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Mid-South Plant News

A Jamie L. Whitten Plant Materials Center Publication

Silvopasture Demonstration to be Planted

In Volume 10, Issue 1 of Mid-South Plant News (July 2003) and in a subsequent Plant Note (No. 6, Sept. 2004), we recounted results of our research on herbicide treatments for establishment of loblolly pine seedlings. We will be utilizing one of the planting sites from this study for establishment of a new silvopasture forage quality demonstration. Silvopasture (Conservation Practice 381) is a land use system that combines trees with managed forages for livestock production.

We removed one of the previous treatment rows in each block to create 20 foot planting areas between the pines. We will test four different grasses or mixtures in these planting areas. One treatment will be the mixed-grass stand with common bermudagrass, dallisgrass, tall fescue, and others that is currently found in the plot. The other plots will be planted this year using common bermudagrass, 'Highlander' eastern gamagrass, or 'Alamo' switchgrass and will be managed as single-species stands. All but the mixed-grass plot were sprayed last fall with glyphosate to control weeds and again in early spring with 2,4-D added to control broadleaf weeds (photo below). 2,4-D alone was spring-applied on the mixed grass plots to avoid damaging the fescue in the stand. The plots will be seeded in late May to June using a no-till drill and mowed and sprayed as necessary during the establishment year. In subsequent years, a sample area within the plots will be harvested using best management techniques for each grass/mix and analyses performed to see what effect shading and competition from the trees have on the quality of these forage grasses.

PMC Manager Moves to Technology Center

Recently, it seems that in just about every issue of this newsletter we have reported on staffing changes at the PMC and this newsletter is no exception. This time we have experienced a major change. Joel Douglas, PMC Manager from 1997 and Mississippi Plant Materials Specialist from 1993 to 1997, has relocated to the Central Region Technology Support Center in Fort Worth as a Plant Materials Specialist. We really hated to lose an individual with Joel's leadership skills and technical expertise, but we are glad that he has had the opportunity he desired to advance in his career and move closer to his parents. He can be reached at (817) 509-3419 and his e-mail address is Joel.Douglas@ftw.nrcs.usda.gov. Justin Norris, District Conservationist from Coahoma County, has been temporarily detailed as acting manager until the manager position can be filled.

Inside this Issue:

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How Clipping Switchgrass Plants Influences Seed Quality

Switchgrass (*Panicum virgatum*) is a native warm-season grass that can be used for forage production, soil stabilization, and wildlife cover and food. In the course of collecting switchgrass seeds for PMC studies, we noticed that seeds from plants that had been cut or clipped during the early summer, while still in the vegetative stage, seemed higher in quality than ones from plants that had not been clipped. More seeds from the clipped plants were plump, dark-colored, and there was less incidence of ergot. We felt it was important to determine if seed quality was improved by clipping. An added benefit is that growers would be able to market a hay crop and a seed crop in the same year from a single field of switchgrass.

We used existing rows (20' long, 4' row spacing with 4 replications) of 'Blackwell' and four local switchgrass collections, accessions 9062746, 9062747, 9062759, and 9062760. Blackwell is an upland ecotype from Oklahoma and the accessions also had the physical characteristics of upland ecotypes (finer stems, broader clumps); however, chromosome testing would be required to confirm this.

The clipping treatment consisted of cutting half the length of the row in each replication with a hedge trimmer. Plants were clipped on June 30, 1999, June 27, 2000, and June 19, 2001. In 1999, the clipping treatments were assigned randomly to either half of the row; however, the unclipped plants lodged onto the clipped ones in adjacent rows, affecting seed production and harvesting. In subsequent years, we split the row, clipping all rows on the same half of each block (photo below). A plant sample was dried to determine moisture content. The plots were fertilized with 50 lb/ac N and K in the spring and an additional 50 lb N after clipping.

The local accessions were in the early boot stage when clipped, but Blackwell was well past the boot stage. Northern varieties often flower earlier when planted in southern locations. Its forage yields (Table 1), although high in 1999 and 2001, would have been very poor in quality.

Table 1. Forage yields for clipping treatment.

Accession	Dry Matter Yield		
	1999	2000	2001
	----------lb/ac----------		
9062746	5090	3398	7711
9062747	5669	3006	6796
9062759	4038	3006	3790
9062760	3385	1830	4705
'Blackwell'	5624	1176	6665
LSD (P<0.05)	1333	915	1699

Seeds were harvested in October from a 3-square-foot section in the center of each treated area by hand-stripping them from the seedheads and weighed to determine total weight. The seed sample was then separated using a South Dakota Seed blower to determine the fraction of heavy (higher quality) seeds in the sample.

Table 2. Average seed yields for 9062646 and 9062647.

Year	Regime	Seed Yield		
		Total	Blown	Heavy
		----------lb/ac----------		-----%----
1999	Clip	83 b	18 b	32
	No clip	131.a	40 a	23 NS
2000	Clip	81 b	12 b	15 a
	No clip	249 a	19 a	9 b
2001	Clip	197 b	78 a	39 a
	No clip	474 a	43 b	10 b

NS means that the means were not significantly different at P<0.05.

Only accessions 9062646 and 9062647 recovered after clipping and produced seed in all three years (Table 2). There were no differences between accessions, so the data presented is the average seed production. The clipping treatment reduced total yield in all three years and heavy seed fraction in all but 2001. In 1999 and 2000, there was below average rainfall before seed harvest (Table 3, Page 4) that negatively affected seed development. Clipping increased the percentage of heavy seeds in all years except 1999; however, since total yields were reduced, it appears that clipping would have a negative effect on seed production. However, since blown seed weight was higher for the clipped plots in 2001, this indicates that if sufficient water can be applied to the crop, either by rainfall or irrigation, during the critical seed set period from August to October, then clipping may improve seed quality of ecotypes that can tolerate this treatment. Ecotypes that do not recover after clipping should be allowed to grow the entire season for seed production purposes.

Alley Cropping Results

The PMC, with cooperation from the National Agroforestry Center and NRCS Foresters, installed an alley cropping (Conservation Practice 311) demonstration planting in 2002. We were interested in the economic feasibility of planting high-value trees on sloping topography with no-till crops grown in the alleyways between the trees. An approximately 5 acre field on a hillside with Loring silt loam soil (up to an 8% slope) was chosen as the study site. Site preparation began in the fall of 2001 when 4 qt/ac of Roundup and 3 ton/ac of lime were applied.

Bareroot seedlings were planted in January 2002 in single rows along the general contour of the field perpendicular to the dominant slope on angles convenient for farming using CORE4 recommendations. Trees species were pecan (*Carya illinoinensis*), which can provide income from both nuts and timber, and green ash (*Fraxinus pennsylvanica*), which is a fairly fast-growing timber species.

Row of trees with soybeans planted in the alleyways

Survival of the pecan seedlings (variety Choctaw) was very poor because the planting stock was too large and lacked necessary feeder roots and stems were damaged by deer (rubs) during the winter. They were replanted in 2003 using better quality stock of 'Sumner' and an electric fence was installed around the planting site. Survival was much better; however, additional deer-rubbing from animals that jumped through the fence again caused severe damage to some of the seedlings during the following winter. We decided that we would not attempt to replace these seedlings with additional pecans. Instead we dug seedlings of yellow poplar (*Liriodendron tulipifera*) from native stands on the PMC and planted them alongside the most seriously damaged pecans. If any of these pecans survive and make adequate growth, we will remove the yellow poplar; however, if not, it will serve as a replacement. Yellow poplar will not provide the same economic benefits as pecan, but it is a faster growing species and can quickly attain a similar size as the older pecans. Survival of green ash was good (over 90%), but deer-rubbing resulted in formation of multiple-stem specimens that required pruning to reestablish a central leader. They were pruned in January of 2005.

We have planted a variety of crops in the alleyways during the course of the study (Table 1). Both soybean varieties were Roundup-Ready. The corn, grown in 2004, was not because we were concerned that three continuous growing seasons of glyphosate application on the crops might damage the trees, but it was a BT variety. The crops were fertilized according to soil test recommendations and an additional 2 ton/ac of lime was applied in February 2004 when testing indicated it was required. Weed and insect controls were also applied based on normal agronomic practice for each crop.

Table 1. Planting information and yields of crops grown in the alleyways.

Crop	Variety	Pl. Date	Yield
			--bu/ac--
Soybean	Asgrow 4602	4/17/02	26
Wheat	NK Coker 9152	10/2/02	50
Soybean	D&PL 5915RR	6/5/03	41
Corn	Dekalb 69-70YG	3/23/04	215

The soybean yields in 2002 were somewhat low for this variety, but considering this was a new field, converted from sod, they were acceptable. The yields of wheat equaled state averages for this variety. Yields of DP&L 5915RR were slightly lower than the 51 bu/ac recorded for MSU trial locations in the hills, but the soybeans were planted somewhat late since they were double-cropped with wheat. The corn yields were somewhat higher than those reported in variety trials and the reason for this is that we had ample, evenly spaced rainfall during the growing season (Table 2, Page 4). Overall, our yields for all crops have been good because we have had favorable weather, with rainfall when the crops needed it and drier conditions when the grasses were pollinating. Also, the sloping topography of the site created ideal soil drainage. Yields were generally somewhat higher near the bottom of the slope than at the top of the slope because soil conditions improved as you move downhill.

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PMC Highlights

January	*Crop registration for Highlander eastern gamagrass was published in Crop Science*
February 14	*Janet Grabowski gave a presentation on establishment of wildflower seeds to a garden club in Water Valley, MS*

Coming Attractions

The planting guide for Highlander eastern gamagrass is being reviewed now and should be available later this spring

Table 2. Annual rainfall at the PMC, Coffeeville, MS during the alley cropping study. (Cont. from Page 3)

	2002	2003	2004	25-yr avg.
	----------in----------			
Jan	9.66	1.47	5.70	4.66
Feb	4.10	7.81	6.74	5.53
Mar	6.08	2.27	3.17	5.70
Apr	8.57	2.85	6.43	6.18
May	8.98	11.18	5.67	5.64
Jun	2.40	5.12	10.99	5.30
Jul	6.11	5.53	1.95	4.26
Aug	5.35	5.10	6.12	3.60
Sep	11.09	3.90	0.00	4.30
Oct	7.43	3.50	4.02	4.10
Nov	4.30	4.73	11.05	6.43
Dec	7.00	4.42	7.61	6.19

Table 3. Seasonal rainfall at the PMC, Coffeeville, MS during the switchgrass clipping study. (Cont. from Page 2)

	1999	2000	2001	25-yr avg.
	----------in----------			
Mar	6.01	5.35	4.19	5.89
Apr	9.05	7.62	7.75	5.95
May	2.95	1.58	4.01	5.35
Jun	8.09	6.22	4.63	5.24
Jul	2.68	1.64	3.60	4.22
Aug	2.12	0.15	5.45	3.17
Sep	2.95	1.45	5.11	4.32
Oct	2.22	0.00	4.77	3.87

Ask the Expert

Q. Why are materials such as rice hulls or dry sand mixed with seeds when planting?

A. These filler materials can make it easier to spread small quantities of seed uniformly over a planting area. They can also be used to help keep "fluffy" seeds, with awns or other seed appendages, from clumping together in a planting box, creating air pockets (this is commonly called bridging) that result in skips in the field. Having a larger quantity of planting material also simplifies calibration of the planter. We have used seed of another crop instead of inert filler materials to serve the same purpose in special cases. For example, last fall we mixed wheat with the small quantity of purple coneflower seeds we had available to plant in the production field. The wheat seed is approximately the same size as a purple coneflower seed and it helped stabilize the soil until the purple coneflower seeds will germinate this spring.