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NRCS Natural Resources Conservation Service Plant Materials Program

Jamie L. Whitten Plant Materials Center

2005 Progress Report of Activities

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INSIDE THIS ISSUE

This document highlights several activities and products of the USDA-NRCS Jamie L. Whitten Plant Materials Center during 2005.

Solutions Plant for Conservation Needs

Jamie L. Whitten PMC
2533 County Road 65
Coffeeville, MS 38922
Phone: (662) 675-2588

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http://www.plant-materials.nrcs.usda.gov/mspmc/

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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 2005.

PMC Service Area

Sunflower Variety and Herbicide Test for Dove

In 2005, the MSPMC began a sunflower variety and herbicide test, with cooperation from Kevin Nelms, Area 4 Wildlife Biologist, MS.

Wildlife biologists frequently recommend planting "peredovick" variety of sunflowers based on a 1980 U.S. Fish and Wildlife study of bird food preferences. Dove and many other species of wild birds showed a preference for black oil-type sunflowers. Peredovick was the best known variety of black oil sunflowers for use in the Southeast. However, the oil crop growth of sunflower in the U.S. has resulted in increased varieties available for southern use. These varieties need to be tested for use in Mississippi and compared to peredovick performance.

Doves are not strong scratchers and rarely perch on seed heads to feed. Therefore, seed must be available on relatively clean, open ground. Many sunflower fields become unattractive to dove due to weed pressure. Historically, very few herbicides were labeled for use on sunflowers and weed control recommendations were not complete. Again, due to increased cropping of sunflowers, new herbicides have recently been labeled for use. In addition, genetically modified herbicide resistant varieties of sunflower are now being marketed. Herbicide efficacy needs to be evaluated due to large price differences and unfamiliarity of new herbicide performances in Mississippi and surrounding areas. The study will result in development of a sunflower dove field system best suited to this region. This system can then be confidently recommended to landowners by NRCS personnel.

Variety plots are 10' by 40' with 3 replicates in a randomized complete block. Eight to twelve varieties will be selected for the study based on possible southern performance. Plots will be planted at a rate of 2 seeds per foot on 30" rows using a no-till planter. Plots will be planted in mid-April. Plots will be fertilized with 50 lbs/acre N at planting and 50 lbs/acre N at 3-4 weeks after germination.

Remainder of test fields are planted using the same equipment, rates, and dates. Herbicide evaluations will be randomly arranged in this field and marked using flags and GPS. Treatments consist of an untreated control, preemerge of metolachlor (Dual Magnum) at 1.33 pts./acre and sulfentrazone (Spartan) at 4 oz./acre and postemerge of clethodim (Select 2 EC) at 8 oz./acre, preemerge of metolachlor (Dual Magnum) at 1.33 pts./acre and postemerge of imazamox (Beyond) at 5 oz./acre. When needed, treatments will be incorporated by rainfall.

Variety testing is evaluated using seed yield. Herbicide efficacy is evaluated using a line transect to estimate percent bare ground. Cost data will also be utilized to compare herbicide and variety economics.

‘Highlander’ Eastern Gamagrass

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 testing was conducted in the greenhouse. The establishment treatment plantings failed in 2005. No data was collected. In 2006 the establishment stand will be moved to the field.

The spring maintenance herbicide testing was conducted on stands of Highlander located at the MSPMC. A one-year-old stand (planted in 2004) and an established stand (planted in 2002, 2003 or 2004) was treated in March of 2005. 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 CO_2 plot sprayer. Injury ratings will be taken at 7, 14, 21 and 28 days after treatment. Seed heads will be harvested from the treated area in approximately mid-July, the seeds removed, and weighed to determine if there are any adverse effects of the herbicides on seed production. Evaluations will be repeated in 2006.

The post-emergence testing is conducted on stands of ‘Highlander’ located at the MSPMC. A one-year-old stand (planted in 2004) and an established stand (planted in 2002, 2003 or 2004) will be treated in May of 2005. Plot size is 5 foot x 8 foot and there are three replications of each treatment. Atrazine is applied at 2 lb ai/ac (2 qt/ac) Other herbicides tested are: 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 be taken at 7, 14, 21 and 28 days after treatment. Shattering of seeds prevented representative samples from being attained. Seed collection procedures will be modified in 2006.

In the first year of evaluation of the spring maintenance and post-emergence on a one year old stand, treatments showed slight to no injury. For the spring maintenance and post-emergence in the older stand, treatments once again showed slight or no injury. Studies will continue in 2006.

Silvopasture Demonstration

This demonstration is to evaluate long-term forage production of perennial warm season grasses in a silvopasture system.

The purpose of the study, begun in 2005, is to evaluate the effect loblolly pines have on yield and quantity of three perennial warm-season forage grasses and mixed grasses.

A loblolly pine stand planted in January, 2001, for another study was thinned to create four 20'x 91' plots (trees are on a 20' x 7' spacing). These plots are each divided into three replications. 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 Bermuda grass was drilled at a rate of 5 lb/acre. Stands were evaluated in July and considered successful. Plots were mowed in September of 2005.

Beginning in 2006, harvests will be timed to optimize yield and quality. For switchgrass - 50-60 days; eastern gamagrass - 45 days; bermudagrass-35 days. The number of cuttings will be effected by rainfall conditions. Dry matter yield will be determined by cutting a swath from the center of each plot. Sub samples collected for dry matter production will be used for tissue analysis for forage quality.

The study is expected to last for ten growing seasons.

Burndown prior to grass planting.

Wildlife Habitat Enhancement

In the fall of 2004, the Jamie L. Whitten Plant Materials Center had the opportunity to partner with the National Wild Turkey Federation; US Forest Service; Columbia Gulf Pipeline; and the Mississippi Department of Wildlife, Fisheries and Parks on a project to help improve wildlife habitat along a right-of-way located inside of the Holly Springs National Forest, home of the MSPMC. The purpose of the project was to utilize a utility right-of-way to improve brood habitat for turkey hens and poults as well as benefiting other types of wildlife.

The project consisted of twelve acres scattered along the Columbia Gulf right-of-way through the National Forest. In late summer of 2004, tillage applications were made to smooth the area for suitable planting. Cool season annual grasses were planted and fertilized in the fall to provide for the wildlife as well as suppress weeds and hold the soil until perennial/reseeding species could be established. Plans were made for several species of plants to be utilized in 2005 including clovers, 'Quail Haven' Reseeding Soybeans, and Lark Selection Partridge Pea. Droughty weather prevented the summer plantings, but are planned for the future. With Hurricanes Katrina and Rita, some soil moisture was available by fall. To conserve moisture, the areas were clipped two times and clover seed was no-tilled instead of planted conventionally. 'Meechee' Arrowleaf Clover, a MSPMC release, was used on 6 acres of the project while the NWTF Clover Mix was used on the remaining 6 acres. Fertilizer applications were made when germinating clover was seen. Evaluations over the winter months have shown the plantings to be successful. With the variety in the clovers used, it is likely to serve the wildlife in the area well for an extended period of time. Management to insure reseeding of the clovers is planned as well. Openings such as right-of-ways are key for wildlife in surroundings where the majority of the land is timber.

No-Till and Crop Rotation Implementation

As the MSPMC put its no-till and crop rotation practices in place, there were certain guidelines which were needed to be followed to help realize the potential of the practices. The potential benefits are: higher seed yields, less weed pressure and building soil quality. Secondary advantages will be less erosion, time efficiency, and lower input costs. After the first three years of these practices, the guidelines will be evaluated and modified as the benefits start to appear.

In the spring of 2003, the MSPMC started no-tilling the majority of the production fields. This was the first step in the plan. Herbicide resistant crops were introduced on open fields for maintenance and rotation. Herbicide resistant soybeans and corn, as well as grain sorghum and wheat will be used in rotation with the production plots. Crop rotation and no-till will also be used outside of regular production plots, to help maintain weed-free and fertile fields for future studies and increases.

For the first three years, a rotation of two years with maintenance crops and one year of production was used. Grain sorghum is used for building organic matter where weed pressure is not as high. The herbicide resistant crops are used on high weed pressure fields. The variation in crops allow different combinations of herbicide chemistry to be used, therefore reducing the bank of weed seed in those fields. Corn and grain sorghum will increase organic matter.

In the very beginning of the implementation, it was evident that more acreage was needed to include all production plots, rotation crops, and fields for upcoming studies and increases. Weather, soil types, weed types, grade, and location dictate what crops go where in the beginning. As is with farming, there is no exact script that can followed; only these guidelines to go by. New fields or old fields brought back into production are generally high in organic matter and weed pressure is intense. Therefore most of these fields should be planted to herbicide resistant soybeans if possible. The oldest fields will need to be planted in herbicide resistant corn or grain sorghum to build organic matter while still suppressing weeds. Production plots will fall in between or behind these crops.

Soil fertility will increase as soil testing is completed in front of on-coming crops and behind past crops. Soil ph will be addressed immediately. With the building of the soils and fertility levels high, maximum yields and herbicide efficiency will be achieved. Unless economic data is needed in a study or the experiment consists of fertilizer rates, the philosophy should be “building the soil” instead of “fertilizing the crop”. In other words, regardless of the type of crop being planted, nutrient deficiencies will be addressed if at all possible.

Tillage has been greatly reduced. Complete no-till practices are good, but not always reachable. Some instances would be deep tillage for hard pan break up and smoothing tillage behind fields being rutted. Some bedding tillage may sometimes be needed. Long range advantages of the no-till practices will be reduced hard pans and better drainage. All tillage practices will be done in the fall if possible. Stale seedbed plantings will take place in the spring behind field preparation in the fall. The goal is to control weeds by dealing with the weed seed found in the top 2-3 inches of the soil. Control will be greatly reduced by trying to control several supplies of weed seed found throughout the depths of soil tillage, that may be brought to the top allowing germination.

Cover crops will be used for different reasons. The advantages are less erosion, increased organic matter, and some weed suppression. Burndown herbicides will be used in late winter to early spring on these cover crops as well as non-covered fields. With conservation in mind, a variety of cover crops will be used. Soil type and grade, plus wildlife will help decide what covers to use where.

Wildflower production will need a separate set of guidelines, such as a three year production to two year maintenance crop rotation. No-till practices would still be in place.

Perennial crops will be planted to fields known to be free of weed seed to give the plants a tremendous head start. Field preparation for such crops could consist of up to three years of preparation. Fallowing and herbicide resistant crops will be used in preparing for the perennials. Any bedding or special row configuration needed for such crops should be done ahead of maintenance crops so soil would not be disturbed ahead of desired perennial crop. Soil type and characteristics of the perennial being planted will decide where it is planted. Available weed seed and need of increase will decide when it is planted.

EXAMPLES OF THREE YEAR CROP ROTATIONS:
2003-2005

example 1: 1st year---Lark Selection Partridge Peas
2nd year---Round-up Ready Corn
3rd year---Round-up Ready Soybeans

example 2: 1st year---Round-up Ready Soybeans
2nd year---Grain Sorghum
3rd year--- ‘Quail Haven’
Reseeding Soybean

2005 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 (100/0/100)
'Quail Haven' Reseeding Soybean
'Halifax' Maidencane
'Highlander' Eastern Gamagrass (300/0/100)
'Chiwapa' Japanese Millet (400/0/100)
'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	3
Abstracts	2
Technical Papers	0
Plant Notes	1
PVP Application	0
Newsletters	2
Total Publications	**10**

Oral Technology Transfer

Type of Presentation	Number
National Presentations	2
Regional Presentations	0
Local Presentations	7
Training Presentations	0
PMC Tours	1
Total Presentations	**10**

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

United States Department of Agriculture
Natural Resources Conservation Service

Jamie L. Whitten Plant Materials Center
2533 County Road 65 Coffeeville, MS 38922
Phone: (662) 675-2588 Fax: (662) 675-2369

PMC Staff
Paul B. Rodrigue – Manager
Tommy Moss – Agronomist
Cassandra Meyer – Secretary
James Pomerlee – Gardener
Jon Allison – Gardener

ECS Staff
Sherry Surrette – Plant Materials Specialist