United States Department of Agriculture

2013 ANNUAL TECHNICAL REPORT

JAMES E. "BUD" SMITH PLANT MATERIALS CENTER

Serving Texas, southwestern Oklahoma, eastern New Mexico, southeastern Colorado, and southwestern Kansas

UNITED STATES DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE

JAMES E. "BUD" SMITH PLANT MATERIALS CENTER

2013 ANNUAL TECHNICAL REPORT

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Plant Materials Center Personnel

Gary L. Rea, Manager
Bandon Carr, Soil Conservationist
Randy Kuehler, Biological Science Technician

HISTORY

The Natural Resources Conservation Service/James E. “Bud” Smith Plant Materials Center had its beginning in 1935 in San Antonio, Texas. The San Antonio Nursery was established under the Soil Erosion Service. It later became the Soil Conservation Service (SCS), which is known today as the Natural Resource Conservation Service (NRCS). In the late 50’s and early 60’s there were two Plant Materials Centers operating through a cooperative enterprise between the Texas Agriculture Experiment Station and the Soil Conservation Service. The Spur, Texas Plant Materials Center was the primary center with the San Antonio Plant Material Center being a sub-center. The Spur Plant Materials Center was located on 48 acres of irrigated land and the San Antonio Sub-Center was located on 30 acres of irrigated land. Seed production from both of the centers was processed at the Big Spring Field Station. It appears that both Plant Materials centers were closed in 1964 and all material moved to Knox City in 1965 when the Knox City Plant Materials Center was establish. Since 1965 all of the seed production has been processed at Knox City.
On September 7, 1967, the Knox City Plant Materials Center (PMC) was given the honorary name of James E. “Bud” Smith Plant Materials Center in honor of Bud’s dedicated service in early plant science work from 1935 up until 1965. The PMC original long-term lease from Mr. T. R. Campbell was for 60 acres of irrigated land. The current lease is for 137.5 acres of his land.

Past Managers at the NRCS/James E. “Bud” Smith PMC	**Dates**
Arnold G. Davis	2/1965 to 6/1966
Howard A. Carleton	11/1968 to 5/1969
Jacob C. Garrison	5/1969 to 7/1974
David G. Lorenz	9/1974 to 3/1984
Jon B. Muncrief	1984 to 8/1985
James S. Alderson	2/1986 to 1/1990
Morris J. Houck	6/1990 to 9/2006
Ray T. Cragar	4/2007 to 7/2008
Gary L. Rea Ph. D	10/2008 to present

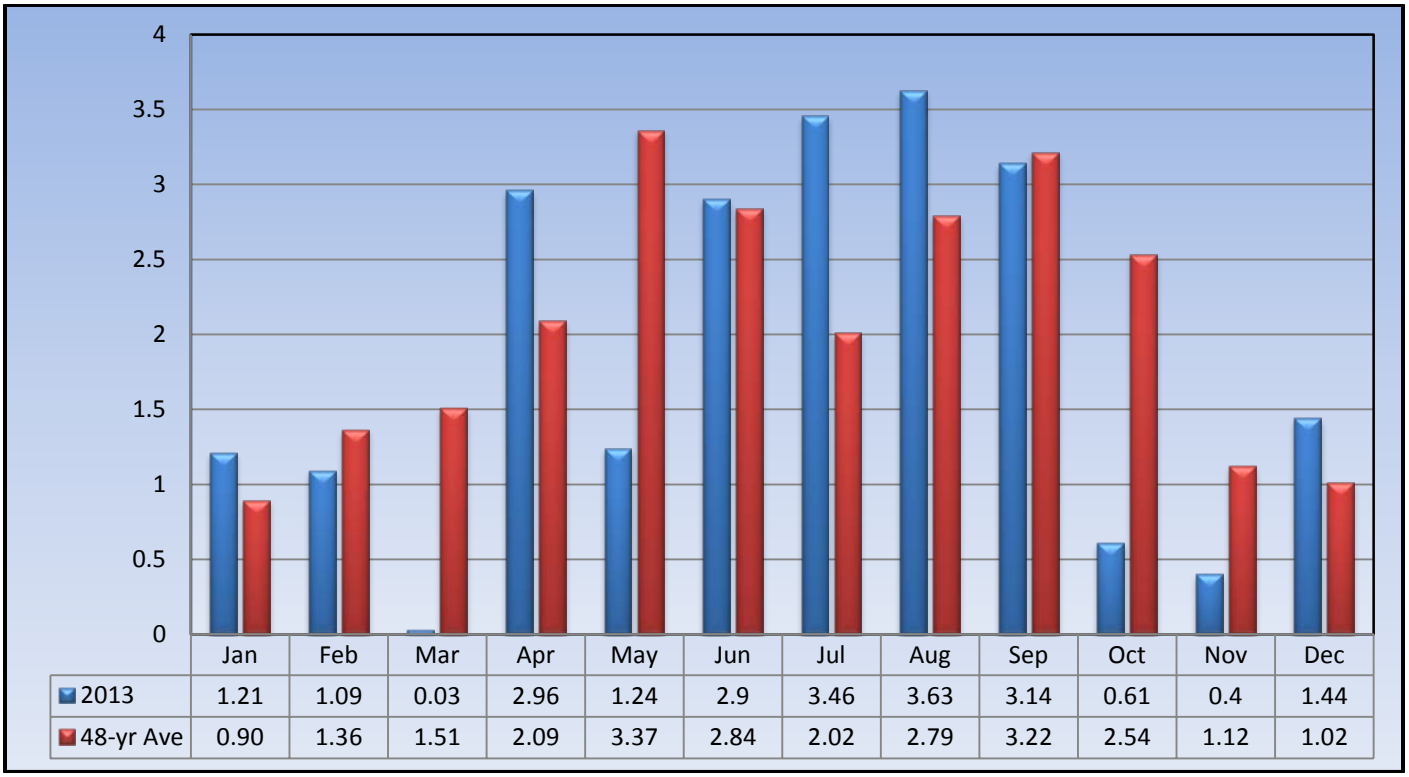
INTRODUCTION

The James E. “Bud” Smith Plant Materials Center is responsible for developing conservation plants and cultural techniques for use on targeted Major Land Resource Area (MLRA) in Texas, Oklahoma, Kansas, Colorado, and New Mexico.

The Plant Materials Center is located approximately 4½ miles NW of Knox City, Texas, in the Rolling Red Plains Land Resource Area. The site is located about 33° north latitude, 100° west longitude and 1500 feet above sea level. Seven shallow irrigation wells supply irrigation water to all fields through an underground pipeline.

Approximately 90 percent of the soil at the PMC is a friable loam or fine sandy loam. Surface soil varies in depth from 10 to 30 inches with sandy clay loam or clay subsoil. The remainder of the soil is slightly heavier, having a fine sandy loam surface soil over clay loam subsoil with a caliche layer between 20 and 36 inches. Water erosion is not usually a problem, but wind erosion poses a constant threat, especially during late winter and spring. On fallow fields, cover crops and tillage practices are applied to control wind erosion.

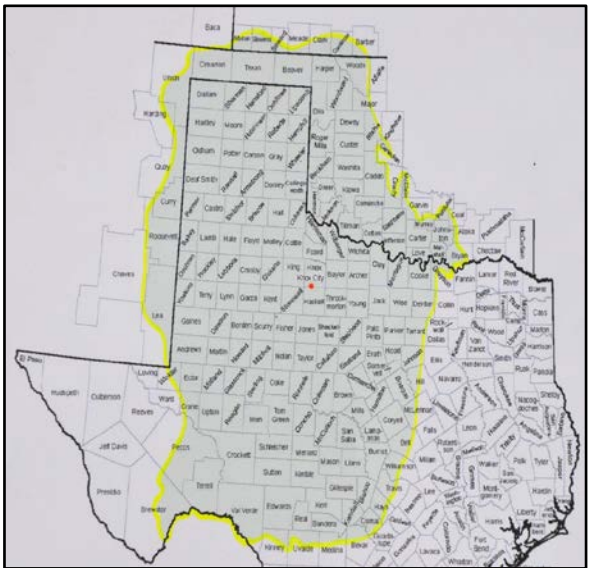
The PMC has a long-term average of 230 frost-free days in its growing season. Rainfall for 2013 was recorded at 22.11 inches, which is slightly lower than the 48-yr average of 24.77 inches. Precipitation for the Center is mainly received in the form of spring, summer and fall rain showers. Snowfalls during winter were few and contributed minor amounts to total precipitation.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	1.21	1.09	0.03	2.96	1.24	2.9	3.46	3.63	3.14	0.61	0.4	1.44
48-yr Ave	0.90	1.36	1.51	2.09	3.37	2.84	2.02	2.79	3.22	2.54	1.12	1.02

SERVICE AREA

The service area of the NRCS James E. "Bud" Smith Plant Materials Center includes a large portion of Texas, southwestern Oklahoma, and a portion of Kansas, Colorado, and New Mexico. The work here is coordinated with the work done at other Plant Materials Centers in Texas and throughout the United States. The shady portions of the map below indicate the Service area.



JAMES E. "BUD" SMITH PLANT MATERIALS CENTER LONG RANGE PLAN

I. Introduction

The mission of the Plant Materials Program is to develop and deliver plant science technology to meet customer and resource needs. The purpose of the Plant Materials Program is to carry out specialized activities in resource conservation, as part of the overall program of the Natural Resources Conservation Service. It is the responsibility of the Plant Materials Center to: 1.) assemble, test, and release plant materials for conservation use, 2.) determine techniques for the successful use and management of conservation species, 3.) facilitate the commercial increase of conservation plant species, 4.) provide for the development and transfer of state of the art applied science technology.

The PMC Long Range Plan (LRP) is used to identify, guide, and direct PMC operation toward solving high-priority resource problems identified in the State(s) Plant Materials LRP. **The James E. "Bud" Smith PMC is directed by needs identified in the Long Range Plans of Texas, Oklahoma, Kansas, Colorado, and New Mexico. It is consistent with goals and objectives identified in the NRCS Strategic Plan.**

II. Long Range Plan Development

This Long Range Plan (LRP) was developed in accordance with the revised National Plant Materials Manual, Part 540.22. This plan is intended to be used as a guide for directing plant materials center activities within the state of Texas, portions of Oklahoma, Kansas, Colorado, and New Mexico.

The Plant Materials Center Technical Advisory Committee(s) is responsible for identifying customers, resource, and program needs. The Technical Advisory Committee consists of representatives from NRCS and other federal and state agencies, private industry, and universities. Advisory members may have an interest due to financial contributions made to the center.

Needs were categorized by the NRCS Goals and Objectives as listed in the revised National Plant Materials Manual, Exhibit 539.1, NRCS Goals and Objectives.

The Technical Advisory Committee recommends studies needed at the center to meet identified concerns. Specific study areas and special concerns are defined by the Technical Advisory Committee and reviewed by the State Conservationist Advisory Committee. Projects budgeted are incorporated into the Center's Business Plan and Workload Analysis.

<u>General Description of the Service Area</u>

Climate - USDA Plant Hardiness Zones 5b through 8b are within the area served. Rainfall is quite varied both in annual amount and in seasonal distribution, but predominately occurs in the form of rainfall. Annual precipitation averages of individual climatological stations range from about 12 to 36 inches.

Major Land Resource Areas - Included in the service area is all or portions of eighteen major land resource areas. MLRAs include the following:

67B – Central High Plains, Southern Part
42 – Trans-Pecos
70A – Canadian River Plains and Valleys
70B – Upper Pecos River Valley
77A, B, C, D, E - Southern High Plains
78A, B, C, D - Central Rolling Red Plains
80A - Central Rolling Red Prairies
80B - North Texas Central Prairies
81A, B, C, D - Edwards Plateau
82A, B - Texas Central Basin
83A – Northern Rio Grande Plain
83B – Western Rio Grande Plain
84A - Cross Timbers
84B - West Cross Timbers
84C - East Cross Timbers
85 - Grand Prairie
86A - Northern Texas Blackland Prairies
87B – Texas Claypan Area, Northern Part

A detailed description of MLRAs, land use, and climate may be found in the reference "Land Resource Regions and Major Land Resource Areas of The United States", Agricultural Handbook 296.

III. NRCS Objectives, Needs, Recommended Actions

The plant material needs of the James E. “Bud” Smith PMC fall into five categories according to NRCS Objectives:

NRCS Objective: 2.1 Healthy and productive cropland sustaining U.S. agriculture and the environment.

A. Plant selection and cultural technique development for stabilization of soils that have high erosion potential.

Problem:
Plant materials are needed that have the innate ability to establish and maintain themselves on sandy soils and control wind erosion. Three major land resource areas in Oklahoma and sixteen MLRA's in Texas are affected, resulting in a total of 4.7 million acres needing attention.

Objective:
To identify, collect, develop technology, and cooperatively release plant selections and techniques for the stabilization of sandy soils with high erosion potential.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Mason' sandhill lovegrass

'Alamo' switchgrass
'Rainbow' wild plum
'Lometa' Indiangrass
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Van Horn' green sprangletop
'Earl' big bluestem
Potter County Germplasm spike dropseed
Borden County Germplasm sand dropseed
Cottle County Germplasm sand bluestem
OK Select Germplasm little bluestem
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Plains Germplasm prairie acacia
Evaluation of Havard panicum

B. Woody species for wind erosion control and wildlife habitat.

Problem:
Adapted woody plant materials that are easily established, fast growing and long-lived are needed for windbreaks. In addition to erosion control, windbreaks will provide wildlife habitat and enhance beautification of the landscape. Nine major land resource areas in Texas and five in Oklahoma are involved.

Objective:
To identify, collect, develop technology, and cooperatively release plant selections and techniques for use in windbreak planting and design.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Rainbow' wild plum
'Yellow Puff' littleleaf leadtree
'Boomer' bur oak
Kerr Germplasm Wright pavonia
Current plant science studies:
Currently no studies

NRCS Objective: 2.2 Healthy watersheds providing clean and abundant water supplies for people and environment.

A. Ground cover vegetation for critically eroding areas to reduce soil loss and improve water quality.

Problem:

There is a need for plant materials and techniques for stabilization of critically eroding areas. All major land resource areas in both states totaling approximately 2.5 million acres are affected need vegetative treatment.

Objective:
To identify, collect, develop techniques, and cooperatively release adapted vegetation for stabilization of critically eroding areas.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Texoka' buffalograss
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'Rainbow' wild plum
'Saltalk' alkali sacaton
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Van Horn' green sprangletop
'Overton R18' rose clover
'Earl' big bluestem
Potter County Germplasm spike dropseed
Borden County Germplasm sand dropseed
Duck Creek Germplasm Texas dropseed
Cottle County Germplasm sand bluestem
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Plains Germplasm prairie acacia
Evaluation of Havard panicum
Evaluation of purpletop

B. Plant selection and cultural techniques for saline and/or alkaline soil conditions.

Problem:
There is a need for adapted plant materials, which are tolerant of saline and/or alkaline soil conditions. All major land resource areas in Texas and four in Oklahoma, totaling more than 1.2 million acres, are affected by different levels of salinity or alkalinity that are either naturally occurring or induced by oil field related activities. (See respective long-range Plant Materials Programs - Oklahoma and Texas).

Objectives:
To identify tolerant materials and techniques for saline or alkaline sites by:

---testing known cultivars for their adaptability.
---collect and evaluate of plants from sites.
---evaluating techniques needed to enhance establishment.
---release adapted plants and techniques.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous Releases:
'Selection 75' kleingrass
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'Lometa' Indiangrass
'Saltalk' alkali sacaton
'Haskell' sideoats grama
Potter County Germplasm spike dropseed
Borden County Germplasm sand dropseed
Duck Creek Germplasm Texas dropseed

Current plant science studies:
Evaluation of Havard panicum

NRCS Objective: 2.3 Healthy and productive grazing land sustaining U.S. agriculture and the environment.

A. Species selection and cultural technique development needed for the enhancement of water quality, improvement of range and pastureland and to promote food and cover for wildlife.

Problem:
There is a need for commercially available adapted plant materials indigenous to the climates of Texas, Oklahoma, Kansas, Colorado, and New Mexico. All major land resource areas in these states need treatment with locally adapted plants.

Adapted species are needed to help improve water quality, provide forage for wildlife during critical periods and provide food/cover for wildlife.

Objective:
To identify, collect, develop, and cooperatively release grasses, forbs, legumes, and woody species adapted to Oklahoma and Texas.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Selection 75' kleingrass
'Mason' sandhill lovegrass
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'T-587' old world bluestem
'Rainbow' wild plum
'Lometa' Yellow Indiangrass
'Yellow Puff' littleleaf leadtree
'Saltalk' alkali sacaton
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Plateau' awnless bushsunflower
'Van Horn' green sprangletop
'Earl' big bluestem
Kerr Germplasm Wright's pavonia
San Marcos Germplasm eastern gamagrass
Cottle County Germplasm sand bluestem
OK Select Germplasm little bluestem
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of sweet Indianmallow
Evaluation of purpletop

Evaluation of Plains Germplasm prairie acacia

NRCS Objective: 2.4 Healthy and productive wetlands sustaining watersheds and wildlife.

A. Wetland vegetation selection and cultural techniques for water quality improvement.

Problem:
There is a need for plant materials and techniques that are adapted for water quality use. All major land resource areas in both states are affected and need adapted species. Urban and rural wastewater treatments, streambank stabilization and drinking water quality improvement are major concerns in the area.

Objective:
To identify, collect, develop techniques and cooperatively release adapted vegetation for water quality improvement.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Released Plant Materials
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'Rainbow' wild plum
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Van Horn' green sprangletop
'Earl' big bluestem
San Marcos Germplasm eastern gamagrass
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Plains Germplasm prairie acacia
Technical evaluation of purpletop

NRCS Objective: 2.5 High-quality habitats on private land supporting the Nation's wildlife heritage.

A. Species selection and cultural technique development needed to promote food and cover for wildlife.

Problem:
There is a need for commercially available adapted plant materials indigenous to the major land resources in Texas, Oklahoma, Kansas, Colorado and New Mexico.

Objective:
To identify, collect, develop and cooperatively release grasses, forbs, legumes, and woody species adapted to Texas, Oklahoma, Kansas, Colorado and New Mexico for wildlife.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and selected off-center sites.

Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

‘Alamo’ switchgrass
‘Aztec’ Maximilian sunflower
‘Rainbow’ wild plum
‘Yellow Puff’ littleleaf leadtree
‘Sabine’ Illinois bundleflower
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Kerr Germplasm wright pavonia
‘Boomer’ bur oak
‘Plateau’ awnless bushsunflower
‘Eldorado’ Engelmanndaisy
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Plains Germplasm prairie acacia
Technical evaluation of purpletop

TECHNOLOGY TRANSFER

PUBLICATIONS

Tech Notes:

- Winter Cover Crop Species Adapted to North-Central West Texas and Southwestern Oklahoma, USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. July 2013.

Plant Guides:

- Plant Guide Awnless Bushsunflower. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. April 2013.

Refereed Journal Article:

- T.L. Springer, R.L. Wynia, and G.L. Rea. Field Emergence and Plant Density of Sand Bluestem lines Selected for Increase Seed Germination. Crop Science, Madison, WI. Vol. 52 Nov-Dec 2012.

Reports:

- KCPMC 2012 Annual Tech Report. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. May 2013.
- 2012 Progress Report of Activities. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. December 2012.

Release Brochures:

- Release Brochure for Plains Germplasm Prairie Acacia, *Acacia angustissima*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. October 2012.
- Release Brochure for ‘Van Horn’ Green Sprangletop, *Leptochloa dubiad*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. November 2012.
- Release Brochure for ‘Saltalk’ Alkali Sacaton, *Sporobolus airoides*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. December 2012.
- Release Brochure for Potter County Germplasm Spike Dropseed, *Sporobolus contractus.* USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. January 2013.
- Release Brochure for Duck Creek Germplasm Texas Dropseed, *Sporobolus texanus.* USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. February 2013.
- Release Brochure for Kerr Germplasm Wright’s Pavonia, *Pavonia lasiopetala*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. March 2013.
- Release Brochure for Borden County Germplasm Sand Dropseed, *Sporobolus cryptandrus*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. April 2013.
- Release Brochure for Cottle County Germplasm Sand Bluestem, *Andropogon halli*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. May 2013.
- Release Brochure for ‘San Marcos’ Eastern Gamagrass, *Tripcacum dactyloides*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. June 2013.
- Release Brochure for ‘Boomer’ Bur Oak, *Quercus macrocarpa*. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. July 2013.

Newsletters/ Articles:

- Knox City Knowledge. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. Volume 4, Issue 1. December 2012.
- Handling and Storage of Seed. The Reverchon Naturalist, Weatherford, TX. Issue 20. March/April 2013.

TRAINING SESSIONS

- Silvopasture Planting Training. Rick Williams and Gary Rea. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. March 2013.
- Quail Habitat and Seed Collection Training. Ricky Linex, Rick Williams, and Brandon Carr. USDA-NRCS Bonham, TX. August 2013.
- Cover Crop Species and Seed Collection Training. Gary Rea and Brandon Carr. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. August 2013.
- Bobwhite Quail Habitat Management and Enhancement. Rick Williams, Ricky Linex, and Brandon Carr. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. September 2013.

TOURS

- Knox City 2nd Grade Science Class Tour. Brandon Carr. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. May 2013.
- 2013 Master Naturalist Tour. USDA-NRCS James E. “Bud” Smith PMC, Knox City, TX. June 2013.

PRESENTATIONS

- Operations and Purpose of James E. “Bud” Smith Plant Materials Center for Master Naturalists 2013. Gary Rea. USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. June 2013.

STUDIES

The Plant Materials Center staff plan and develop studies to solve problems identified in the PMC's Long-Range Plan. All active studies are listed below with the study number and name and their objectives. Each study is identified in the following pages.

Study Number and Name: 48I187J Evaluation of sweet Indianmallow

Study Objective: Evaluate and release selected accessions of sweet Indianmallow.

Study Number and Name: 48I190S Evaluation of Havard panicum

Study Objective: Evaluation and release of selected accessions of Havard panicum.

Study Number and Name: TXPMC-T-0903-BF ICST- Biomass Study
Study Objective: Comparison of Warm Season Perennial Species for Biomass Production.

Study Number and Name: TXPMC-P-0904-RA Evaluation of vine-mesquite
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-P-0905-RA Evaluation of Blue Grama
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-P-0907-RA Evaluation of Threeflower melic
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-P-0908-WL Evaluation of showy menodora
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-T-1002-RA Sampling Protocol for Established and Newly Planted Perennial Grasses for Vegetative Barriers
Study Objective: Collect raw measurements on various perennial grasses used as vegetative barriers in order to develop a conservation planning tool.

Study Number and Name: TXPMC-P-1003-PA Initial Evaluation of Texas Cupgrass (*Eriochloa sericea*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1004-WL Initial Evaluation of Prairie Bundleflower (*Desmanthus leptolobus*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1005-PA Initial Evaluation of Western Wheatgrass (*Pascopyrum smithii*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1006-RA Initial Evaluation of Pink Smartweed (*Polygonum pensylvanicum*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1007-CR Initial Evaluation of Knotgrass (*Paspalum distichum*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-T-1101-PA Evaluating Warm Season Grasses for Winter Stockpiling
Study Objective: Evaluate warm season grasses by nutrient quality, forage production, and grazing management through winter months

Study Number and Name: TXPMC-P-1102-RA Initial Evaluation of Roundhead lespedeza (*Lespedeza capitata*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1103-PA Initial Evaluation of Switchgrass (*Panicum virgatum*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1104-PA Initial Evaluation of Plains Lovegrass (*Eragrostis intermedia*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1105-PA Initial Evaluation of Hall's Panicum (*Panicum hallii*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1106-RA Initial Evaluation of Scurfpea (*Psoralea tenuiflora*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1107-WL Initial Evaluation of Narrow Leaf Globe Mallow (*Spaeralcea angustifolia*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-T-1108-PA Germination and Emergence of Three Cultivars of Switchgrass
Study Objective: Compare the emergence and germination of three common switchgrass cultivars to determine if seed production environment contribute to seed quality

Study Number and Name: TXPMC-T-1109-RA Seed Count
Study Objective: Evaluate and determine seed counts for all inventory and new production at the PMC

Study Number and Name: TXPMC-T-1110-RA North Texas Ecotype Project
Study Objective: A cooperative agreement with North Texas Ecotype (South Texas Natives) to collect and evaluate materials for possible releases.

Study Number and Name: TXPMC-T-1201-CP Winter Cover Crop Demonstration Following Irrigated Cotton
Study Objective: Demonstrate differences in farming techniques by comparing cover crop, monoculture, and conventional tillage in an irrigated cotton operation. Goal is to show how to improve soil health in farming operations in the PMC service area.

Study Number and Name: TXPMC-T-1202-CP Winter Cover Crop Demonstration Following Dryland Cotton
Study Objective: Demonstrate differences in farming techniques by comparing cover crop, monoculture, and conventional tillage in a dryland cotton operation. Goal is to show how to improve soil health in farming operations in the PMC service area.

Study Number and Name: TXPMC-T-1203- CP Summer Cover Crop Demonstration Following Limited Irrigated Wheat
Study Objective: Demonstrate differences in farming techniques by comparing cover crop, monoculture, and conventional tillage in a wheat operation. Goal is to show how to improve soil health in farming operations in the PMC service area.

Study Number and Name: TXPMC-P-1301-CP Evaluation of Species for Winter Cover Crop
Study Objective: Evaluate cool season species for use in cover crop systems throughout the PMC service area

Study Number and Name: TXPMC-P-1302-CP Evaluation of Species for Summer Cover Crop
Study Objective: Evaluate warm season species for use in cover crop systems throughout the PMC service area

Study No. : 48I187J - Evaluation of *Abutilon fruticosum*, sweet Indianmallow

Objective: Evaluate an assembly of sweet Indianmallow and select a superior plant to primarily enhance water quality, for improvement of range and pastureland, and to promote food and cover for wildlife.

Evaluation Factors: Evaluate plants for emergence, survival, vigor, stand, early bloom, freeze recovery, and drought tolerance.

Progress or Status: Thirteen accessions survived in the greenhouse and were transplanted in June of 2009. Plants were evaluated by survival, maturity, flower color, and plant height. Evaluations were made beginning in the spring and continuing throughout the growing season until frost. It was decided to drop this study. Low seed production and long dormancy make production difficult.

Entry	Accession	County (TX)
1	9049561	Williamson
2	9049578	Schleicher
3	9049534	Williamson
4	9049630	Williamson
5	9049631	Caldwell
6	9064870	Bell
7	9064878	Coryell
8	9049589	Real
9	9064853	Bell
10	9064883	Gonzales
11	9049560	Parker
12	9049539	Caldwell
13	9064859	Coleman

Remarks: Transplanted on 6/3/2009 in B-1 Block

Figure 1 2013 Data from Indianmallow Rod Rows

				Survival				Height			Maturity					Sd Prd		
Plot	Entry	Accession	County (TX)	June	July	Aug	% Stand	June	July	Aug	June	Aug	Flower Color	Greenup	50% Greenup	July	Aug	Notes
105	5	9049631	Caldwell	5	5	5	50%	26	28	25	2	2	Orange	3/19/2013	4/22/2013	3	8	
107	7	9064878	Coryell	5	6	5	50%	23	31	34	3	3	Orange	3/19/2013	4/22/2013	2	5	Some Segregating
110	10	9064883	Gonzales	6	7	6	70%	31	30	36	3	1	Orange	3/19/2013	4/22/2013	4	8	Tall and Erect, Looks Good
111	11	9049560	Parker	7	7	7	70%	26	28	31	2	1	Yellow	3/19/2013	4/22/2013	3	5	
113	13	9064859	Coleman	6	5	6	60%	28	25	29	2	2	Orange	3/19/2013	4/22/2013	5	4	
203	5	9049631	Caldwell	7	8	6	60%	23	29	30	2	1	Orange	3/19/2013	4/22/2013	3	6	Tall and Erect
206	11	9049560	Parker	1	1	1	10%	11	25	27	3	1	Yellow	3/19/2013	4/22/2013	9	8	Bad Survival
207	13	9064859	Coleman	5	5	5	60%	27	27	36	3	2	Yellow	3/19/2013	4/22/2013	5	5	
211	10	9064883	Gonzales	6	6	6	70%	20	23	25	3	3	Orange	3/19/2013	4/22/2013	4	7	Tall and Erect
212	7	9064878	Coryell	0	1	1	60%		19	21		1	Orange	3/19/2013	4/22/2013	0	9	
301	11	9049560	Parker	5	5	2	50%	22	22	23	3	1	Orange	3/19/2013	4/22/2013	7	8	
304	13	9064859	Coleman	6	7	6	40%	23	20	25	3	2	Yellow	3/19/2013	4/22/2013	3	7	
305	7	9064878	Coryell	10	8	8	60%	21	29	28	2	2	Orange	3/19/2013	4/22/2013	3	4	Some Segregating
308	5	9049631	Caldwell	4	4	4	70%	23	28	21	2	1	Orange	3/19/2013	4/22/2013	5	7	
311	10	9064883	Gonzales	4	5	5	40%	19	26	33	3	2	Orange	3/19/2013	4/22/2013	6	6	Tall and Erect

Study No. : 48I190S - Evaluation of *Panicum havardii*, Havard panicum

Objective: To evaluate an assembly of Havard panicum and select a superior plant to primarily aid in cultural techniques for saline and/or alkaline soil conditions and for stabilizing sandy soils that have high erosion potential.

Evaluation Factors: Evaluate for stand, early-stage of bloom, vigor, and freeze recovery.

Progress or Status: Evaluations were evaluated again in 2013 and harvested to conduct germination. Due to the extremely dry growing season, viable seed was not produced. The rod rows will be evaluated again before culling and moving into a replicated test.

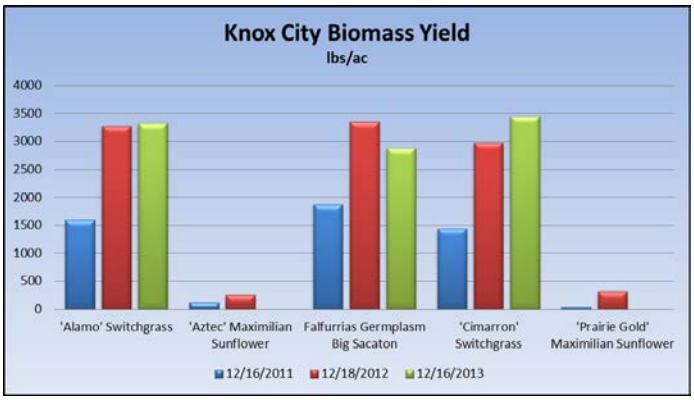
				Height			Maturity			Uniformity				Seed Prod		Germ	
Accn. No	R/R	Survival	% Stand	June	Aug	Sep	June	Aug	Sep	June	Aug	Sep	Erect/ Prostrate	Aug	Sep	%	Notes
102	17/2	9	90%	32	47	60	3	2	2	8	4	4	Erect	8	4	0%	
201	17/1	10	100%	17	36	51	3	2	2	4	6	5	Erect	7	4	0%	
202	18/1	4	40%	16	33	54	3	2	2	5	4	7	Erect	8	6	1%	
302	18/2	10	100%	24	42	58	3	2	3	4	7	7	Erect	9	6	0%	
401	18/3	10	100%	26	40	60	3	2	2	5	3	4	Erect	4	3	0%	
402	18/4	10	100%	34	52	55	3	2	1	3	6	4	Erect	2	3	0%	
404	18/5	8	80%	36	48	54	3	2	2	4	5	7	Erect	3	6	2%	
502	18/6	10	100%	26	38	56	3	2	2	5	4	7	Erect	5	5	3%	
503	19/6	10	100%	22	43	65	3	2	2	7	5	5	Erect	6	6	1%	
504	19/5	7	70%	21	42	58	3	2	3	5	5	5	Erect	8	5	0%	
602	19/4	9	90%	26	56	61	3	2	2	7	4	4	Erect	6	4	0%	
604	19/3	8	80%	25	52	58	3	2	1	5	4	5	Erect	3	4	0%	
701	19/2	10	100%	26	44	56	3	2	1	3	6	7	Erect	8	5	0%	
702	19/1	9	90%	17	45	53	3	2	2	7	5	3	Erect	8	3	0%	Looks Good
703	20/1	10	100%	23	38	54	3	2	2	8	6	7	Erect	9	5	2%	
704	20/2	9	90%	19	33	55	3	2	2	7	6	7	Erect	5	5	0%	
801	20/3	9	90%	28	54	65	3	2	2	6	4	4	Erect	4	4	0%	Looks Good
802	20/4	10	100%	32	50	60	3	2	1	8	3	5	Erect	4	4	0%	
804	20/5	8	80%	26	54	59	3	2	2	6	4	5	Erect	5	4	0%	
901	20/6	10	100%	27	44	56	3	2	2	6	3	5	Erect	8	6	0%	
902	21/6	7	70%	26	49	50	3	2	2	5	6	6	Erect	4	5	0%	Looks Good
1001	21/5	10	100%	31	47	51	3	2	2	5	5	5	Erect	6	5	0%	
1003	21/4	8	80%	22	43	58	3	2	2	7	3	7	Erect	7	6	0%	
204	21/3	9	90%	34	56	60	3	2	2	4	5	4	Erect	5	4	0%	

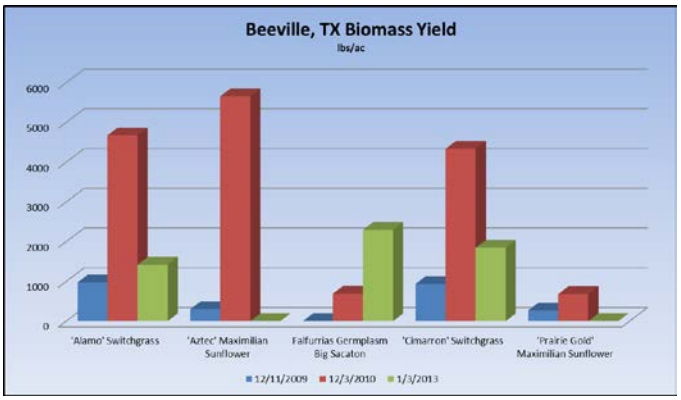
Study No.: TXPMC-T-0903-BF ICST- Biomass Study

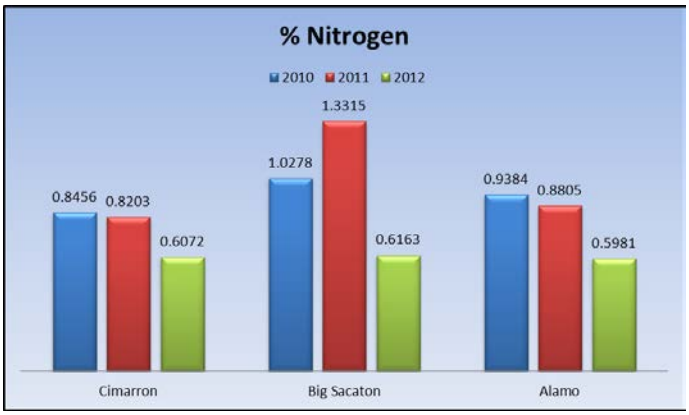
Objective: Switchgrass has been designated as one of the leading biomass energy crops for production, gasification, and liquid field production. The objective of this study is to compare biomass yield and fuel quality of warm season grasses to Maximilian sunflower as dedicated energy crops.

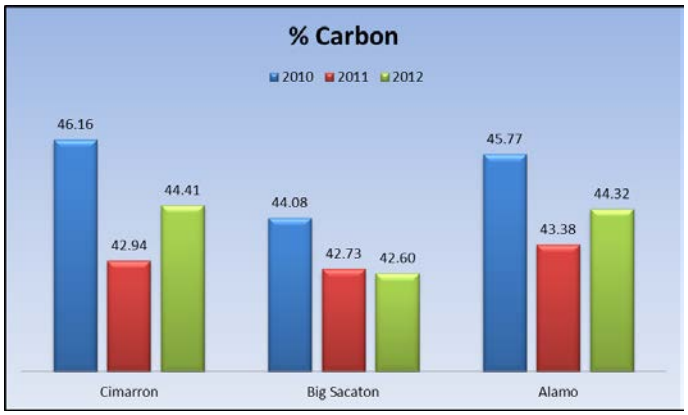
Evaluation Factors: A biomass harvest will be taken four weeks after the first frost by clipping a 14'5" sample. A grab sample will be taken and dried at 55'C for 24 hours. Then yield and % dry matter can be calculated. 100 grams of dried sample will be sent to Agri-Life in Stephenville, TX for chemical analysis.

Progress or Status: After three years of data collection at Knox City and Beeville, TX, data indicates that Maximilian sunflower, *Helianthus maximiliani,* does not appear to be as prolific a biomass producer as switchgrass and big sacaton. In both locations, the Maximilian sunflower failed to produce significant biomass. One explanation of this would be drought conditions throughout 2011 and 2013 in Texas. Big sacaton produced excellent biomass yields at Knox City, but did not survive well at Beeville. The % Nitrogen from the big sacaton was statistically higher than the switchgrass samples. The % Carbon was statistically lower for big sacaton compared to the switchgrass samples.









Study No. : TXPMC-P-0904-RA Evaluation of vine-mesquite

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide for stabilization of soils that have high erosion potential.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Eight-seven collections were submitted to the PMC along with twenty-six accessions the South Texas PMC, and thirty found in the PMC seed vault. These collections were started in the greenhouse and transplanted into rod rows in "N" block in the spring of 2010 and 2011. Currently, there are eighty-three individual rod rows growing for evaluation. Evaluations were made throughout the 2013 growing season and the population was culled before harvest. Thirty-one accessions were harvested for germination trial and advancement.

			Survival			Height				Maturity				Uniformity				Seed Prd			Germ	B	G
Accn. No	R/R	Greenup	2012	2013	% Stand	June	July	Aug	Sep	June	July	Aug	Sep	June	July	Aug	Sep	June	July	Aug	%	Notes	Notes
9085239	4/1	19-Mar	10	10	100%	14	11	16	16	3	1	3	2	6	5	4	5	0	9	4	4%	1	2
9085250	6/1		10	10	100%	11	3	18	17	3	3	3	3	5	5	3	3	0	0	5	1%	1	2
9085267	7/1		10	10	100%	8	9	19	19	3	3	3	3	4	3	4	4	0	0	8	0%	2	1
9085292	11/1	19-Mar	10	10	100%	10	11	20	22	3	3	3	3	4	6	4	4	0	0	4	2%	1	1+
9086227	13/1	19-Mar	10	10	100%	8	14	18	20	3	3	3	3	4	6	5	5	0	0	6	0%	1	1
9093050	20/1	19-Mar	9	9	90%	13	13	19	18	3	2	3	2	4	5	4	5	0	8	5	0%	1	1+
9093051	21/1	19-Mar	9	9	90%	11	13	23	22	3	2	3	2	3	3	3	4	0	8	5	0%	1	1
9093053	22/1		10	10	100%	13	19	21	20	3	1	3	2	5	3	2	2	0	5	4	2%	1	1
9093055	1/2	19-Mar	10	10	100%	11	13	19	20	3	3	3	3	7	6	3	3	0	0	5	1%	1	1+
9093057	2/2		10	10	100%	11	12	17	19	3	3	3	3	4	4	6	5	0	0	5	0%	1	1
9093074	3/2	19-Mar	10	10	100%	9	14	14	13	3	3	3	2	2	4	5	4	0	0	7	3%	1	2
9093075	4/2	19-Mar	7	7	70%	11	12	19	20	3	3	3	2	5	6	5	5	0	0	4	0%	1	1
9093081	6/2	19-Mar	3	3	30%	10	12	21	20	3	2	3	3	5	4	5	5	0	9	4	4%	1	1
9093082	7/2	19-Mar	3	3	30%	15	12	21	19	3	1	3	3	4	3	3	4	0	9	5	1%	1	1
9093103	11/2	19-Mar	10	10	100%	14	14	19	19	3	3	3	2	5	4	4	4	0	0	4	0%	1	1
9093099	12/2	19-Mar	9	9	90%	12	12	16	17	3	3	3	3	4	6	3	3	0	0	4	1%	1	1
9093106	13/2	19-Mar	10	10	100%	12	9	23	22	3	1	3	2	7	3	2	3	0	9	4	1%	1	1
9093118	15/2	19-Mar	9	9	90%	12	17	22	23	3	1	3	2	5	4	4	4	0	8	3	1%	1	1
9093121	16/2	19-Mar	10	10	100%	9	13	16	17	3	2	3	3	5	5	3	4	0	9	3	0%	1	1
9093124	17/2	19-Mar	10	10	100%	12	15	21	20	3	1	3	3	4	3	3	3	0	7	4	1%	1	1
9093131	20/2		10	10	100%	14	21	24	22	3	3	3	2	4	5	4	5	0	0	6	2%	1	1
9093144	2/3	19-Mar	10	10	100%	15	18	19	18	2	1	3	2	3	5	3	3	9	7	6	0%	1	1
9093145	3/3	19-Mar	8	8	80%	6	14	22	22	3	1	3	2	4	7	4	5	0	9	4	1%	1	1
9093149	4/3	19-Mar	8	8	80%	10	16	26	24	3	3	3	3	3	7	5	5	0	0	7	1%	1	1
9093154	6/3	19-Mar	10	10	100%	11	15	19	22	3	1	3	3	5	6	4	6	0	9	7	2%	1	1
9093157	7/3	5-Mar	5	5	50%	9	15	23	21	3	1	3	2	6	4	3	4	0	9	7	0%	2	1
9107762	9/3	19-Mar	10	10	100%	16	20	21	21	3	1	3	3	6	4	3	3	0	6	3	0%	1	1
9107765	10/3	19-Mar	8	8	80%	11	13	22	20	3	1	3	3	6	6	5	5	0	7	3	0%	1	1
9107768	12/3	19-Mar	10	10	100%	11	11	20	21	3	3	3	3	4	4	4	4	0	0	6	0%	1	1
9107781	13/3	19-Mar	10	10	100%	12	15	23	22	3	3	3	3	6	4	3	3	0	0	5	0%	1	1
PMT 4702	20/3	19-Mar	10	10	100%	12	18	25	23	3	1	3	3	7	2	2	3	0	6	4	2%	1	1

Study No.: TXPMC-P-0905 Evaluation of Blue Grama

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide for stabilization of soils that have high erosion potential.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance

Progress or Status: Forty-six collections were submitted to the PMC. These collections were started in the greenhouse and transplanted into rod rows located in "N" block in the spring of 2010 and 2011. Currently, there are twenty-five individual rod rows growing for evaluation. Evaluations began in the spring of 2012 and continued through the growing season until frost. Evaluations were made throughout the 2013 growing season and the population was culled before harvest. Thirteen accessions were harvested for germination trial and advancement.

		Survival			Height				Maturity				Uniformity				Seed Prod				Erect	Germ
Accn. No	R/R	2012	2013	% Stand	June	July	Aug	Sep	June	July	Aug	Sep	June	July	Aug	Sep	June	July	Aug	Sep	Pro	%
9093151	17/5	6	5	50%	9	19	21	22	2	2	1	1	6	5	2	4	2	4	2	2	Erect	0%
439880	1/10	10	10	100%	10	13	21	22	2	1	1	1	6	7	2	2	3	5	3	3	Erect	2%
9093076	3/10	9	9	90%	12	16	22	21	2	2	1	2	6	4	4	3	4	4	2	2	Erect	1%
9093151	5/10	6	9	90%	12	13	21	21	1	2	1	2	3	4	5	5	3	7	4	2	Erect	0%
9093120	7/10	7	7	70%	8	14	23	22	2	1	1	1	6	5	3	5	2	7	5	3	Erect	0%
9093123	8/10	9	9	90%	9	16	23	24	2	1	1	1	8	3	2	4	3	2	3	2	Erect	1%
9093126	9/10	8	8	80%	8	14	22	22	2	2	1	2	9	4	3	4	2	3	2	2	Erect	2%
9093128	10/10	8	8	80%	10	20	21	21	3	1	1	1	4	5	4	4	0	4	4	4	Erect	1%
9093132	1/11	8	8	80%	14	17	28	26	1	2	1	1	6	7	6	4	4	6	8	2	Erect	0%
9093135	2/11	9	8	80%	13	14	19	20	3	1	1	2	4	5	7	5	0	9	5	2	Erect	0%
9093137	4/11	8	6	60%	12	15	21	19	2	2	1	1	4	5	4	5	3	6	3	2	Erect	0%
9107767	9/11	7	8	80%	9	17	19	18	2	2	1	2	8	4	4	6	3	2	2	3	Erect	1%
9107789	11/11	9	9	90%	11	17	28	28	3	2	1	2	8	3	3	3	0	9	4	2	Erect	1%

Study No. : TXPMC-P-0907-RA Evaluation of Three-flower melic

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Thirty-two collections of this species have been submitted to the PMC. Current collections were planted in greenhouse and nineteen were transplanted in the fall of 2013. Data collection will begin in the spring of 2014. The following list shows the accession numbers for the collections being evaluated at the PMC.

Accession	County	Collector
9093017	Sutton	Ty Williams and Kason Haby
9093018	Sutton	Kason Haby
9093059	Concho	Hal F. Rogers
9093060	Runnels	Hal F. Rogers
9107791	Pecos	Preston Irwin, Sam Schiwart, and Rustin Tabor
9107793	Mason	Walt Broyles and Carol Brinke
9107794	Sutton	Donnie Lunsford and Tom Payton
9107795	Bandera	Kason Haby
9107796	Mason	Bryan Lange
9107797	Crockett	Ty Williams and Tyler Hu
9107799	Bosque	Kent Ferguson
9107800	Runnels	Randy Linex & Kathy Sanders
9107801	Runnels	Randy Linex & Ronnie Vanicek
9107803	Edwards	Kenneth Reed
9107862	Palo Pinto	Austin Shero and Ricky Linex
9107863	Lampasas	Bubba Van Zandt, Justin Haley, Brenda Gibson
9107864	Lampasas	Bubba Van Zandt, Justin Haley, Brenda Gibson
9107940	Edwards	Kenneth Reed
9107941	Palo Pinto	Austin Shero and Myron Merz

Study No. : TXPMC-P-0908-RA Evaluation of showy menodora

Objective: Collection and evaluation for a superior forb plant for use as an improvement of range and pastureland, and provide food such as deer browse and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently only six collections of this species have been submitted to the PMC. Accessions were started in the greenhouse and transplanted into rod rows in the spring of 2013. Evaluations will begin in the spring of 2014. The following list shows the collections being evaluated at the PMC.

Accession	County	Collector
9107780	Uvalde	Ricky Linex and Steve Nelle
9107836	Sutton	Tyler Hinrichs and Ty Allen
9107837	Crockett	Tyler Hinrichs and Ty Allen
9107911	Tom Green	Rob Ziehr
9107945	Sutton	Tom Payton
9110690	Crockett	Tori Dutton, Brenda Gibson, & Alex Homesley

Study No.: TXPMC-T-1002-RA Sampling Protocol for Established and Newly Planted Perennial Grasses for Vegetative Barriers

Objective: Collect raw measurements on various perennial grasses used as vegetative barriers in order to develop a conservation planning tool adapted to the service area.

Evaluation Factors: Plant architecture quantitative measurements will be recorded throughout different growth stages on a newly planted barrier. The stages for the newly planted barriers are 2-4 leaf, stem elongation, seed maturity, and dormancy. Measurements taken in the planted barriers include: plant height, 6mm stem diameter, 18mm diameter, plot weight, % dry matter, % moisture, yield (lbs/ac), leaf: stem ratio, lodging, stems per plant, plants per row, and optical porosity. All data will be recorded and distributed as raw data. The tables below are a summary of the data that has been recorded for the year 2013.

Progress or Status: Plots were planted on May 29, 2013. Data was collected for the newly established plots at the 3-4 leaf stage, stem elongation, seed maturity, and dormant growth stages. Raw data with photos for porosity was sent to Joel Douglas in Fort Worth for distribution. This was the last year of data collection for this study.

Species Used for New Barrier Plots:
'Alamo' Switchgrass, *Panicum virgatum*
'Blackwell' Switchgrass, *Panicum virgatum*
'Selection 75' Kleingrass, *Panicum coloratum*

'Alamo' Switchgrass *Panicum virgatum*

	Height (in)	6'dia (mm)	18'dia (mm)	plot wt (lbs)	sam grn wt	sam dry wt	stem grn wt	stem dry wt	leaf grn wt	leaf dry wt	leaf to stem ratio	% Dry Matter	% Moisture	Yield (lb/acre)	plts/3 ft row	Stems/ Plant
2-4 Leaf Stage	8.6	1.7	1.3	0.033	15.0	4.1	2.4	0.4	4.8	1.6	3.98	0.26967	0.73033	36.17	25.00	
Stem Elongation	26.2	4.4	3.6	0.433	196.6	43.3	50.6	9.3	33.0	9.1	1.00	0.22565	0.77435	385.91	16.00	5.95
Seed Maturity	55.3	4.7	3.6	3.968	409.7	151.5	97.6	37.5	51.4	19.3	0.52	0.36953	0.63047	5950.68		
Dormant	50.9	4.1	3.8	.965	229.6	206.1	33.2	30.2	22.9	21.4	0.71	0.89810	0.10190	3508.35		

'Blackwell' Switchgrass *Panicum virgatum*

	Height (in)	6'dia (mm)	18'dia (mm)	plot wt (lbs)	sam grn wt	sam dry wt	stem grn wt	stem dry wt	leaf grn wt	leaf dry wt	leaf to stem ratio	% Dry Matter	% Moisture	Yield (lb/acre)	plts/3 ft row	Stems/ Plant
2-4 Leaf Stage	7.2	1.5	1.1	0.073	33.2	8.3	3.5	0.6	5.7	1.5	4.01	0.26779	0.73221	73.82	28.75	
Stem Elongation	16.2	3.2	2.5	0.3151	143.1	32.6	14.5	2.6	21.8	5.8	2.26	0.23753	0.76247	290.71	20.00	5.0
Seed Maturity	38.7	3.2	2.1	1.468	341.3	132.9	27.7	11.2	22.2	9.3	0.85	0.39012	0.60988	2343.65		
Dormant	39.4	3.3	3.0	0.35	142.8	120.8	11.3	10.4	8.4	7.8	0.75	0.84366	0.15634	1207.55		

'Selection 75' Kleingrass *Panicum coloratum*

	Height (in)	6'dia (mm)	18'dia (mm)	plot wt (lbs)	sam grn wt	sam dry wt	stem grn wt	stem dry wt	leaf grn wt	leaf dry wt	leaf to stem ratio	% Dry Matter	% Moisture	Yield (lb/acre)	plts/3 ft row	Stems/ Plant
2-4 Leaf Stage	8.9	1.9	1.5	0.045	20.3	5.6	2.0	0.4	4.8	1.4	5.90	0.28575	0.71425	49.94	13.00	
Stem Elongation	29.3	4.0	3.2	0.950	431.3	95.5	61.7	15.2	41.1	11.5	0.74	0.22408	0.77592	851.85	11.22	6.75
Seed Maturity	41.2	2.5	1.7	5.40	306.68	110.2	47.4	15.2	14.6	5.0	0.33	0.35809	0.64191	7856.86		
Dormant	39.2	2.5	2.3	1.52	309.0	270.9	20.6	18.6	7.9	7.3	0.40	0.87752	0.12248	5377.42		

Study No.: TXPMC-P-1003-PA Initial Evaluation of Texas Cupgrass (Eriochloa sericea)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Forty-seven collections of this species were submitted to the PMC and sixteen rod rows were established. After two years of evaluations, it has been determined that the accessions submitted were not adapted to this area. Survival rates decreased and seed production was low, with virtually no viable seed produced. It was decided that this test would be closed.

			50%	Survival			Height				Maturity				Uniformity			Seed Prd				Erect	Germ
Accn. No	R/R	Greenup	Greenup	2012	2013	% Stand	May	June	July	Aug	May	June	July	Aug	June	July	Aug	May	June	July	Aug	Prostrate	%
9049269	1/12	5-Mar	19-Mar	9	2	20%	7	25	29	26	2	mid	1	1	7	4	4	5	8	6	9	Erect	1%
9049270	2/12	5-Mar	19-Mar	4	0	0%																	
9107829	3/12	5-Mar	19-Mar	5	1	10%	13	24	28	33	1	mid	2	1	6	3	2	6	8	4	6	Erect	9%
T38705	4/12	5-Mar	19-Mar	5	0	0%																	
T43229	5/12	5-Mar	19-Mar	5	3	30%	8	20	23	28	1	mid	1	1	4	6	6	5	7	7	6	Erect	3%
T43230	6/12	5-Mar	19-Mar	3	0	0%																	
T43231	7/12	5-Mar	19-Mar	0	0	0%																	
T43254	8/12	5-Mar	19-Mar	7	2	20%	5	29	25	31	3	late	1	1	7	6	8	3	3	5	6	Erect	27%
T43290	1/13	19-Mar		2	0	0%																	
T43294	2/13	5-Mar	19-Mar	4	0	0%																	
T43295	3/13	19-Mar		4	0	0%																	
T43298	4/13	5-Mar	19-Mar	4	1	10%	12	21	26	29	3	mid	1	1	6	4	7	3	3	6	8	Erect	14%
T45759	5/13	5-Mar	19-Mar	3	0	0%																	
T53730	6/13	5-Mar	19-Mar	8	2	20%	9	21	29	28	3	mid	1	1	3	5	4	2	4	3	5	Erect	1%
T53732	7/13	5-Mar	19-Mar	9	3	30%	8	18	26	24	3	mid	1	1	3	5	5	3	5	3	7	Erect	2%
T53739	8/13	5-Mar	19-Mar	10	2	20%	13	24	28	28	2	early	1	1	4	4	3	4	4	5	5	Erect	2%

Study No.: TXPMC-P-1004-WL Initial Evaluation of Prairie Bundleflower (Desmanthus leptolobus)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food such as deer browse and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently five collections of this species have been submitted to the PMC. The decision has been made to close this study due to the lack of species submitted. The five collections are going to be offered to Texas Agrilife in Stephenville, TX. Below is a list of the accessions collected:

Accession	County	Collector
9107833	Throckmorton Co., TX	Justin Trimble
9107854	Lubbock Co., TX	J.W. Wagner
9107865	Young Co., TX	Carrie Shipps
9110723	Palo Pinto	Kelly Crawford
9110997	Falls	Brian Bailey

Study No.: TXPMC-P-1005-PA Initial Evaluation of Western Wheatgrass (Pascopyrum smithii)

Objective: Collection and evaluation for a superior cool season grass for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Twenty-seven collections of this species were submitted to the PMC and twenty-three rod rows were established. After two years of evaluations, it has been determined that the accessions submitted were not adapted to this area. Survival rates decreased and seed production was low, with virtually no viable seed produced. It was decided that this test would be closed.

			50%	Survival			Height		Maturity			Seed Prd	
Accn. No	R/R	Greenup	Greenup	2012	2013	% Stand	May	June	May	June	Uniformity	May	June
432400	1/15	12/20/2012	01/15/13	6	2	20%	15	22	late	late	7	2	5
9107804	2/15	12/20/2012	01/15/13	5	2	20%	10	13	late	late	6	0	0
9107805	3/15	12/20/2012	01/15/13	1	0	0%							
9107806	4/15	12/20/2012	01/15/13	1	0	0%							
9107812	7/15	12/20/2012	01/15/13	2	0	0%							
9107813	8/15	12/20/2012	01/15/13	5	1	10%	13	13	mid	mid	8	0	2
9107815	9/15	12/20/2012	01/15/13	3	0	0%							
9107816	10/15	12/20/2012	01/15/13	2	0	0%							
9107817	11/15	12/20/2012	01/15/13	1	0	0%							
9107818	12/15	12/20/2012	01/15/13	3	0	0%							
9107820	13/15	12/20/2012	01/15/13	2	0	0%							
9107821	14/15	12/20/2012	01/15/13	4	0	0%							
9107822	1/16	12/20/2012	01/15/13	1	0	0%							
9107823	2/16	12/20/2012	01/15/13	3	1	10%	10	15	late	late	5		2
9107824	3/16	12/20/2012	01/15/13	2	0	0%							
9107827	4/16	12/20/2012	01/15/13	1	0	0%							
9107830	6/16	12/20/2012	01/15/13	3	0	0%							
9107834	8/16	12/20/2012	01/15/13	5	1	10%	15	15	mid	mid	7		5
9107840	9/16	12/20/2012	01/15/13	1	0	0%							
9107848	10/16	12/20/2012	01/15/13	6	3	30%	11	14	late	late	8		1
9107850	11/16	12/20/2012	01/15/13	1	0	0%							
Barton	12/16	12/20/2012	01/15/13	3	0	0%							
Arriba	13/16	12/20/2012	01/15/13	1	0	0%							

Study No.: TXPMC-P-1006-RA Initial Evaluation of Pink Smartweed (Polygonum pensylvanicum)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Thirty-five collections have been submitted to the PMC. Accessions were started in the greenhouse and transplanted into rod rows in the spring of 2013. Evaluations will begin in the spring of 2014. The following list shows the accessions being evaluated at the PMC.

Accession	County	Collector
9110710	Hartely	Kirk Dahl
9110713	Lynn	Eric Kaiser and Charlie Stice
9110715	Hale	John Parkes and Clete Vanderburg
9110717	Bailey	Clayton Vanderburg, Jordan Menge, and Alexis Coufal
9110720	Floyd	Kyle Lindgren
9110721	Lamb	Jason Eckert and Wendell Ogerly
9110724	Roberts	Eddy Corse
9110727	Hockley	Nathan Shrode and Rustin Tabor
9110728	Hardeman	Stephanie Gray
9110730	Lubbock	Rustin Tabor and Nathan Shrode
9110731	Lubbock	Rustin Tabor and Nathan Shrode
9110732	Lubbock	Rustin Tabor and Nathan Shrode
9110733	Lubbock	Rustin Tabor and Nathan Shrode
9110734	Crosby	Rustin Tabor and Nathan Shrode
9110736	Dawson	Matt Brewer
9110994	Lynn	Manual DeLeon
9107825	Dawson	Mark Hall and Hal Rogers
9107832	Gray	John Wimberley
9107835	Roberts	Eddy Corse
9107838	Terry	Kegan Crouch, Rhett Kerby, & Damon Hertle
9107839	Terry	Kegan Crouch, Rhett Kerby, & Damon Hertle
9107845	Carson	Ronnie May
9107846	Hockley	Nicholas Demel
9107847	Hays	Minnette Marr, Karen Langridge, Chrissy Wise, and Julie Hollar
9107849	Hardeman	Stephanie Gray
9107851	Briscoe	Kathryn Brady
9107853	Lubbock	J.W. Wagner
9107857	Knox	Charles Schur and Kenny Prewitt
9107912	Ochiltree	Kole Ballard and Robert Unterkircher
9107917	Lipscomb	Mary Foster
9107920	Hockley	Nicholas Demel and Nathan Shrode
9107924	Titus	Jared Clements
9107926	Hartley	Don Skiles
9107932	Castro	Ronny Clifton and Chadd Warminski
9110699	Ochiltree	Price Money and Kole Ballard

Study No.: TXPMC-P-1007-CR Initial Evaluation of Knotgrass (Paspalum distichum)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently two collections of this species have been submitted to the PMC. The decision has been made to close this test due to insufficient plant materials received to test. The two collections will continue to be stored in the PMC seed storage facility indefinitely.

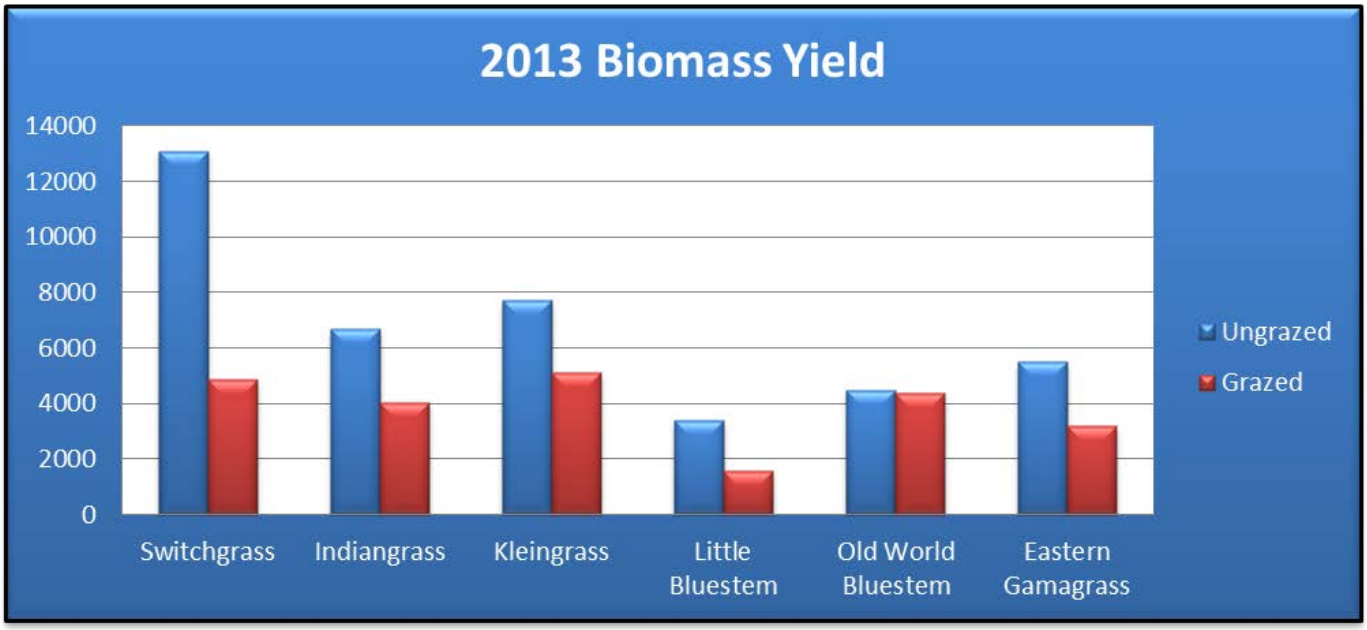
Accession	County	Collector
9107852	Garza Co., TX	Derrick Fuchs
9110712	Lynn	Eric Kaiser and Charlie Stice

Study No.: TXPMC-T-1101-PA Evaluating Warm Season Grasses for Winter Stockpiling

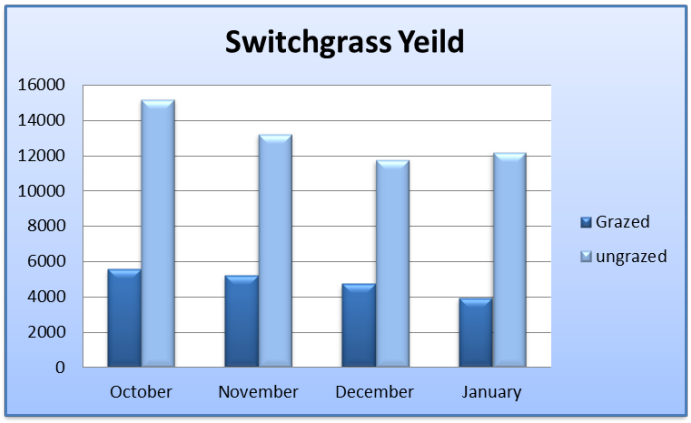
Objective: Limited information is available on the quality and quantity of native pastures throughout the winter months. Cultivars/selections of warm season grasses will be compared in replicated plots to evaluate the nutritional value and yield potential from the fall through winter months. A comparison will also be made to determine nutritional value and tonnage of winter pastures that are grazed with pastures that are not grazed.

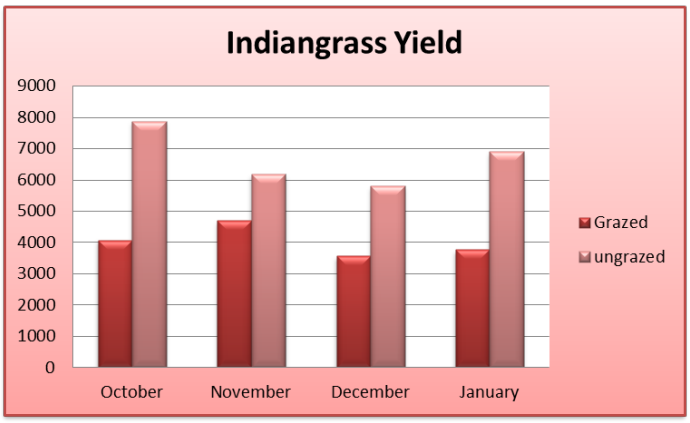
Evaluation Factors: Evaluations will be made between each species as it progresses through the winter months. Biomass and nutritional values will be compared at six different dates to determine the amount and quality of grazing a pasture or rangeland as opposed to baling and storing in a barn. Grass plots will be divided into halves with one half being mowed down to six inches around the first of July. This will simulate a pasture that has been grazed throughout the spring and summer months, but rested in order to provide recovery for winter grazing. A biomass sample will be taken at this time simply to determine the amount of yield at this time of the year.

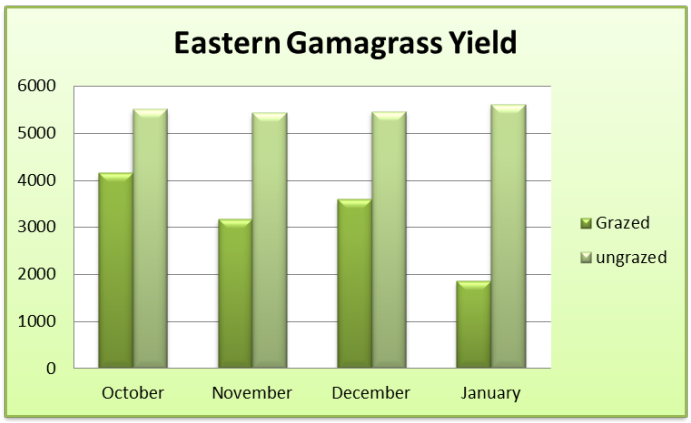
Progress or Status: Study was transplanted in the spring 2012. No data was collected the first year. Data collection began in the summer of 2013. The following graph shows the differences in biomass between each entry and between the plots that were clipped in June to simulate grazing and plots that grew all season long. This information also shows the grasses that recover better from grazing than others.

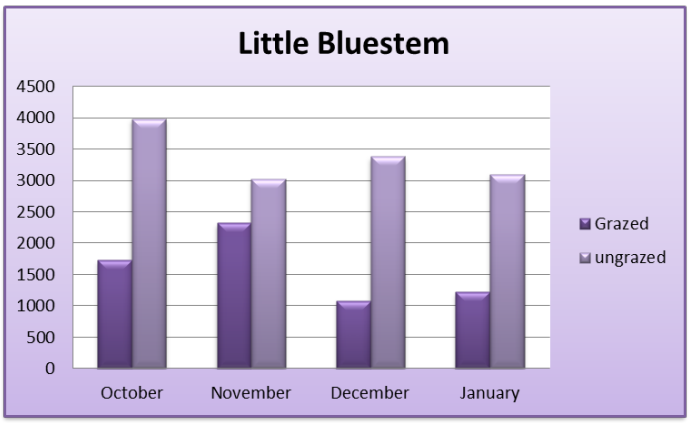


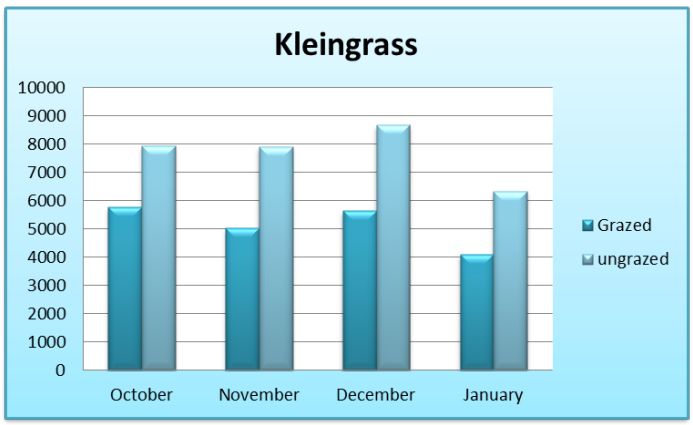
The following graphs show the biomass collected at the different clipping dates throughout the fall and winter months. Again, it shows the differences in grazing the individual grasses compared to season long growth. No chemical analysis has been received from the lab at this time.

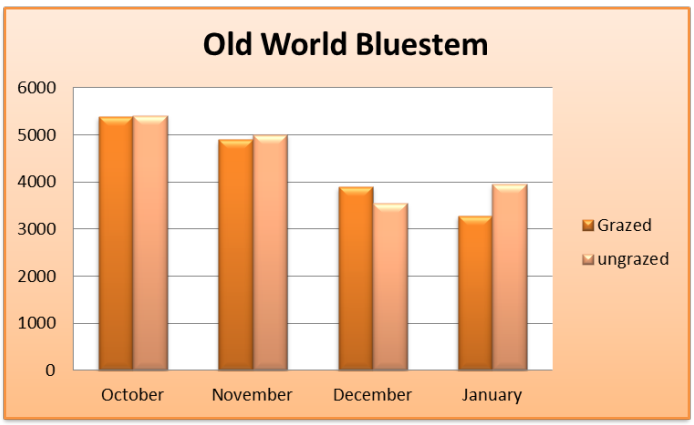

Switchgrass Yeild
16000
14000
12000
10000
8000
6000
4000
2000
0
October
November
December
January
Grazed
ungrazed


Indiangrass Yield
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
October
November
December
January
Grazed
ungrazed


Eastern Gamagrass Yield
6000
5000
4000
3000
2000
1000
0
October
November
December
January
Grazed
ungrazed


Little Bluestem
4500
4000
3500
3000
2500
2000
1500
1000
500
0
October
November
December
January
Grazed
ungrazed


Kleingrass
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
October
November
December
January
Grazed
ungrazed


Old World Bluestem
6000
5000
4000
3000
2000
1000
0
October
November
December
January
Grazed
ungrazed

Study No.: TXPMC-P-1102-RA Initial Evaluation of Roundhead Lespedeza (Lespedeza capitata)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: No collections were received during 2013. The decision has been made to close this study due to insufficient plant materials received for testing.

Study No.: TXPMC-P-1103-PA Initial Evaluation of Switchgrass (Panicum virgatum)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Twenty-five collections have been submitted to the PMC. Species will remain on the plant collection request list in hopes of adding more samples to this collection before sending the collections to Oklahoma State University to enter them into their molecular genetics program.

Accession	County	Collector
9107914	Hemphill	Marty Rash
9107916	Hutchinson	Eric Kaiser
9107919	Gray	John Wimberley and Brittany Anderson
9107921	Carson	Ronnie May
9107922	Hutchinson	Shannon Rowley
9107927	Bolder, CO	Restoration Crew
9107928	Bolder, CO	Restoration Crew
9110692	Hemphill	Marty Rash
9110697	Carson	Ronnie May
9110698	Carson	Ronnie May
9110701	Gray	Brittany Anderson
9110703	Fisher	Matthew Coffman and Kaitlyn High
9110707	Mitchell	Derrick Fuchs
9110708	Tom Green	Wade Day and Jake Maenius
9110714	Hale	John Parkes and Clete Vanderburg
9110716	McCulloch	Carrie Koennecke
9110718	Bailey	Clayton Vanderburg and Kayla Creek
9110719	Floyd	Kyle Lindgren
9110735	Bandera	Lynn Post
9111041	Lipscomb	Mary Foster
9111052	Travis	Jeremy Hasty
9111053	Hutchinson	Stinnett F.O.
9111055	Hemphill	Thomas Hunt and Bruce Pickens
9111056	Roberts	Eddy Corse and Payton Mumford
9111057	Hansford	Payton Mumford

Study No.: TXPMC-P-1104-PA Initial Evaluation of Plains Lovegrass (Eragrostis intermedia)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Four collections have been submitted to the PMC. The decision has been made to close this study due to insufficient plant materials for testing. The collections received will be stored at in the seed storage facility at the PMC indefinitely.

Accession	County	Collector
9107925	Colorado	Jim Hilton
9110706	Lipscomb	Mary Foster
9110741	Edwards	Kenneth Reed
9111050	Knox	Charlie Schur

Study No.: TXPMC-P-1105-PA Initial Evaluation of Hall's Panicum (Panicum hallii)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Seven collections have been submitted to the Plant Materials Center. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Panicum hallii* Vasey
Common Name: Halls Panicum

Morphological Characteristics:

- native, perennial bunchgrass
- warm season
- leaves are flat and glabrous
- curling basal leaves at maturity or when dried
- panicle is outline pyramidal with few branches
- spikelets are located on short pedicels
- plant height is 6-28 inches with nodes that can be glabrous to pubescent
- starts growth in early spring
- flowers from April to November
- reproduces from seeds and tillers
- occurs on dry, arid soils
- adapted to sand or clay soils, particularly calcareous soils

Conservation Use:

The James E. "Bud" Smith plant materials center has identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting; 512 Forage and Biomass Planting; 332 Contour Buffer Strips; 393 Filter Strips; and 528 Prescribed Grazing.

Study No.: TXPMC-P-1106-RA Initial Evaluation of Scurfpea (Psoralea tenuiflora)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Ten collections have been submitted to the Plant Materials Center. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Psoralea tenuiflora*
Common Name: Scurfpea

Morphological Characteristics:

- native forb
- warm season
- 8-20 inches tall with many branches
- Stems are erect or ascending, 1 to several, wiry, longitudinally ridged, grayish hairy, stems readily disarticulates from crown at maturity
- Leaves are alternate, palmately compound, stem-leaves 5 foliate, branch leaves often 3-foliate: leaflets elliptic to oblanceolate, ½ to 2 inches long, ¼ to ½ inch wide, densely pubescent below and on margins, very sparse pubescent above. Surface glandular dotted
- flowers are solitary to 4 per node, pea-like up to ¼ inch long, 5 blue-violet petals and a short calyx with 5 teeth, calyx green to purple, flowers June- August
- seedpod is about ¼ inch long, ovoid and flattened, terminating into short beak, single seed, seed matures at different time on the plant
- root system is a long slender deep taproot, very drought tolerant
- adapted to dry sandy or rocky prairie, plains, open woods and along roadsides
- Distributed throughout Texas except for the Pineywoods and the South Texas Plains.

Conservation Use:

The James E. “Bud” Smith plant materials center has identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting.

Study No.: TXPMC-P-1107-WL Initial Evaluation of Narrow Leaf Globe Mallow (Spaeralcea angustifolia)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Sixteen collections have been submitted to the PMC. Accessions were started in the greenhouse and eleven rod rows were established. Evaluations will begin in the spring of 2014. The following list shows the accessions being evaluated at the PMC.

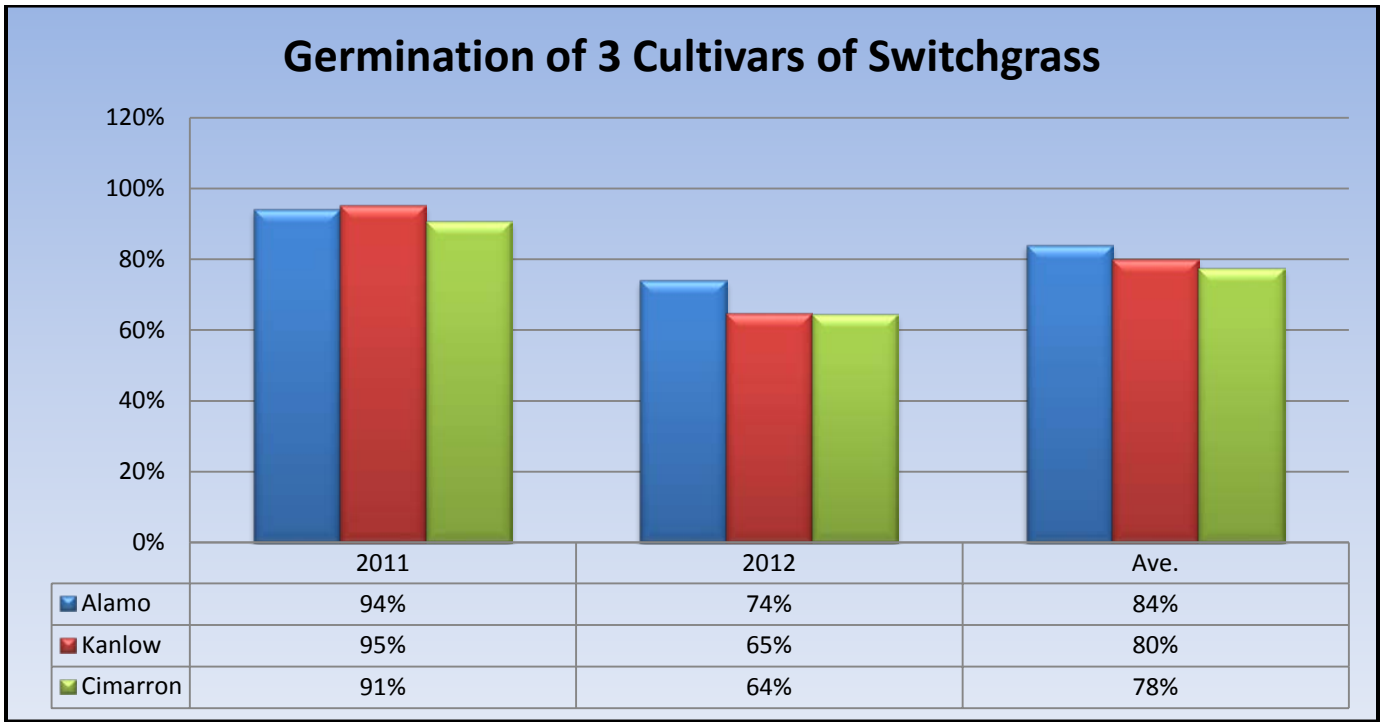
Accession	County	Collector
9085629	Tom Green	Steve Nelle
9110687	Coke	Mark Sides
9110711	Hartely	Kirk Dahl
9110725	Jeff Davis	Laurie Meadows
9110729	Hockley	Nathan Shrode and Rustin Tabor
9110737	Crosby	Ricky Linex
9110738	Crosby	Ricky Linex
9110739	Crosby	Ricky Linex
9110740	Crosby	Ricky Linex
9110742	Fisher	Matthew Coffman and Michelle Downey
9110743	Fisher	Matthew Coffman and Michelle Downey

Study No.: TXPMC-T-1108-PA Germination of Three Cultivars of Switchgrass

Objective: Switchgrass (*Panicum virgatum*) can be difficult to establish in certain areas. Germination at the James E. "Bud" Smith Plant Materials Center in Knox City, TX has historically been high in most years. Other areas have noticed difficulty producing switchgrass. Three cultivars, 'Alamo', Cimarron, and Kanlow will be grown in a replicated test to determine whether this is due to cultivar differences or environmental conditions. Harvested seed will be compared by germination.

Evaluation Factors: Cultivars will be evaluated by testing the germination in a replicated study.

Progress or Status: Plots were started in the greenhouse and transplanted in the spring of 2011. Irrigation was provided to aid in establishment. Seed was harvest in the fall of 2011, 2012, and 2013 for germination tests.



	2011	2012	Ave.
Alamo	94%	74%	84%
Kanlow	95%	65%	80%
Cimarron	91%	64%	78%

Study No.: TXPMC-T-1109-RA Seed Count

Objective: Seed count information dates back to several years and in many cases, only one source was counted. Improvements in technology have enabled more precise counts to be obtained. Also, seed weights can differ from one year or production area to another. Environmental conditions such as temperature, humidity and precipitation during the growing season can all influence seed weight. Harvesting, processing, and storage of seed can also affect the weight of the seed. To determine accurate seed weights, multiple samples need to be counted. Counting seed with from different years and locations will give a better idea of the average weight of each species. From this average, planting rates can be adjusted to maximize productivity while keeping costs at a minimum.

Evaluation Factors: Each year's harvest will be counted using the PMC seed counter or manually counting one pound. Slick seed will be counted on the seed counter and fluffy seed that will not flow through the seed counter will be counted manually as time permits. The seed counts are kept in a Microsoft excel spreadsheet.

Progress or Status: All lots of PMC releases stored in the PMC cold room have been counted up through the 2013 harvest.

Grasses					
Release	Common Name	Scientific Name	Lot Number	Year	Seed/ Pound
Alamo	Switchgrass	*Panicum virgatum*	SWC-76-PVH	1976	348,456
			SCO-92-	1992	456,520
			SFD-08-PV	2008	389,054
			SFD-09-PVP09	2009	500,112
			SBR-09-PVMH	2009	403,703
			SBR-10-M1--	2010	397,584
			SBR-10-O-09	2010	409,324
			SBR-11-M1--	2011	594,558
		Average			437,414
Haskell	Sideoats Grama	*Bouteloua curtipendula*	SBR-11-Y--	2011	189,000
			SBR-10-M1--	2010	232,932
			433946-1-88	1988	160,912
			SFD-05-	2005	244,193
			SFD-08-	2008	285,885
			SFD-04-	2004	226,961
			SBR-11-M1--	2011	186,252
			SBR-13-Y-02	2013	215,896
			SBR-13-M1--	2013	220,486
		Average			218,057

Release	Common Name	Scientific Name	Lot Number	Year	Seed/ Pound
Lometa	Indiangrass	*Sorghastrum nutans*	PMT-1733	1979	168,434
			SBR-11-M1--	2011	304,549
			SBR-10-M1--	2010	165,669
			SBR-10-W-01	2010	170,899
			SFD-88	1988	153,846
			SBR-03-H	2003	160,389
			SFD-07-434362	2007	219,742
			SFD-09-SNP01H	2009	193,862
			SBR-11-W-01	2011	301,722
			SBR-13-W-01	2013	162,784
			SBR-13-M1--	2013	153,846
		Average			195,977
Earl	Big Bluestem	*Andropogon gerardii*	SFD-01-M	2001	191,531
			SCO-06-408932-DO	2006	186,147
			SFD-96-AG	1996	130,607
			SFD-96-AGH	1996	134,251
			SCO-99-M	1999	133,784
			SBR-13-M1--	2013	125,000
		Average			150,220
Selection 75	Kleingrass	*Pancium coloratum*	SBR-11-M1--	2011	660,584
			SCO-88-2	1988	751,713
		Average			706,149
Saltalk	Alkali Sacaton	*Sporobolus airoides*	434445-82M	1982	1,014,474
			Saltalk 96	1996	1,490,950
			PMT-326-78	1978	1,061,788
			PMT-155-69M	1969	1,564,396
			SBR-13-M1--	2013	1,178,381
		Average			1,261,998
San Marcos	Eastern Gamagrass	*Tripcacum dactyloides*	434493-99-2	1999	6,160
			434493-07	2007	5,940
			434493-06	2006	6,695
			434493-05	2005	5,849
			SFD-09-TDP94	2009	11,184
			SGO-12-H-94	2012	12,292
		Average			8,020
Potter County	Spike Dropseed	*Sporobolus contractus*	SCO-01-	2001	1,224,846
			SG0-13-F-13	2013	1,856,760
		Average			1,540,803

Release	Common Name	Scientific Name	Lot Number	Year	Seed/ Pound
Ok Select	Little Bluestem	*Schizachyrium scoparium*	SGO-10-Y--	2010	267,857
			SGO-10-W-08	2010	259,448
			SCO-06-SSC	2006	241,582
			SGO-07-9029926	2007	309,523
			SCO-05-	2005	285,714
			SCO-08-	2008	251,235
			SGO-11-W-Y-	2011	330,333
			SWC-81-SSH	1981	253,485
			SCO-08-YR1H	2008	253,189
			SG0-13-W-08	2013	262,483
		Average			271,485
Duck Creek	Texas Dropseed	*Sporobolus texanus*	9029932-90	1990	1,897,204
			9029932-90	1990	1,458,348
		Average			1,677,776

Trees and Shrubs

Release	Common Name	Scientific Name	Lot Number	Year	Seed/ Pound
Boomer	Bur Oak	*Quercus macrarpa*	T-4550	1979	82
			SFD-11-Yard-	2011	87
		Average			85
Rainbow	Wild Plum	*Prunus sp.*	PMT-3788	1979	1,362
			SFD-10-C-2-00	2010	1,244
		Average			1,303
Yellow Puff	Littleleaf Leadtree	*Leucaena retusa*	SFD-87-	1987	9,769
		Average			9,769

Forbs					
Release	Common Name	Scientific Name	Lot Number	Year	Seed/ Pound
Eldorado	Engelmann's Daisy	*Engelmannia peristenia*	PMT-874	1979	58,414
			SBR-11-J-0509S	2011	93,152
			SBR-12-J-05-09	2012	76,884
			SBR-13-M1--	2013	71,000
			SBR-13-J-03-09	2013	70,387
		Average			73,967
Plateau	Awnless Bushsunflower	*Simsia calva*	SBR-10-M1--	2010	332,977
			SBR-10-J-05-09	2010	523,336
			SBR-11-J-0305S	2011	351,456
			SBR-11-J-0305C	2011	369,240
			SBR-12-J-03-09	2012	343,320
			SBR-13-M1--	2013	304,533
			SBR-13-J-03-09	2013	299,240
			SBR-13-F-13	2013	282,400
		Average			350,813
Aztec	Maximilian Sunflower	*Helianthus maximiliani*	SBR-10-N-09	2010	243,424
			SBR-11-N-09	2011	239,132
			SBR-10-M1--	2010	230,303
			SBR-11-M1--	2011	238,279
			SBR-05-HMAH-MIX	2005	278,540
			SBR-99-HMH	2999	174,734
			SBR-09-HMM1	2009	212,989
			SBR-12-N-09	2012	209,514
			SBR-13-M1--	2013	289,720
			SBR-13-F-13	2013	193,760
			SBR-13-N-09	2013	200,040
		Average			228,221
Kerr	Wright's Pavonia	*Pavonia lasiopetala*	SGO-10-N-09	2010	50,405
			SWC-78-PLH	1978	26,712
			SGO-11-N-09	2011	30,812
			SG0-13-N-09	2013	38,373
		Average			36,576

Legumes					
Release	Common Name	Scientific Name	Lot Number	Year	Seed/ Pound
Sabine	Illinois Bundleflower	*Desmanthus illinoensis*	SFD-09-DIP09	2009	62,871
			SBR-10-M1--	2010	78,894
			SBR-10-L-09	2010	81,744
			Sabine 98	1998	60,014
			SBR-11-M1--	2011	67,121
			SBR-11-L-09	2011	67,056
			SBR-12-L-09	2012	71,912
			SBR-13-M1--	2013	67,280
			SBR-13-F-13	2013	64,574
		Average			69,052
Hondo	Velvet Bundleflower	*Desmanthus velutinus*	SGO-10-Q-08	2010	77,372
			SGO-10-K-08	2010	88,232
			SCO-08-DV	2008	63,914
			SGO-10-M1--	2010	74,974
			477961-99	1999	72,928
			SGO-10-M1--	2010	73,552
			SG0-13-M1--	2013	85,827
			SG0-13-F-12	2013	69,347
		Average			75,768
Comanche	Partridge Pea	*Chamaecrista fasciculate*	1990	1990	55,782
			SBR-09-CFP09	2009	55,768
			SBR-10-M1--	2010	65,834
			Comanche-91	1991	65,182
			SBR-11-M1--	2011	59,494
			SBR-11-N-11	2011	67,610
			SBR-12-N-11	2012	72,220
			SBR-13-M1--	2013	62,827
			SBR-13-N-11	2013	49,813
		Average			61,614
Plains	Prairie Acacia	*Acacia angustissima*	SCO-08-PA	2008	22,340
			SCO-05-	2005	23,416
			SCO-06-AAN-MIX	2006	22,722
			SGO-10-D-03	2010	23,250
			SGO-11-D-03	2011	26,296
			SGO-12-D-03	2012	26,804
			SG0-13-D-03	2013	23,393
			SG0-13-F-12	2013	27,067
		Average			24,411
Cuero	Purple Prairie Clover	Dalea purpurea	SGO-10-K-08-09	2010	334,264
			SCO-09-DP09	2009	225,776
			SBR-09-DPM1H	2009	218,260
			SG0-11-K-08-09	2011	215,892
			SGO-10-M1--	2010	294,029
			SGO-12-K-08-09	2012	235,140
			SG0-13-K-08-09	2013	361,853
			SG0-13-M1--	2013	439,040
		Average			290,532

Study No.: TXPMC-T-1110-RA Texas Natives Project

Objective: TXDOT has provided funding to develop and release plant materials that can be used for highway roadside plantings. The goal is to develop a diverse mix of plant materials that can be used across the state of Texas. The agreement was made with Texas Natives, a division of South Texas Natives. Texas Natives has cooperated with the PMC to use land to grow and evaluate new collections as well as produce seed for this project. Plant collections made through this project will be given a NRCS accession number and stored in the seed storage cooler at the PMC.

Evaluation Factors: All evaluations and testing will be conducted by Texas Natives for release. The PMC/NRCS will be included as a secondary release agency.

Progress or Status: The Texas Natives Project currently has over 700 individual rod rows with more expected for 2014. The PMC has assigned 482 accession numbers for plant collections that will be used and evaluated through this project.

Study No.: TXPMC-T-1201-CP Winter Cover Crop Demonstration Following Irrigated Cotton

Objective: Cover crop mixes are becoming increasingly popular. Higher production cost and drought conditions are forcing producers to look at more economical ways to farm. There is also a growing concern for the soil and its ability to continue to meet the world food and clothing needs of the future. Little work has been conducted in respect to implementing a cover crop and no till management practice in the PMC service area. Produces are looking for advice and guidance to transition from heavy tillage management practices to no-till production. The purpose of this demonstration is to show produces how to make the transition to using cover crop mixes. The three management options (cover crop mix, monoculture, and tillage) will allow producers to see how improved soil health can improve the condition of the soil in an irrigated cotton production system. It will also answer any doubts about nutrient, water, and pest management that many producers are concerned about.

Evaluation Factors: Each year, soil samples and yield data will be compared to previous years. The expectation is that each year soil health should continue to improve with a decrease in farm inputs. The final evaluation should be a technical guide on how to incorporate cover crops into common service areas throughout the PMC service area.

Materials and Methods: Plots will be grown in a manner consistent with an irrigated cotton production system. Three different treatments will be planted side-by-side consisting of ½ acre each. (Cover crop mixes, monoculture covers, and tillage management practices). Cotton will be planted with a no till planter on 40 inch rows. Cotton will be planted at a rate 3-4 seed per foot.

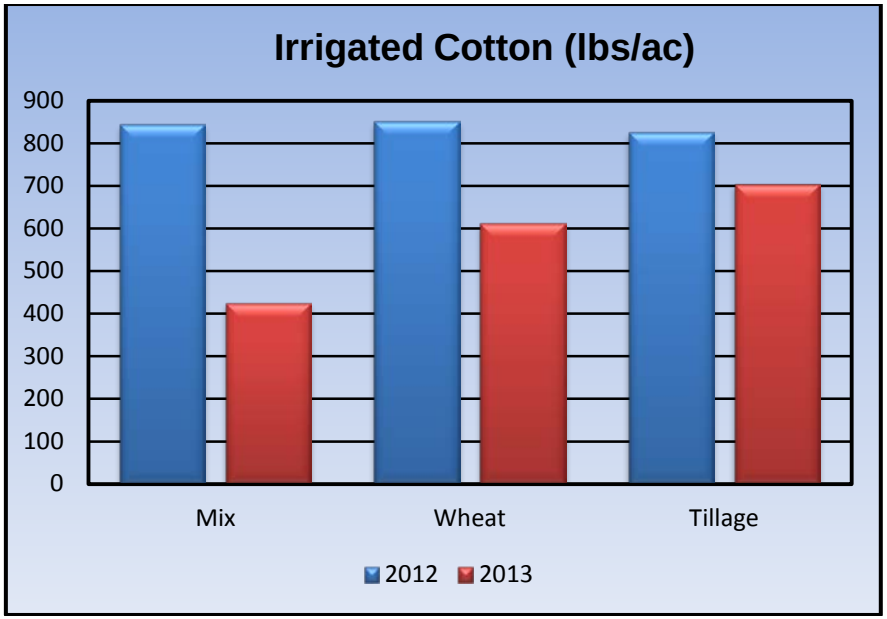
Soil samples will be taken annually when cover crops are terminated. The samples will be sent to Temple, TX where Rick Haney will run the soil analysis. Fertilizer will be added to each individual plot to bring fertility up to levels needed to produce a 2 bale/acre yield. Soil moisture and temperature will also be recorded on each plot. Readings will be taken weekly at the same time of day.

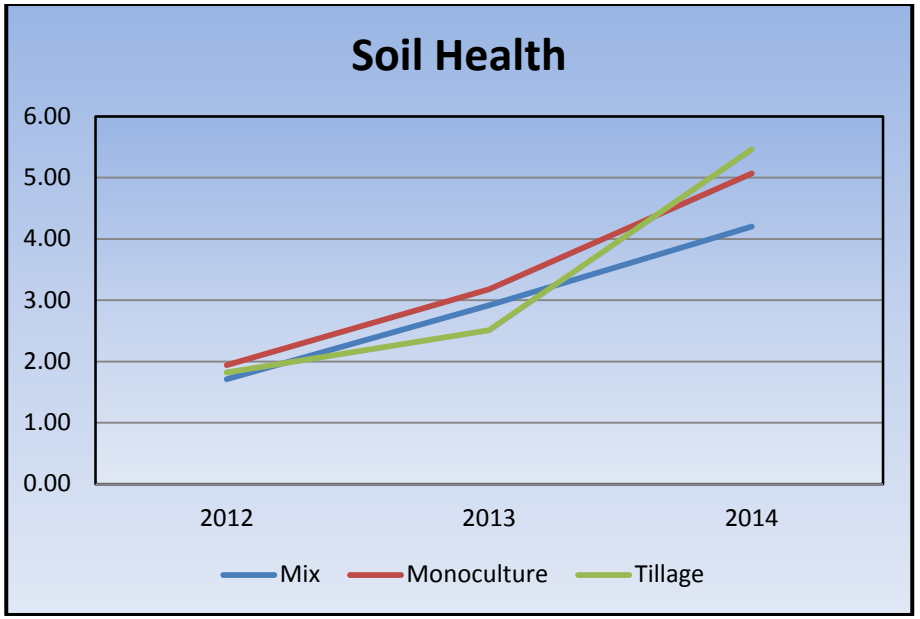
Irrigation will be applied in accordance with normal cotton production. Weeds will be controlled either with chemical or by hoeing, depending on the cotton variety planted each year.

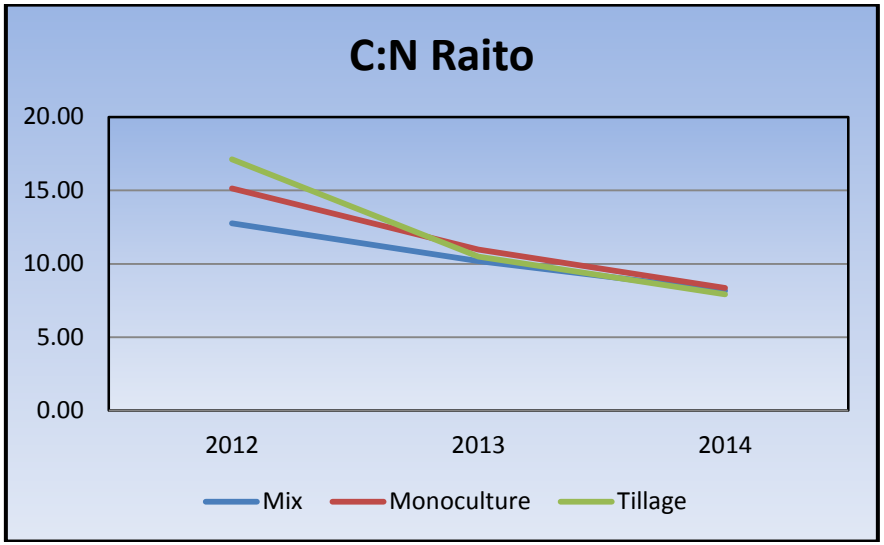
A sample of four rows 100 feet long will be stripped and weighed. From the stripped sample, a grab sample will be taken. The sample should be weighed, lint and seed removed from burs and trash, and air dried. Then the dry weight is recorded so yield can be calculated.

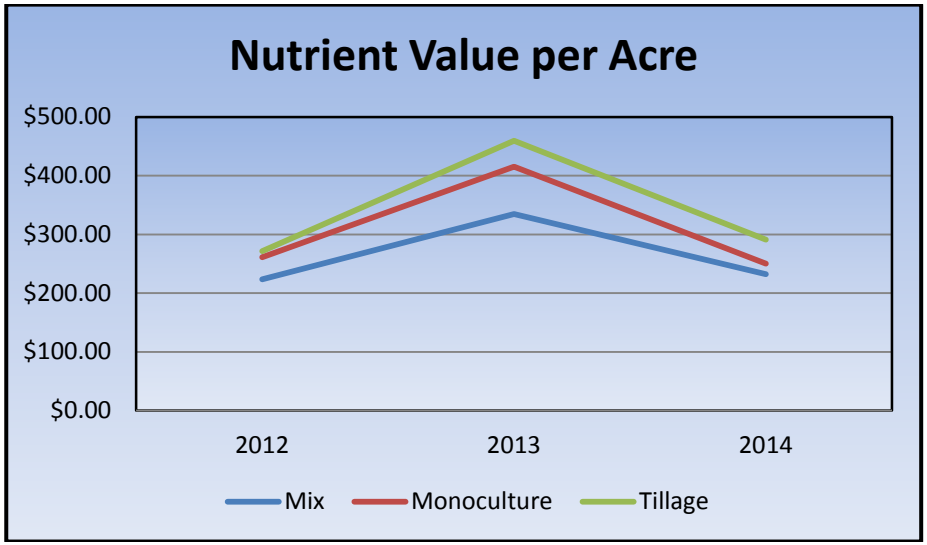
Cover crop mix will be either broadcast before defoliation of cotton or drilled with no-till drill immediately following harvest. Monoculture crop will be no-till drilled following harvest. Tillage will begin following harvest to prevent weed growth and for land preparation.

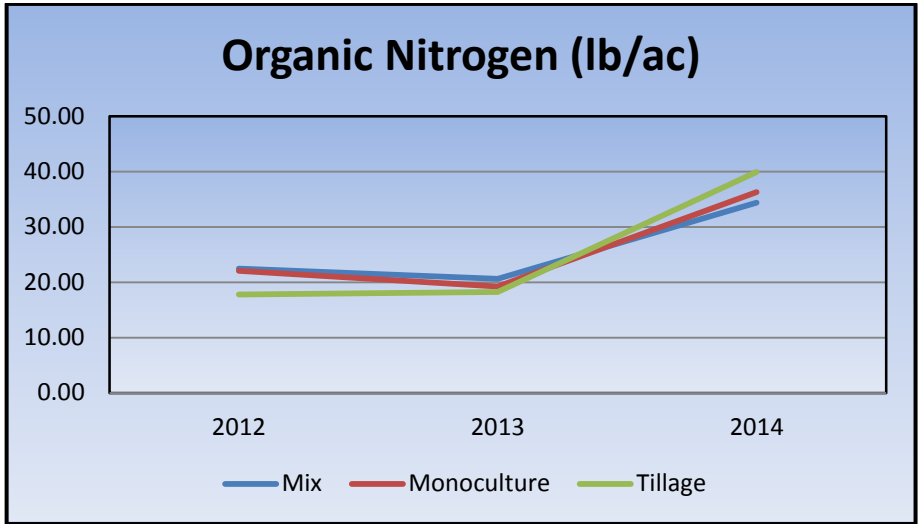
Progress or Status: Two years of cotton yield and three years of soil analysis have been collected. The following graphs show the differences between the yield and soil analysis of the three treatments over the past three years.

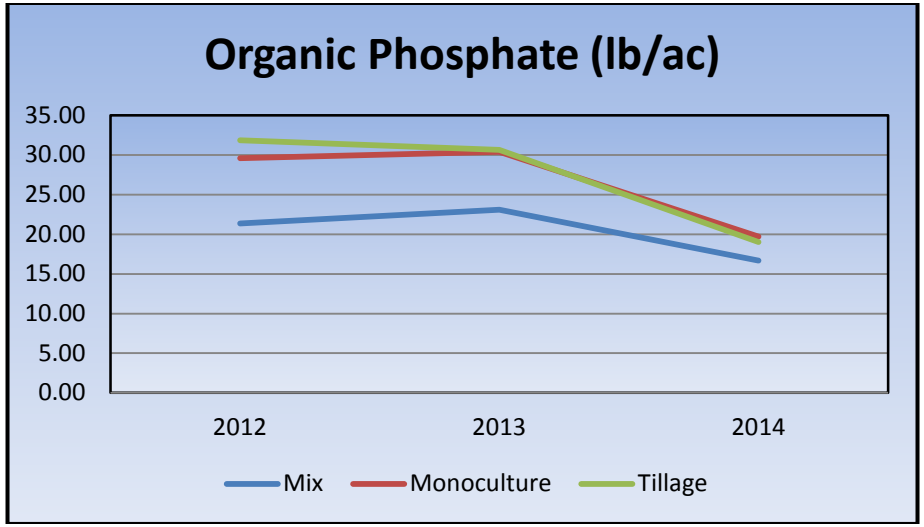

Irrigated Cotton (lbs/ac)
900
800
700
600
500
400
300
200
100
0
Mix
Wheat
Tillage
2012
2013

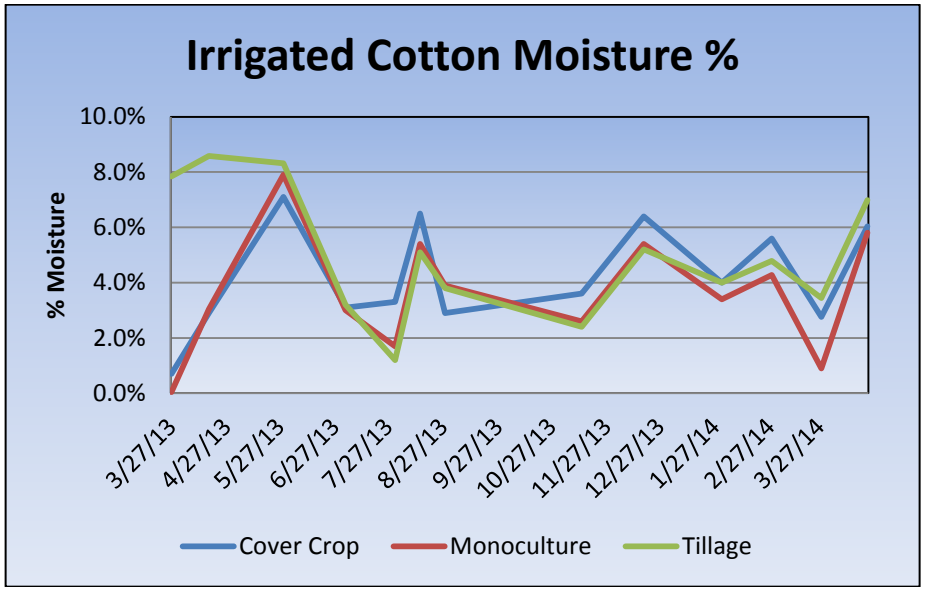

Soil Health
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage

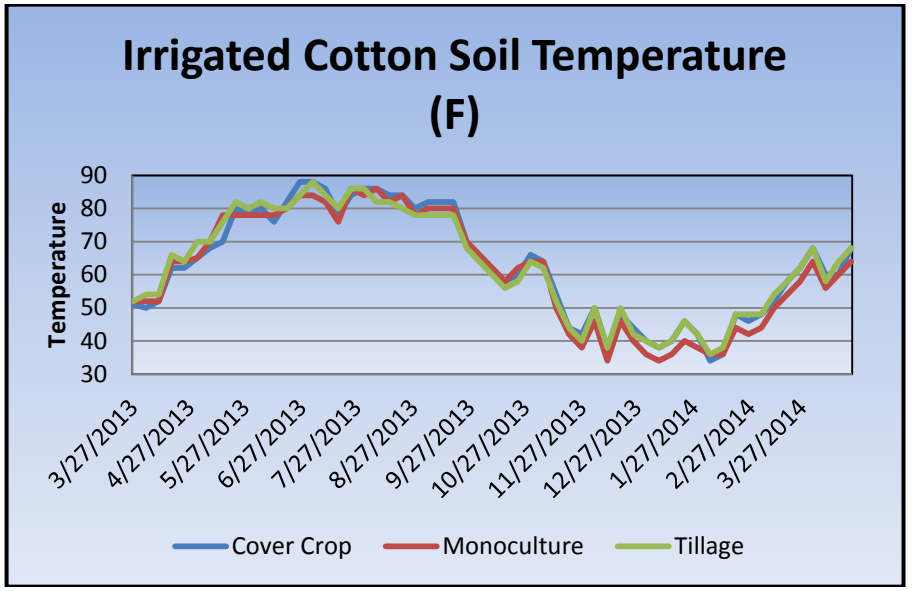

C:N Raito
20.00
15.00
10.00
5.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Nutrient Value per Acre
$500.00
$400.00
$300.00
$200.00
$100.00
$0.00
2012
2013
2014
Mix
Monoculture
Tillage


Organic Nitrogen (lb/ac)
50.00
40.00
30.00
20.00
10.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Organic Phosphate (lb/ac)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Irrigated Cotton Moisture %
% Moisture
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
3/27/13
4/27/13
5/27/13
6/27/13
7/27/13
8/27/13
9/27/13
10/27/13
11/27/13
12/27/13
1/27/14
2/27/14
3/27/14
Cover Crop
Monoculture
Tillage


Irrigated Cotton Soil Temperature (F)
Temperature
90
80
70
60
50
40
30
3/27/2013
4/27/2013
5/27/2013
6/27/2013
7/27/2013
8/27/2013
9/27/2013
10/27/2013
11/27/2013
12/27/2013
1/27/2014
2/27/2014
3/27/2014
Cover Crop
Monoculture
Tillage

Study No.: TXPMC-T-1202-CP Winter Cover Crop Demonstration Following Dryland Cotton

Objective: Cover crop mixes are becoming increasingly popular. Higher production cost and drought conditions are forcing producers to look at more economical ways to farm. There is also a growing concern for the soil and its ability to continue to meet the world food and clothing needs of the future. Little work has been conducted in respect to implementing a cover crop and no till management practice in the PMC service area. Produces are looking for advice and guidance to transition from heavy tillage management practices to no-till production. The purpose of this demonstration is to show produces how to make the transition to using cover crop mixes. The three management options (cover crop mix, monoculture, and tillage) will allow producers to see how improved soil health can improve the condition of the soil in a dryland cotton production system. It will also answer any doubts about nutrient, water, and pest management that many producers are concerned about.

Evaluation Factors: Each year, soil samples and yield data will be compared to previous years. The expectation is that each year soil health should continue to improve with a decrease in farm inputs. The final evaluation should be a technical guide on how to incorporate cover crops into common service areas throughout the PMC service area.

Materials and Methods: Plots will be grown in a manner consistent with an dryland cotton production system. Three different treatments will be planted side-by-side consisting of ½ acre each. (Cover crop mixes, monoculture covers, and tillage management practices). Cotton will be planted with a no till planter on 40 inch rows. Cotton will be planted at a rate 2-3 seed per foot.

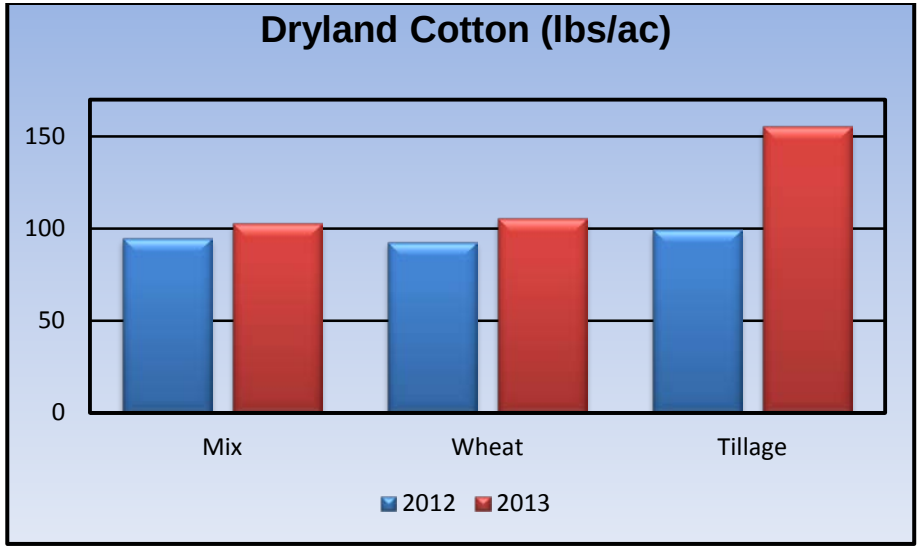
Soil samples will be taken annually when cover crops are terminated. The samples will be sent to Temple, TX where Rick Haney will run the soil analysis. Fertilizer will be added to each individual plot to bring fertility up to levels needed to produce a 1 bale/acre yield. Soil moisture and temperature will also be recorded on each plot. Readings will be taken weekly at the same time of day.

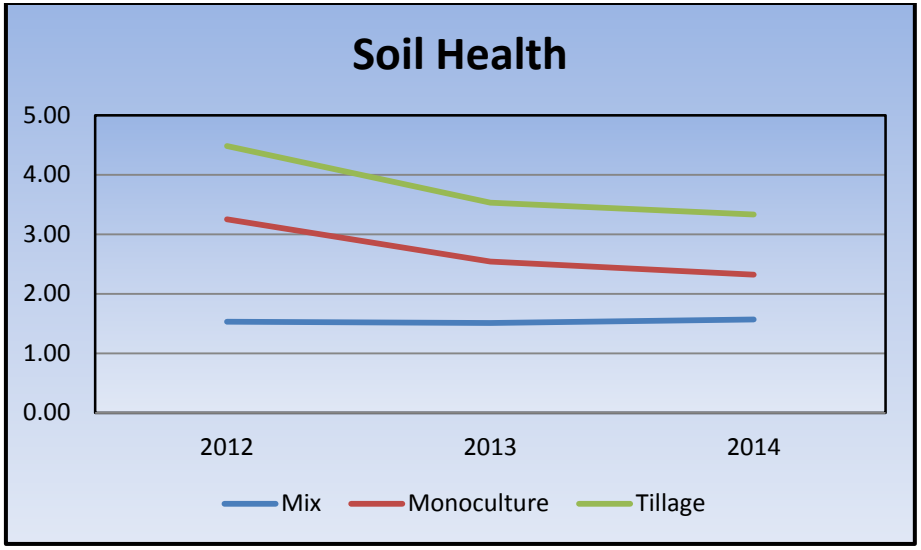
Weeds will be controlled either with chemical or by hoeing, depending on the cotton variety planted each year.

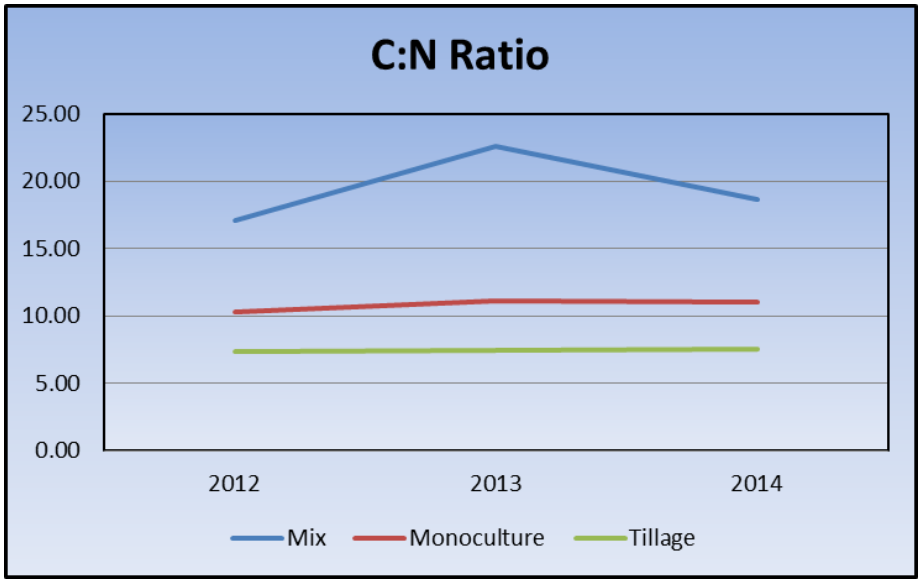
A sample of four rows 150 feet long will be stripped and weighed. From the stripped sample, a grab sample will be taken. The sample should be weighed, lint and seed removed from burs and trash, and air dried. Then the dry weight is recorded so yield can be calculated.

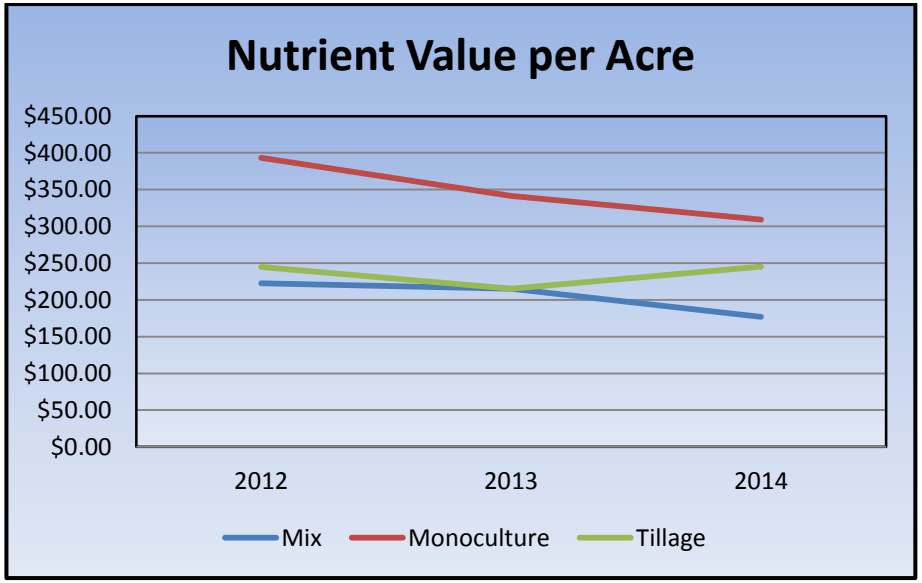
Cover crop mix will be either broadcast before defoliation of cotton or drilled with no-till drill immediately following harvest. Monoculture crop will be no-till drilled following harvest. Tillage will begin following harvest to prevent weed growth and for land preparation.

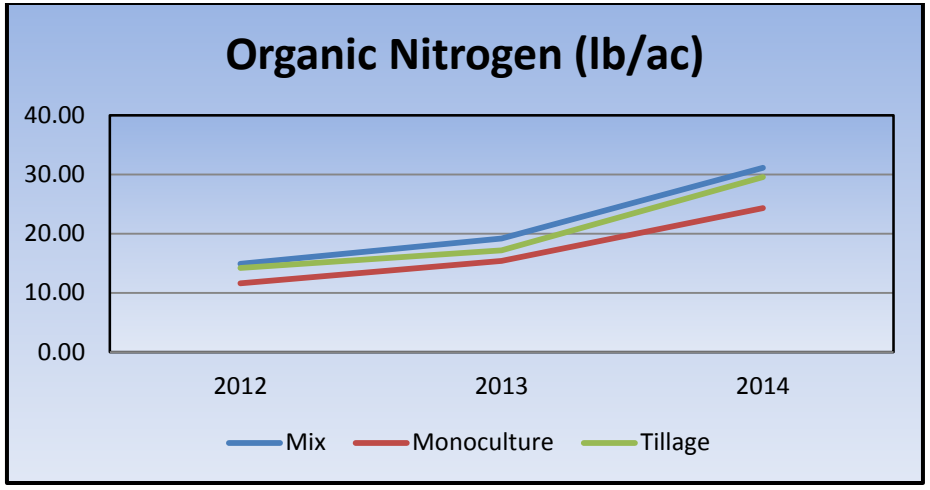
Progress or Status: Two years of cotton yield and three years of soil analysis have been collected. The following graphs show the differences between the yield and soil analysis of the three treatments over the past three years.

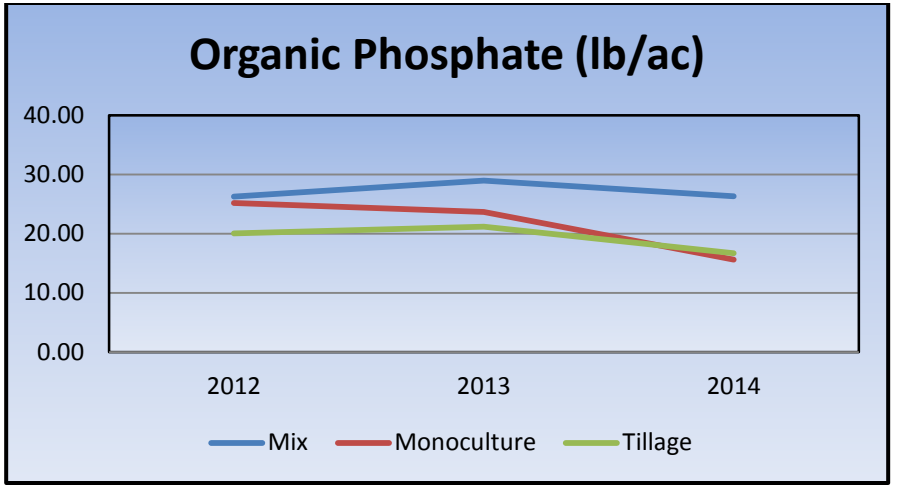

Dryland Cotton (lbs/ac)
150
100
50
0
Mix
Wheat
Tillage
2012
2013

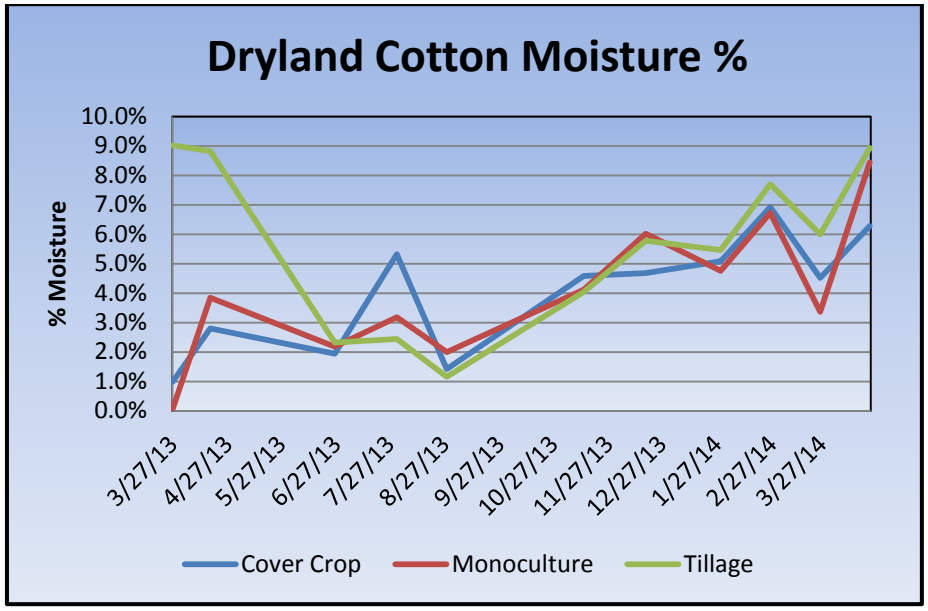

Soil Health
5.00
4.00
3.00
2.00
1.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage

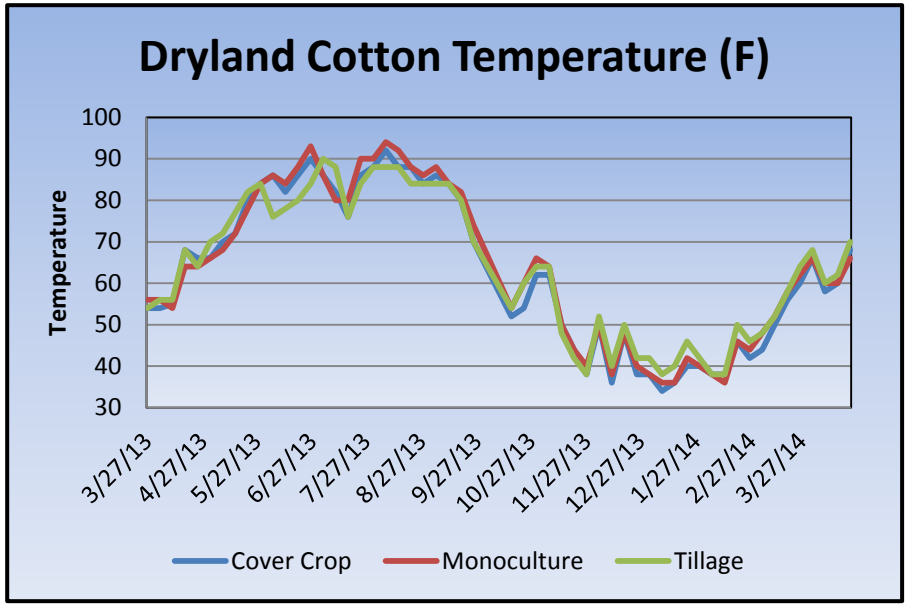

C:N Ratio
25.00
20.00
15.00
10.00
5.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Nutrient Value per Acre
$450.00
$400.00
$350.00
$300.00
$250.00
$200.00
$150.00
$100.00
$50.00
$0.00
2012
2013
2014
Mix
Monoculture
Tillage


Organic Nitrogen (lb/ac)
40.00
30.00
20.00
10.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Organic Phosphate (lb/ac)
40.00
30.00
20.00
10.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Dryland Cotton Moisture %
% Moisture
10.0%
9.0%
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
3/27/13
4/27/13
5/27/13
6/27/13
7/27/13
8/27/13
9/27/13
10/27/13
11/27/13
12/27/13
1/27/14
2/27/14
3/27/14
Cover Crop
Monoculture
Tillage


Dryland Cotton Temperature (F)
Temperature
100
90
80
70
60
50
40
30
3/27/13
4/27/13
5/27/13
6/27/13
7/27/13
8/27/13
9/27/13
10/27/13
11/27/13
12/27/13
1/27/14
2/27/14
3/27/14
Cover Crop
Monoculture
Tillage

Study No.: TXPMC-T-1203-CP Summer Cover Crop Demonstration Following Wheat

Objective: Cover crop mixes are becoming increasingly popular. Higher production cost and drought conditions are forcing producers to look at more economical ways to farm. There is also a growing concern for the soil and its ability to continue to meet the world food and clothing needs of the future. Little work has been conducted in respect to implementing a cover crop and no till management practice in the PMC service area. Produces are looking for advice and guidance to transition from heavy tillage management practices to no-till production. The purpose of this demonstration is to show produces how to make the transition to using cover crop mixes. The three management options (cover crop mix, monoculture, and tillage) will allow producers to see how improved soil health can improve the condition of the soil. It will also answer any doubts about nutrient, water, and pest management that many producers are concerned about.

Evaluation Factors: Initial layout of the demonstration did not require an experimental design. The plots were only going to be used for visual side-by-side comparison. More advanced testing and data collection may be conducted within each treatment at a later time. Experimental design will then be determined.

Materials and Methods: Plots will be grown in a manner consistent with a limited irrigated wheat production system. Three different treatments will be planted side-by-side consisting of ½ acre each. (Cover crop mixes, monoculture covers, and tillage management practices). Wheat will be planted with a no till drill at 1 bushel per acre.

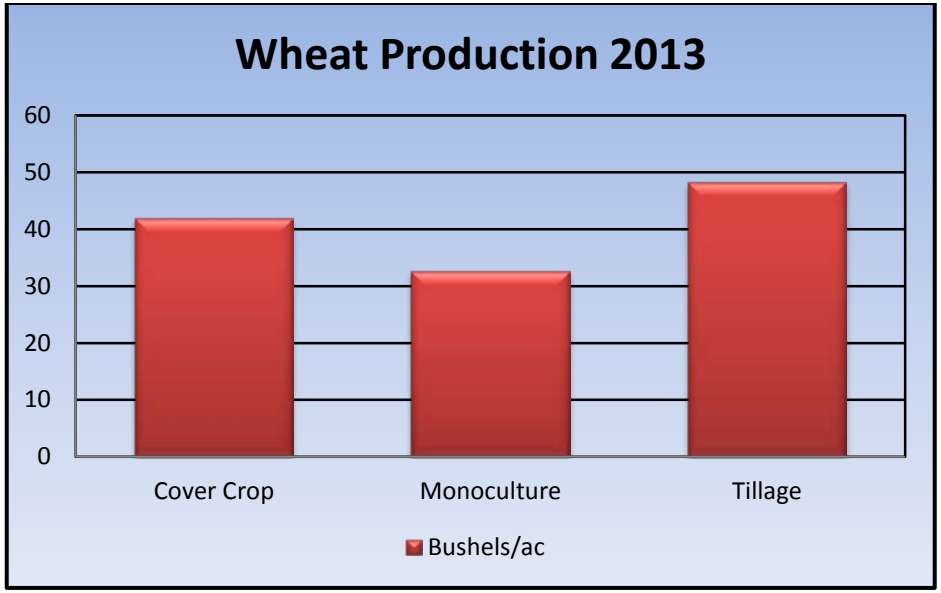
Soil samples will be taken annually when cover crops are terminated. The samples will be sent to Temple, TX where Rick Haney will run the soil analysis. Fertilizer will be added to each individual plot to bring fertility up to levels needed to produce a 35 bushel per acre yield. Soil moisture and temperature will also be recorded on each plot. Readings will be taken weekly at the same time of day.

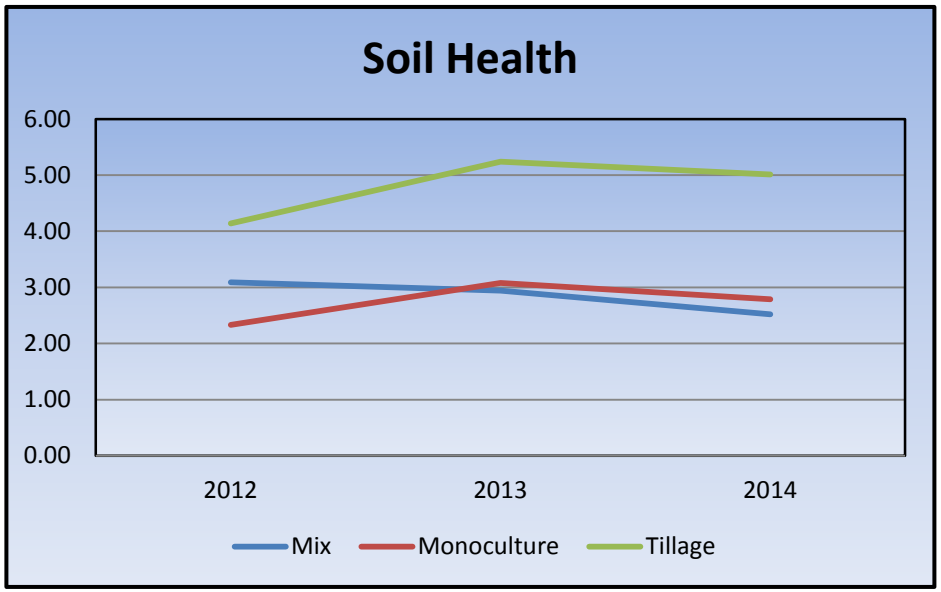
Limited irrigation will be applied in accordance with normal wheat production. Weeds will be controlled either with chemical or by hoeing, depending on the cotton variety planted each year.

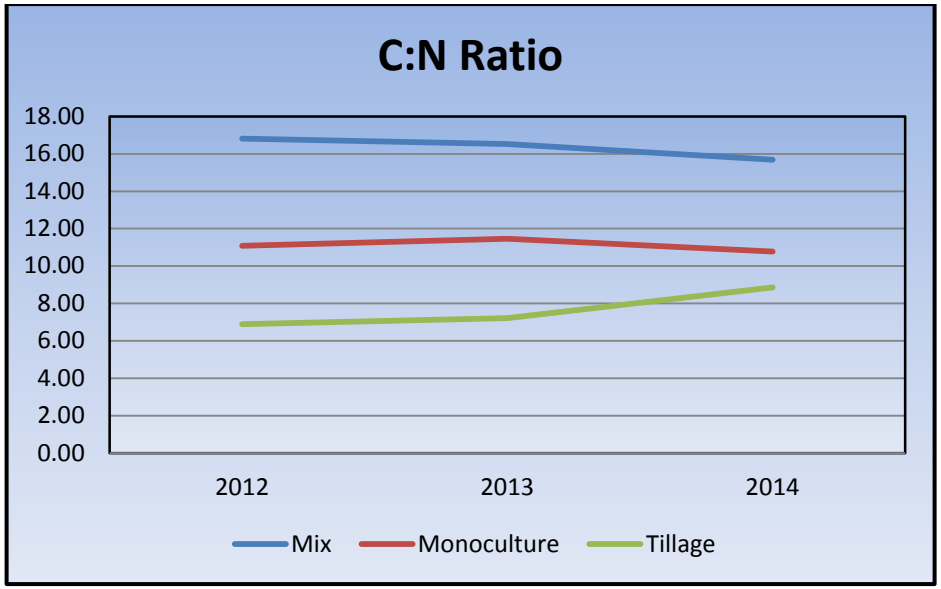
A sample of four rows 100 feet long will be combined and weighed. From the combined sample, a grab sample will be taken. The sample should be weighed and air dried. Then the dry weight is recorded so yield can be calculated.

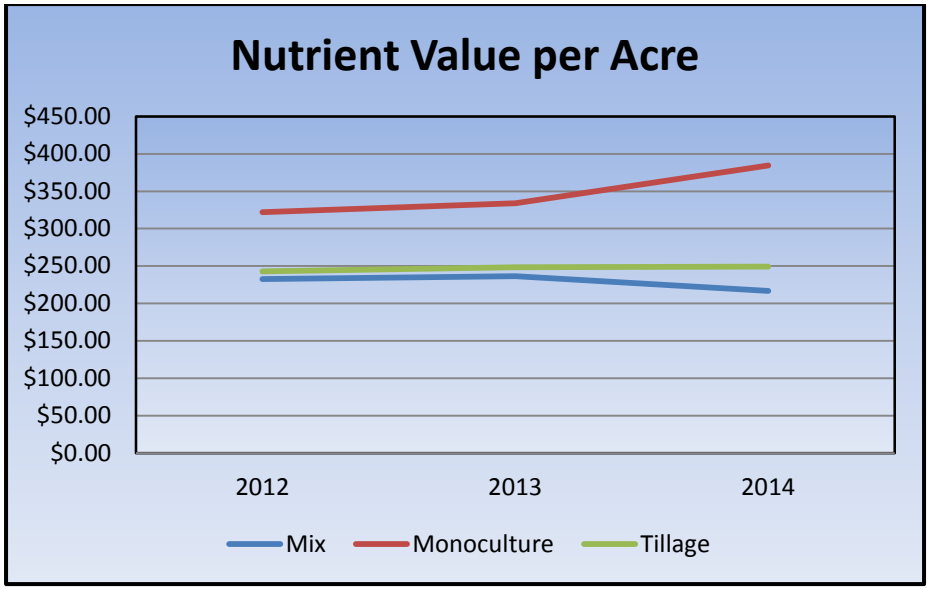
Cover crop mix will be drilled with no-till drill following harvest. Monoculture crop will be no-till drilled following harvest. Tillage will begin following harvest to prevent weed growth and for land preparation.

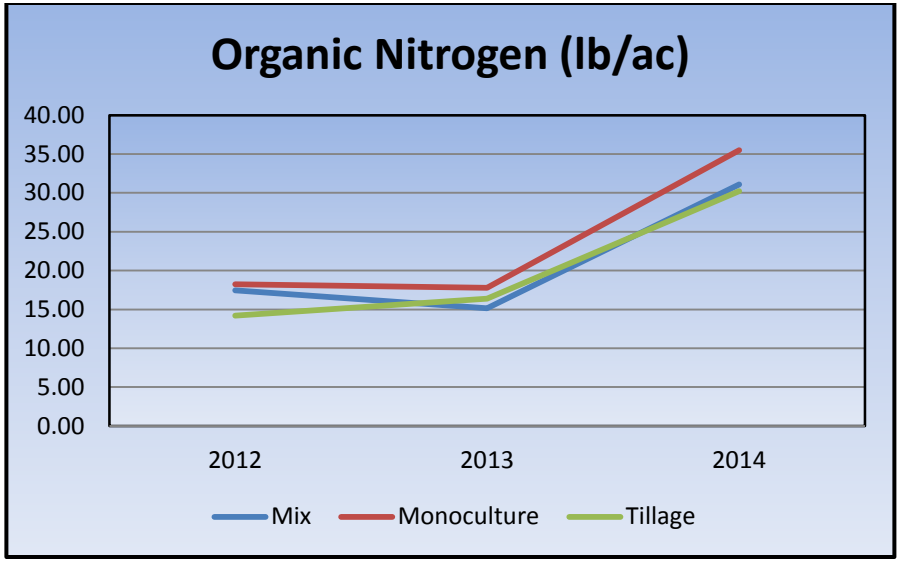
Progress or Status: One year of wheat yield and three years of soil analysis have been collected. The following graphs show the yield and the differences between soil analysis of the three treatments over the past three years. Wheat will be harvested in June of 2014 and the summer cover crop mix and monoculture will be planted.

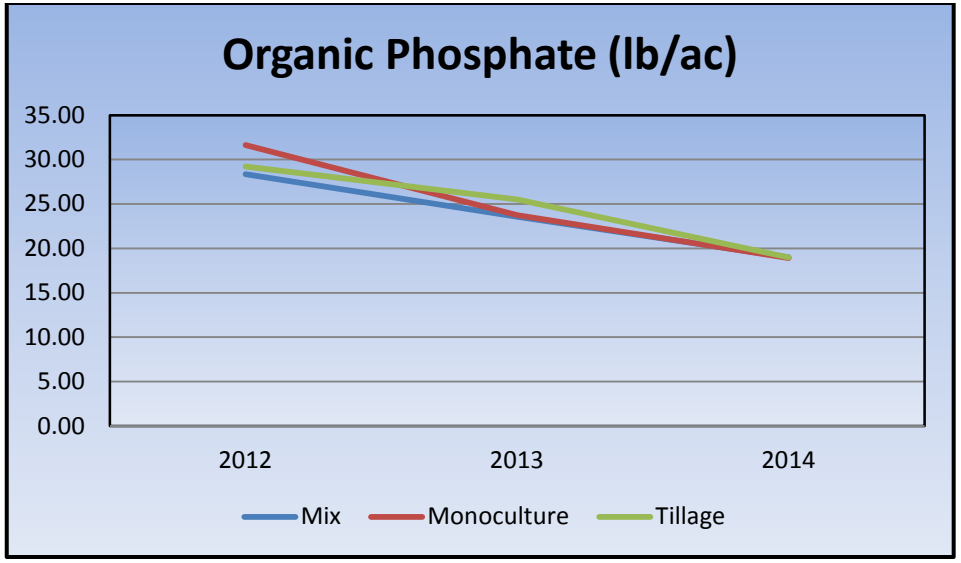

Wheat Production 2013
60
50
40
30
20
10
0
Cover Crop
Monoculture
Tillage
Bushels/ac

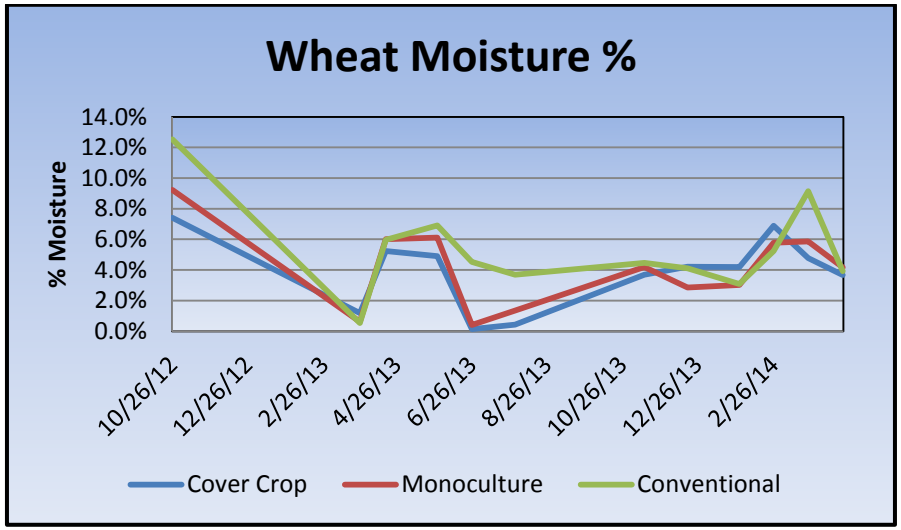

Soil Health
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage

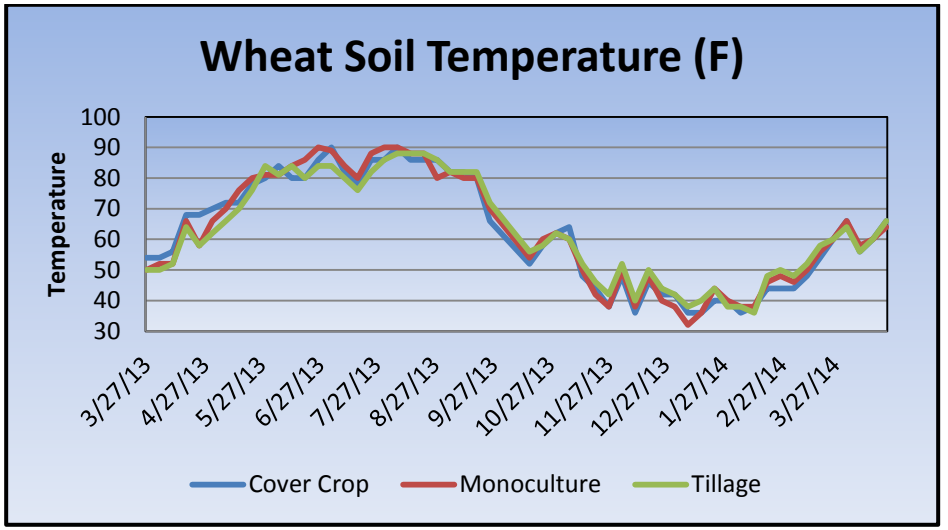

C:N Ratio
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Nutrient Value per Acre
$450.00
$400.00
$350.00
$300.00
$250.00
$200.00
$150.00
$100.00
$50.00
$0.00
2012
2013
2014
Mix
Monoculture
Tillage


Organic Nitrogen (lb/ac)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Organic Phosphate (lb/ac)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2012
2013
2014
Mix
Monoculture
Tillage


Wheat Moisture %
% Moisture
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
10/26/12
12/26/12
2/26/13
4/26/13
6/26/13
8/26/13
10/26/13
12/26/13
2/26/14
Cover Crop
Monoculture
Conventional


Wheat Soil Temperature (F)
Temperature
100
90
80
70
60
50
40
30
3/27/13
4/27/13
5/27/13
6/27/13
7/27/13
8/27/13
9/27/13
10/27/13
11/27/13
12/27/13
1/27/14
2/27/14
3/27/14
Cover Crop
Monoculture
Tillage

Study No.: TXPMC-P-1301-CP Evaluation of Species for Winter Cover Crop

Objective: Due to the increased emphasis in soil health, plant diversity and adaptability of cover crops need to be investigated before making recommendations on the best adapted cover crops for the PMC service area. Species used in cover crop mixes can have different areas of adaptation based on where the plants originated. This study compares fifty individual cool and warm season species to determine which ones are adapted to the service area. The study includes grasses, forbs, and legumes commonly used in winter mixes.

Evaluation Factors: Data collected will include: biomass, emergence, height, vigor, winter kill, and cover.

Progress or Status: The study was planted on October 23, 2012. Data was collected when plots had 75% emergence. Height and % ground cover measurements were taken every thirty days until harvest. Visual notes were taken on vigor and survival. The plots were harvested on April 26, 2013 and biomass was calculated. The data was summarized and a tech note was published in July 2013.

Plots were planted October 23, 2012

Common Name	Days to 75% Emergence	Height (in)						% Ground Cover						Yield
		11/15/12	12/17/12	1/22/13	2/27/13	3/26/13	4/26/13	11/15/12	12/17/12	1/22/13	2/27/13	3/26/13	4/26/13	lbs/ac
Common Alfalfa	16	1	1	1	2	2	5	2	5	8	15	38	85	500-600
Barley	8	6	11	11	9	13	26	5	91	98	100	100	100	6,000-8,000
Arrowleaf Clover	16	1	1	1	2	4	12	3	9	13	26	73	100	5,000-6,000
Berseem Clover	16	1	2	2	3	3	10	1	7	9	21	53	76	4,000-5,000
Crimson Clover	10	1	2	2	2	4	17	2	28	33	48	85	100	6,000-7,000
Rose Clover	16	1	1	1	2	2	11	1	5	5	20	60	100	7,000-8,000
White Clover	15	1	2	2	3	7	20	1	18	18	40	95	100	5,000-6,000
Yellow Clover	16	1	1	1	1	1	5	1	8	9	10	15	59	2,000-3,000
Forage Collards	14	4	7	7	7	9	31	5	90	95	98	98	98	3,000-4,000
Etheopean Cabbag	12	3	7	7	11	15	21	5	93	93	98	100	100	4,000-5,000
Faba Beans	16	2	4	4	7	8	13	5	30	33	50	53	75	3,000-4,000
Field Peas	15	2	4	4	5	7	12	6	75	80	86	97	100	4,000-5,000
Flax	10	2	4	4	9	14	20	2	23	25	38	43	43	600-700
Black Oats	14	5	10	10	13	15	30	13	88	90	95	100	100	7,000-8,000
Oats	11	4	6	6	5	9	23	18	61	63	88	100	100	6,000-8,000
Phacelia*	16	3	3	3	3	0	0	4	15	18	20	0	0	0
Plantain	16	2	2	2	3	5	10	1	13	13	28	63	100	1,800
Radish	11	3	5	5	6	8	15	4	93	95	91	93	88	3,000-4,000
Rape	10	4	8	8	7	8	27	19	95	100	100	100	100	4,000-5,000
Annual Rye	8	6	8	8	8	19	42	23	95	100	100	100	100	7,000-8,000
Safflower	12	2	3	3	5	4	7	2	48	53	63	55	50	N/A
Sainfoin	16	1	2	2	2	5	12	1	18	23	58	98	100	3,000-4,000
Triticale	10	6	9	9	9	19	40	28	98	100	100	100	100	6,000-7,000
Turnips	12	3	5	5	7	7	26	21	90	93	95	95	93	6,000
Cahaba Vetch	14	2	3	3	3	6	11	20	83	90	95	98	100	3,000-4,000
Chickling Vetch	15	3	6	6	9	9	10	16	83	88	89	99	93	3,000-4,000
Common Vetch	14	3	4	4	6	6	10	18	73	83	93	100	100	5,000-6,000
Hairy Vetch	14	2	3	3	3	10	14	18	55	61	89	100	100	5,000-6,000
Wheat	11	5	9	9	8	16	26	18	88	94	96	99	100	5,000-6,000
Winfred Hybrib	13	4	7	7	9	10	15	23	93	98	100	100	100	3,000-4,000

*Phacelia died out after four months

The data represented in this technical note was collected at the James E. “Bud” Smith Plant Materials Center near Knox City, TX. This data represents one year of data collection with no other special replication other than that within the research plot at the PMC. This information is to be used in general comparisons between species and sites and may not reflect actual results at all locations in Texas.

Study No.: TXPMC-P-1302-CP Evaluation of Species for Summer Cover Crop

Objective: Due to the increased emphasis in soil health, plant diversity and adaptability of cover crops need to be investigated before making recommendations on the best adapted cover crops for the PMC service area. Species used in cover crop mixes can have different areas of adaptation based on where the plants originated. This study compares fifty individual cool and warm season species to determine which ones are adapted to the service area. The study includes grasses, forbs, and legumes commonly used in summer mixes.

Evaluation Factors: Data collected will include: biomass, emergence, height, vigor, winter kill, and cover.

Progress or Status: The study was planted on June 12, 2013. Data was collected when plots had 75% emergence. Height and % ground cover measurements were taken every thirty days until harvest. Visual notes were taken on vigor and survival. The plots were harvested on September 4, 2013 and biomass was calculated. The data was summarized and a tech note was published in January 2014.

Plant Growth Attributes for Cover Crop Adaptability at Knox City PMC

Plots were drilled on June 12, 2013 on 8 inch spacing and harvested 100 days after planting

Test was replicated 4 times

Common Name	%Emergence**				%Cover**			Height (in)**			Yield*
	5	7	11	14	30	60	90	30	60	90	lb/ac
Buckwheat	81	90	91	99	39	69	63	8	22	21	2,596
'Red Riper' Cowpeas	60	75	98	100	56	100	100	9	17	18	5,181
'Iron and Clay' Cowpeas	68	73	85	100	49	100	100	11	23	26	5,765
'California' Black-eyed Cowpeas	34	43	48	71	29	90	90	8	19	20	4,968
Impact Forage Collards	23	41	53	75	51	76	60	9	8	7	662
BMR 84 Grazing Corn	61	74	83	96	60	96	96	16	26	25	*11,607
Guar	61	71	78	99	25	84	84	4	12	18	5,083
HS II Hybrid Forage Sorghum	63	71	83	100	60	100	100	17	38	42	*20,552
Cow Lick Hybrid Forage Sorghum	60	69	76	100	60	100	100	22	34	44	*16,239
Surpass BMR Hybrid Forage Sorghum	76	80	91	100	66	100	100	20	37	42	*18,694
WAC-610 Hybrid Grain Sorghum	73	81	91	100	71	100	100	20	26	26	*18,398
9200Y-White Hybrid Grain Sorghum	20	31	41	80	53	100	100	19	32	32	14,035
W-615 Hybrid Grain Sorghum	64	75	93	100	53	100	100	20	27	28	*18,649
ML 401 BMR Hybrid Pearl Millet	38	50	55	85	68	94	96	20	26	34	10,182
Kenaf	85	88	95	99	65	98	98	11	26	33	5,937
'Rio Verde' Lab Lab Bean	61	73	85	99	19	89	89	4	11	20	4,001
'Ronaai' Lab Lab Bean	49	58	71	95	36	82	91	4	11	18	4,270
Kobe Lespedeza	0	0	5	14	6	15	20	2	7	11	3,043
Browntop Millet	21	36	45	73	61	100	100	10	30	30	6,886
'Dove' Proso Millet	5	5	10	21	18	80	88	14	39	37	8,039
German Foxtail Millet	14	20	21	50	29	81	69	13	32	34	5,340
Japanese Millet	9	26	31	69	35	85	88	8	29	30	6,255
Hybrid Pearl Millet	43	50	55	85	53	90	90	18	30	31	*14,906
Mung bean	70	80	89	100	60	99	99	7	19	21	6,293
'Comanche' Partridge Pea	10	18	30	63	40	100	100	6	22	27	8,072
Catjang Pea	74	81	95	100	60	99	99	7	18	24	3,995
'Tamrun OL02' Peanut	0	14	33	65	26	75	88	4	7	10	4,568
Bengal Rice	0	33	48	85	11	68	65	8	18	19	2,808
Sesame	30	44	55	91	61	89	89	8	21	34	8,777
Sesbania	21	43	59	88	46	69	75	9	34	51	5,987
Egyptian Wheat Sorghum	54	61	74	100	68	100	100	22	43	54	15,734
Early Sumac Sorghum	9	26	38	90	54	100	100	20	48	52	15,041
Bird Magnet Sorghum	71	80	95	100	61	100	100	18	31	29	*21,124
Wild Game Food Sorghum	29	43	48	96	64	100	100	18	28	29	13,195
Sorghum Almum	16	39	43	91	59	100	100	21	60	61	11,789
Zacate Sorghum Sudangrass Hybrid	46	61	78	100	64	100	100	25	50	56	17,611
Maxi Gain BMR-6 Sorghum Sudangrass Hybrid	84	91	94	100	60	100	100	23	36	38	16,526
Super Graze Ultra Sorgo Sudangrass Hybrid	73	81	96	100	70	100	100	20	42	47	18,673
Sugar Queen Sorgo Sudangrass Hybrid	53	70	86	99	70	100	100	21	49	50	*20,131
'Piper' Sudan Grass	45	60	88	100	54	100	100	24	58	59	17,510
'Laredo' Soybeans	41	50	69	96	30	79	84	4	14	19	4,351
Peredovik Type Sunflower	64	74	79	88	34	66	65	4	23	25	4,284
'Tropic Sun' Sunn Hemp	68	79	95	100	40	83	85	5	18	29	5,164

***Produced seed before harvest, resulting in increased bimass yields compared to other sources**

**** %Emergence and Cover and Plant Height is shown in days from planting**