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Mid-South Plant News

A Jamie L. Whitten Plant Materials Center Publication

'Highlander' Eastern Gamagrass Released

'Highlander' Eastern Gamagrass

Fifteen years ago, we began working to develop a cultivar of eastern gamagrass that is well adapted for forage and erosion control in the Southeast. A total of 73 collections were made by field office and PMC personnel from sites in Oklahoma, Arkansas, Mississippi, Alabama, Tennessee, South Carolina, North Carolina, Texas, and Georgia. Plants were assembled and evaluated at Coffeeville.

Initial evaluation of these collections showed that one, from Montgomery County, Tennessee (accession 9062680), proved to have superior vigor, growth form, and pest resistance. This accession underwent further testing to confirm its forage yields and quality at several sites within Mississippi and at additional sites in the Southeast. It is best used as a hay crop; however, it can be grazed if given appropriate management (i.e. rotational grazing) to prevent damage to the plant stand. It is capable of producing annual yields of more than 8 tons per acre when harvested on a 45-day cutting regime. A 45-day clipping frequency typically represents two to three harvests per growing season in the lower southern states, but is greatly influenced by rainfall and length of growing season. Our studies show that it has potential for use as a perennial silage crop and as a biomass source for bioenergy production (related story on page 2). We have also conducted studies to examine its seed production and establishment requirements, and its nutrient uptake capability. It can be a useful component in many types of conservation plantings, such as buffers and vegetative barriers.

The name Highlander was chosen for this cultivar because its site of origin lies within the Highland Rim region. It was officially released in June of this year in cooperation with the Mississippi Agricultural and Forestry Experiment Station and the Jimmy Carter PMC in Americus, Georgia. Plant variety protection will be sought for this cultivar in order to maintain the identity of the release and ensure quality of seed produced. Large-scale seed production began at the PMC in 2000 and seed will be available for commercial producers in 2004. Interested producers should contact Joel Douglas at the PMC.

PMC Staff Changes

In the last edition of our newsletter, we reported that two of our staff members had taken other positions. In this edition, we are happy to report that we hired a new gardener in October to help take up some of the slack. His name is Jon Allison and he also farms land in Tippo, Mississippi. He has already been of immense help in several of our field activities.

Inside this Issue:

We're on the Web

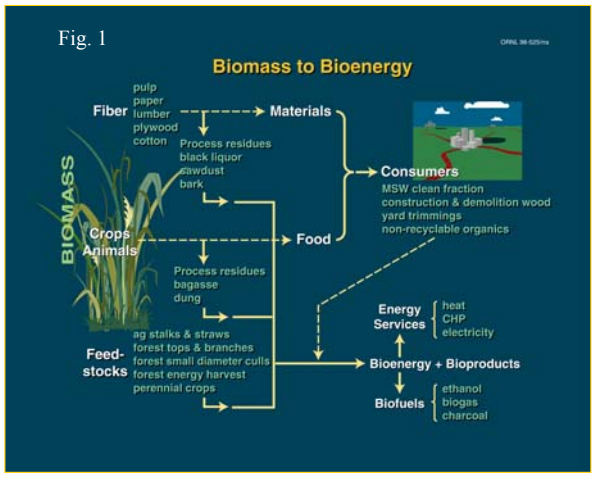
Plant-Materials.nrcs.usda.gov

NRCS Natural Resources Conservation Service

Bioenergy Crops – A Sustainable Energy Source

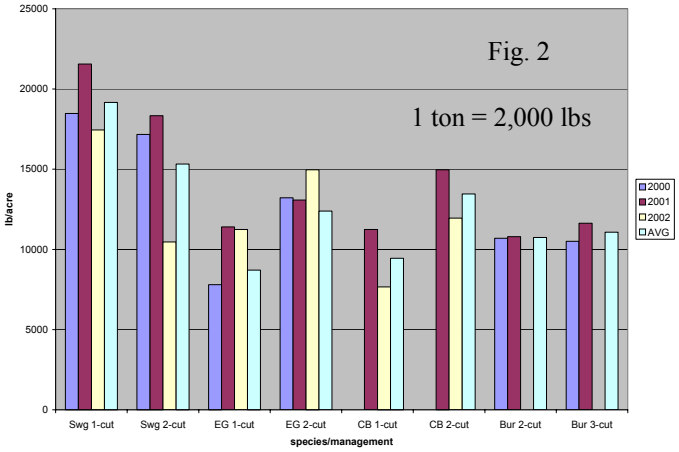
The U.S. Department of Energy (DOE) is aggressively working to meet our national energy needs by reducing dependence on foreign suppliers and placing a lesser demand on our domestic petroleum reserves. One of the areas that DOE is actively exploring is the conversion of biomass into energy (Fig. 1). Specifically, this involves releasing the energy contained in plants and organic matter by combustion or converting it into liquid fuel (e.g. ethanol). Three percent of the energy consumed in the U.S. is generated from various forms of biomass energy but this value is expected to increase significantly in the future.

Fig. 1



The Jamie L. Whitten PMC is involved in this bioenergy development process by assisting DOE in evaluating and selecting high biomass producing grass crops for use as renewable energy sources. The PMC is investigating harvest systems that maximize biomass production of several warm season perennial grasses adapted to the Mid-South area. Grasses being tested are 9062680 eastern gamagrass, 'Alamo' switchgrass, weeping lovegrass, 'Tifton 44' bermudagrass, and Caucasian bluestem. These species were chosen based on their agronomic characteristics, commercial seed availability, and current usage of these species in the Mid-South.

Switchgrass is generally recognized as the "model" bioenergy grass crop. In this test, switchgrass averaged over 9.5 tons of biomass per acre when clipped once in mid-September (Fig. 2), but only 7.7 tons when clipped twice, once at late boot stage and again in mid-September. Eastern gamagrass and Caucasian bluestem produced the most biomass when clipped two times per year, yielding 6.2 and 6.7 tons per acre, respectively for each species. Bermudagrass yields were fairly comparable for the two-cut (5.4 tons per acre) and three-cut treatments (5.5 tons per acre). Weeping lovegrass did not establish well at the PMC and was dropped from testing. Bermudagrass, Caucasian bluestem, and weeping lovegrass are all non-native species that may present varying levels of concern about invasiveness. New cultivars of big bluestem, Indiangrass, and switchgrass are being developed jointly by Mississippi State University and the PMC that may increase the palate of native species that can be planted for bioenergy production.



These potential energy crops along with other herbaceous and woody plant species can be grown on marginal cropland, providing an economic alternative to conventional row crops. In addition to protecting the natural resources on these less productive lands, biomass energy crops can improve the rural economy by creating jobs and encouraging domestic economic growth.

Sustainable bioenergy crops can also help to reduce global warming by providing a valuable carbon sink to sequester the greenhouse gas, carbon dioxide, in their tissues.

Eastern Gamagrass biofuel plots at the PMC

Pine Seedling Establishment Methods

Pine seedlings on much of the private lands in Mississippi are planted without using herbicides to control weed growth. Dense stands of weeds can kill or impair growth of pine seedlings.

The PMC, in cooperation with Lynn Ellison, USDA-NRCS Mississippi Area 1 Forester, began looking at herbicide treatments to improve growth and survival of loblolly pine seedlings. The site was mowed in late summer 2001. Pine seedlings were planted January 22, 2002. Herbicide treatments (Table 1) were applied in a 6-foot band over the planting row. Landowners would broadcast Roundup, which was not possible in this study. The Roundup and December Oust treatments were applied prior to tree planting. The mowing treatment was included because this is a common practice used by many landowners. Surfactants were added to the spray solution for all herbicides except Oust. Included here are our preliminary results.

Table 1. Treatments used.

Chemical	Rate	Date	Chem.	Rate	Date	Chemical	Rate	Date
Control								
Mowing		6/1						
Roundup*	4 qt	9/15						
Roundup*	4 qt	9/15	**Oust**	3 oz	12/15			
Roundup*	4 qt	9/15	**Oust**	3 oz	12/15	**Arsenal**	4 oz	4/1
Arsenal	4 oz	4/1	**Oust**	2 oz	4/1			
Arsenal	4 oz	4/1	**Oust**	2 oz	4/1	**Transline**	4 oz	4/1

* Formulation used was Roundup Ultra Max.

There was almost no tree mortality in any of the treatments. This is probably due to the fact that superior pine seedlings were used and they were planted carefully. Losses would be expected to be much higher on larger tracts that did not receive herbicide treatments, especially if lower quality seedlings were used. The treatments had a major impact on estimated weed stand ratings taken on July 1, 2002 (Table 2).

Table 2. Estimated weed stand.

Chemical	% Weed Stand
Control	100
Mowing	100
Roundup	93
Roundup + Oust	55
Roundup + Oust + Arsenal	49
Arsenal + Oust	92
Arsenal + Oust + Transline	95

The Roundup + Oust and the Roundup + Oust + Arsenal treatments provided the best weed control. Roundup alone does not provide adequate weed control during the first growing season. Weed stands in the Arsenal + Oust and the Arsenal + Oust + Transline treatments were not much lower than in the control plots. The majority of the weeds present on this site were grasses and broadleaves. If competing woody species had been present, weed control ratings for these treatments would have been much higher than in this study.

Fig 1. Stem basal diameter measurements

Chemical costs were calculated based on July 2002 prices of chemicals and surfactants (Table 3). Generic formulations of glyphosate would be cheaper than the Roundup Ultra Max used in this study. Spraying costs would be $15-$20/acre and would be incurred at **each** application date. Mowing costs range from $10-$17/acre. Plant height and basal stem diameter measurements were made on January 9, 2003. Basal diameters (1 mm = 0.04 inches) were measured below the lowest branch on the seedlings (Fig. 1). Those same treatments that resulted in the lowest weed stands resulted in significantly improved plant growth.

Table 3. Plant height, stem diameter, and chemical cost

Chemical	Ht. (in)	Dia. (mm)	Cost/acre*	Cost/acre
Control	20	6.3		
Mowing	24	8.0		
Roundup	23	10.0	$28.25	$47.09
Roundup + Oust	25	10.3	$46.97	$65.81
Roundup + Oust + Arsenal	29	11.3	$55.33	$74.41
Arsenal + Oust	23	9.0	$20.84	$20.84
Arsenal + Oust + Transline	21	8.0	$26.44	$26.44

* Costs for Roundup sprayed in a 6-foot band used in this study. Next column is for broadcast Roundup applications.

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Patricia Taylor – Secretary
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Jon Allison – Gardener

A typical cultipacker

PMC Highlights

October 1-3	*Joel Douglas and Janet Grabowski both gave multiple presentations at the Third Eastern Native Grass Symposium in Chapel Hill, North Carolina*
October 18	*Janet Grabowski presented information about the PMC to people attending the field day at the Truck Crops Experiment Station in Crystal Springs, Mississippi*
December 9	*Janet Grabowski and Joel Douglas presented posters at the annual meeting of the Mississippi Chapter of the Soil and Water Conservation Society in Canton, Mississippi and Janet was presented with the Conservation Educator Award for her work with the Wildflower Conservation Program*
February 1-3	*Joel Douglas gave a presentation and Janet Grabowski displayed a poster at the 100th Annual Meeting of the Southern Association of Agricultural Scientists at Mobile, Alabama*
March 4, 25, May 6	*Janet Grabowski provided plant materials training to new NRCS employees from across the southeastern states at the Delta Conservation Demonstration Center in Greenville, Mississippi*
June 12	*PMC Field Day with 75 people attending tours of wildflower production fields and presentations by Mississippi State University and Extension Service personnel*

Ask the Expert

Q What is a cultipacker?

A. A cultipacker (above) is an implement that is pulled behind a tractor to firm the soil, creating a firm seedbed for planting small seeded grasses, legumes, and wildflowers. It consists of series of 12-inch, cleated rollers weighing approximately 10 pounds each aligned on a rigid bar. Some implements are equipped with a seed box, which can seed and pack in one operation, and are called "packer seeders". Using a cultipacker before and after planting ensures good seed-to-soil contact.