

2011 Annual Progress Report of Activities



2011 Booneville PMC Current Study Summaries and Highlighted Activities

Technology Development

Measuring Shortleaf Pine Growth with Switchgrass

Agroforestry, the process of combining forage and timber production on the same land management unit, may provide landowners in Arkansas with an alternative production system. These systems are designed to provide added financial benefit from forage production in the years before timber stands reach marketable age. Well-managed agroforestry systems may also provide added soil erosion control, shade for livestock, and wildlife habitat.



Figure 1: Switchgrass grows in alleyways between shortleaf pine rows



Figure 2: Switchgrass alleyways are baled

The Booneville PMC initiated a study in 2006 to examine the effect of forage growth on tree growth. 'Alamo' switchgrass (*Panicum virgatum*) was planted in between rows of shortleaf pine (*Pinus echinata*). Switchgrass biomass was harvested and tree height and diameter were measured in 2010 and 2011. Two years of recorded data shows that shortleaf pine trees with switchgrass in tree alleyways grew an average of 2.5 inches less than trees in control plots containing a mix of other native grasses. Data collection will continue yearly for the next three years. Detailed results will be reported in the 2011 Annual Technical Report.



Figure 3: Shortleaf pine tree growth is measured

Maximizing Switchgrass Production for Biofuels

Switchgrass is a native perennial grass found in most southern and eastern states. It has been grown for decades on marginal lands and is adapted to a broad range of soil textures and moisture regimes. It has been recognized as a potential renewable energy source in the form of a biofuel.



Figure 4: Switchgrass harvest

This study compares two switchgrass cultivars, 'Alamo' and 'Cave in Rock' to determine the maximum production of annual biomass in both irrigated and non-irrigated plots. The study also compares biomass yields in plots fertilized with either animal waste (broiler litter) or commercial fertilizer.

Though inexpensive poultry litter is readily available to most landowners in western Arkansas, eastern Oklahoma, and southwestern Missouri, use of commercial fertilizer is becoming increasingly necessary due to growing concerns about water quality in

soil and water nutrient surplus areas. Data from this study indicates that there is no statistical difference in yields between the two fertilizer treatments.

The effect on yield from two different harvest frequencies is also being compared. Single-harvest plots are harvested once at the end of the growing season, while multiple-harvest plots are harvested in June and also at the end of the growing season. Long-term yield studies are intended to supply information to landowners interested in participating in the growing biofuels industry. The last harvest for this study was

completed in the fall of 2011 and yield data will be included in the 2011 Technical Report. Technical Notes on this study will be written and available in the spring of 2012.

Growth curve studies for Switchgrass, Big bluestem, and Eastern Gama Grass

Warm-season native grass species provide multiple conservation uses including forage for livestock, biomass for energy conversion processes, soil conservation, and wildlife habitat. The Booneville PMC initiated a study in 2010 to record growth patterns for ‘Alamo’ switchgrass (*Panicum virgatum*), ‘Bumpers’ eastern gama grass (*Tripsacum dactyloides*), and Hampton germplasm big bluestem (*Andropogon gerardii*).

Growth patterns/curves for these grass species supply information for conservation planning purposes. Collected information will be used to develop a grazing module for each grass within the Revised Universal Soil Loss Equation (RUSLE2) that can predict soil erosion in livestock pastures.

Yield, plant height, phenological stage, and percent growth are reported monthly for each grass. Final growth curve data will be collected in the fall of 2011. Technical Notes on this study will be written and available in the spring of 2012.



Figure 5: Forage samples are taken

Vegetative Rehabilitation of Cut Highway Slopes in Eastern Oklahoma

The Oklahoma Department of Transportation (ODOT) contracted with the PMC to develop standards and specifications for establishment of native grasses along ODOT rights-of-way in Eastern Oklahoma.

Three studies have been established in 2007 that are representative of most of the severe slope problems on highways in eastern Oklahoma.



Figure 6: Mulching treatment applied to test highway slope



Figure 7: Hydro-seeding highway test slope

Typical highway cut slopes are populated with cool season annuals with very little perennial vegetation present. Several attempts have been made by ODOT in the past to establish permanent vegetation on these areas with little or no success.

The Booneville PMC conducted a complete site characterization of each of these areas in 2006. Sites were planted with native warm season grass species including 'Cheyenne' indiangrass (*Sorghastrum nutans*), 'Kaw' big bluestem (*Andropogon gerardii*), 'Aldous' little bluestem (*Schizachyrium scoparium*), and 'Alamo' switchgrass. Recommendations for establishing native warm season grasses were developed by the PMC using data collected over a three year period. This project will assist ODOT in developing specifications for vegetation bidding to private companies.

Final report for the study has been submitted to ODOT and is expected to be made publicly available by early 2012.

Demonstrations and Field Plantings

The Booneville Plant Materials Center maintains eight demonstration sites. 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.



Figure 8: Weyerhaeuser site planting



Figure 9: Weyerhaeuser fly ash disposal area seeding

In May, an eight-acre planting of 'Bumpers' eastern gamagrass was established by the PMC for Weyerhaeuser, a forest products company with a plywood mill located in Dierks, Arkansas. The planting established permanent vegetation on a fly ash disposal area at the mill and will help keep topsoil in place.

Technology Transfer

Tours and Trainings

The US Senate Appropriations Committee staffers toured the Booneville PMC to highlight the importance of small farms in rural Arkansas. PMC staff gave a poster presentation at the Native Grasses on Working and Natural Landscapes conference in Knoxville, Tennessee. PMC staff also gave a presentation to

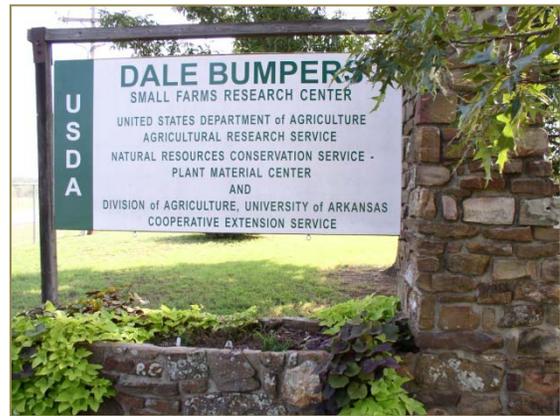


Figure 10: Sprayer calculations are demonstrated to field office personnel

the National Black Grower's Council in Pine Bluff, Arkansas. NRCS field office personnel from Arkansas and Oklahoma received training on the Plant Materials program mission and activities at the Booneville PMC. Nine additional tours and presentations were given by PMC staff this year.

Who We Are

The Booneville Plant Materials Center was established in 1987 in Booneville, Arkansas to help solve resource concerns in the southern Ozarks, Arkansas River Valley, and Boston and Ouachita Mountains. The service area is approximately 54 million acres and includes portions of Arkansas, Oklahoma, and Missouri. The Booneville PMC farm encompasses 291 acres and is co-located with the Agricultural Research Service's Dale Bumpers Small Research Farm. The center is one of 27 NRCS Plant Materials Centers in the nation and focuses on solving water quality resource concerns and providing vegetative tools to protect and enhance pasturelands, critical areas, woodlands, croplands, and wildlife areas.



What We Do

The mission of the Natural Resources Conservation Service Plant Materials Programs is to develop, test, and transfer effective plant science technology to meet customer and resource needs by cooperating with partners and other agencies, NRCS field office staff, landowners, and agricultural producers. NRCS PMC activities help accomplish the objectives of the current United States Department of Agriculture (USDA) and NRCS Strategic Plan in providing timely and effective vegetative solutions for identified resource needs.

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