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Newsletter from the Booneville Plant Materials Center
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## New study to customize fertilizer recommendations for switchgrass production

The Booneville Plant Materials Center (BPMC) recently implemented a new study to correlate differing rates of nitrogen (N), phosphorus (P), and potassium (K) to switchgrass dry matter yield. Native warm-season grass (NWSG) crops are often marketed as capable of producing similar dry-matter yields to bermudagrass with less total fertilizer application. Drs. Philip Moore and Dan Pote from the Agricultural Research Service (ARS) have collaborated with the PMC and the NRCS Central National Technology Support Center on this study to determine the best fertilizer recommendations for maintaining switchgrass monocultures for hay or pasture.

Figure 2: Switchgrass grown with five different rates of nitrogen fertilizer was harvested in early June (fertilizer rate increases from left to right).

Five different rates of N, P, and K were applied to study plots in April 2014 and harvested in early June (Figure 1). Switchgrass yield will be evaluated over three years with a harvest frequency of two to three cuttings per year. Yield will also be recorded for control plots receiving no fertilizer.

Figure 1: Eddie Pratt shows the difference between plots fertilized with 0 (left) and 200 (right) lb ac$^{-1}$ P in July prior to the second harvest.

The University of Arkansas soil-testing lab gives landowners recommendations based on soil samples for establishing and maintaining native warm-season grass hay and forage crops. Even though research from the BPMC indicates that these grass species have different nutritional requirements and differing optimum management strategies, different NWSG species are consolidated into one crop code. Fields of switchgrass, eastern gamagrass, and mixes of native grasses are given similar fertilizer recommendations,

This study will provide information for customized fertilizer recommendations based on yield goals.

## Landowners attend NWSG field day at the PMC to prepare for drought

A group of over 35 cattle producers from Arkansas and Oklahoma and NRCS field office staff members attended a field day at the BPMC on July 15. The field day focused on basic establishment and management of several native warm season grass species and was a joint effort between the BPMC and Bob Harper, Logan County Cooperative Extension Agent.

Figure 3: Cattle producers discuss the benefits and challenges of grazing switchgrass.

Many producers have become increasingly interested in diversifying forage sources due to the catastrophic drought that hit Arkansas in 2012. Particpants received training in choosing a native grass species to fit their needs, using the NRCS nine-step planning process to accomplish their goals, and controlling weed completion during native grass establishment. BPMC staff taught participants how to calibrate the Logan County Conservation District seed drill and how to identify three native grass species in the field.

The BPMC would like to thank Bob Harper, Jeremy Huff, Levi Horrell, and Holly Jones for their help in making this event a success. According to evaluations submitted after the workshop, over 50% of cattle producer participants planned to establish some amount of native grass on their farm.

## Stablilizing irrigation reservoir slopes with maidencane: update

Figure 4: Maidencane is far from the waterline in August after irrigation cycles.

Maidencane (Panicum hemitomon Schult.) is a warm season perennial grass that grows from 2-5 feet tall. It spreads mainly by rhizomes with little seed production, and most seed is sterile. It is known to be an excellent shoreline stabilization plant in fresh water impoundments. It grows rapidly and forms dense roots and rhizomes that stabilize soil and trap sediments. It performs best in moist soils, not tolerating inundation or dry sites.

The BPMC planted 10,000 maidencane rhizomes, supplied by the Jamie Whitten Plant Materials Center, at the high water level of a new 40 acre irrigation reservoir near Lonoke in April 2013. Survival is 30 – 40%. The PMC staff used a mechanical planter to establish the grass. Inconsistent depth control may have caused the poor survival rate. Rhizomes may be planted to, but not over, 2 inches deep. The conditions at planting were dry, and rhizomes were planted into subsoil material used to construct the levee.

Effects of the wave action occurring on the inside slopes of the reservoir are now are becoming evident. Areas where maidencane has become established are not eroding (Figure 4), while bare adjacent areas are yielding to the effects of the waves. The stand has been fertilized at a rate of 200 lbs. per acre with a complete blend fertilizer in May and July 2014. Plants that survived are becoming well established (Figure 5). The real issue is survival over time with radical water level fluctuations as irrigation water is drawn down for crop use, leaving the maidencane in dry soil for long periods. When the water level is drawn down during irrigation periods, the plants will grow down the slope

Figure 5: Some areas will be replanted due to poor establishment.

toward the moisture. When the reservoir is refilled in the fall and winter months, the down slope plants will be under water and may not survive. The surviving plants are currently doing an excellent job of stabilizing the slopes, therefore replanting to complete the stand is being planned.

Reggie Cunningham, Lonoke County DC, and his 22 member team will assist the PMC staff replant gaps between maidencane stands on the reservoir levee in April 2015. Jamie Whitten Plant Materials Center will supply the replant materials. Stay tuned for updates!

## Mid-contract management Activities Applied to CRP pollinator plots

One key aspect of managing pollinator habitat areas lies in reinvigorating the site with periodic disturbances. The BPMC recently burned and lightly tilled pollinator study plots (Figures 6 and 7). The plots were established in 2011 to evaluate three commercially available pollinator seed mixes.

The seed mixes were planted according to Conservation Reserve Program (CRP) specifications for CP42 Pollinator Habitat. Pollinator habitat established through CRP should be maintained for ten years and must be disturbed periodically by light disking, prescribed burning, or selective herbicide treatments. The disturbances, or mid-contract management activities, usually occur three years after establishment. According to CRP, the goal of periodic disturbance is to enhance or maintain flowering plant diversity, set back vegetative succession and woody encroachment, and expose soil for pollinator nesting sites. It is also important to not burn or disk the entire habitat area at once, as insects need habitat adjacent to disturbed areas. Activities, such as burning, should be scheduled so that only portions of the total habitat area are disturbed during one year.

Figure 6: Plots burned in March (top) bloomed in May (bottom).

So far, the biggest challenge of maintaining prime habitat for pollinators in this study is maintaining bare ground, which is essential for ground-nesting insects like bumblebees. Bermudagrass (*Cynodon dactylon*) has invaded bare areas, while tiny winged elm (*Ulmus alata*) trees have sprouted in some plots. A single species, such as showy evening primrose (*Oenothera grandis*), has crowded out other flowering species in some plots.

Figure 7: Plots lightly tilled in May (left) bloomed in June (right).

Prescribed burning was highly effective in exposing bare ground compared to disking treatments because some plots have an accumulated layer of residue covering the ground.

Blooming dates for flowering species will continue to be recorded after disturbance activities and compared to control plots, where no disturbances have occurred. Prescribed burning should be part of an approved burn plan and should be performed using extreme caution by those who have had appropriate training. Contact your local NRCS office or the BPMC for more information.

Figure 8: Pollinator specialist Anne Stine (left) taught landowners how to assess habitat value for pollinators in the CRP study plots in August. Class participants identified blooming flowers and insect pollinators (right).

## Staffing update

Conservation agronomist and assistant BPMC manager Alayna Jacobs has accepted a new position as manager at the Jamie L. Whitten Plant Materials Center in Coffeeville, Mississippi. She wishes to thank BPMC staff members, conservation partners, and Arkansas NRCS staff members for their hospitality and friendship.

Alayna will start work east of the Mississippi River in November.

## *About Us:*

The Dale Bumpers Small Farm Research Center is home to the USDA, Natural Resources Conservation Service-Booneville Plant Materials Center and the USDA Agricultural Research Service. The primary service area of the Center encompasses 53 million acres of Arkansas, Oklahoma and Missouri. We are located at: 6883 South State Hwy 23, Booneville, Arkansas 72927. You may contact us at (479) 675-5182, Fax: (479) 675-5466. Our hours are from 8:00 A.M. to 4:30 P.M., Monday - Friday. **If you would like a tour of the PMC, please call to schedule an appointment.**

## *Our Mission Statement:*

The mission of the Natural Resources Conservation Service, Plant Materials (PM) Programs is to develop, test, and transfer effective state-of-the-art plant science technology to meet customer and resource needs. NRCS PMC activities are consistent with the objectives of the current United States Department of Agriculture (USDA) and NRCS Strategic Plan namely to provide timely and effective vegetative solutions for identified resource needs.

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