth form, it is a good nesting site for quail. These releases will also help to meet TxDOT's native seed needs. It is our hope that the pappusgrasses will be an acceptable substitute for buffelgrass in South Texas' roadside seed mixes once they are readily available.

To inquire about future seed availability contact Douglass King Seed Company at (888) 357-3337 or Pogue Agri Partners at (830) 583-3456. 🌿



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Breeder seed field of Maverick Germplasm pink pappusgrass at Rio Farms.

STN Hires New Native Seed Collection and Evaluation Manager - Tony Falk

We'd like to introduce the newest member of the STN Family, Tony Falk. Tony grew up Pearl City, Illinois, and later attended Ripon College in Ripon, Wisconsin where he received a Bachelor of Arts degree in Environmental Studies and Biology. Upon graduation he took a job as a project manager with an environmental restoration and consulting company in the Chicago suburbs called EnCAP Inc. While there he was involved in prairie restoration and management efforts, and worked frequently with state and local agencies on a variety of restoration projects. Tony began work on his M.S. degree at the Caesar Kleberg Wildlife Research Institute in January 2008. He worked on a project funded by Texas Parks and Wildlife Department and STN testing the use of native seed mixes for wildlife habitat restoration and exotic grass control in the Lower Rio Grande Valley. 🌿



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Tony Falk has been hired as STN's new Collections and Evaluations Manager

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 U.S. Postage Paid
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 Permit #172

Editor: Annette Peterson



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