MISSISSIPPI PERENNIAL COOL-SEASON FORAGE CROP

VARIETY TRIALS, 2018

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MISSISSIPPI'S OFFICIAL VARIETY TRIALS

MISSISSIPPI STATE UNIVERSITY™
MS AGRICULTURAL AND
FORESTRY EXPERIMENT STATION

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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.

Cover photo by Rocky Lemus

Mississippi Perennial Cool-Season Forage Crop Variety Trials, 2018

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Visit our website at ***mafes.msstate.edu/variety-trials/forage.asp***.

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INTRODUCTION

Varieties of forage crops are evaluated every year in MAFES small-plot trials. Seed for the entries are provided by seed companies and state universities and tested at one or more locations across Mississippi. All entries from privately owned companies are tested on a fee basis. Standard varieties were added by MAFES as a reference for comparison purposes. In addition, varieties of interest were also added when applicable. Seed sources are presented in Table 11. This report contains data from six tall fescue varieties (*Festuca arundinaceus)*, 11 perennial clover varieties (white clover, *Trifolium repens*; red clover, *Trifolium pretense*), and four alfalfa varieties (*Medicago sativa*), all established in fall 2017. Locations are the North Mississippi Branch Experiment Station at Holly Springs, Prairie Research Unit at Prairie, H. H. Leveck Animal Research Farm Forage Unit at Starkville, and Coastal Plain Branch Experiment Station at Newton.

STAND ESTABLISHMENT AND PERSISTENCE

Tall fescue varieties established well across all locations, but some varieties suffered stand loss during the summer, justifying the need for stand ratings to be recorded in fall 2018 at all locations (Table 10). All alfalfa plots across the testing locations failed to persist into fall 2018.

Data presented in Tables 4–10 can be used to evaluate the performance of each forage variety or species within that test. Comparisons were statistically evaluated by using the LSD (least significant difference). The LSD represents the amount of yield that must be observed between any two varieties to determine if the differences observed were due to variety variation alone. Coefficient variation (CV) describes the accuracy of the test compared to other tests. Highly variable results between replications will be reflected in a high CV.

Table 1. Monthly rainfall totals for Newton, Starkville, Prairie, and Holly Springs, 2018.

Location	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
Newton	2.48	9.46	5.35	6.52	2.66	4.70	8.52	4.82	7.07	—	—
Starkville	2.03	10.33	5.61	5.93	1.92	4.34	4.98	2.82	11.08	—	—
Prairie	1.32	10.26	2.79	8.70	4.21	3.28	3.80	4.29	4.01	—	—
Holly Springs	3.37	12.98	3.74	7.49	4.44	7.50	3.05	5.02	6.92	—	—
MS 30-yr. avg.	4.96	4.76	5.04	4.96	4.37	4.13	4.80	4.25	3.03	3.94	4.76

Table 2. Mean high and low temperatures by month for Newton, Starkville, Prairie, and Holly Springs, 2018.												
Location	**Jan.**	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
	°F	*°F*	*°F*	*°F*	*°F*	*°F*	*°F*	*°F*	*°F*	*°F*	*°F*	*°F*
Newton												
High	55	71	71	75	89	93	94	92	91	81	—	—
Low	30	50	46	48	64	71	73	72	72	59	—	—
Starkville												
High	49	65	67	71	88	93	93	93	90	79	—	—
Low	26	43	43	44	64	71	72	71	70	56	—	—
Prairie												
High	—	—	—	—	—	—	—	—	—	—	—	—
Low	—	—	—	—	—	—	—	—	—	—	—	—
Holly Springs												
High	49	63	63	70	87	90.7	92	91	88	77	—	—
Low	27	44	41	46	65	70	73	71	70	56	—	—
MS 30-yr. avg.												
High	56	60	69	76	83	89	92	92	87	77	67	58
Low	35	38	45	52	62	69	72	71	65	53	44	37

PROTOCOL

Tall fescue, perennial clovers, and alfalfa trials across the state were established in fall 2017. Soil samples from each location were collected and analyzed by the Mississippi State University Soil Testing Lab. Each trial area was amended with lime, phosphorus (P_2O_5), and potassium (K_2O) according to soil test recommendations. Recommendations for phosphorus and potassium in grass were usually fulfilled with one application of 13-13-13. Plot dimensions were 6 feet by 10 feet and planted using a precision cone seeder (ALMACO plot drill) on a prepared seedbed. The experimental design was a randomized complete block replicated four times. Recommended seeding rates were based on pure live seed (PLS) and are presented in Table 3. All grass plots were harvested when 75% of the plots achieved 15 inches of growth. Alfalfa was harvested at 10% bloom, and clovers were harvested when 75% of plots were 10–15 inches tall. Perennial clovers, alfalfa, and tall fescue were harvested to a stubble height of 3 inches. Plots were harvested with a Winterstieger plot harvester (Austria) equipped with a forage header. A subsample was collected and dried at 131°F to calculate dry matter (DM) percentage. Data were analyzed using the general linear model (PROC GLM) of SAS and mean separation was conducted using the LSD at $\alpha = 0.05$.

Climate data is recorded in Table 1 and 2 from Holly Springs, Prairie, Starkville, and Newton for 2018.

Table 3. Seeding rates used in variety trials.[1]	
Variety	**Seeding rate (PLS)**
	lb/A
Alfalfa	20
Red Clover	12
Tall Fescue	20
White Clover	3

[1]PLS = Pure Live Seed.

PERENNIAL CLOVER AND ALFALFA

Alfalfa is a perennial legume common in the Midwest and irrigated areas in the West and North. Alfalfa varieties have been selected for more Southern climates, but stand persistence can still be a problem in Mississippi. Several diseases and pests, such as crown rot (*Sclerotinia trifoliorum)*, stem rot (*Phytophthora medicaginis*), alfalfa weevil (*Hypera hostica*), and leafhoppers (*Empoasca solana*), can decrease dry matter yield and decrease stand persistence. Alfalfa is also sensitive to soil pH and should be maintained at 6.5 or greater. Alfalfa is one of the few forages that include both RoundUp Ready® and conventional varieties. Planting should take place between September and October at a seeding rate of 20 pounds per acre on a firm seedbed. Most of the yield distribution for alfalfa is in early summer to early fall. Alfalfa can also be successfully established in warm-season sod grasses to increase hay quality and yield distribution especially in low nitrogen input situations.

Red clover is a short-lived perennial in Mississippi, rarely surviving the summers. In central to southern Mississippi, it should be treated as an annual. Red clover tolerates wet, acidic soils and withstands shading during the seedling stage, which gives it potential to be overseeded in sod grasses. When seeding in an established pasture system, it is best to plant between October 15 and November 20. In grass mixtures, plant red clover at 4–8 pounds per acre, but in pure stands, 12 pounds per acre will be sufficient.

White clover is more persistent than red clover, but yields are typically less. It does offer more opportunity in grazing situations than in hay harvest because of its prostrate growth habit. White clover is tolerant of wet soils and prefers a pH of 6 or above. Plant white clover at 3–4 pounds per acre in pure stands or 2–3 pounds per acre in mixtures between September and October. Like red clover, white clover acts as an annual in the southern part of the state, but it has a greater reseeding potential. Both species of clovers have excellent forage quality, but white clover tends to have a greater potential to cause bloat. When grazing white clover, it is recommended to interseed with grass to reduce bloat potential.

Table 4. Dry matter yields of alfalfa, red clover, and white clover varieties in Holly Springs, 2018.

Variety	6/5/18
	lb/A
Alfalfa	
Georgia 505	1684
Georgia 805	1092
SW6334	1982
SW7354	2617
Red Clover	
RC 0701	3197
Rustler	2363
Southern Belle	3096
Sport	1893
White Clover	
Companion	2083
Cobra	2361
PPG-TR-101	2904
Rampart	2176
Redhawk	2050
Renovation	2065
Romano	1656
Mean	2215
$LSD_{0.05}$	888
CV%	28

Planted: October 17, 2017 Soil: Grenada Silt loam
Herbicide: Pursuit (ammonium salt of imazethapyr) 4 oz/A after first harvest

Results — Perennial clover and alfalfa yield averaged 3,588 pounds of dry matter per acre across the state. Holly Springs, Starkville, and Newton produced relative yields of 61%, 125%, and 113% of the state average, respectively. At all locations, red clover varieties produced the greatest average DM yield, while alfalfa produced the least DM yield, likely due to late-summer die off.

Table 5. Dry matter yields of alfalfa, red clover, and white clover varieties in Starkville, 2018.

Variety	5/4/18	6/19/18	Total
	lb/A	*lb/A*	*lb/A*
Alfalfa			
Georgia 505	2333	621	2955
Georgia 805	4034	524	4165
SW6334	2737	604	3342
SW7354	2836	573	3408
Red Clover			
RC 0701	4128	1353	5482
Rustler	5054	1182	6236
Southern Belle	4670	1161	5831
Sport	4546	757	5303
White Clover			
Companion	4604	—	4604
Cobra	3758	—	3758
PPG-TR-101	4350	—	4350
Rampart	4009	—	4009
Redhawk	4535	—	4535
Renovation	4612	—	4612
Romano	4730	—	4730
Mean	4062	847	4488
$LSD_{0.05}$	1025	NS[1]	NS
CV%	31	36	34

[1]NS: Not Significant
Planted: October 18, 2017 Soil: Marietta Fine Sandy loam
Herbicide: Pursuit (ammonium salt of imazethapyr) 4 oz/A after first harvest

Table 6. Dry matter yields of alfalfa, red clover, and white clover varieties in Newton, 2018.

Variety	5/4/18
	lb/A
Alfalfa	
Georgia 505	2333
Georgia 805	4034
SW6334	2737
SW7354	2836
Red Clover	
RC 0701	4128
Rustler	5054
Southern Belle	4670
Sport	4546
White Clover	
Companion	4604
Cobra	3758
PPG-TR-101	4350
Rampart	4009
Redhawk	4535
Renovation	4612
Romano	4730
Mean	4062
$LSD_{0.05}$	1025
CV%	31

Planted: October 19, 2017 Soil: Prentiss Sandy loam
Herbicide: Pursuit (ammonium salt of imazethapyr) 4 oz/A after first harvest

TALL FESCUE

Tall fescue is a perennial grass with short rhizomes and is primarily grown in the northern part of the state. It does well on poorly drained soils, making it popular in lowland areas. Tall fescue should be established from September to October at a seeding rate of 15–20 pounds per acre. During the establishment year, avoid grazing below 4 inches to minimize stand failure. Tall fescue tolerates soil pH of 5.8 to 7.5 and responds well to nitrogen. Endophyte toxicity can be a problem; however, grazing management, the inclusion of clovers, and the use of novel-endophyte and endophyte-free varieties can be used to mitigate the harmful effects of the toxin.

Results — Two tall fescue varieties suffered severe stand loss in Starkville, only one variety exhibited decreased persistence in Holly Springs, and all plots appeared similar at Prairie (Table 10). The average DM yield across locations averaged 4,476 pounds DM per acre. Holly Springs, Prairie, and Starkville produced relative DM yields of 59%, 143%, and 98% of the state average, respectively.

Table 7. Dry matter yields of tall fescue varieties in Holly Springs, 2018.

Variety	5/10/18	11/26/18	Total
	lb/A	*lb/A*	*lb/A*
Baroptima plus 34	2119	489	2608
BAR FA 6BTR179	1795	218	2013
PPG-TF-112	2002	326	2328
K31	2188	349	2537
Texoma MaxQ	2994	599	3593
STF50	2545	331	2877
Mean	2274	385	2659
$LSD_{0.05}$	NS[1]	178	813
CV%	25	30	20

[1]NS: Not Significant
Planted: October 17, 2017 Soil: Grenada Silt Loam
Fertilized: 100 lb/A of 13-13-13 at planting and 50 lb/A of N using urea ammonium sulfate after harvest
Herbicide: GrazonNext (aminopyralid + 2,4-D) 1 pt/A

Table 8. Dry matter yields of tall fescue varieties in Prairie, 2018.

Variety	6/5/18	10/31/18	Total
	lb/A	*lb/A*	*lb/A*
Baroptima plus 34	4108	2154	6262
BAR FA 6BTR179	4210	2111	6321
PPG-TF-112	3898	2242	6140
K31	4537	2204	6741
Texoma MaxQ	4111	2756	6867
STF50	3872	2192	6064
Mean	4123	2276	6399
$LSD_{0.05}$	NS[1]	NS	NS
CV%	20	22	14

[1]NS: Not Significant
Planted: October 12, 2017 Soil: Houston Clay
Fertilized: 100 lb/A of 13-13-13 at planting and 50 lb/A of N using urea ammonium sulfate after harvest
Herbicide: GrazonNext (aminopyralid + 2,4-D) 1 pt/A

Table 9. Dry matter yields of tall fescue varieties in Starkville, 2018.

Variety	5/30/18	4/19/18	11/29/18	Total
	lb/A	*lb/A*	*lb/A*	*lb/A*
Baroptima plus 34	3392	672	358	4421
BAR FA 6BTR179	3435	648	189	4272
PPG-TF-112	2799	667	371	3837
K31	3323	699	441	4462
Texoma MaxQ	3264	530	534	4328
STF50	3749	675	482	4906
Mean	3327	648	396	4371
$LSD_{0.05}$	NS[1]	NS	175	NS
CV%	24	28	29	21

[1]NS: Not Significant
Planted: October 18, 2017 Soil: Marietta fine sandy loam
Fertilized: 100 lb/A of 13-13-13 at planting and 50 lb/A of N using urea ammonium sulfate after harvest
Herbicide: GrazonNext (aminopyralid + 2,4-D) 1 pt/A

Table 10. 2018 stand ratings of tall fescue varieties in Holly Springs, Prairie, and Starkville, 2018.[1]

Variety	Holly Springs	Prairie	Starkville	Average
Baroptima plus 34	4	4	2	3
BAR FA 6BTR179	2	4	2	3
PPG-TF-112	4	4	3	3
K31	4	4	4	4
Texoma MaxQ	4	4	4	4
STF50	4	4	4	4
Mean	4	4	3	3

[1]Rating: Stand survival in the fall 2018 — 1 = Poor (< 25% stand), 2= Moderate (25–50% stand), 3 = Good (50–75% stand), 4 = Excellent (75–100%)

Table 11. Variety and seed sources for the 2018 perennial forage variety trial.	
Variety	**Company**
Alfalfa	
Georgia 505	MSU Check
Georgia 805	MSU Check
SW6334	S&W Seed Company
SW7354	S&W Seed Company
White Clover	
Cobra	The Noble Foundation
Companion	Oregro Seeds
PPG-TR-101	Mountain View Seeds
Rampart	Oregro Seeds
Redhawk	Oregro Seeds
Renovation	Smith Seed Services
Romano	Oregro Seeds
Red Clover	
RC 0701	Mountain View Seeds
Rustler	Oregro Seeds
Southern Belle	MSU Check
Sport	Oregro Seeds
Tall Fescue	
BAR FA 6BTR179	Barenbrug USA
Baroptima plus 34	Barenbrug USA
K31	MSU Check
PPG-TF-112	Mountain View Seeds
STF50	Smith Seed Services
Texoma MaxQ	Barenbrug USA

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George M. Hopper, Director **www.mafes.msstate.edu**