South Texas Natives

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Plant Profile

Slender grama (*Bouteloua repens*)

By Forrest Smith

Slender grama (*Bouteloua repens*) is an important early successional grass species native to south Texas. Other common names include large-mesquite grass, zacate sabanilla, and navajitas. It is commonly found in brushy pastures, rights of way, grasslands, and along stream banks on sandy or gravelly soils. Over the continent, slender grama occurs throughout southern Texas, New Mexico, and Arizona, south through Mexico, to Guerrero and is widespread in South America from Columbia to Argentina. Disjunct, introduced populations also occur in Massachusetts and Maine. Slender grama is a component of various South Texas habitat types, including grasslands, savannahs, live oak woodlands, coastal sand dunes, and riparian areas. It is most conspicuous following rains. Flowering from May–December, slender grama is commonly 1–2' in height and has a dense bunchy growth form, with some populations exhibiting numerous stolons which root and form new plants. Slender grama is known as an early successional species, representing one of the first native species to re-colonize disturbed areas; it thrives under moderate habitat disturbance. The low dense growth form, presence of stolons, and aggressive nature of the plant make it an excellent choice for revegetation of areas susceptible to soil erosion or highway right-of-ways.

Slender grama seedhead, flowering

Forage value and palatability of slender grama is relatively low compared to other native species.

Slender grama has long been recognized as having potential for use in restoration. Scientists were working with it for this purpose as early as 1935 in Arizona. However, there has never been commercially available seed. *South Texas Natives* (STN) began collecting slender grama for evaluation in 2002. We obtained collections from throughout the region, which were planted for initial evaluation in 2003 at Bladerunner Farms. We specifically targeted slender grama for potential use in highway right-of-way reseeding by the Texas Department of Transportation (TxDOT) and oil and gas revegetation projects. Slender grama was one of the few native grass species that met the criteria for roadside revegetation. Initial evaluation showed that many accessions of the grass exhibit a biannual or annual life cycle, while others were strongly perennial. Initial tests revealed that seed quality of slender grama was excellent. Based on growth form, longevity, and seed production, personnel from STN and Bladerunner Farms selected several accessions for advanced evaluation. Plots for this evaluation were planted at Rancho Blanco, near Laredo and at the STN Irrigated Farm at Kingsville. Performance in both locations was excellent. STN also began seed increase and development of harvest techniques for slender grama for a TxDOT demonstration seeding

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Keith Pawelek, Manager of Production & Commercialization, standing in a seed increase block of slender grama at Bladerunner Farms, Inc., at Poteet, TX

project. We found that commercial production potential of this grass was high, as growth, maintenance, and production of seed were easier than many native species previously worked with. The outstanding accessions were increased from original seed at Texas Agricultural Experiment Station in Beeville (TAES-B). Excellent growth and seed production, and encroachment into adjacent areas was noted by personnel there.

In 2006, in cooperation with TAES-B and the E. Kika De La Garza Plant Materials Center, the 4 accessions selected for advance evaluation and seed increase at Beeville were released as a blend named "Dilley" germplasm slender grama. Further seed increase was initiated in conjunction with Bladerunner Farms, where 0.25 acre increase plots were established of each accession. The first breeder seed of Dilley was made available to commercial producers in the fall of 2006 under a memorandum of agreement with STN. Bladerunner Farms has planted the first commercial production field of the release, and to date has seen excellent performance of the release. The first harvest is expected in the fall of 2007.

Additional evaluation and seeding trial experiments involving Dilley are being conducted by STN. A project at the Welder Wildlife Refuge is attempting to determine the herbicide tolerance and competitive ability of slender grama in areas infested with old world bluestems. Severe drought conditions persisted for 8 months following this seeding; however slender grama was noted as having the best emergence among the 10 native species planted when rains finally came in late summer 2005. Slender grama plots continue to thrive despite re-infestation of the area by old world bluestems. Additional field trials were established in June of 2007 at the Welder Refuge. Seeding rates and season of seeding are being evaluated at Rancho Blanco to determine the best methods for establishment. Data collected so far has shown that greatest stand establishment occurs when Dilley is seeded in late summer. Results from this research will also help to determine proper seeding rates for right-of-way plantings This planting has also shown slender grama to have good competitive ability against buffelgrass (*Pennisetum ciliare*). Our previous evaluations have also shown it to be competitive with common bermudagrass (*Cynodon dactylon*).

We are also documenting the insect use of slender grama. Several insect species have been noted that can be detrimental to commercial seed production, including thrips and rice stink bugs. Proper control methods are being refined to address these pests. On an interesting side note, we have observed large numbers of honeybees lighting and gathering pollen on seedheads in mid-summer. Previous research has pointed to slender grama being wind-pollinated. However, the grass may also be insect pollinated, and provide much needed food sources to bees and other pollinators in times when other food sources may be in short supply.

For pure stands, Dilley germplasm slender grama should be seeded at a rate of 8 lbs. pure live seed per acre. When planted in a mixture of native species, seeding rates should be adjusted accordingly. Slender grama rarely occurs in pure stands under native conditions. Seed can be coated for planting so that it will flow more easily through seed drills. Greatest success establishing slender grama has been by broadcast seeding and lightly covering the seed with a roller packer, or from drilling coated seed into moist soil. Planting depth should be ¼" or less.

We recommend planting slender grama as part of a mix of native species in rangeland plantings. However, this grass has many non-traditional uses not often associated with native species. Its low palatability, easy and quick establishment, and preference for disturbed conditions make it an excellent tool for erosion control in areas denuded by livestock, oil and gas exploration, or construction. Seeding Dilley slender grama following

disturbances may help impede invasion by non-native species, control soil erosion, and prepare the soil for later establishment of other more desirable native species. The greatest potential use of Dilley is for highway right-of-way reseeding. The low growth form of the grass should help reduce mowing costs, and quick establishment characteristics adequately meet TxDOT requirements. Frequent mowing of slender grama does not seem to affect its longevity. Dilley may also have use in residential and urban settings for high-traffic areas and as an attractive, extremely drought tolerant ornamental native grass.

Foundation seed of Dilley is currently available to commercial seed producers. Seed for public purchase will be available spring 2008. We believe that Dilley will be extremely useful to a variety of consumers, and feel that its use in place of exotic species will be an excellent testimony to the importance and further development of more valuable native plant resources.

Forrest Smith is the Manager of Native Plant Collections and Evaluations for STN.

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The Progress of Native Plant Restoration in Buffelgrass

By Aaron Tjelmeland

In the last 50 years, exotic grasses have become as much a part of the south Texas landscape as prickly pear cactus and mesquite. The impact of these grasses on native plants and wildlife has been significant and varies by species. Some species remain more or less where they're planted, while others readily invade areas where they were not planted and are referred to as "invasive exotics". Our research focuses on buffelgrass, an African grass brought to south Texas in the 1940s.

Since the introduction of buffelgrass, an estimated 9.8 million acres of south Texas has been converted to this exotic grass. The colonization of buffelgrass is aided by soil disturbance, such as disking or root plowing, near seed sources. Buffelgrass appears to invade aggressively in certain environments, but not in others. Once established, buffelgrass is frequently able to out-compete native plants, especially on heavy clay loam soils. It can also support a fire cycle that favors its propagation and survival. Furthermore, a study completed in 2002 found that a mixture of exotic grasses, including buffelgrass, reduced the abundance of bobwhite quail and other grassland birds, as well as insects, which are important quail food items.

We initiated a series of studies focused on restoration and diversification of areas dominated by buffelgrass. The first of these studies was initiated in 2002, which utilized several herbicides in an attempt to establish several native grass species within a buffelgrass pasture. Although all areas eventually returned to buffelgrass within 2 years, results of this early research

Aaron Tjelmeland inspecting Buffelgrass

© Aaron Tjelmeland

Shortspike windmillgrass seeded into buffelgrass

taught us that the potential may exist for native grasses of the genus *Chloris*, which seem to have an increased tolerance to some herbicides.

As we finished collection and analysis of the 2002 experiment, we began a similar experiment in 2004 using the herbicide Arsenal® along with a mixture of native grasses. The native grass shortspike windmillgrass, of the genus *Chloris*, exhibited a resistance to Arsenal® and a high resistance to drought conditions, which have been prevalent since late 2004. The E. Kika de la Garza USDA-NRCS Plant Materials Center (PMC) and *South Texas Natives* is conducting further experiments with shortspike as well as other *Chloris* species to select accessions that are better adapted to the climatic conditions of south Texas.

While we've been experimenting with native grasses, we've also begun to experiment with legumes as well. In 2004, we attempted to establish a seed mix called BeeWild Bundleflower®, which is a mixture of bundleflower cultivars from Mexico. This mixture did not establish well due mainly to the severe drought conditions that we experienced; although, deer browsing also played a minor role. While this seed mix is not native to south Texas, the methods of establishment could be used for native legumes. Currently, the PMC has developed a sufficient seed stock of prairie acacia and future experiments have been planned using this native legume.

Exotic grasses were introduced for forage and continue to be vital to cattle operations on a large portion of south Texas ranches. It is not likely that these grasses will go away anytime soon; however, we are dedicated to giving ranchers and land managers restoration options and tools for diversification whose interests are in wildlife and native plants. We foresee more efficient and cost-effective options for restoring areas dominated by buffelgrass as our understanding of these processes increase.

Aaron Tjelmeland is currently working with Dr. Bart Ballard as the Program Coordinator for Migratory Bird Research at CKWRI. He received his master's degree in Range & Wildlife from TAMUK, and received his bachelor's degree in Animal Ecology and Botany from Iowa State University.

STN Welcomes New Office Coordinator

By Robin Harkey

South Texas Natives recently hired a new office coordinator in December of 2006. Annette Peterson is a welcome addition providing needed expertise in financial and overall administrative management. She focuses on the organization and tracking of grants and private accounts. She oversees the general maintenance within the office along with other duties such as website updates, newsletters and editing.

Annette received a bachelor's degree from Kansas State University in Horticulture and has worked in the sales and marketing industry for over 15 years. Most recently she has worked for the Epiphany Episcopal School in Kingsville as an administrative assistant with an emphasis on finance.

Annette is married to Pete Peterson, head men's basketball coach at Texas A&M-Kingsville. Annette and Pete have two daughters Hannah, age 15 and Leah, age 9. We gladly welcome Annette to the *South Texas Natives* family!

Robin Harkey is a former research associate with STN.

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South Texas Natives Office Coordinator, Annette Peterson.

In Memory of Dr. Richard Hoverson

By Paula Maywald & Forrest Smith

On July 31, 2006 south Texas lost a diligent steward of its natural resources, Dr. Richard R. Hoverson. The La Feria resident passed away at the age of 80. Richard's contributions to plant and forage research, ranching, and the native plant industry were numerous. He wore many hats throughout his life, all helping to exhibit the resourcefulness and dedication of this self-proclaimed workaholic. Among these were U.S. Navy Service, agronomy specialist, forage specialist, private ranch consultant, seed producer, entomologist, boat rigger, fishing guide, native plant nurseryman, and most importantly, mentor to ranchers, students, and professionals. Richard served on the *South Texas Natives* (STN) Technical Committee, making many valuable contributions to the direction and goals of the project.

We first met Richard in 2002 at his native plant nursery in La Feria. Richard took a sincere interest in STN, as he had long ago seen the value of native plants. Richard donated many of the native plants that are today growing in the Range Garden between the Kleberg Ag Building and the Howe Ag Lab. Richard's broad knowledge of the south Texas flora was inspiring to native plant enthusiasts, range and wildlife professionals, and land managers. He not only knew what each plant was, but more importantly, he knew the why, how, and what about each plant that you can't learn in a classroom. His many years of being a student of the brush had taught him things about native plants that the average person has no way of comprehending. His nursery was a living herbarium of the flora of south Texas. Richard's knowledge and enthusiasm of native plants was contagious.

His work with ranchers also had a lasting impact on the region. He not only worked for landowners, but more importantly taught them. Throughout our travels and work with native plants, Richard's name came up often, and always with highest regard and respect for his knowledge of native plants, and for the person he was.

Richard started work with the Texas A&M Extension Service in 1968. He served as an agronomy specialist, eventually becoming a forage specialist. While working with the extension service, he began consulting with ranchers in Texas and Mexico. This work led him to experimentation with various grasses for forage production. Richard was a pioneer in working with ranches to realize the production potential of wildlife to their operations. Eventually, Richard began work developing seed production and harvest techniques for buffelgrass, his success eventually leading him into private enterprise as a full-time seed salesman and private consultant. Eventually, the economy of Mexico, and a decline in buffelgrass sales forced Richard out of the consulting business. He tried becoming a fishing guide, but an untimely winter freeze crippled that industry as well. He then started Texas Natives Nursery and for the next 16 years was one of the largest producers of native plant material in the Rio Grande Valley. He produced close to 750,000 plants during his nursery career, while still handling fishing charters.

Dr. Richard Hoverson

Richard is survived by his wife of 55 years, Ruby, 5 children: Michael, Daniel, John, Susan, and Jeanne; 8 grandchildren, and one great-grandchild. His legacy and contribution to the natural resources of south Texas lives on through many students, professionals, ranchers, and friends whom he influenced in his life and career. Perhaps most enduring though are the productive ranches, beautiful native landscapes, fields of grasses, and improved wildlife habitat Richard so directly played a role in; that is a wonderful legacy to be remembered by.

Paula Maywald is the Coordinator for STN.

Insects and Native Plants

By Stephanie Campbell

Insects are a valuable resource providing vital ecological services such as pollination, pest control, decomposition, and sustenance to wildlife species. In fact, the economic value of these services provided by wild native insects in the United States has been estimated to be at least $57 billion annually! Gallinaceous and migratory birds, as well as insectivorous fish, rely on insects for food. Without healthy populations of insects in suitable habitat, our wildlife would be in great peril, and the recreational wildlife activities Americans enjoy, such as

hunting, fishing, and bird watching, would be impacted.

Native plants provide critical habitat that supports insects and wildlife. Researchers from the Caesar Kleberg Wildlife Research Institute (CKWRI) have determined native bird abundance, diversity of bird species, and abundance of insects relative to native grass and exotic grass sites in south Texas. They observed that lark sparrows, black-throated sparrows, northern mockingbirds, northern bobwhite, and Cassin's sparrow were more abundant on native grass sites than on non-native grass sites. Ground-foraging birds were found to be greater on native grass sites; similarly, these native grass sites were also found to have greater arthropod abundance (arthropods include insects, spiders, and crustaceans). Additionally, current research at the CKWRI conducted by Graduate Research Assistant Joey Sands indicates that the density of arthropods is greater in native-dominated grass sites, and arthropod abundance is less in areas dominated by buffelgrass rather than native plants. The diet of northern bobwhite chicks, especially in the first several weeks of life, includes protein-packed insects, such as grasshoppers, beetles, bugs, crickets, ants, termites, and spiders. Likewise, beetles, grasshoppers, flies, and leafhoppers comprise a major component in the diet of turkey poults. Clearly, the habitat native plants provide, along with the insects associated with these forbs and grasses, benefit our native wildlife.

In *South Texas Natives'* (STN) evaluation plots and seed increase fields, we have observed several insects that are known to benefit native plants by helping to prevent outbreaks of harmful pests. Many beetles, flies, and caterpillars help our native plants by serving as pollinators, soil builders, and predators of plant-eating insects. For example, the larval and adult ground beetles, predators belonging to the family Carabidae, will feed on damaging ground-inhabiting larvae, insect eggs, snails, and slugs. The larvae of the green lacewings (family Chrysopidae) feed on aphids and many other insects in larval and adult stages that can damage native plants. The well-known ladybugs or ladybeetles (family Coccinellidae) are successful predators as larvae and adults as well. Their favorite snacks are aphids, but many species also feed on scales, thrips, mealybugs, mites and other harmful soft-bodied insects. We also collected the assassin bug, belonging to the Reduviidae family. In the nymph and adult stages, the assassin bug will feed on a variety of damaging insects such as flies, leafhoppers, caterpillars, and beetles in both the larval and adult stages. Beneficial spiders are always in great abundance. The numerous species, both immature and adult, are predators of a wide variety of insects, including flying insects and caterpillars.

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Bordered Patch larvae on Awnless Bush Sunflower

Damage by insects has also been observed in several forms. Physical damage to native plants is made by pests that feed on stems, leaves, flowers, fruit, and seed. Species known as stem borers actually tunnel a hole into the stem, interfering with the transfer of essential nutrients to the roots, stems, and leaves. The damage caused by pests can also lead to a plant's increased susceptibility to disease by providing points of entry for pathogens, including fungi (causing molds and mildews), bacteria, and viruses. The physical damage caused by insects also leads to costs incurred in chemical pest management efforts, including the monetary cost of control, lost field work time to ensure protection from chemical exposure, and reduction in populations of beneficial insects.

One of the primary advantages of commercially-produced native seed over wild harvested seed is the increased viability of the seed. Seed harvested in the wild often has very poor viability as a result of insect damage. When producing seed for restoration purposes and for distribution to commercial seed growers, chemical control of insects is often necessary to produce high-quality

South Texas Natives Definitions:

Revegetation - replanting plants for ecological, farm management or aesthetic purposes. Revegetation can increase the area of suitable habitat in the landscape, improve the quality of existing habitat, and help to link remnant or isolated habitats by providing 'stepping stones' and corridors.

Restoration - the state of being restored to its former good condition, or the act of restoring something to a satisfactory state.

Successional stage - A stage or recognizable condition of a plant community that occurs during its development from the bare ground to climax habitat. Recent theory points toward state and transitional models dealing with aggregations of co-specific plants whose abundance or occurrence is dictated by natural and man-induced disturbances.

Invader - a species that has been introduced into an area beyond its native range. Invasions can result in losses of native species, changes in community structure and function, and alterations of the physical structure of the system.

seed. Because chemical control of harmful insects also destroys populations of beneficial insects, care should be taken to ensure that harmful insect populations have reached a threshold where seed yield and quality or plant survival is negatively impacted before implementing chemical control. Severe infestations of harmful insects are often good indicators of other agronomic issues, such as poor plant health or vigor, low soil fertility, poor adaptation to the planting site, or environmental stresses, such as drought. Other times these harmful insect "booms" are a result of the large-scale production of native plant species that are typically less abundant or more widely distributed across the landscape in their native habitats. Irrigation of native plant stands for seed production in times of drought also influences harmful insect abundance. These irrigated stands often become the only food source for seed and plant eating insects, resulting in abnormal insect concentrations that must be controlled.

In 2006, STN was faced with infestations of several insects. Thrips, tiny insects belonging to the order Thysanoptera, caused damage to sideoats grama (*Bouteloua curtipendula*), Texas grama (*B. rigidiseta*), hairy grama (*B. hirsuta* var. *hirsuta*) and slender grama (*B. repens*). Plant-feeding thrips pierce a hole and suck out the contents of individual cells of leaves, flowers, and pollen causing a reduction in pollination and reduced seed fill (accumulation of food reserves). This, in turn, results in reduced seed production and reduced seed quality. The rice stink bug (*Oebalus pugnax*) infested our Arizona cottontop (*Digitaria californica*) and little bluestem (*Schizachyrium scoparium*) seed increase fields and our brownseed paspalum (*Paspalum plicatulum*) and pink pappusgrass (*Pappophorum bicolor*) evaluation plots. The rice stink bug feeds on seeds with a piercing-sucking mouthpart called a proboscis. Nymphal and adult feeding removes the contents (the endosperm) from developing seeds during the milk and soft dough stages. We have also controlled fall armyworms (*Spoloptera frugiperda*) in Arizona cottontop and sideoats grama. These caterpillars occurred in large numbers following large rainfall events and at times when drought eliminated their other food sources. Armyworms will feed day and night on all above-ground plant

Rice stink bugs on Arizona cottontop

parts and often cause severe damage to native grasses.

When we sampled our seed increase fields, several other pests were observed and collected. However, these pest populations were not causing significant damage to warrant chemical control. For example, seed bugs, belonging to the family Lygaeidae, feed on mature seed, typically injecting saliva and sucking out the dissolved contents of the seed. We observed leaf-footed or coreid bugs (family Coreidae) eating seed and foliage. Another pest we collected was the shield-backed bug (subfamily Scutelleridae), a plant feeder.

Clearly, the promotion of native plants by STN is beneficial to wildlife and the insects wildlife utilize. The continued observation of insect populations in our evaluation plots will help us determine the beneficial and harmful insects that have the potential to establish populations in our future seed increase fields. In growing native plants, we strive to balance our efforts, protecting the beneficial insect species, managing the harmful populations, and producing quality seed.

Stephanie Campbell is a former research associate with STN.

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Native Seed Availability

Common Name	Latin Name	Where Available	Date Available
Catarina Blend Bristlegrass	*Setaria leucopila & Setaria vulpiseta*	Pogue Agri Partners, Douglass W. King Co., Bamert Seed Co.	Spring 2008
Dilley Germplasm Slender Grama	*Bouteloua repens*	Bladerunner Farms	Spring 2008
La Salle Germplasm Arizona Cottontop	*Digitaria californica*	Pogue Agri Partners	Spring 2008
Kinney Two-flowered Trichloris	*Chloris crinita*	Douglass W. King Co.	Now
Lavaca Germplasm Canada Wildrye	*Elymus canadensis*	Turner Seed Company	Now
Mariah Germplasm Hooded Windmillgrass	*Chloris cucullata*	Watley Seed Company	Late Spring 2008
Welder Germplasm Shortspike Windmillgrass	*Chloris subdolichostachya*	Turner Seed Company	Spring 2008

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