



Year 2002

Progress Report of Activities



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E. "Kika" de la Garza Plant Materials Center

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The Kika de la Garza Plant Materials Center (PMC) is a 91-acre facility established to provide cost-effective vegetative solutions for soil and water conservation problems. This means identifying plants and developing techniques for successful conservation use. It also means assisting in the commercial development of these plants and promoting their use in natural resource conservation and other environmental programs.

The PMC was established in 1981. It is one of 26 centers located throughout the United States. The PMC is operated by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), in cooperation with an Advisory Board from Texas A&M University-Kingsville, the Caesar Kleberg Wildlife Research Institute (CKWRI), South Texas Association of Soil & Water Conservation Districts, and the Gulf Coast Association of Soil & Water Conservation Districts. The Kika de la Garza PMC serves approximately 27 million acres of the southern portion of Texas.

Program Emphasis

The mission of the Kika de la Garza PMC is to develop and transfer plant science technology to solve natural resource problems in the South Texas area. Plant testing and plant selection as well as the development of new plant science technologies are the primary products of our program. The PMC conducts plantings and studies at the Center and off-Center with cooperating partners. The PMC works with NRCS Field Offices and Resource Conservation and Development (RC&D) groups, Conservation Districts, federal and state agencies, and private landowners.

Our current program emphasis at the PMC is in the following areas:

- Rangeland Habitat Restoration and Enhancement
- Coastal Shoreline Stabilization
- Coastal Habitat Restoration and Enhancement
- Erosion Control/Water Quality Improvement on Agricultural Land

Following are highlights of some of the activities of the PMC for 2002. Please contact the PMC for more detailed information.

Rangeland Habitat Restoration and Enhancement

South Texas Natives Project:

The goal of the South Texas Natives Project (STN) is to provide economically viable sources of plants and seeds and to develop effective planting strategies for the restoration of South Texas plant communities. As a partner in this initiative, the Kika de la Garza Plant Materials Center is establishing a seed nursery of South Texas



Hall's Panicum

ecotypes of a variety of grasses, forbs, and legumes. Ecotypes will be developed for 3 basic regions: the Gulf Coast Prairie, the South Texas Plain and the Coastal Sand Plain. The ecotype regions were established to be large enough to retain regional integrity and genetic adaptability. The seed nurseries will consist of approximately 20 collections of each species per ecoregion. The nurseries will consist of transplants that are isolated as necessary to maintain species integrity and diversity. The seed nurseries will be hand harvested to ensure a complete spectrum of seed is harvested from each species. The nursery seed will then be planted in production fields where it will be harvested and bulked per species within each ecoregion. The ecoregion seed will then be made available to commercial seed growers.

In 2001, we received 66 collections representing 7 species for the South Texas Plain Ecoregion and 24 collections representing 5 species for the Coastal Sand Plain Ecoregion. We established a small seed nursery consisting of over 3,770 plants and harvested a little over 23 pounds of seed.

In 2002, we received 941 collections from the STN Project. This included 866 collections representing 97

species for the South Texas Plain Ecoregion, 178 collections representing 45 species for the Coastal Sand Plain Ecoregion, and 69 collections representing 32 species for the Gulf Coast Prairie Ecoregion. The seed nursery was expanded to approximately 4,571 plants and we harvested almost 26 pounds of seed.

In December 2002, we seeded trays to add to the seed nursery. This included 342 collections representing 22 species for the South Texas Plain and Coastal Sand Plain Ecoregions, and 61 collections representing 12 species for the Gulf Coast Prairie Ecoregion. These seedlings will be planted both on and off-site for evaluation and seed production.

The Gulf Coast Ecotype Project:

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, ecotypic plant material



White Prairie Clover

to displace invasive species on pastures and agricultural fields, along the Texas Gulf Coast. Thirteen species including 4 forbs, 1 cool season grass, and 8 warm season grasses were selected for initial collecting and evaluation. Ten to twenty-five collections of each species are being made by the partners of this project, as well as a few other groups, from the 30 counties along the Texas Gulf Coast.

A transplant nursery is established once collections are received by the PMC. These transplants are planted in irrigated field plots where seed is hand harvested and evaluated for production, germination, and establishment. Successful collections will eventually be released for commercial production.

In 2001, 42 collections were received, representing 12 of the 13 selected species. In 2002, 14 of these collections (6 different species) were transplanted in to the field and 11 ounces of seed were collected. Also in 2002, 48 additional collections were received representing 11 of the selected species. In December 2002, 61 of the collections were seeded into 100 cell trays. Those exhibiting good germination will be transplanted into the field beginning in the spring.

Native Plant Selection and Breeding:



Hooded Windmillgrass Breeder Block

One of the goals of the PMC is to produce economically viable sources of native plants and seeds for the restoration of South Texas habitat. But as Gary Pogue, owner of Pogue Seed Company, has put it, “attempts to commercially produce native plants have usually ended in failure.” In order to produce economically viable commercial seed we must find the right species that have good seed production and seed quality characteristics. These plants must produce enough seed to be economically feasible. The seed must also have good germination and emergence characteristics to ensure consistent levels of field establishment. Seed production and seed quality are not the only characteristics that these species must possess. These plants must have seed that can be harvested, processed, and planted by conventional equipment in order to have large-scale commercial application. This is a large request for our South Texas native plants, which have been notorious for producing small fluffy seed that is difficult to harvest, small seeds that shatter off the plant, or seeds that have poor seed fill and dormancy problems.

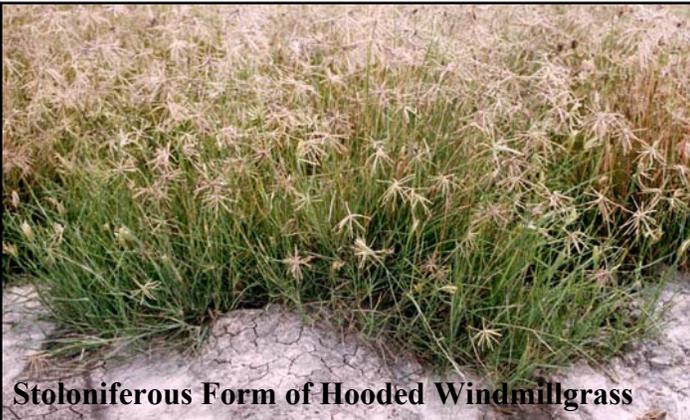


Plains Bristlegrass Breeder Block

The PMC is currently evaluating three promising grass species of South Texas. Hooded windmillgrass (*Chloris cucullata*), brownsseed paspalum (*Paspalum plicatulum*), and plains bristlegrass (*Setaria vulpiseta*) appear to have good characteristics for large-scale commercial seed production. We are working with Dr. Bill Ocumpaugh, with the Texas Ag. Experiment Station at Beeville, to evaluate seed production and seed quality characteristics

of brownseed paspalum and hooded windmillgrass under irrigated and non-irrigated conditions. We have also established breeding blocks of hooded windmillgrass and plains bristlegass in order to screen and select accessions that might develop improved seed germination and seedling emergence characteristics. We are determined to develop commercial seed of these native grasses that will provide a consistent level of field establishment.

Hooded Windmillgrass for Use by TxDOT



Stoloniferous Form of Hooded Windmillgrass

The Texas Department of Transportation (TxDOT) oversees thousands of acres of highway right-of-way that must be revegetated after construction clears them of plant cover. In South Texas this is usually done by planting exotic species, due to the lack of large quantities of native seed. The little native seed that is available often has poor establishment and is expensive compared to the weedy exotic species. These exotics often invade pastures and fields adjoining the right-of-ways where they were planted. This tends to decrease the number of native species that occurs there, and decreases the quality of the range. Unfortunately, until good quality, commercially produced native seed is available for South Texas, this process will continue. TxDOT, CKWRI, and the PMC have begun looking into native species in South Texas that can fill this need.

Hooded windmillgrass (*Chloris cucullata*) is one species that shows this potential. It is a native, warm season bunchgrass that forms culms 15-60cm tall and rooting stolons. It occurs naturally in Texas, and its range reaches in to Oklahoma, New Mexico, and northeastern Mexico. *C. cucullata* has been known to produce hybrids where its range overlaps with *C. verticillata* and *C. andropogonoides*. These have been named *C. subdolichostachya* (shortspike windmillgrass) and appear to have a more stoloniferous form with culms 30-70cm tall. The characteristics of these two species indicate that they should be evaluated for roadside planting.

Forty-three accessions of windmillgrass were collected and seeded in the greenhouse in 2000. Of these, 36 were

transplanted to an irrigated field site in April of 2000. These plants were evaluated and seed was hand harvested throughout 2000 and 2001. Four collections of shortspike windmillgrass and two of hooded windmillgrass had superior performance. Unfortunately, when seed germination was tested shortspike windmill had an average of 8.6% germination (with a range of 1% to 24%), while hooded windmillgrass had 32.6% germination (with a range of 0% to 100%). Breeder blocks of the superior accessions were established in 2002 to see if a strain with both high germination and a stoloniferous form can be obtained.

Native Grass Restoration Methods



Bomer Field Site

Millions of acres of rangeland in South Texas and Mexico are inundated with buffelgrass (*Cenchrus ciliaris*) and other non-native grasses. Seeding these areas with native grasses can be problematic because 1) existing non-native grass seed banks can be considerable, and 2) broad-leaved weed infestation is common. Herbicides have been successfully used to reduce competition in restoration projects. In this study, a stand of buffelgrass at the Bomer Wildlife Management Area, Duval County, TX was sprayed with Round-Up. After a period of 2 weeks, experimental units were mowed using a disc shredder and then raked. A month later, a mixture of plains bristlegass (*Setaria vulpiseta*), fourflower trichloris (*Trichloris pluriflora*), and green sprangletop (*Leptochloa dubia*) was seeded with a Tye no-till rangeland drill, and an additional application of Round-Up was used to control small amounts of buffelgrass regrowth. Pre- and post-emergent herbicides will be applied, and evaluation will be based on their ability to selectively control both buffelgrass seedlings and broad-leaved weeds while not impacting seeded native grass species.

Seeding occurred October 8th, and rainfall has been above average both before and after. Currently, most native grass seedlings are 2-4 inches tall. On the plots awaiting post-emergent herbicide treatments, buffelgrass seedlings

and broad-leaved weeds are common. Pre-emergent herbicide treated plots are exhibiting very little growth of any kind.

Coastal Shoreline Stabilization

Bioengineering Methods

The PMC, working with the San Patricio Soil & Water Conservation District (SWCD) implemented a unique bluff shaping and shoreline stabilization project near Fulton, TX in August 2001. A historic structure made from oyster shell located on Copano Bay was threatened by coastal wave erosion. The PMC developed a bioengineering design to protect the building by utilizing encapsulated soil and native salt-tolerant plants.

Following construction, high tides and coastal wave action undermined the toe of this project. Thus, the PMC came up with a repair using sandbags and a new product called Detalok. Detalok is an innovative method for installing sand bags for stabilizing slopes. The Detalok units interconnect sand bags, increasing the shear strength of the constructed slope. Spikes are molded into the Detalok unit, which allows interlocking of the sandbags. In October of 2002, the PMC and Sinton NRCS Field Office installed the Detalok repair system. Native, salt-tolerant marshhay cordgrass and gulf cordgrass were added to the repair to provide long term stabilization with root reinforcement and to improve habitat and aesthetics.

One of the major benefits of the Detalok system is its flexibility for repairs. For small blowouts, the sandbags can be adjusted to fit the repair. Furthermore, it is easy for a homeowner or



Detalok Unit
flexibility for repairs. For small blowouts, the sandbags can be adjusted to fit the repair. Furthermore, it is easy for a homeowner or



contractor to install because it does not require any heavy equipment. Monitoring of this project should provide further guidance on nonstructural shoreline erosion control practices for embankments and dunes along the Texas Gulf Coast.

Gulf Cordgrass:

There are over 3,000 miles of coastal shoreline along the Texas Gulf Coast. Many of these miles have eroding bluffs that need adapted plant material for stabilization. These bluffs, along with coastal wetland berms and dredge



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 environmentally friendly stabilizing system for miles of eroding shorelines. The PMC made 19 vegetative collections of gulf cordgrass (*Spartina spartinae*) in 2000 for evaluation of seed production and seed quality characteristics.

All collections had excellent survival and vegetative production over both 2001 and 2002. Seeds from each collection were hand harvested in 2001 and subjected to germination tests in March 2002. Of the 19 collections, 10 had poor seed germination (0-20%), 6 had good seed germination (20-40%), and three had excellent seed germination (44%, 48%, & 60%). The collection with 60% seed germination also had the highest overall performance in 2001, and ranked 5th of the nineteen in overall performance in 2002.

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