Information Bulletin 508 March 2016

Mississippi Native Grass

VARIETY TRIALS, 2015

Mississippi's Official Variety Trials

MAFES

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This report contains data generated as part of the Mississippi Agricultural and Forestry Experiment Station. Joint sponsorship by the organizations listed on page 8 is gratefully acknowledged.

Trade names of commercial and public varieties tested in this report are included only for clarity and understanding. All available names (i.e., trade names, experiment code names or numbers, chemical names, etc.) and varieties, products or source seed in this research are listed on page 8.

Mississippi Native Grass Variety Trials, 2015

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Recognition is given to research technicians Melvin Gibson and Roy Gibson (field technician) at the South Mississippi Branch Experiment Station for ground preparations and herbicide application. In addition, recognition is given to student workers Michael Kennedy and Mike Hammock for their assistance in cultivating, packing, planting, harvesting, and recording plot data.

This document was approved for publication as Information Bulletin 508 of the Mississippi Agricultural and Forestry Experiment Station. It was published by the Office of Agricultural Communications, a unit of the Mississippi State University Division of Agriculture, Forestry, and Veterinary Medicine.

Find variety trial information online at ***mafes.msstate.edu/variety-trials***.

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INTRODUCTION

In recent years, a renewed interest in the use of native crops for forage has prompted selections of ecotypes and development of cultivars that may be better adapted to current forage production systems. This information bulletin discusses the results of trials with the most common native grasses that show adaption to soil and climatic conditions in Mississippi, such as big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and indiangrass (*Sorghastrum nutans*). Typically, these cultivars are merely ecotypes chosen from specific areas and adapted for use at different locations. There is now a need to reevaluate the performance of many of these improved varieties for use in Mississippi.

Big bluestem is a perennial bunchgrass, native to the Great Plains and eastern U.S. It is extremely deep rooted, encouraging superior drought tolerance when compared with other warm-season perennials. Big bluestem is one of the most palatable native crops, maintaining excellent forage quality throughout the summer. It does not tolerate close grazing, and improper grazing pressure could lead to stand thinning. We recommend using rotational stocking to graze this grass to a residual stubble height of 6 inches.

Indiangrass is a perennial bunchgrass, native to the eastern Great Plains and eastern U.S. It can spread not only by seed, but also by rhizomes. This grass can be used for both pasture and hay, and, like big bluestem, it maintains good forage quality throughout the summer. It can tolerate semiclose grazing in a rotational system, but in continuous systems, we recommend a stubble of 10–16 inches.

Switchgrass is one of the most widespread native grasses of North America. It is a perennial bunchgrass that can become tall and stemmy much sooner than indiangrass or big bluestem. Due to its rapid maturity, we recommend intense rotational stocking to maintain stands and good forage quality. Switchgrass is more tolerant of acidic and poorly drained soils than the other native species. This grass has two ecotypes: upland (northern U.S.) and lowland (southern U.S.). Lowland switchgrass yields can reach 6–10 dry tons per acre.

Table 1. Monthly rainfall totals for Poplarville, Starkville, Holly Springs, and Newton, 2015.

Location	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
Poplarville	3.13	2.3	3.79	5.33	11.44	4.01	4.71	1.00	0.01	6.92	4.4	8.46
Starkville	5.71	4.98	5.47	5.06	5.45	3.18	4.09	2.20	0.95	1.43	0.20	0.09
Holly Springs	0.00	0.53	2.37	2.27	3.09	2.21	0.51	1.00	0.02	0.41	6.44	2.22
Newton	6.71	4.13	4.91	5.15	2.16	4.97	3.57	4.05	3.6	6.82	7.02	6.08
MS 30-yr. avg.	5.30	4.70	5.80	5.60	5.10	3.30	4.50	3.80	3.60	3.30	4.80	5.90

Little bluestem is a perennial bunchgrass that sometimes uses rhizomes to propagate. Though it is found across the continental U.S., with the exception of the far Pacific Coast, it is most prominent in the dryer Midwest. It is more drought-tolerant than switchgrass, big bluestem, and indiangrass, and it can tolerate more intensive grazing than the other native grasses. However, forage quality and palatability quickly decrease with maturity.

In the results presented, comparisons can be statistically evaluated by using the LSD (least significant difference). The LSD represents the amount of yield that must be observed between any two entries to determine if the differences observed were due to cultivar variation alone. The coefficient of variation (CV) represents the variation within the trial to measure the quality of the data presented. Typically, a lower CV represents a trial with low variation between replications.

PROTOCOL

Trials were planted with an Almaco plot drill in 6-by-10-foot plots arranged in a randomized complete block design with four replications. Seeding rates were adjusted to account for pure live seed (PLS) (Table 2). Trials were separated by species due to different optimum harvest times. Plots were not amended with any fertilizer, lime, or irrigation at any time. Seedbed was cultivated 5 months before planting and allowed to settle, receiving glyphosate treatments as needed to eliminate weeds and create a stale seedbed.

Plots from individual species were harvested to a 6-inch stubble height after they reached between 24 and 30 inches of growth. Harvesting was performed using a "Zero Turn" mower equipped with a bagging system and taking a 52-inch swath from the middle of each plot.

To determine dry matter percentage, subsamples were taken from each plot, weighed, and dried in a force-air oven at 131°F until weight remained constant. Statistical analysis was performed using PROC GLM in SAS, and means were considered different at $P < 0.05$. Subsamples were further used to evaluate forage nutritive value using NIR and the grass hay equation of the NIRS Forage and Feed Testing Consortium (Madison, Wisconsin).

Table 2. Seeding rates.[1]

Genus/Species	Seeding rate (PLS)
	lb/A
Big bluestem	12
Indiangrass	10
Little bluestem	5
Switchgrass	8

[1]PLS = Pure Live Seed

Plateau (imazapic) was used at a rate of 6 ounces per acre as both a preemergence and postemergence application during the establishment year on the indiangrass, big bluestem, and little bluestem. Switchgrass trials received a postemergence application of Pastora (nicosulfuron and metsulfuron methyl) at 1.5 ounces per acre.

RESULTS

All locations were initially planted in May 2013 and allowed 1 year of establishment before data collection was initiated. During the establishment year, occasional mowing and clearing of the plots was performed to minimize weed competition. In general, big bluestem across every location showed superior stand establishment and was considered fully established for most varieties by the end of the first year. All species were fully established in Poplarville by the end of 2013, but indiangrass and switchgrass had to be replanted in May 2014 in Starkville, Newton, and Holly Springs due to incomplete stands in the plots. Little bluestem ranked as the most difficult to establish with complete stands available for harvest in Poplarville only after two plantings. In Starkville, data from only big bluestem is presented due incomplete stand establishment with the other species.

Table 3. Forage dry matter yields at Poplarville, 2015.[1]

Species/Variety	Harvest date		Total	2014-15 avg.
	6/3/15	8/4/15		
	lb/A	*lb/A*	*lb/A*	*lb/A*
Big bluestem				
Earl	2983	2896	5879	5854
Kaw	3501	3858	7359	8335
OZ-70	4010	3957	7967	9173
Roundtree	3438	4017	7455	8436
Suther	4521	3846	8367	8699
Indiangrass				
Cheyenne	2233	—	2233	3694
Cycle 7 IG	2449	—	2449	4553
Little bluestem				
Aldous	2502	—	2502	3455
Cimmarron	2211	—	2211	3321
Switchgrass				
Alamo	3049	3679	5809	6344
Blackwell	1881	1849	3730	4347
Cave n Rock	2266	3005	5271	5108
Cycle 7 UPSG	2917	2384	4705	5630
Expresso	3270	3477	6747	6369
Kanlow	2479	2807	5286	5468
Mean	2914	3252	5198	5919
$LSD_{0.05}$	794	1016	1607	1098
CV%	19	21	21	13

[1]Planted: May 29, 2013 Soil type: Basin Loam

Table 4. Forage nutritive value at Poplarville, 2015.[1]

Species	Harvest date					
	6/3/15			8/4/15		
	NDF	ADF	CP	NDF	ADF	CP
	%	%	%	%	%	%
Big bluestem	73	41	6	75	42	7
Indiangrass	69	39	9	—	—	—
Little bluestem	70	39	9	—	—	—
Switchgrass	71	38	8	73	40	7
Mean	71	39	8	74	41	7
$LSD_{0.05}$	NS	1.17	1	NS	NS	NS
CV%	2	2	7	3	5	7

[1]NS = Not Significant
NDF= Neutral Detergent Fiber, ADF= Acid Detergent Fiber, CP= Crude Protein

Table 5. Forage dry matter yields at Newton, 2015.[1]

Species/Variety	Harvest date		Total	2014-15 avg.
	6/24/15	8/28/15		
	lb/A	*lb/A*	*lb/A*	*lb/A*
Big bluestem				
Earl	1735	1708	3443	3005
Kaw	2225	2495	4720	4038
OZ-70	2881	2311	5192	4731
Roundtree	1715	1774	3489	2873
Suther	2164	1904	4068	3570
Indiangrass				
Cheyenne	1909	2814	4722	—
Cycle 7 IG	2276	2106	4381	—
Little bluestem				
Aldous	2086	1496	3582	—
Cimmarron	2653	2103	4756	—
Mean	2183	2079	4262	3643
$LSD_{0.05}$	NS	703	NS	NS
CV%	32	23	25	24

[1]NS = Not Significant
Planted: May 24, 2013 Replanted: June 5, 2014 Soil type: Prentiss Fine Sandy Loam

Table 6. Forage nutritive value at Newton, 2015.[1]

Species	Harvest date					
	6/24/15			8/28/15		
	NDF	ADF	CP	NDF	ADF	CP
	%	%	%	%	%	%
Big bluestem	70	40	7	70	40	8
Indiangrass	76	42	6	73	43	7
Little bluestem	74	41	6	74	41	7
Mean	73	41	6.5	72	42	7.5
$LSD_{0.05}$	2.5	NS	NS	NS	NS	NS
CV%	1.3	.98	7.1	1.7	3.3	8

[1]NS = Not Significant
NDF= Neutral Detergent Fiber, ADF= Acid Detergent Fiber, CP= Crude Protein

Table 7. Forage dry matter yields at Starkville, 2015.[1]

Species/Variety	Harvest date		Total	2014-15 avg.
	6/10/15	8/20/15		
	lb/A	*lb/A*	*lb/A*	*lb/A*
Big bluestem				
Cycle 7 BBS	3690	3036	6727	5251
Earl	3363	3323	6686	4964
Kaw	3146	2669	5814	4575
OZ-70	3585	2958	6544	5061
Roundtree	3480	2879	6359	4911
Suther	3484	3215	6698	4891
Switchgrass				
Alamo	3781	3353	7134	4771
Blackwell	1732	2010	3741	2230
Cave n Rock	1970	1775	3745	2662
Cycle 7 UPSG	2119	2454	4573	2961
Expresso	2653	2454	5107	3671
Kanlow	2498	2257	4755	2902
Mean	2959	2698	5657	4071
$LSD_{0.05}$	1196	866	1825	1487
CV%	28	22	22	25

[1]Planted: May 30, 2013 Soil type: Marietta Fine Sandy Loam

Table 8. Forage nutritive value at Starkville, 2015.[1]

Species	Harvest date 8/20/15		
	NDF	ADF	CP
	%	%	%
Big bluestem	76	44	4.2
Switchgrass	73	40	3.6
Mean	74.5	42	3.9
$LSD_{0.05}$	2.5	1.2	0.56
CV%	2	2	9

[1]NDF= Neutral Detergent Fiber, ADF= Acid Detergent Fiber, CP= Crude Protein

Table 9. Forage dry matter yields at Holly Springs, 2015.[1]

Species/Variety	Harvest date		Total	2014-15 avg.
	7/21/15	10/2/15		
	lb/A	*lb/A*	*lb/A*	*lb/A*
Big bluestem				
Cycle 7 BBS	3008	2001	5009	4547
Earl	2139	1514	3653	2520
Kaw	2583	1121	3704	3112
OZ-70	2087	1653	3740	2777
Roundtree	2099	1086	3185	2837
Suther	2084	1571	3656	2715
Indiangrass				
Cheyenne	—	1791	1791	1932
Cycle 7 IG	—	2645	2645	3001
Mean	2213	1644	3120	2729
$LSD_{0.05}$	536	500	806	741
CV%	15	20	16	17

[1]Planted: May 31, 2013 Soil type: Grenada Silt Loam

Table 10. 2015 forage dry matter yield for species at Poplarville, Newton, Starkville, and Holly Springs.[1]

Species	Poplarville	Newton	Starkville	Holly Springs
	lb/A	*lb/A*	*lb/A*	*lb/A*
Big bluestem	7405	4182	6471	3824
Indiangrass	2341	4551	—	2217
Little bluestem	2356	4169	—	—
Switchgrass	5257	—	4842	—
Mean	4339	4300	5656	3020
$LSD_{0.05}$	1827	NS	827	695
CV%	24	27	25	22

[1]NS = Not Significant

Table 11. 2014-15 2-year average forage dry matter yield for species at Poplarville, Newton, Starkville, and Holly Springs.[1]

Species	Poplarville	Starkville	Holly Springs
	lb/A	*lb/A*	*lb/A*
Big bluestem	8099	4942	3084
Indiangrass	4123	—	2466
Little bluestem	3388	—	—
Switchgrass	5544	3199	—
Mean	5288	4070	2775
$LSD_{0.05}$	1567	643	NS
CV%	18	27	28

[1]NS = Not Significant

Table 13. Seed suppliers for native grass variety trial.		
Species	**Variety**	**Company/Source**
Big bluestem	Earl	Bamert Seed Company
	Kaw	Bamert Seed Company
	OZ-70	Bamert Seed Company
	Roundtree	Bamert Seed Company
	Cycle 7 BBS	Mississippi State University
	Suther	Public
Indiangrass	Cheyenne	Bamert Seed Company
	Cycle 7 IG	Mississippi State University
Little bluestem	Aldous	Bamert Seed Company
	Cimmarron	Bamert Seed Company
Switchgrass	Alamo	Bamert Seed Company
	Blackwell	Bamert Seed Company
	Cave n Rock	Public
	Cycle 7 UPSG	Mississippi State University
	Expresso	Mississippi State University
	Kanlow	Public

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