Booneville Plant Materials Center
2001 Annual Progress Report

Introduction: The Booneville Plant Materials Center (**PMC**) was established in 1987 to serve the plant material needs of the Southern Ozarks, the Arkansas River Valley, and the Ouchitas. The Center's priorities include protection and enhancement of water quality; protection and enhancement of pastureland; critical area treatment; protection and enhancement of woodlands; and protection and enhancement of wildlife land.

Location: The Booneville **PMC** is located in Logan County, Arkansas, in conjunction with the **USDA**-Agricultural Research Service (**ARS**), and The Arkansas Cooperative Extension Service (**ACES**). The **PMC** leases, from the State of Arkansas, 282 acres located in the Arkansas River Valley.

Service Area: The primary service area of the Booneville **PMC** Includes portions of Arkansas, Oklahoma, and Missouri (approx. 54 million acres.) This area includes the following MLRAs:

Ozark Highland	116A
Ozark Border	116B
Boston Mountains	117
Arkansas Valley and Ridges	118
Ouachita Mountains	119
Western Coastal Plain	133B
Alabama, Mississippi, and Ark. Blackland Prairie	135

Much of the service area is characterized by rugged terrain with elevations from 300 to 3,000 feet. Average annual rainfall varies from 36 inches in the west to 53 inches in the eastern higher mountain areas. Forage production and woodlands are the major land uses, and small family farms characterize the agriculture.

Staff:

Plant Materials Center Manager	Randy King
Assistant Manager	Lance Tharel
Secretary	Pat Dieterich
Biological Sciences Technician	Eddie Pratt
Biological Sciences Technician	Dale Goff
Agronomy Student Trainee	Cody Carlisle

Soils: Soils on Center include:

Leadvale silt loam, 1 to 3 percent slopes. This is a deep, moderately well drained, nearly level soil on old stream terraces in broad valleys. Individual areas range from about 10 to 400 acres in size.

Taft silt loam, 0 to 2 percent slopes. This is a deep, somewhat poorly drained, level to nearly level soil on old stream terraces in broad valleys. Individual areas range from about 10 to 400 acres.

Linker fine sandy loam, 3 to 8 percent slopes. This is a moderately deep, well-drained, gently sloping soil on hilltops. Individual areas range from about 5 to 200 acres.

Enders-Mountainburg association, rolling. This association consists of well-drained soils in a regular and repeating pattern on rolling hillsides. Slopes are 8 to 20 percent. The mapped areas on this association range from about 50 to 700 acres.

Studies

Release potential:
Eastern gamagrass
Big bluestem

Technology Development:
Bermudagrass variety trial
Indiangrass variety trial
Native grasses establishment study
Big bluestem plant density study
Switchgrass (Hydrogel) study
Fruit and nut tree production (mined land)
Grand Prairie Irrigation Dist. (local ecotypes)
Switchgrass Biofuels study (lowland types)
Switchgrass Biofuels study (upland types)
Ark Highway and Trans. Dept. (AHTD) Mountainburg
AHTD (Winslow)
AHTD (Texarkana)
AHTD (Greenwood)
AHTD (Mountain View)
AHTD (Magazine)
AHTD (Batesville)
AHTD (Ft. Smith)
AHTD Mountainburg II

Demonstrations:

Eastern gamagrass (Elm Park)
Eastern gamagrass (Altus)
Switchgrass (Altus)
Switchgrass (on center)
Eastern gamagrass (on center)
Switchgrass (Morrilton)
Native Grasses (Univ. of Ark. Pine Bluff)

Release Potential Summary

Eastern gamagrass Cultivar: Booneville **PMC** will release an eastern gamagrass cultivar in 2003. The accession 9058495 has been tested at Booneville since 1988, and has been a part of the eastern gamagrass intercenter species trial in 4 southern **PMC**'s since 1994. It is in advanced testing and initial seed increase at Booneville at present.

Big bluestem Cultivar: Booneville will (cooperatively with Elsberry MO) release a big bluestem cultivar for the Southern Ozarks in 2005. The selected accession will go into advanced evaluation at Booneville and Elsberry in 2002. Five accessions were selected, based on performance (forage quality and quantity), using "kaw" as the standard.

Technology Development Study Summaries

Lowland Switchgrass for a Biofuel Source: A contract from the Department of Energy and a cooperative agreement with Dr. Charles Talafero (Oklahoma State University) as the principal investigator, has resulted in the **PMC** testing switchgrass for biomass production. "Alamo", "Cave-in-rock", "Kanlow", along with seven of Dr. Talaferos' experimental lines were planted at Booneville in 1997, harvested annually, and reported to Talafero. The results are also reported annually to other cooperators along with a narrative summary of the study.

Upland Switchgrass for a Biofuel Source: This study is identical to the above, with the exception of cultivar entries which are upland types. This study began in 2000, and will be completed in 2005.

Bermudagrass variety trial: In the last 2 to 3 years, the Arkansas state Cattleman's Association and other individuals have expressed a need for information relative to bermudagrass production. The University of Arkansas Agronomy Department terminated bermudagrass cultivar testing in 1998. To fill this void, the Booneville **PMC** began (in 2000) establishing bermudagrass plots to collect dry-matter production, forage quality, ease of establishment and persistence data. The study contains the following entries: "Common", "Guyman", "Midland", "Midland 99", "Russell", "Tifton 44", "Quick Start" and, one experimental line, "74X12-6" from Oklahoma State University.

The study will be expanded as other entries become available. The results of this study will be published in Technical Notes.

Switchgrass Hydrogel Study: Switchgrass was established to assess the benefit of using a hydrogel product. Multiple levels of hydrogel and switchgrass were established in small plots. Hydrogel has the chemical characteristic to absorb 400 times its weight in water. Studies indicate that hydrogel may be beneficial to plants by supplying moisture during periods of drought thereby reducing stress. Results will be reported annually and at the conclusion of the study.

Native Grass Establishment Study: Replacing endophyte infected fescue stands in eastern Oklahoma and western Arkansas has been a major concern for producers wishing to convert old pastures to native grass species. Eight treatment methods of replacing the existing fescue sod with native grass species were used. The treatments used combinations of burn, chemical application, no-till and tillage. Every plot that contained the tillage component was successful (at different levels). Results of this study will be published in the form of a Technical Note.

Indiangrass Variety Trial: Numerous requests for cultivar recommendations and establishment of Indiangrass in the southern Ozarks and Ouchitas resulted in the initiation of this study. The trial consists of “Cheyenne”, “Lometa”, “Osage”, “Rumsey”, and an introduction of “PR514673”. Established in March, 1996, these cultivars were planted in a clean firm seedbed. Dry-matter production and forage quality data have been collected for 4 years.

Big Bluestem Study Density: Dry-matter production and in some instances forage quality may be affected by plant population. Plant density determination information may benefit producers and answer questions pertaining to row spacing at the time of planting. This study will evaluate dry-matter production and quality of big bluestem using various plant spacing between the rows and within the row. Results will be reported annually and at the termination of the study.

Fruit and Nut Tree Production on Reclaimed Coal Mined Land: Coal strip (surface) mining in the 1930s which was reclaimed in the mid 1980s has resulted in large unproductive areas. Since these are “pre-law” mines, there was no topsoil stockpiled for use during reclamation. Fruit and nut tree production is being evaluated on land that was basically characterized as low production. The study consists of four varieties each of apple, peach, pecan, and walnut. The trees were planted in 1994, and have recorded excellent growth. Drip irrigation is used, and the orchard is mowed twice per year. The apple and peach trees are in full production with only a trace of pecan production and no walnut yield. Diameter at Breast Height (DBH) is recorded annually in the fall. This study will be concluded in 2005. A Technical Note will be developed.

Grand Prairie Irrigation District: The Arkansas Natural Heritage Commission, Corps of Engineers (Memphis, TN) and the Booneville **PMC** are cooperating in this study. White River water is being diverted to reservoir storage for irrigation purposes by constructed canals. The area along the canals will be planted to native ecotype warm-season grasses. This study will prescribe procedures for establishment and assist in maintaining this original genetic material for these ecotypes. Established methods for native ecotype warm-season grasses will be evaluated to determine optimum planting procedures on canal banks.

Arkansas Highway and Transportation Department

The Booneville Plant Materials Center (**PMC**) was awarded its second contract by the Arkansas Highway and Transportation Department (**AHTD**) in September 2000. The **PMC** has nine active studies throughout the state of Arkansas that are designed to address erosion on both new highway construction and existing highway rehabilitation. These studies test various annual and perennial species, a variety of seedbed preparation techniques, various mulches and mulch application methods; also new product tests such as hydrogel and envirogard and envirogard plus. The products of this effort will be revised vegetative establishment specifications and rehabilitation specifications for **AHTD**, as well as Technical Notes, that will benefit others who need to establish vegetation on critical areas, such as abandoned gas well drilling sites, county roads, and logging roads.

AHTD Mountainburg: The Mountainburg site was designed to identify species, and seedbed preparation techniques. Six species; big bluestem; little bluestem, eastern gamagrass, indiangrass; switchgrass; and maximillian sunflower, were used. The seedbed treatments were tilled/planted; tilled/planted/rolled; no-till/planted, and no-till/planted/rolled. Switchgrass was selected in all reps and treatments as most successful, then indiangrass, big bluestem, eastern gamagrass, sunflower, and little bluestem. These results have been reported to the (**AHTD**) in 2000, and will be published in Technical Notes.

AHTD Winslow: The Winslow site was selected to test Hydrogel. This moisture holding product is being tested for rate of application and performance both incorporated and unincorporated. One of the greatest problems that **AHTD** faces is moisture retention on cut slopes. The **AHTD** is very interested in species that are drought tolerant and products that will assist in moisture retention. These factors become very important when they complete a site in mid to late summer, when there is little chance of precipitation, yet the contractor is required to plant and irrigate completed slopes. The Hydrogel study will be completed in 2005, with the results provided to the **AHTD**, and Technical Notes.

AHTD Texarkana: The study in Texarkana is similar to that in Mountainburg. The difference is the climate and soils are dramatically different, which warranted the southern study.

AHTD Greenwood: This study is on State Highway 71. It is a rehabilitation study. The 2:1 slope eliminates the use of motorized equipment. The slope had three-foot gullies. The Center staff established several hundred plants in cones, and transplanted them on the slope across the gullies in varying width and thicknesses. We are monitoring silt below each treatment annually. The results of this study will be provided to the **AHTD** and published in Technical Notes.

AHTD Mountain View: The department wanted the **PMC** to look at cool season species in northern Arkansas. The Mt. View site is designed similarly to the Mountainburg site with the exception of species. Orchardgrass, western wheatgrass, tall wheatgrass, and ladino clover were used. To date, orchardgrass has performed best at Mountain View. This is the first site that Hydrogel was used. The results of this study have been reported to **AHTD**, and will be published in Technical Notes.

AHTD Magazine: This is another rehabilitation site. We are testing vegetative hedges across 3:1 slopes at various angles, widths, and thicknesses to assess their effectiveness in stabilizing rill erosion. The results have been reported to the **AHDT**, and will be published in Technical Notes.

AHTD Batesville: Poultry litter and commercial fertilizer on 3:1 slopes were the main treatments at the Batesville site. Since poultry litter is readily available in North West Arkansas, the **AHTD** wanted to test it against commercial nutrients. As we expected, there was a dramatic difference. The poultry litter's high organic matter content held more moisture and provided an environment for better germination and seedling vigor. The effects of the litter were obvious for a longer period of time than the commercial. Application of the litter is more difficult than that of commercial (uniform) fertilizer, but can be overcome with development of specialized application equipment. The results of this study have been reported to the **AHTD** and will be published in Technical Notes.

AHTD Ft. Smith: Envirogard Plus is a product made of recycled paper and composted animal waste. It is a loose 3/8-inch pellet packaged in 30-pound bags. It was applied to a bare 3:1 slope at approximately ¼ inch depth. This application was made in May 2000 and the mulch is still in place with no soil erosion since placement. The **PMC** is designing further studies involving Envirogard Plus to determine best seed placement (above or below), and will collect germination, seedling vigor, etc. The results of these studies will be reported to the **AHTD**, and published in Technical Notes.

AHTD Mountainburg II: A second study near Mountainburg was established this spring. The new study is designed to compare mulch materials applied on a 3:1 slope. The materials used were annual small grain straw, grass hay, jute blanket and Envirogard Plus (composted animal waste and recycled paper). The plant material used was "Blackwell" switchgrass. Data collected will consist of erosion control, germination, stand, and seedling survival and vigor. This study is the first in a series to be carried out by the Booneville **PMC** for the **AHTD.** The contract is for 48 months and began in January 2001.

Demonstrations/Field Planting Summary

The Plant Materials Center maintains eight demonstration sites. A two-acre plot of "Pete" eastern gamagrass was established for demonstration on center in 1997. A four-acre plot of "Pete" was established for the Idabel Oklahoma Conservation District on their Demonstration Farm in 1999. "Pete" was established for demonstration at Elm Park and Altus (AR) in 2000. Native grasses, "Pete" eastern gamagrass, "Alamo" switchgrass, "Kaw" big bluestem, and "Lometa" indiangrass were established on the University of Arkansas at Pine Bluff research farm near Lonoke, AR in 1999. "Alamo" switchgrass was established to demonstrate erosion control on a sand fill in Morrilton, AR for the Arkansas Power Corp. in 1998. "Alamo" has also been planted for demonstration in Altus, AR. and on Center in 2000. The off center plots are managed by the cooperator and evaluated by the District Conservationist in that county. The **PMC** staff makes annual visits to each site.

Accomplishments

	Goal	**Accomplished**
Field offices contacted	75	57
Field offices assisted.	100	138
Partners assisted	25	65
Partners contacted	50	158
Cooperators contacted	125	110
New studies	2	0
Evaluations	250	40
New written technology	10	2
Oral presentations	10	14
Demonstration plantings	2	2
Seed production	300	200
Plant production	1000	350