

East Texas Plant Materials Center

2013 Progress Report of Activities



6598 FM 2782, Nacogdoches, Texas Phone: 936-564-4873 Fax: 936-552-7924 <http://plant-materials.nrcs.usda.gov/etpmc>

Study Update and Focus

Cooperatives

The East Texas Plant Materials Center (ETPMC) continued two cooperative studies in 2013 with Dr. Jim Kiniry of the Agricultural Research Service, Temple, Texas and the Kika de la Garza Plant Materials Center (STPMC) in Kingsville, Texas. Dr. Kiniry is using the ETPMC as one of ten locations across three states to evaluate warm season, perennial, grasses for biomass production for cellulosic ethanol manufacturing. This study will determine which species and (or) varieties of grasses are best adapted to specific eco-regions allowing producers to choose the best species/variety



STPMC brown seed paspalum being harvested at the ETPMC to determine adaptation, seed fill, and yield.

for their geographic location.

The ETPMC is also working with the STPMC to evaluate cold tolerance and adaptation of silver bluestem, four flower trichloris, Indian blanket flower, brownseed paspalum, and Florida paspalum. These evaluations will provide release information on seed fill, germination, and area of adaptation. The studies are aimed at producing a co-release that is adapted for use in both service areas, and is part of the ETPMC initiative to streamline the plant release process and eliminate duplication of work.

Technology Development

Rust Resistant Indiangrass

An F₂ generation of rust resistant Indiangrass was grown in 2013. This field was monitored for signs of rust infection throughout the growing season. Any plants exhibiting rust infection were removed from the field before flowering. Seed was harvested from the remaining plants to create an F₃ population for evaluation and seed increase in 2014.



A susceptible accession of Indiangrass (L) shown next to a resist accession (R) in the same plot that was selected as one of five parents for the breeding work

Long Leaf Pine Work

The ETPMC continues to receive requests for help in restoring longleaf pine eco-systems. Multiple studies were developed with Texas Parks and Wildlife (TPWD) at the Alazan Bayou Wildlife Management Area located adjacent to the ETPMC. The initial study to evaluate the effects of partridge pea on pine seedling survival was lost due to feral hogs rooting in the plots and intense weed pressure. The loss of the partridge study led to studies focused on site preparation using herbicides to suppress weed pressure and another that monitors the effect polyacrylamide gel to help retain moisture around the seedlings roots during their first summer of growth.



Long leaf pine eco-system at Boykin Springs showing grass savannah under mature trees that once dominated portions of the southeastern United States

The ETPMC has partnered with the United States Forest Service (USFS) to aide in their development of eco-specific, warm season, native grasses such as pinehill bluestem, *Schizachyrium scoparium* (Michx.) Nash var. *divergens* (Hack.) Gould. The ETPMC helps clean seed USFS personnel collect, and has dedicated 5 acres of field space for seed increase plantings. Seed collected from these fields will be used to aid restoration efforts in USFS National Forests. Germplasm that exhibits exceptional performance may be tested for their area of adaptation and released for use in broader restoration efforts throughout the longleaf pine range in the southeastern United States.

Cover Crop and Soil Health

Soil health is a topic gaining momentum and national attention. In response, the ETPMC developed a dry land demonstration study in 2012 that compares no-till agricultural practices using cool season cover crops to conventional tillage practices without the use of fall cover crops. Soybeans are being grown on half acre plots under these two management practices to monitor the changes in plant health and seed yield. Soil samples are taken each spring before planting to monitor changes in soil fertility and composition between the two practices.



NRCS soil scientist Alan Peer and Texas state agronomist Willie Durham taking soil samples on cover crop study

A cool season cover crop evaluation was planted in 2013 to determine adaptability of species to the ETPMC service area. The study focuses on cover crops that could be identified by cultivar or variety name so results could be tied to specific plants. This was difficult as most cover crop seed is listed as VNS, variety not specified. The study is a randomized complete block design with 3 replications containing 10 legume species, 6 grass species, and 7 species of forbs. Survival, biomass production and plant vigor will be measured throughout the growing season.

Following suit with NRCS efforts to increase soil health awareness, the ETPMC has begun planting all fallow ground with warm and cool season cover crops to improve soil health, increase pollinator and wildlife habitat, and reduce the amounts of herbicide and fertilizer used on the center. The use of cover crops provides a valuable learning stop during field tours to discuss the benefits cover crops provide, the equipment needed to manage this agricultural practice, and how the equipment works.

Pollinator Habitat

Nine commercially available wildflower mixes from five companies are currently being evaluated at the ETPMC for use in pollinator habitat improvement and to provide a diverse forb component to conservation plantings. Species adaptability and persistence has been monitored and recorded each year. The study is meant to increase efficiency of the ETPMC by identifying seed sources that are readily available for use in the ETPMC service area as opposed to developing new releases, and to provide useful information for technical guides and seeding tables used by NRCS field offices.

Native Warm Season Grass Release Evaluation

In 2013 the ETPMC planted an adaptation study of commercially available Plant Materials Program releases of native, perennial, warm season, grasses developed by PMCs throughout the southeastern United States. The goal of the study is to increase



Alan Shadow planting the native warm season grass study

efficiency in release development, reduce duplication of plant releases within the Plant Materials Program, and develop new species and (or) release information for Texas NRCS conservation planting standards. The study focuses on the “big 4” tall grass prairie grasses; little bluestem, big bluestem, switchgrass, and Indiangrass. The study will evaluate each cultivar’s survival and performance to determine its adaptation and potential use in the ETPMC Service area. This information will be added to Texas NRCS electronic field office technical guide (efotg) planting standards, and give field office staff more available options to increase diversity within the plant community when developing conservation plantings.

ETPMC Assisted Graduate Studies



Jodi Hill (standing) and Sierra Gibbons planting grass plugs for her silvopasture study

In 2012 the ETPMC focused on developing partnerships with local universities by implementing five graduate level studies. These studies were continued in 2013, consisting of four with Stephen F. Austin State University (SFASU) and one with Rice University. The studies include simulated silvopasture using both native and introduced warm season forage grasses; moist soil management and the cataloging of species found within the seed bank; identification of fungal pathogens affecting Indiangrass; the response of native and introduced cool season grasses to endophytes; and the response of native shrubs and trees used in shelter belts around poultry production facilities. These studies will yield information that can be added to field office practice standards.

Center Improvement

2013 saw the introduction of new equipment focused on improving foundation seed quality. For separating filled and unfilled seed from light materials such as little bluestem, a Westrup LA-DUAL continuous batch aspirator was added to the seed lab. An optical sorter was also added to separate *Diodia teres* (Poor Joe) from foundation seed of Crockett Germplasm Herbaceous Mimosa. Poor Joe is an aggressive weed, with seed nearly identical to the Crockett Germplasm Mimosa in shape and weight. It has been extremely difficult to remove with screen and gravity cleaners. The optical sorter is programmed by running a pure sample of 200 seed through the machine. It is calibrated to accept seed that falls into the sample’s spectra range. Any seed not matching the calibration is hit with a quick blast of air as it falls through the machine, ejecting it from the desired seed, and catching it in a separate container. Two passes through



The optical sorter (L) and the dual aspirator (R) will allow the ETPMC to produce higher quality foundation seed by allowing more precision in removing weed and unfilled seeds

the optical sorter effectively removes over 95 percent of the weed seed. A 15'x30' seed cooler and new dehumidifier system was also installed to replace the aging system and cooler. The new cooler is a seamless, fiberglass design, and has doubled the ETPMC's seed storage capabilities.

Improving soil health through the use of cover crops is a practice that is gaining interest rapidly. To help test various cover and commodity crops in existing crop residue, the ETPMC purchased a no-till research plot drill. This planter will allow the PMC to test crops in a real world situation without preparing a seed bed, but can also be used as conventional no-till drill for large



Installation of the new walk in cooler for storing seed collections and foundation seed



New research, no-till plot drill for cover crop work



Transplanting 'Nacogdoches' eastern gamagrass into new foundation fields under irrigation.

plantings. The new no-till plot drill will allow more precision in planting depth, plot length, and seeding rates, as well as increase time efficiency in establishing studies. Information from work accomplished with the new no-till plot planter will directly support NRCS field office staff by supplying updated information for Conservation Practices 344 and 329.

2013 also saw efforts to transfer seed increase blocks and foundation seed fields to new fields with hardline, permanent irrigation. These fields were started from seedlings generated in the greenhouse at the ETPMC and were transplanted with a vegetable planter. 'Nacogdoches' eastern gamagrass and Harrison Germplasm Florida paspalum were transplanted in the spring of 2013 and created a solid, mature stand by the end of growing season. The ETPMC was able to harvest seed from the Harrison Germplasm field in its first year of growth. Moving production fields to fields with permanent irrigation eliminates moving irrigation pipe by hand from field to field during the

growing season, saving time, labor, and allowing staff to water all the production fields in a single day. The old irrigation system required more than a week to rotate pipe around the center to various seed production fields.

Outreach, Presentations, and Tours

The ETPMC conducted 17 tours and (or) presentations in 2013. Groups visiting the center included SFASU soils lab students, minority based farmers' organizations, master gardeners, agriculture extension employees, NRCS field office staff, and high school students. The ETPMC has become a partner with the USFS's Green Schools program by providing training and donating native grasses and wildflowers to school garden projects that emphasize the use of native plants. It provides students from large metropolitan areas, such as Houston, the opportunity to get away from the city and learn the importance of conservation.



Newton Master Gardeners toured the ETPMC this summer and took advantage of muscadines in the People's Garden

Staff also participated in the Louisiana State University AgCenter's Field Day at the Red River Research Station in Bossier City, Louisiana, and presented the positive attributes of using native, warm season grasses and legumes for cattle production.

The ETPMC has used the expansion of the research and production fields to set up demonstrations of several conservation practices. These large scale, functioning demonstrations are anticipated to be used during training sessions for new field office staff and to educate the public on conservation practices available through the NRCS.



New fields being precision graded for irrigation and water flow control



Grassed waterway installed to control water flow and prevent erosion



Engineered low water/stream crossing at end of water way to carry water over the road and prevent wash outs

Conservation Practices Supported

The ETPMC's function is to provide support to NRCS field office operations. Studies are aimed at developing information that allows field office staff to have better knowledge and tools to use in their

conservation management role. The ETPMC is currently working on studies that directly support, but are not limited to, the Conservations Practices listed below:

- 327 Conservation Cover
- 340 Cover Crops
- 342 Critical Area Planting
- 512 Forage and Biomass Plantings
- 412 Grassed Water Ways
- 442 Irrigation Systems, sprinkler
- 464 Irrigation Land Leveling
- 462 Precision Land Forming
- 329 Residue Management (No-Till, Strip Till, Direct Seed)
- 344 Residue Management Seasonal
- 578 Stream Crossing
- 381 Silvopasture Establishment

Seed Increases

The ETPMC is currently increasing the following species:

- *Liatris pycnostachya* for release
- *Tridens strictus* for release
- *Helianthus mollis* cooperative release with Louisiana Native Plant Initiative
- *Schizachyrium scoparium* for the Louisiana Native Plant Initiative

Collections

The ETPMC is currently requesting collections of the following species. Please see the web link for details: http://www.tx.nrcs.usda.gov/technical/pmc/plant_collection_11.html

Andropogon gerardii

Desmodium sp.

Ratibida columnifera

Polygonum pensylvanicum

Helianthus angustifolia

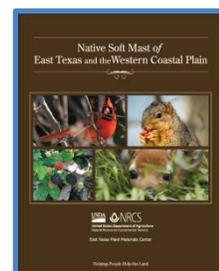
Echinochloa walteri

Endangered Species

In 2013 the ETPMC continued work with *Hibiscus dasycalyx*, *Leavenworthia texana*, and *Physaria pallida*. Melinda Brakie is developing improved germination and propagation procedures for these species at the request of The Center for Plant Conservation, through the Mercer Arboretum and Anita Tiller. This organization has requested help in developing improved germination and propagation techniques for White Bladder Pod, *Physaria pallida* and Golden Glade Crest, *Leavenworthia texana*.

Publications

The ETPMC produced 10 technical documents in fiscal year 2013 and 18 total publications. These documents include, Technical Notes, Plant Guides, journal



articles, scientific posters, thesis work, and brochure identifying important soft mast producing species. For a complete list of publications past and present, please see: <http://plant-materials.nrcs.usda.gov/etpmc/publications.html>

Plant Materials Staff

Alan Shadow – Center Manager Ryan Smith – Biological Aide
Melinda Brakie – Soil Conservationist Max McCormack – Biological Aide
Michael Woody – Biological Technician

Who We Are

The East Texas Plant Materials Center (ETPMC) is one of 27 centers operated by the Natural Resources Conservation Service (NRCS), United States Department of Agriculture. The ETPMC services 42 million acres and covers portions of Texas, Louisiana, Arkansas, and Oklahoma. The center was established in 1982 and is a joint venture between Soil and Water Conservation Districts in east Texas and northwestern Louisiana, NRCS, Stephen F. Austin State University (SFASU), and US Forest Service. The ETPMC encompasses 75 acres of research and production fields, and is located in the Stephen F. Austin Experimental Forest, south of Nacogdoches, Texas.

What We Do

The mission of the NRCS Plant Materials Program is to develop and transfer effective plant technology for the conservation of natural resources. In working with a broad range of plant species, including grasses, forbs, trees, and shrubs, the program seeks to address priority needs of NRCS field offices and land managers in both public and private sectors. Emphasis is focused on using native plants to solve conservation problems and to protect and restore ecosystems. Center personnel develop research projects and technical reports for use in developing technical guides for agency personnel and landowners on the use of plant materials in various conservation practices. The ETPMC's area of emphasis includes, but is not limited to:

- Enhancement of water quality through the protection of riparian and wetland areas
- Restoration of degraded pasture, range, and timber lands
- Restoration of surface-mined sites
- Wildlife habitat improvement
- Restoration of saline sites associated with the oil and gas industry
- Improvement of air quality as related to poultry and other livestock industries

Contact Information

Address: 6598 FM 2782, Nacogdoches, Texas 75964

Phone: (936) 564-4873 Fax: (936) 552-7924

Web Address: <http://plant-materials.nrcs.usda.gov/ETPMC>

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