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NRCS Natural Resources Conservation Service Plant Materials Program

Jamie L. Whitten Plant Materials Center

2006 Progress Report of Activities

April 2006

INSIDE THIS ISSUE

This document highlights several activities and products of the USDA-NRCS Jamie L. Whitten Plant Materials Center during 2006.

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Visit the MSPMC Web Site at:
http://www.ms.nrcs.usda.gov/technical/JamieL.Whitten.html

Vist the Plant Materials Program Site at:
http://www.plant-materials.nrcs.usda.gov/

What We Do

The Jamie L. Whitten Plant Materials Center (MSPMC), located in Coffeeville, Mississippi, is operated by the USDA Natural Resources Conservation Service (NRCS). Our mission is to develop, test, and transfer effective state-of-the-art plant science technology to meet the resource needs of our customers. Our program has an excellent internal system for identifying current and future plant materials needs, coupled with a seamless system of product development and program delivery.

By working with a broad range of plant species, including grasses, forbs, trees, and shrubs, the MSPMC seeks to address priority needs of NRCS field offices and land managers in both the public and private sectors.

Conservation Objectives

The MSPMC works closely with NRCS field offices and land managers on a broad range of conservation concerns and issues. Pastureland Improvement, Cropland Erosion Control, Critical Area Erosion Control including Urban Conservation, Wildlife Habitat Enhancement, and Water Quality Improvement are the major conservation issues in our service area, which includes Mississippi, the delta regions of Arkansas, Louisiana, western Tennessee, southeastern Missouri, southwestern Kentucky, and the Blackland prairie of central Alabama.

To accomplish our mission objectives, we generate numerous products including plant releases, written plant science information, and public presentations. This document provides a brief review of many MSPMC activities accomplished during 2006.

PMC Service Area

’Chiwapa’ in Group IV soybeans

Many growers in the Mid-South have installed water-control structures to allow retention of water on their fields in the winter months to provide habitat for wildlife (Conservation Practice 644). Waterfowl utilized wasted seed from the agronomic crops in addition to weed seeds and other plant parts as their winter food source. However, research by wildlife biologists has shown that seeds of agronomic crops degrade quickly under flooded conditions. Also, the widespread use of Roundup-ready crops in the past decade has severely impacted the number of weeds that are present in the fields to produce seeds or provide other plant parts for food. To ameliorate these circumstances, some growers plant a late-season crop after they harvest their agronomic crops specifically to provide a food source for waterfowl. One popular crop for this use is a 90-day seed-ripening millet. However, in most years, it is difficult to get the millet established due to lack of rainfall in the late summer after the agronomic crop is harvested.

Chiwapa/Soybean Study Info:

- 1.25 lbs = 30 lbs/acre on a 30X50 plot
- PLS = 1.5 lbs/plot

Three sites with near same soybean planting dates. Millet planting dates were scheduled for June 16, June 30, July 14. Two of the planting sites were failures due to the drought .

The later planting date (Table 1) gave a more desirable stand. However, severe drought conditions more than likely contributed to the reduced amount of seed produced (insufficient data for statistical analysis).

After observing these results, it has been determined that while planting into soybeans may be a desirable practice, ‘Chiwapa’ may not be the species/cultivar to plant. Therefore, a future study may evaluate browntop millet along with Japanese millet cultivars to evaluate the planting practice.

Table 1.

Planting date 1

Variable	N	Mean
%Stand	2	10.000
lbperAC	2	30.452
seed fill	2	3.0000
avail seed	2	3.5000

Planting date 2

Variable	N	Mean
%Stand	3	11.667
lbperAC	3	8.3047
seed fill	3	3.6667
avail seed	3	4.0000

Planting date 3

Variable	N	Mean
%Stand	3	73.333
lbperAC	3	1.7620
seed fill	3	5.0000
avail seed	3	5.0000

Note: 1= good, 3= fair, 5= poor when referring to seed fill and available seed on the ground at time of evaluations.

Native Warm Season Grasses Development

There are 4 native warm season grasses being evaluated for adaptability and improved seed germination characteristics at the MSPMC in cooperation with Mississippi State University: little bluestem, beaked panicum, purpletop, and a low growing switchgrass.

These grass species when released will provide plant materials that can be used in buffer practices, CRP, WRP, and numerous wildlife and restoration activities.

Each material is in a different stage of development. Progress to date, especially in seed dormancy, varies.

There are few cultivars of little bluestem [*Schizachyrium scoparium* (Michx.) Nash] that are adapted to the PMC service area (as well as the other native warm season grasses), especially for the southern reaches of the area, and seed is difficult to obtain from commercial sources. With the growing emphasis on planting native warm-season grasses in many farm programs for erosion control and wildlife habitat, cultivar development is a priority.

Beaked panicum is not highly productive as a forage crop, but it has potential for critical area stabilization and is shade tolerant.

There is a need for a low-growing ecotype of switchgrass for some conservation practices such as vegetative barriers (Conservation Practice 601), critical areas (Conservation Practice 342), and wildlife habitat plantings (Conservation Practice 645) in the southeastern U.S.

Purpletop [*Tridens flavus* (L.) A.S. Hitchc.] has limited potential as a forage crop, but can be used for critical area stabilization and has some shade tolerance.

The current studies are aimed at reducing seed dormancy through natural selection. Crossing blocks are planted from the plants that germinate in 14 days from the previous crossing block.

Table 1.

Species	Cycle of Selection	Pre-stratification Germination† (%)	Germination After Stratification ‡ (%)
Switchgrass (Upland)	1	0.67	4.17
Little Bluestem	2	1.7	13.50
Purpletop	2	15.17	76.83
Beaked Panicum	0	0	6.67

† Pre-stratification germination over a 14 d germination under 16 hr/8hr day/light and 30° light/20°C dark temperature.

‡ Germination percentage after 14 d moist stratification at 3° C followed by return to germination conditions [14 d under 16 hr/8hr (day/light) and 30° light/20°C dark temperature].

Table 1 above shows the current status of development based upon germination (2005 seed). Seed from the 2006 crossing blocks are currently being germinated. Insufficient Beaked Panicum was germinated from the 2005 seed, therefore there was no 2006 crossing block and seed was once again taken from the zero cycle block. The remaining species all advanced in cycle by an additional year.

Drought at MSPMC in 2006

Many parts of the nation experienced drought in the fall 2005 and summer 2006, and the MSPMC was no exception. This impacted studies and release production.

In 2006, the MSPMC recorded 12.32” (average is 18.24”) in the May to August growing season. However, June and July totaled less than 3” (average is 9.33”), a very dry period.

Alleycropping Demonstration

In 2002 the PMC began cooperating with the National Agroforestry Center to demonstrate the potential for alley cropping in the Southeast using high value trees combined with no-till crops planted on sloping topography. A 5 acre hillside of Loring silt loam soil (up to an 8% slope) at the PMC was chosen as the study site. Trees were planted in single rows along the general contour of the field and perpendicular to the dominant slope on angles convenient for farming using the CORE4 recommendations. Trees species include pecan [*Carya illinoinensis* (Wangenh.) K. Koch], which will provide an intermediate income from nut production in addition to future timber production, and green ash (*Fraxinus pennsylvanica* Marsh.), which is a fairly fast-growing timber species.

The study is still in its early stages, and as the trees grow, effects on crop production can be anticipated and will be documented.

Crop	Input/acre[2/]	Yield bu/acre	Price/bu	Net Return/acre[3/]
2002				
Soybean	$97.00	26	$5.32 (Oct 2002)	**$41.32**
2003				
Wheat	$118.00	54	$3.08 (June 2003)	$48.32
Soybean	$91.00	41	$7.05 (Nov 2003)	$198.05
				$246.37
2004				
Corn	$265.00	180	$2.20 (Sept 2004)	**$131.00**
2005				
Soybean	$108.00	47	$5.75 (Nov 2005)	$162.25
2006				
Wheat	$148.00	61.2	$3.99 (June 2006)	$96.19
Soybean	$63.50	0		($63.50)
				$32.69

1/ Economic contribution of the trees is not considered

2/ Input cost figures obtained from http://www.agecon.msstate.edu/research/budgets.php

3/ Yield x Price - Input Cost = Net

Wheat was planted in the fall of 2006 and corn will be planted in the spring of 2007, completing a crop rotation cycle.

Silvopasture Demonstration

A loblolly pine stand planted in January, 2001, for another study was thinned to create 4 20' x 91' plots (trees are on a 20' x 7' spacing). These plots are each divided into three reps. Existing warm season grasses in the plots were sprayed with glyphosate (1 qt/ac) in early October 2004, except one plot which will serve as a mixed grass plot.

The three plots to be planted were sprayed in March 2005 with glyphosate and 2,4-D. The plots were then fertilized for P and K in April and burned down again with glyphosate in May 2005. Plots were planted in May of 2005.

'Alamo' switchgrass was no-till drilled at 8 lb PLS/acre. 'Highlander' eastern gamagrass was planted on 20" rows at a rate of 3 to 4 seed per ft, and common bermudagrass was drilled at a rate of 5 lb/acre. Stands were evaluated in July and considered successful. Plots were mowed in September of 2005.

The year of 2006 was the first year of growth for the planted grasses. Therefore little data was expected during 2006. However, an extended drought in 2006 further slowed stand development and growth.

In order to prevent additional stress on the plants, it was decided to take only one fall forage clipping. The Table below provides the preliminary data for dry matter yield averaged over the replicates. The mixed stand is the grasses present and established prior to initiation of the study.

Species	Dry Matter Yield
	lbs/ac
mixed	2629
'Alamo'	2253
bermuda	2104
'Highlander'	2326

2006 was affected by drought so only one clipping was done at the end of the growing season. In 2007, multiple clippings will be done.

2006 'Highlander' Gamagrass Herbicide Study

In 2003, the MSPMC, in cooperation with the Mississippi Agricultural and Forestry Experiment Station (MAFES) and the Jimmy Carter PMC in Americus, Georgia, released 'Highlander' eastern gamagrass (*Tripsacum dactyloides*) for forage (512) and erosion control (327) in the Southeast.

'Highlander' eastern gamagrass was released in 2003 to be used primarily as a forage crop. In order to produce sufficient seed for the commercial market, growers need effective herbicide treatments that can be legally applied to the crop.

The main focus of this research is to develop herbicide recommendations for seed producers; however, many of the herbicides tested may also have application for establishment of 'Highlander' for forage production and other conservation practices.

The study was begun in 2005. Herbicide treatments were studied for: establishment, spring maintenance treatments, and post-emergence treatments.

The establishment herbicide plantings conducted in the greenhouse in 2005 failed and no data was collected. In 2006 the establishment stand was moved to the field. However, drought conditions at planting led to poor stand establishment and no data was collected. In 2007, the establishment planting will be on a site that can be irrigated if necessary.

The 2006 spring maintenance herbicide testing was conducted on stands of Highlander located at the MSPMC. A one-year-old stand and an established stand were treated in May of 2006. Plot size is 5 foot x 8 foot and there are three replications of each treatment. There is an untreated control plot. Herbicide treatments include atrazine 4L at a rate of 2 lb ai/ac (2 qt/ac); Dual Magnum at 2 lb ai/ac (2 pt/ac); Prowl 3.3 EC at 1 lb ai/ac (2.4 pt/ac); Karmex 4L at 1 lb ai/ac (2 pts/ac); and Axiom DF at 0.75 lb ai/ac of FOE 5043 and 0.19 lb ai/ac of metribuzin (22 oz Axiom/ac). All field herbicide treatments are applied using the CO2 plot sprayer. Injury ratings are taken at 7, 14, 21 and 28 days after treatment (10 = no injury / 1 = dead). An average of injury ratings from all 4 dates shows Karmex caused the most injury. There were no significant differences in plant responses between the one-year-old and established stands.

The post-emergence testing was conducted on stands of 'Highlander' located at the MSPMC. A one-year-old stand and an established stand were treated in May of 2006. Plot size is 5 foot x 8 foot and there are three replications of each treatment. The herbicides tested are: Atrazine applied at 2 lb ai/ac (2 qt/ac); Aim 2EC at 0.008 lb ai/ac (0.51 oz/ac) plus nonionic surfactant (0.25% v/v); Clarity 4SL (dicamba) at 0.25 lb ai/ac (0.5 pt/ac); Permit 75DF (halosulfuron) at 0.047 lb ai/ac (1 oz/ac) plus crop oil concentrate (1.0% v/v); Accent 75DF at 0.5 oz ai/ac (0.67 oz/ac) plus crop oil concentrate (1.0% v/v); Evik 80DF (ametryn) at 1.6 lb ai/ac (2 lb/ac) plus nonionic surfactant (0.25%v/v), and 2,4-D Amine 4L at 1.0 lb ai/ac (2 pt/ac). There is also a control plot for comparison purposes. Injury ratings are taken at 7, 14, 21 and 28 days after treatment (10 = no injury / 1 = dead). An average of injury ratings from all 4 dates shows Evik caused the most injury. There were no significant differences in plant responses between the one-year-old and established stands.

2006 Highlights

Technology from the Jamie L. Whitten PMC is an integral part of the NRCS strategic plan. The goals of providing a productive natural resource base and a high quality environment can not be realized without sound plant science technology.

Plant Materials in Production
(Foundation/Certified/Common)

Lark Selection Partridge Pea (0/0/175)
'Quail Haven' Reseeding Soybean
'Halifax' Maidencane
'Highlander' Eastern Gamagrass (135/0/0)
'Chiwapa' Japanese Millet (0/0/100)
'Meechee' Arrowleaf Clover
Morton Germplasm Shrub Willow
9062821 Switchgrass
9002928 Beaked Panicum
Pangburn Switchgrass
Wetland Plants (3 species)
Mississippi Wildflowers (7 species)

Active Studies

PMC Objectives	Number
Cropland	5
Pasture/Hayland	4
Critical Area/Buffers	4
Wildlife Habitat	4
Total Studies	**17**

Written Technology Transfer

Type of Publication	Number
Annual Reports	2
Major Publications	
Abstracts	0
Technical Papers	4
Plant Notes	0
PVP Application	0
Newsletters/News Articles	4
Total Publications	**10**

Oral Technology Transfer

Type of Presentation	Number
National Presentations	0
Regional Presentations	0
Local Presentations	0
Training Presentations	3
PMC Tours	3
Total Presentations	**6**

Looking for Information on Vegetative Solutions to Conservation Problems?

Visit the Plant Materials Program Website!
http://www.plant-materials.nrcs.usda.gov/

- Plant Fact Sheets on conservation plants
- Information on obtaining conservation plants
- Publications and technology development from 26 PMCs across the country
- New improved plants, uses and technology
- Links to websites with additional or supporting information

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