Year 2004 Progress Report of Activities

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Elsberry, Missouri Plant Materials Center
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Who We Are

The Elsberry Plant Materials Center (PMC) is a branch of the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). It is one of 26 plant materials centers located throughout the United States. Areas served include Missouri, Iowa, and Illinois. The Center is located approximately 60 miles north and west of St. Louis, Missouri on Highway 79.

What We Do

It is our mission to develop and transfer effective state-of-the-art plant sciences technology to meet customer and resource needs. NRCS Plant Materials activities are consistent with the objectives of the U.S. Department of Agriculture and NRCS Strategic Plans, namely to provide timely and effective vegetative solutions for resource needs. Emphasis is on using native plants. Superior adapted plants are developed, tested and released to commercial growers along with production and management technology.

Four major objectives are addressed:

1. Improve Water Quality by Filtering and Sediment Control, Utilizing Nutrients, and Stabilizing Shorelines
2. Biodiversity of plant species for Wildlife, Wetlands and Restoration
3. Increase Forage Quality and Quantity
4. Additional Conservation Needs of Missouri, Iowa, and Illinois

Major Objective #1: Improve Water Quality - Evaluation of Native Sedges and Grasses for Filters and Buffers

A conservation need is being addressed for the use of native wetland species of cool season grasses and sedges to determine their performance for conservation practices such as filter strips and buffers.

Collections from Missouri and Iowa were propagated in the greenhouse and planted in a bottomland site on the PMC. A land scraper was used to construct 2 miniature wetland plots. The plots were dug roughly 6 inches deep in order to hold moisture. The collections were planted in blocks of 100 plants (5 ft. by 20 ft.) using 1 ft. spacing. Collections that did not have 100 plants were planted in a separate plot in smaller blocks with other blocks of the same species.

Crowfoot Sedge, *Carex crus-corvi*
Planted and evaluated in simulated wetland cell.

Each block was evaluated for vegetative spread and density of stand in late summer 2004. The collections will be evaluated three more times (winter, spring, and summer) and selection/s will be made. Once the selection/s have been made, seed will be harvested and an increase plot will be established.

Major Objective #2: Biodiversity of Plant Species - 2004 Missouri Native Ecotype Plant Releases.

The Elsberry Plant Materials Center in cooperation with the Missouri Department of Conservation released Northern Missouri Germplasm Grayhead Coneflower and Southern Missouri Germplasm Little Bluestem. These plants will be used for prairie and roadside plantings, prairie landscaping, plantings for wildlife food and habitat (WHIP), critical area cover and Conservation Reserve Program (CRP).

Ratibida pinnata, **Grayhead Coneflower Flowering at the Elsberry Plant Materials Center.**

Grayhead coneflower is a perennial forb that grows 5-6 feet tall and has the ability to establish quickly. Little Bluestem is a perennial short growing warm-season grass that is very common in prairie mixes. These source-identified releases will continue to provide commercial growers with more options for landowners and buyers.

Major Objective # 3: Increase Forage Quality and Quantity - Release of OZ-70 Big Bluestem

The Elsberry Plant Materials Center released OZ-70 Germplasm Big Bluestem 12/10/03 (fiscal year 2004). It was released as an improved selection for the Ozark region of Southern Missouri, Northern Arkansas, Eastern Oklahoma and Southern Illinois.

The OZ-70 selection has very good forage production and vigor that appears to be comparable or better than Rountree. OZ-70 is approximately two weeks later in booting than Rountree and forage quality is better when tested on the same date at Elsberry. (See below.)

Clipping Data	Percent Crude Protein		Percent ADF		Percent NDF	
	OZ	RT	OZ	RT	OZ	RT
6/19/02	14.3	8.0	30.9	35.7	55.8	60.8
7/8/02	8.2	5.8	34.1	33.0	59.3	60.5
8/30/02 *	11.4	11.9	34.3	34.7	54.6	56.6

*** Regrowth material from 7/8/02 clipping. OZ = OZ-70 Germplasm big bluestem, 'RT' = 'Rountree' big bluestem, ADF = acid detergent fiber, NDF = neutral detergent fiber**

Rountree exhibits considerably more rust when compared to OZ-70 in Southern Missouri. OZ-70 also has very good seed production with a 2003 yield of 280 bulk pounds of clean seed per acre.

In 2004 foundation seed was sold from the Elsberry PMC to the commercial market for making this selection available to the public in 2005.

Major Objective # 3: Increase Forage Quality and Quantity - Testing of Native Warm and Cool Season Grasses Using Fecal Samples

True representation of forage quality for warm season grass species is questionable when determining percent crude protein and digestibility using wet chemistry lab procedures. Taking a pure forage sample and comparing wet lab chemistry with fecal sample testing shows a need for a correlation factor between tests.

The PMC, with the help of Mark Kennedy, Missouri State Grassland Specialist, conducted this comparison between the two testing methods. Forage samples were green chopped and fed to weaned calves for four days. Replicated fecal samples were taken after the fourth day and sent for testing. Forage samples were also sent to the lab.

Samples of three native warm season grass species (eastern gamagrass, big bluestem, and Indiangrass), one native cool season grass (Virginia wildrye), and also tall fescue were tested. The warm season species were tested three times (5/28/04, 7/15/04 original growth, and 7/15/04 regrowth material after 5/28/04 clipping). The cool season species were tested once (4/28/04). The first set of samples was at the vegetative stage in April or May depending on the species. The second set was a warm season mid-summer sample (7/15/04) at the late vegetative to seedhead development stage. At this time (7/15/04) a third set of samples for regrowth material from the time of the first sample clipping to the time the second sample was also taken. These clipping dates will be correlated with a PMC study comparing ten warm season grass species using lab analysis.

The comparison of test results indicates variability between cool and warm season species. Tall fescue tested very similar between both testing methods. Virginia wildrye wet lab tests exaggerated percent crude protein and underestimated digestibility in comparison to fecal sample testing. Wet lab testing of the warm season species under-estimated both crude protein and digestibility in comparison to fecal sample forage quality testing. Results data are as follows:

Forage Quality Testing

Cool Season Species	*Fecal Samples*	*Wet Lab Samples*
Sample Date: 4/28/2004		
Virginia wildrye	**Ave.**	**Ave.**
%C P	15.5	19.5
Digestibility	69.7	61.7
Tall Fescue	**Ave.**	**Ave.**
%CP	12.2	12.7
Digestibility	61.3	57.0

Forage Quality	*%CP*	*Digestibility*
Prime	>19	>65
1	17-19	62-65
2	14-16	58-61
3	11-13	56-57
4	8-10	53-55
5	<8	<53

Forage Quality Testing

Warm Season Species	*Fecal Samples*	*Wet Lab Samples*
1st Warm Season Sample Date: 5/28/2004		
Big Bluestem	**Ave.**	**Ave.**
% CP	12.4	10.0
Digestibility	62.4	53.3
Eastern gamagrass	**Ave.**	**Ave.**
% CP	12.1	8.8
Digestibility	60.4	51.4
2nd Warm Season Sample (Original Growth) Date: 7/15/04		
Big Bluestem	**Ave.**	**Ave.**
%C P	10.3	5.2
Digestibility	62.39	54.37
Eastern gamagrass	**Ave.**	**Ave.**
%CP	6.6	4.9
Digestibility	59.3	55.5
3rd Warm Season Sample (Regrowth) Date: 7/15/04		
Big Bluestem	**Ave.**	**Ave.**
% CP	10.3	6.3
Digestibility	64.0	55.1
Eastern gamagrass	**Ave.**	**Ave.**
% CP	10.5	6.9
Digestibility	60.9	56.5

Major objective # 4: New Conservation Needs - Using *Amorpha fruticosa,* L., False Indigo Bush at the PMC

In 2000, collections were made in the three state service area to begin a study that would generate a local source, fast growing, and high seed producing false indigo bush. There were 31 total collections; 19 from Iowa, four from Illinois, and eight from Missouri. False indigo bush is a medium size shrub that can reach a height of ten feet. It is an open canopy shrub with the bulk of the foliage and twigs in the upper 1/3 of the crown. It is found along stream and lake banks, but can also be found on upland locations.

False Indigo, *Amorpha fruticosa L*.
Established production plot at the Elsberry PMC.

The PMC has three separate plantings representing the three-state service area. These plots were planted in a randomized complete block and have undergone evaluations for vigor, height, spread, insect and disease resistance. Selected false indigo bush will be used for bank stabilization, to enhance wetland riparian areas, and establish wildlife food and cover on upland sites. It will also be added along with tick trefoil to covey headquarter mixes, in order to establish better quail habitat.

Plant Materials Center Annual Training/Tour

The PMC held a one-day training/tour session, June 9, 2004. Forty-eight individuals from Illinois and Missouri attended. These individuals represented NRCS employees, Missouri Department of Conservation, SWCD, and the public. The training session introduced the group to the use of plant materials for the conservation planning process.

The tour portion of this session involved viewing and discussion of many studies the PMC is conducting along with the specialized seed harvesters and seed separators.

For 2005 the tour /training session date will be June 8, 2005, from 10:00 am to 2:30 pm.

2004 Weather Data

Precipitations Averages

	2004	72 Year Ave	Departure
Precip.	45.90	37.26	+8.64

Temperature Averages

	2004	72 Yr. Ave.	Departure
Ave High	63.76	65.55	-1.79
Ave Low	44.70	43.89	+0.81
Ave. Yearly	54.23	54.72	-0.49

Significant Wet and Dry Periods in 2004

	2004	Average
Nov. 1 – Dec. 7	6.73	3.43
Sept. 1 – Oct. 6	0.62	3.88

To learn more about these and other Elsberry PMC activities visit our website:
http://www.Plant-Materials.nrcs.usda.gov