

Booneville Plant Materials Center

2000 Annual Progress Report



Introduction: The Booneville Plant Materials Center (PMC) was established in 1987 to serve the plant materials 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 Woodland, 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, and The Arkansas Cooperative Extension Service. 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 in. in the eastern higher mountain areas. Forage production and woodland are the major land uses, and small family farms characterize the agriculture.

Staff: Plant Materials Center Manager
Assistant Manager
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Biological Sciences Technician
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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)

Demonstrations:

Eastern gamagrass (Elm Park)

Eastern gamagrass (Altus)

Switchgrass (Altus)

Switchgrass (on center)

Eastern gamagrass (on center)

Switchgrass (Morrliton)

Native Grasses (Univ. of Ark. Pine Bluff)

Native Grasses (Arkansas Post)

Eastern gamagrass (Idabel OK)

Indiangrass (Harrison, AR)

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 PMCs 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 2001.

Technology Development Study Summaries

Bermudagrass variety trial: The University of Arkansas terminated bermudagrass cultivar testing in 1998. Since the Arkansas State Cattleman's Association and others have expressed a need for this information, 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: 'Common', 'Tifton 44', 'Midland', 'Midland 99', 'Russell', 'Guyman', 'Quick Start' and, one experimental line, '74X12-6' from Oklahoma State University. Other entries will be added, as they become available. The results of this study will be published in Technical Notes.

Indiangrass Variety Trial: This study was initiated by numerous requests for cultivar recommendations for establishment of Indiangrass in the southern Ozarks and Ouchitas. The trial consists of, 'Lometa', 'Osage', 'Cheyenne', 'Rumsey', and PR514673. These cultivars were drilled in a clean firm seedbed in March of 1996. Dry-matter production and forage quality data have been collected for 4 years. A Technical Note will be developed highlighting the results of this study in 2001.

Native Grasses Establishment Study: Concern in replacing endophyte infected fescue stands, in Eastern Oklahoma, with native grass species prompted this study. Eight methods (treatments) of replacing the fescue with native grasses were used. The treatments used combinations of tillage; chemical application; burn, and no-till. Every plot that contained the tillage component was successful (at different levels). Results of the study will be published this fall in the form of a Technical Note.

Big bluestem Density Study: Plant populations can affect dry-matter production and in some instances quality. Determination of density 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 row and within the row. Results will be reported annually and at the termination of the study.



Switchgrass Hydrogel Study: 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 and reducing stress. Switchgrass with multiple levels of hydrogel were established to access the benefit of using this product. Results will be reported annually and at the conclusion of the study.



Fruit and Nut Tree Production on Reclaimed Coal Mined Land: Fruit and nut tree production is being evaluated on land that was strip (surface) mined (for coal) in the 1930s' and reclaimed in the mid 1980s'. Since these are 'pre-law' mines, there was no topsoil stockpiled for use during reclamation. The study consists of four varieties each of apple, peach, pecan, and walnut. The trees were planted in 1994, and have recorded excellent growth. The apple and peach trees are in full production with only a trace of pecan production and no walnut yield. Drip irrigation is used, and the orchard is mowed twice per year. The breast diameter height is recorded annually in the fall. This study will be concluded in 2005. A Technical Note will be developed.

Grand Prairie Irrigation District: This study is in cooperation with the Corps of Engineers (Memphis, TN) and the Arkansas Natural Heritage Commission. Canals being constructed to divert water for reservoir storage and irrigation purposes from the White River will be planted to native ecotype warm-season grasses. Establish methods for native ecotype warm-season grasses will be evaluated to determine optimum planting procedures on canal banks. This study will prescribe procedures for establishment and assist in maintaining this original genetic material for these ecotypes.



Switchgrass (lowland types) as a Biofuel Study: The PMC is involved in testing switchgrass biomass production. The contract is under the DOE, and administered by David Burgdorf. Dr. Charles Talafero (Oklahoma State University) is the principal investigator and partner to the Booneville PMC in this effort. 'Alamo', 'Cave-in-Rock', 'Kanlow', along with seven of Dr. Talafero's experimental lines were planted at Booneville in 1997, harvested annually, and reported to Talafero. The results are also reported annually to Dave Burgdorf, along with a narrative summary of the study.

Switchgrass (upland types) as a Biofuel Study: This study is identical to the above, with the exception of cultivar entries, which are upland types. This study was planted in 2000, and will not be completed until 2005.

Arkansas Highway and Transportation Department

The Booneville Plant Materials Center was awarded its second contract by the Arkansas Highway and Transportation Department (AHTD) in September 2000. The PMC has eight 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 enviogard and enviogard 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.

Arkansas Highway and Transportation Department (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 appear in a Critical Area Treatment Technical Note in 2001.

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 Note(s).

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 feet gullies. The Center staff established several hundred plants in cones, and transplanted them on the slope across the gullies in varying width and thickness'. 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 north Arkansas. The Mountain View site is designed similar 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 a Technical Note.

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

AHTD Batesville: Poultry litter vs. commercial fertilizer on 3:1 slopes were the main treatments at the Batesville site. Since poultry litter is readily available in NW 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 (uniformity) 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 wastes. It is a loose 3/8" pellet packaged in 30# bags. It was applied to a bare 3:1 slope at approximately 1/4" 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.

Demonstrations/Field Planting Summary

The Plant Materials Center maintains ten demonstration sites, of which, four were established in 2000. 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. Ecotypes of Indiangrass, switchgrass, big and little bluestem were established at Arkansas Post. 'Lometa' was planted at Harrison, AR. 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	100	106
Field offices assisted	50	57
Partners contacted	40	73
Partners assisted	10	84
Cooperators contacted	100	119
New studies	4	5
Evaluations	1240	645
New written technology	8	8
Oral presentations	10	15
Demonstration plantings	2	3
Seed production (lbs.)	250	650
Plant production (lbs.)	1000	1200