Year 2008 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 27 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
- Biofuels

Following are highlights of some of the activities of the PMC for 2008. Please contact the PMC for more detailed information.

"Seeds for Conservation" Field Day


PMC Field Day Tour

The PMC, South Texas Natives, and Caesar Kleberg Wildlife Research Institute hosted a field day in November 2008. The events began with a tour of the PMC facilities with PMC manager, John Lloyd-Reilley and poster displays. This was followed by a wildlife habitat workshop given by State Resource Conservationist, Susan Baggett, Rangeland Management Specialist, Jason Hohlt, and State Plant Materials Specialist, Rob Ziehr. The group then toured the South Texas Natives' test plots and facilities at the Kleberg Wildlife Complex with Forrest Smith, Interim Coordinator for South Texas Natives.


STN Test Plot Tour

An afternoon program of speakers was held at the Kleberg Wildlife Complex with NRCS State Conservationist, Don Gohmert, as Master of Ceremonies. Speakers included: Fred Bryant, Leroy G. Denman, Jr. Director of Wildlife Research at CKWRI; Joseph Fitzsimons, Chairman Emeritus at Texas Parks and Wildlife Department; Dennis Markwardt, Vegetative Management Section Director of the Texas Department of Transportation; Andy Scott, Director of Research at Rio Farms Inc.; Carlos Fernandez, Plant Physiology and Cropping Systems Leaders at Texas AgriLife Research Corpus Christi; and Forrest Smith.


Orange Zexmenia

John Lloyd-Reilley introduced the latest PMC and STN co-release, Goliad Germplasm orange zexmenia. Goliad Germplasm is a composite of seven collections from Val Verde, Starr, Goliad, Webb, Duval, Jim Hogg, and Bexar Counties, Texas. Orange zexmenia is a native, perennial sub-shrub with a mature foliage height ranging from 20 to 40 inches. It is browsed by white-tailed deer, cattle, sheep, and goats. Bobwhite quail have been observed eating the seeds. It blooms from March to December and is an adult nectar source for butterflies and other pollinators. Goliad Germplasm is recommended for use in upland wildlife plantings, native landscaping, and in range seeding mixes. It also can be used in many types of conservation plantings, such as stream-side buffers and filter strips. This release will be made available to seed dealers in 2009.


South Texas Natives

At the end of the program several gifts were presented to Paula Maywald, former Coordinator for South Texas Natives in recognition of her work with South Texas Natives from its inception and over the past six years. Paula left STN to pursue a career in land restoration consulting. Forrest Smith was promoted to Coordinator for South Texas Natives.

Native Species and Genetic Diversity

The South Texas Natives project is an initiative started by the Caesar Kleberg Wildlife Research Institute at TAMU-Kingsville 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 with STN, the E. 'Kika" de la Garza PMC has assisted in the co-release of 11 ecotypes for south Texas. The ecotype concept is the idea of releasing a mix of numerous collections of a species. It centers around the idea of mixing a broad spectrum of the genetic makeup of that species adapted to a specific ecoregion. Ecotypes are used to restore local habitat. It is understood that it may not be an exact match to a local habitat, but if no local material is available, it will be a closer genetic match than seed from out-of-region origins. Ecoregion seed is established to be large enough to support a commercial seed market, but small enough to retain regional integrity and genetic adaptability.

There are genetic pitfalls however with the broad mix of collections for the ecotype release. The original samples must be representative and non-selective to maintain genetic diversity. The ploidy level (number of chromosome sets) of the collections must match each other as well as the target restoration site in order to avoid producing sterile hybrids. And it is critical to know whether the species is self pollinating or cross pollinating to avoid both inbreeding and outbreeding depression. The E. "Kika" de la Garza PMC has established a protocol to help understand and manage the genetics of its ecotype releases. To help determine the mode of reproduction (cross, self, etc.) it looks at field variability of the species over four generations. It also has pollen bags that it can employ to help in determining whether the species is cross pollinating or not. Dr. Deborah Overath, Texas A&M University Corpus Christi, has volunteered her assistance to help assess mode of reproduction using DNA and paternity analysis of the offspring. Dr. Byron Burson, ARS-Temple, Texas is currently helping us determine apomixis (asexual reproduction) through microscopic cell observations. The PMC has also developed a working relationship with the US Forest Service Genetics Lab in Placerville, CA. They can asses both ploidy levels of our collections as well as genetic diversity within and between collections. Most recently they are evaluating 26 collections of multi-flowered false Rhodesgrass (*Trichloris pluriflora*).

# Samples Prepped for DNA Analysis	# Samples Prepped for Ploidy Analysis	# Samples Prepped for Isozyme Analysis
415 total	144 total	390 total
26 collections	26 collections	26 collections

All collections evaluated had the same ploidy level. Twenty-one of the 26 collections had the exact same genotype. Only 22 seeds of the 415 total seeds evaluated had variation that distinguished them from the common genotype. A collection from Jim Wells county was the

only collection to have a consistent genetic difference from the other 25 collections. It is with this carefully managed ecotype approach and genetic screening that STN and the PMC hope to improve our efforts to release commercial seed that is adapted, diverse, and appropriate for the landowners of south Texas.

New Collections


Black Eyed Susan

The PMC is still seeking new collections of several species including: blackeyed Susan (*Rudbeckia hirta*), low prairie clover (*Dalea scandens*), roundhead prairie clover (*Dalea multiflora*), sideoats grama (*Bouteloua curtipendula*), switchgrass (*Panicum virgatum*), and white prairie clover (*Dalea candida*). Species description sheets as well as seed collecting protocols can be found on the Texas Plant Materials Program website (http://www.tx.nrcs.usda.gov/technical/pmc/) or contact the PMC for more information.

Evaluation of Endangered, Rare and Endemic Plants of South Texas

The Plant Materials Center (PMC) and the US Fish & Wildlife Service (USFWS) are working together to gather information pertaining to the taxonomy, morphology, habitat and reproductive biology of two rare and endemic plant species, plains gumweed (*Grindelia oolepis*) and threeflower broomweed (*Thurovia triflora*), and one endangered legume (*Hoffmannseggia tenella*). We are working together in order to aid in the restoration, stabilization and maintenance of their populations.

Plains gumweed is a rhizomatous perennial forming small clumps. Its stems are no more than one foot tall. It seems to occur mostly in ephemeral wet spots in coastal prairies on clayey soils. It is endemic to the Texas Gulf Coast Plain. Plains gumweed is on the Texas watch list for rare and endangered species.

Plains gumweed was harvested from one site on a ranch in Refugio County from October 26 through December 13, 2007. The total harvest for the year was 133 seeds weighing 0.2623 grams. Calculations estimate that plains gumweed produces 230,202 seeds per pound.

Fifty seeds of plains gumweed were planted at the PMC in January of 2008 and 18 successfully germinated. The plants were then planted in 14 x 14 inch containers with most containers getting four plants. They began flowering in June, six months after they germinated, with the peak of flowering occurring in September. They continued to produce seed from August through November. Due to the rhizomatous nature of this species there are now several hundred plants that are capable of being transplanted at a reintroduction site.

At the field sites, plains gumweed flowered from September through November. The sites which had populations of plains gumweed either had naturally occurring short vegetation or grass that was being kept mowed.


Threeflower Broomweed

Threeflower broomweed (*Thurovia triflora*) is an annual that bears little resemblance to other broomweeds of the region, neither in stature nor flower color. It is tiny, seldom more than 4 or 5 inches tall, and has small white flower-heads, whereas the other local broomweed species (*Gutierrezia texana* and *Amphiachyris dracunculoides*) are generally at least a foot tall and bare larger yellow flower heads. It also differs in habitat. Unlike the others, which are weedy generalists that increase under heavier grazing regimes, threeflower broomweed tends to be restricted to slightly saline or sodic soils that occur in small patches within a nonsaline soil matrix. Three flowered broomweed is an endemic species that has limited populations (21-100) and thus makes the species vulnerable to depletion and loss.

Threeflower broomweed was also harvested from one site on the same ranch from November 15 through December 13, 2007. The total harvest for the year was 543 seeds weighing 0.3338 grams. Calculations estimate that threeflower broomweed produces 738,532 seeds per pound.

One hundred seeds were planted at the PMC in January of 2008 and 72 successfully germinated. The threeflower broomweed began flowering in September, peaked in October and finished in mid November

At the field sites, the first plants were seen in September and continued to produce seed through November. The sites that threeflower broomweed are growing in at the Refugio location are small patches of short grass relative to the surrounding area and rock hard, possibly saline, soil that has been compacted by livestock. Many if not most plants were growing within the livestock trails rather than just along the edges.

Shanna Dunn, NRCS soil scientist for the Corpus Christi region, visited the project site on November 29, 2007. She used an EM-38, electro-magnetic device, to determine the soil salinity from our plant harvest sites. The plains gumweed sites ranged from 0.4 to 1.2 EC levels at the surface and 0.5 to 1.4 EC levels at around 6 inches below the surface. In general, these sites are only slightly saline. This may be partly due to the high rainfall that occurred at this site temporarily leaching the salts. At the threeflower broomweed harvest site, the surface reading indicated an EC of just 2.0. However, the subsurface had a reading of 7.3 with a SAR of 64, which indicates a high level of salinity. For reference, bermudagrass is considered a salt tolerant species. Its threshold for 50% survival is at an EC level of 6.9.

Currently, ecological data is being collected at the sites that have populations of these two species. Data that is being collected includes the cover percentages of bare ground, litter, grass, forbs and canopy cover within the 1 square meter in which the focal species is centered. Vegetation height is also being recorded as well as associate species. Soil near each plant is being collected to test for texture and salinity.

The USFWS is also providing funding to the PMC to carry out actions needed to prevent the further decline of the federally endangered slender rushpea, a plant native to Kleberg and Nueces counties. The PMC will look at: restoration and enhancement of habitat, seed collection and propagation, surveys for new populations, a pilot introduction attempt, and development of a reintroduction plan. These actions are intended to help the U.S. Fish & Wildlife Service in its efforts toward recovery of this species.

Current Availability of Ecotype Releases

Common Name	Scientific Name	Available From	Date Available
Catarina Blend Bristlegrass	*Setaria leucopila* & *Setaria vulpiseta*	Pogue Agri Partners, Douglass W. King Co., Bamert Seed Co. Turner Seed Company	Now
Dilley Germplasm Slender Grama	*Bouteloua repens*	Bladerunner Farms, Douglass W. King Co.	Now
Chaparral Germplasm Hairy Grama	*Bouteloua hirsuta*	Douglass W. King Co.	late 2009?
Atascosa Germplasm Texas Grama	*Bouteloua rigidiseta*	Douglass W. King Co.	late 2009?
La Salle Germplasm Arizona Cottontop	*Digitaria californica*	Pogue Agri Partners, Douglas King Seed Co., Bladerunner Farms	Now
Kinney Germplasm Two-flower 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, Douglass W. King Co.	no crop yet late 2009?
Welder Germplasm Shortspike Windmillgrass	*Chloris subdolichostachya*	Turner Seed Company	Now
Zapata Germplasm Rio Grande Clammyweed	*Polanisia dodecandra* ssp. *riograndensis*	Turner Seed Company	Fall 2009
Divot Talloweed Blend	*Plantago hookeriana* & *Plantago rhodosperma*	Pogue Agri Partners, Turner Seed Company	expected in Fall 2010