MISSISSIPPI PERENNIAL COOL-SEASON FORAGE CROP VARIETY TRIALS, 2022

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MISSISSIPPI'S OFFICIAL VARIETY TRIALS

MISSISSIPPI STATE UNIVERSITY™
MS AGRICULTURAL AND
FORESTRY EXPERIMENT STATION

Mississippi Perennial Cool-Season Forage Crop Variety Trials, 2022

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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. The 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. Seed sources are presented in Table 8. This report contains data for tall fescue (Festuca arundinacea), perennial clovers (white clover, Trifolium repens; red clover, Trifolium pretense), alfalfa (Medicago sativa), and chicory (Cichirium intybus) all established in the fall of 2020. Trial locations are Leveck Animal Research Farm Forage Unit at Starkville and Black Belt Branch Experiment Station at Brooksville.

Data presented in Tables 2 to 8 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) at the 0.05 probability level. 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.

PROTOCOL

Tall fescue, perennial clovers, and alfalfa trials across the state were established in October 2020. Soil samples from each location were taken and analyzed at the Mississippi State University Soil Testing Lab. Each trial area was fertilized with lime, phosphorus (P_2O_5), and potassium (K_2O) according to soil test recommendations. Recommendations for phosphorus and potassium in the grass were usually fulfilled with one application of 13-13-13. Tall fescue trials were fertilized with 350 pounds per acre of 13-13-13 at planting, followed by 50 pounds per acre of N using urea ammonium sulfate (33-0-0S) after each harvest. Plot dimensions were 6 feet by 10 feet and planted using a precision cone seeder on a prepared seedbed. Plots were arranged as a randomized complete block replicated four times. Recommended seeding rates were based on pure live seed (PLS) and are presented in Table 1. All grass plots were harvested when 75% of the plots achieved 15 inches of growth. Alfalfa was harvested at 50% bloom, and clovers were harvested when 75% of plots were 10–15 inches in height. Perennial clovers, alfalfa, and tall fescue were harvested to a 4-inch stubble height. Plots were harvested with a Winterstieger plot harvester equipped with a forage header. A subsample was collected and dried at 131°F until dry to calculate the dry matter percentage (DM). Data were analyzed using the general linear model (PROC GLM) of SAS and mean separation was conducted using the least significant difference (LSD) at $\alpha = 0.05$.

Table 1. Seeding rates used in variety trials.[1]

Variety	Seeding rate (PLS)
	lb/A
Alfalfa	20
Red Clover	12
Tall Fescue	20
White Clover	3
Chicory	15

[1]PLS = Pure Live Seed.

PERENNIAL CLOVER AND ALFALFA

Alfalfa is a perennial legume common in the Midwest and irrigated west and northern regions of the United States. Alfalfa varieties have been bred for more Southern climates, but stand persistence can be a problem. Several diseases and pests such as crown rot (Sclerotinia trifoliorum), stem rot (Phytophthora medicaginis), alfalfa weevil (Hypera hostica), and leafhoppers (Empoasca solana) are major problems. Alfalfa is also very 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 the 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 2–3 pounds per acre in mixed stands or 3–4 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 the potential for bloat.

Table 2. Dry matter yields of alfalfa, red clover, and white clover varieties by harvest date in Starkville.

Variety	5/11/22	Total
	lb/A	*lb/A*
Alfalfa		
Bulldog	1734	5609
GO-FU	1816	4331
UF 2015	—	—
Red Clover		
CV30091	1893	6566
CW040040	2581	6466
Dynamite	2246	6797
Q	2352	5869
White Clover		
Cresendo	2390	6215
Domino	2037	4614
Stamina	2247	5200
Aberlasting	1660	5144
Mean	2096	5681
$LSD_{0.05}$	724	NS
CV,%	23	28

Planted: 10-8-20
NS: not significant
Herbicide: 5 oz/A of imazethapyr
Soil type: Marietta Fine Sandy Loam

Table 3. Dry matter yields of alfalfa, red clover, and white clover varieties by harvest date in Brooksville.

Variety	5/18/22	6/29/22	9/29/22	2022	2021
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Alfalfa					
Bulldog	1734	4139	3960	10176	8006
GO-FU	1816	1934	3042	5893	6228
UF 2015	—	3197	3077	7474	5872
Red Clover					
CV30091	1893	1504	3234	4738	4749
CW040040	2581	1934	2819	4752	5511
Dynamite	2246	1912	2511	4422	5430
Q	2352	2171	2934	5105	5054
White Clover					
Cresendo	2390	872	2408	3281	5319
Domino	2037	1023	2756	3779	2222
Stamina	2247	739	2459	3198	5265
Aberlasting	1660	1389	3833	5222	2806
Mean	2096	1892	3003	5276	6523
$LSD_{0.05}$	724	1170	NS	2110	3044
CV, %	23	42	25	27	45

Planted 10-7-20
NS: not significant
Herbicide: 5 oz/A of imazethapyr
Soil type: Silty Clay

Figure 1. Alfalfa regrowth after extreme frost in December of 2022 at Brooksville — GO-FU (left), Bulldog 505 (right)

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 low land areas. Tall fescue should be established from September to October at a seeding rate of 15–20 pounds per acre. During the establishment (mid-March to late June) year, avoid grazing below 4 inches and do not graze from July to September to minimize stand failure. Tall fescue tolerates soil pH of 5.8 to7.5 and responds well to nitrogen. Endophyte toxicity can be an issue; however, 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.

Table 4. Dry matter yields of tall fescue varieties by harvest date in Brooksville.

Variety	5/18/22	9/29/22	2022	2021
	lb/A	*lb/A*	*lb/A*	*lb/A*
Armory	3114	3559	6674	7280
BAR 9301BTR1	2627	3002	5629	4979
BAR BTR NEA23	2913	3329	6241	6804
BAR FA6 BTR 179	2021	2310	4330	4563
BarOptima PLUS e34	1841	2104	3946	4452
Estancia/ArkShield	4099	4685	8783	7812
GALA16101T	2802	3203	6005	4413
Kentucky 32	3496	3996	7492	6573
SLTF10-3	1640	1874	3514	2326
Mean	2728	3118	5846	5467
$LSD_{0.05}$	NS	NS	44	3844
CV, %	40	40	NS	43

Planted 10-7-20
NS: not significant
Fertilizer: 50 lb/A N (13-13-13) after planting and 50 lb/A N (33-0-0S) after each harvest
Herbicides: 1 qt/A of aminopyralid and 2,4-D after first harvest
Soil type: Silty Clay

Table 5. Dry matter yields of tall fescue varieties by harvest date in Starkville.		
Variety	**5/3/22**	**2021**
	lb/A	*lb/A*
Armory	1820	2743
BAR 9301BTR1	738	2002
BAR BTR NEA23	936	2409
BAR FA6 BTR 179	624	2076
BarOptima PLUS e34	723	2548
Estancia/ArkShield	1387	3092
GALA16101T	1375	3373
Kentucky 32	1887	3145
SLTF10-3	559	2067
Mean	1117	2606
$LSD_{0.05}$	599	844
CV, %	26	22

Planted: 10-1-20
NS: Not Significant
Fertilizer: 50 lb/A N (13-13-13) after planting and 50 lb/A N (33-0-0S) after each harvest
Herbicides: 1 qt/A of aminopyralid and 2,4-D after first harvest
Soil type: Stough Fine Sandy Loam

CHICORY

Chicory (Cichorium intybus) is a perennial, short-lived herb native to Europe with growth potential in Mississippi from April to August. It produces a deep taproot and easily reseeds itself if allowed to flower. It is ideally planted in the fall and allowed to establish before winter. Chicory is highly nutritive and extremely succulent, and it tends to be resistant to armyworms herbivory. By late spring and throughout the summer it readily produces seed heads and may become less palatable to livestock. Heavy grazing with nitrogen fertilizer application is suggested to maintain good forage quality.

Table 8. Dry matter yields of chicory varieties by harvest date in Starkville.

Variety	4/21/22	6/9/22	2022	2021
	lb/A	*lb/A*	*lb/A*	*lb/A*
Additive	1761	1730	3491	6168
DLF	1011	1288	2299	4643
Endure	1881	1911	3793	5515
Oasis	1498	1409	2907	6093
Six Point	1697	1550	3248	5883
Trigger	726	908	1634	5746
Mean	1429	1466	2895	6168
$LSD_{0.05}$	850	NS	NS	4643
CV, %	33	35	31	5515

Planted 10-8-20
*NS: Not Significant
Fertilizer: 50 pounds of N per acre (13-13-13) after planting and 50 pounds of N per acre using (33-0-0S) after each harvest
Soil Type: Savannah Fine Sandy Loam

Table 7. Dry matter yields of chicory varieties by harvest date in Brooksville.

Variety	5/18/22	6/29/22	9/22/22	2022	2021
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Additive	2686	1273	1547	5507	7804
DLF	2768	1167	2018	5953	9323
Endure	2595	1329	1595	5519	7709
Oasis	2017	1081	1776	4875	8010
Six Point	2613	1235	1940	5788	7918
Trigger	2174	1258	1611	5043	7688
Mean	2475	1224	1748	5447	8075
$LSD_{0.05}$	NS	NS	NS	NS	1578
CV, %	26	17	30	21	11

Planted: 10-7-20
*NS: Not Significant
Fertilizer: 50 pounds of N per acre (13-13-13) after planting and 50 pounds of N per acre using (33-0-0S) after each harvest
Soil Type: Silty Clay

Figure 2. Chicory tissue damage and recovery from December 2022 freeze.

Table 8. Seed sources and support for the perennial cool-season forage variety trial.

Variety	Seed Company/source	Variety	Seed Company/source
Chicory		**Perennial Clover**	
Oasis	Mountain View Seeds	CV30091	Baranburg
Additive	Mountain View Seeds	CW040040	Baranburg
Six Point	Mountain View Seeds	Cresendo	Baranburg
Endure	Mountain View Seeds	Stamina	Grassland Oregon
Trigger	Mountain View Seeds	Dynamite	Grassland Oregon
DLF	Mountain View Seeds	Q Grassland Oregon	
Tall Fescue	Domino	Grassland Oregon	
BAR FA6 BTR 179	Baranbrug	AberLasting	Grassland Oregon
BAR BTR NEA23	Baranbrug	GO-FU	Grassland Oregon
Armory	Baranbrug	Bulldog 505	Check
BAR 9301BTR1	Baranbrug	UF 2015 AP	University of Florida
BarOptima PLUS e34	Baranbrug		
Estancia/ArkShield	MTV		
Kentucky 32	Oregro		
SLTF10-3	Oregro		
GALA16101T	University of Georgia		

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Scott Willard, Director **www.mafes.msstate.edu**