Jamie L. Whitten Plant Materials Center

2001 Progress Report of Activities

March 2002

INSIDE THIS ISSUE

This document highlights many of the activities and products of the USDA-NRCS Jamie L. Whitten Plant Materials Center for FY 2001.

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Visit Our Web Site at:
Plant-Materials.nrcs.usda.gov

NRCS
Natural Resources Conservation Service

What We Do

The Jamie L. Whitten Plant Materials Center (PMC), located in Coffeeville, Mississippi, is operated by the USDA Natural Resources Conservation Service. 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 future plant materials needs, coupled with a seamless system of product development and program delivery.

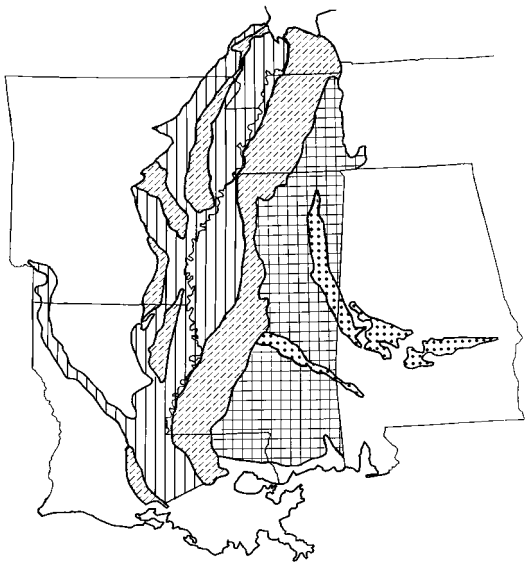
In working with a broad range of plant species, including grasses, forbs, trees, and shrubs, the PMC seeks to address priority needs of field offices and land managers in both public and private sectors.

Conservation Objectives

The PMC 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, 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, eastern Kentucky and the Blackland prairie of Alabama.

To accomplish our mission objectives we generate numerous products including plant releases, written plant science information and public presentations. This document highlights many of the activities accomplished during fiscal year 2001.

PMC Service Area



131 Southern MS Valley Alluvium
133A Southern Coastal Plain
134 Southern MS Valley Silty Uplands
135 AL, MS, AR Blackland Prairie

For more detailed information, contact the PMC at (662) 675-2588.

Native Warm Season Grasses

Conservationist across the Mid-South have shown increased interest in using native warm season grasses for wildlife habitat, soil and water conservation, landscaping, biofuels and forage production. The PMC is working to improve the management techniques that producers need to successfully use native grasses in their operations.

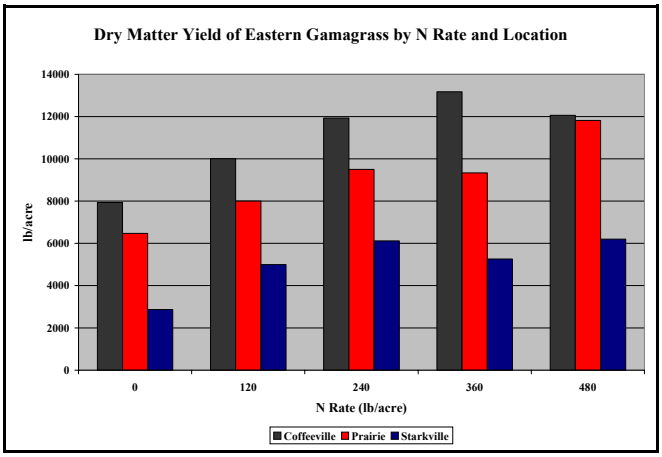
Eastern Gamagrass Response to Nitrogen

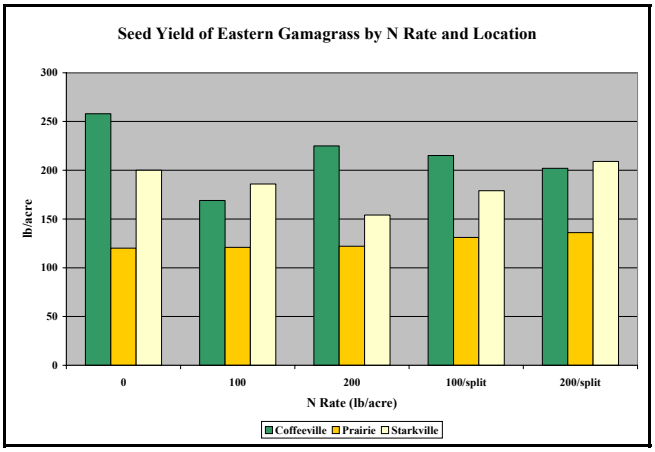
Management guidelines for long term sustainable production of eastern gamagrass (*Tripsacum dactyloides*) as livestock forage are needed in the southeastern states. Previous research at the PMC has shown that a 45-day clipping schedule is required for optimum production and quality. In addition to clipping management, nitrogen (N) fertilizer must be considered for optimum forage production. The PMC began a cooperative study with Mississippi State University to determine the effect of N fertilizer (0, 120, 240, 360, 480 lb/acre) on forage production of accession 9062680 eastern gamagrass. Results in 2001 showed eastern gamagrass responded positive to increased N rates at Starkville, Coffeeville, and Prairie with the highest yield occurring at 360 and 480 lb/acre. Yields were higher on a Coastal Plain soil (Coffeeville) than a Blackland Prairie soil (Prairie). Preliminary results indicate 120 lb/acre N may be an economical rate for hay production.

Nitrogen Fertilizer Influence on Seed Production of Eastern Gamagrass

One production problem for eastern gamagrass has been low seed yields compared to other grass seed crops. Research has shown that N applied in spring is beneficial for increasing seed yields and quality of some perennial grasses. A cooperative study began with Mississippi State University to determine if N is advantageous for increasing seed yield of 9062680 eastern gamagrass when applied in the spring in single (0, 100, 200 lb/acre) or split applications (100 and 200 lb/acre).

Results in 2001, showed seed production of eastern gamagrass responded little to increased N at Starkville, Coffeeville and Prairie. Limited or no response to N is not uncommon in perennial grasses after one year of application. The benefits of applying N for increased seed production may not be realized until the second or third year. High seed yields in the control (0 lb/acre) plots may be attributed to less lodging and greater uniformity of seed set. In contrast, plots receiving N had more vegetative growth, higher percentage of lodging and less uniform seed set. Seed quality parameters (% seed fill and seed weights) were similar across N rates.





Native Warm Season Grasses *(continued)*

Adapted Warm Season Grass Cultivars

There is a need for better adapted cultivars of native grasses for conservation use in the PMC service area.

The PMC and researchers at Mississippi State University have joined together to accelerate cultivar development of beaked panicum (*Panicum anceps*), purpletop (*Triden flavus*), big bluestem *(Andropogon gerardii*), switchgrass (*Panicum virgatum*), indiangrass (*Sorghastrum nutans*) and little bluestem (*Schizachyrium scoparium*) for conservation programs and restoration projects. Our strategy is to select early germinating ecotypes that will compete with weeds for better field emergence and subsequent stands. Selections are being made and will undergo additional testing in 2002.

Indiangrass *(Sorghastrum nutans)*

Bioenergy Crops as Sustainable Energy

The PMC completed the final year of a 4 year cooperative agreement with the U.S. Department of Energy Bioenergy Feedstock Development Program. We have evaluated warm season perennial grass crops for production of low-cost, high-quality biomass feedstock for use as liquid biofuels and biomass electric power.

Potential energy crops such as switchgrass, eastern gamagrass, bermudagrass (*Cynodon dactylon*) and caucasian bluestem (*Bothriocloa caucasica*) may be grown and produced on marginal cropland. In addition to protecting the natural resources on these lands, biomass energy crops improve the rural economy by encouraging domestic economic growth.

It appears that switchgrass and eastern gamagrass maximize biomass production in a one cut system. Caucasian bluestem responded to the two cut system and bermudagrass produced higher yields in the three cut system.

Season Total Biomass Production

Species	1 Cut	2 Cut	3 Cut
	----------tons/acre----------		
Switchgrass	10.8	9.2	N/A
Eastern gamagrass	6.2	6.5	N/A
Caucasian bluestem	5.6	7.5	N/A
Bermudagrass	N/A	5.4	6.8

Water Quality

Phosphorus loss from fields receiving land-applied poultry litter is an increasing environmental concern. A major issue in manure management is whether nutrient management plans should be based on phosphorus (P) or nitrogen (N) content.

The PMC entered a cooperative study with the Mississippi Agriculture and Forestry Experiment Stations at Holly Springs and Prairie Mississippi to estimate the yield and nutrient uptake potential of 9 grasses and 1 legume receiving poultry litter.

Poultry litter application rates were based on N requirements of each species to maximize biomass production. The nutrient content in the litter was 3.26% N, 5.06% P_2O_5 and 26.23% moisture. 'Pensacola' bahiagrass (*Paspalum notatum*) and dallisgrass (*Paspalum dilatatum*) were dropped from this location because of severe winter damage.

Season Total Yield, P and N Uptake of warm season grasses at Coffeeville, MS.

Species	Total Yield	P Uptake	N Uptake
	----------lb/acre----------		
262 lb N and 407 lb P_2O_5			
Johnsongrass	9626	26	128
'Summerall 007' bermudagrass	7625*	21	77
9062680 Eastern gamagrass	9885	19	128
'Alamo' switchgrass	9337	16	122
140 lb N and 217 lb P_20_5			
Weeping lovegrass	10919	18	117
Common bermudagrass	6646	16	66
'Tropic Sun' sunn hemp	7856	14	220**
Caucasian bluestem	8779	13	102

*Total yield based on 2 cuttings **Estimating N uptake of a legume

Native Wildflower Conservation Program

Mississippi has a rich and varied assortment of wildflowers that provide beautiful splashes of color from spring to fall in all areas of our state. The Native Wildflower Conservation Program functions as a means for the eighty-two Soil and Water Conservation Districts within the state to distribute native Mississippi wildflower seeds to local residents. This program is a joint venture between the PMC and the Mississippi Soil and Water Conservation Commission. These wildflowers are used in home gardens, parks, and schoolyards, as well as along roadsides and other areas where a more natural appearance is desired.

Seeds of black-eyed susan, plains coreopsis, and clasping coneflower germinate in the fall prior to the harvest year. Unfortunately, 2000 was the third year of an extended drought. Because there was no rainfall, seeds germinated later than usual and seedlings were very small going into an unusually cold winter. Plains coreopsis was not affected by the weather conditions and harvests were very good. We also had small harvests of clasping coneflower, lyre-leaf sage, and swamp rose mallow.

This year we tried using weed barrier fabric in the field where we transplanted cardinal flower. Weed control was better and it appears that plant survival was increased, but plants did not produce much seed. We also hand-planting a block of purple coneflower. It appears that this approach has been successful and we may finally be able to make a significant harvest next year.

Morton Germplasm Shrub Willow

The Jamie L. Whitten PMC released Morton Germplasm shrub willow as a tested pre-varietal release in 2001 for stream bank stabilization and ornamental uses. It is currently available for commercial production. Limited quantities are also available for field demonstration plantings.

Salix koriyanagi is native to Korea, but is widely grown by the Japanese for use in basketry. The original source material of Morton Germplasm came from the Morton Arboretum in Lisle, Illinois. Prior derivation of this material is unknown. It was originally planted at the PMC in the mid-1960's and has been tested in a limited number of field plantings.

Morton Germplasm is a large, upright, multi-branched shrub, which can reach 13 feet at maturity. Young branches are slender, shiny, very flexible, pale green in color and yellowish under the bark. Bark on older stems is yellowish-gray. Leaves are either opposite or alternate, 2 to 4 inches long, narrow, and slightly toothed along the edges. They will be shades of pale pink and brown when emerging. Flowers are produced from February to March. Male and female flowers are held in separate densely flowered, cylindrical catkins.

The ability of Morton Germplasm to regrow rapidly after periodic close mowing or pruning makes it ideal for soil bioengineering systems to control erosion along stream banks. Plants respond to cutting by resprouting from the base of the plant, but generally do not form root suckers.

Morton Germplasm is shorter than the native black willow (*Salix nigra* Marsh.) commonly found along streams in the southeastern United States and therefore is not as prone to toppling into and clogging channels when undercut. It can be used with hard structures, such as rip-rap, or, on less erosive sites, it can be planted alone or in combination with other plant species. It is too large to use on very small or intermittent streams. It appears to have resistance to canker diseases that have severely affected many plantings of 'Bankers' and 'Streamco', the two dwarf willows most commonly recommended for bioengineering systems.

Morton Germplasm can be established using unrooted or one-year-old rooted cuttings or using live fascines (bundles of dormant whips). Survival will generally be higher if rooted cuttings are used, but unrooted cuttings are easier to plant. Live fascines require more plant material than cuttings, but provide greater erosion protection. Cuttings should be taken in late winter to early spring, before the leaves emerge. They should be made from fresh growth and measure 3/8 to 1/2 inches in diameter at the basal end and 12 to 15 inches in length. Live fascines, also called wattles, are cigar-shaped bundles of dormant stems, cut 6 to 10 feet long, arranged so that approximately half the butt ends of the stems are on each end of the bundle. The bundle should be approximately 8 to 10 inches in diameter and should be tied securely with baling twine.

Contact the PMC for more information on availability and use of Morton Germplasm shrub willow or other conservation plants.

2001 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. Technology transfer is the lifeblood of the PMC.

Seed and Plant Production

Planting Stock	lb/No.
Foundation Seed (lbs)	595
Common Seed (lbs)	658
Wildflower Seed (lbs)	574
Container Planting Stock (number)	6672
Woody (number)	3236
Vegetative Rootstock (number)	106,000
Total Production	**1827 /115,908**

Written Technology Transfer

Type of Publication	Number
Plant Guides and Fact Sheets	11
Technical and Progress Report	9
Symposia, Posters, and Papers	7
Technical Notes	2
Popular Articles	2
Total Publications	**31**

Active Studies

PMC Objectives	Studies
Pasture / Hayland	16
Cropland	10
Forest/Wildlife/Natural Area	6
Water Quality	2
Total Studies	**32**

Oral Technology Transfer

Type of Presentation	Number
Local Presentations	8
Regional Presentations	4
PMC Tours	3
National Presentations	1
Total Presentations	**16**

Looking for Information on Vegetative Solutions to Conservation Problems?

Visit the Plant Materials Program Website!
Plant-Materials.nrcs.usda.gov

- Plant Fact Sheets on conservation plants.
- Information on how to obtain conservation plants.
- Publications and technology development from 26 PMC's 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

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