

MISSISSIPPI ANNUAL COOL-SEASON FORAGE CROP VARIETY TRIALS, 2023

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MISSISSIPPI'S OFFICIAL VARIETY TRIALS



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MS AGRICULTURAL AND
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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 15 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 seed sources in this research are listed on Page 15.

Mississippi Annual Cool- Season Forage Crop Variety Trials, 2023

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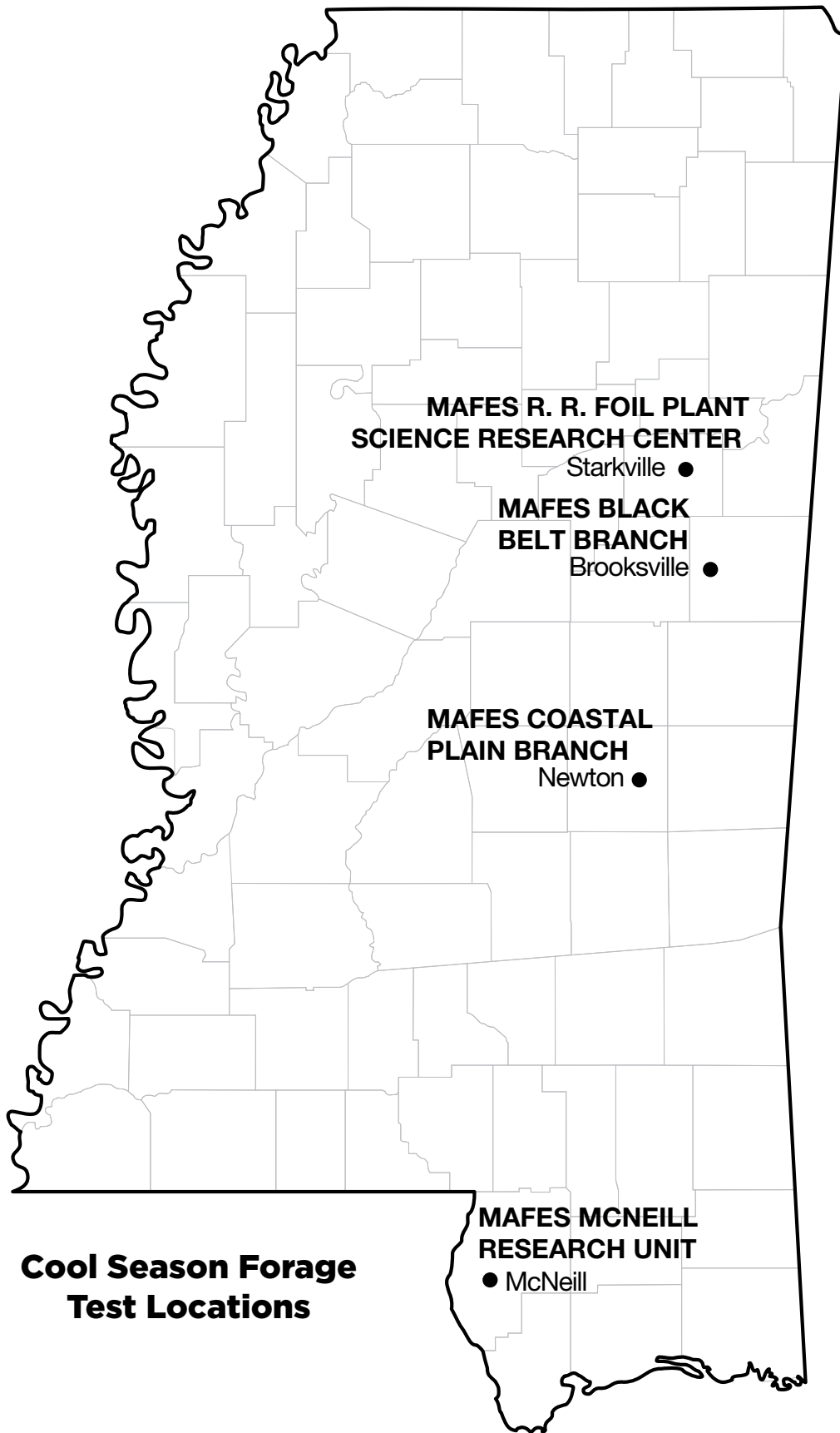
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Find variety trial information online at mafes.msstate.edu/variety-trials.



Mississippi Annual Cool-Season Forage Variety Trials, 2023

INTRODUCTION

Varieties of several forage crop species are evaluated every year in the Mississippi Agricultural and Forestry Experiment Station's (MAFES) small-plot forage trials. Entries are provided by seed companies as well as forage and breeding programs at state universities. Experimental and commercially available varieties are tested at one or more locations across Mississippi. All entries from privately owned companies are tested on a fee basis. Some varieties may be added by the MAFES forage variety testing program as a reference for comparison purposes. In addition, varieties of interest may also be added when applicable. Testing was conducted at the following locations: MAFES H.H Leveck Animal Research Center Forage

Unit (Mississippi State campus), MAFES Black Belt Experiment Station (Brooksville, MS), MAFES Coastal Plain Experiment Station (Newton, MS), and MAFES McNeill Research Unit (McNeill, MS).

Data presented in Tables 2-12 are used to evaluate the performance of each forage crop within its respective trial. Mean and harvest comparisons were statistically evaluated by using the least significant difference (LSD) test at the probability level of $\alpha = 0.05$. The LSD value represents the minimum amount of dry matter yield (lb DM/A) that must be observed between any two varieties to determine if the difference was due to the variety's performance alone. Sources of seed are presented in Table 13.

PROTOCOL

Annual ryegrass, small grains, and annual clover trials across the state were established between October and November of 2022. At all locations, soil samples were taken and analyzed by the Mississippi State University Soil Testing Laboratory. Trial areas were amended with lime and fertilized with phosphorus (P_2O_5) and potassium (K_2O) according to the soil test recommendations for individual species. Grass trials were additionally fertilized with 50 lb N/A at planting and after the 1st harvest using urea ammonium sulfate (33-0-0/11S). Plots were 6 ft x 10 ft and planted using an ALMACO (Nevada, IA) precision cone seeder on a prepared seedbed. The trial design was a randomized complete block replicated four times. The seeding rates used are presented in Table 1. Individual trials were harvested when 75% of the plots achieved 15 inches of growth. All plots were harvested to a three-inch stubble height. Plots were harvested using a Winterstieger Cibus F (Winterstieger AG, Ried, Austria) equipped with a forage plot harvester reel type header that collected a 4.8 ft x 10 ft swath to calculate the total yield. A subsample was collected and dried at

130°F until a constant weight was achieved to calculate DM concentration. Data were analyzed using the General Linear Model (PROC GLM) of SAS and mean separation was conducted using LSD at $\alpha = 0.05$.

Table 1. Recommended seeding rates for cool-season forage crops.

Type	Species	lb/A PLS
Annual Grasses	Rye	100
	Oat	100
	Triticale	100
	Ryegrass	30
Annual Clovers	Arrowleaf	10
	Berseem	25
	Balansa	4
	Ball	3
	Crimson	30
	Persian	8

ANNUAL RYEGRASS VARIETY TEST

INTRODUCTION

Annual ryegrass is the most relevant and versatile cool-season annual grass for livestock producers in Mississippi. In pasture and hay systems, annual ryegrass is a popular forage because of its ease of establishment, high nutritive value, high yielding potential, good reseeding ability, and adaptability to a wide range of soil types. Annual ryegrass can be established in pure stands or mixed with small grains and/or clovers for cool-season forage production. For these reasons, annual ryegrass is a staple for many cool-season grazing programs in Mississippi. Recommended planting dates vary by location but usually fall between September to mid-October for prepared seedbed or late October if overseeded on a warm-season perennial grass pasture. Seeding rates are 30 lb/A for pure stands and 20 lb/A for mixtures with small grains and/or clovers. Annual ryegrass is responsive to nitrogen fertilizer and its use should be split into two applications for grazing systems. Reasonable productivity can be expected

from November to May in the southern part of Mississippi and February to May in the northern part of Mississippi. Annual ryegrass should normally be allowed to reach an initial height of at least 10 inches before grazing begins.



RESULTS

Data in Tables 2-5 present the yield performance of ryegrass varieties across Mississippi. The mean total yield was greatest in McNeill (7484 lb/A) and Brooksville (6429 lb/A) since harvest was delayed and allowed to grow over 15 inches increasing overall biomass production. This was largely due to wet field conditions impeding harvest with the Winterstieger forage harvester. The total mean yield for Starkville

(6032 lb/A) and Newton (5449 lb/A) was consistent with previous years data. In general, the first harvest was delayed significantly at all locations due to extremely cold weather in December that damaged plots at all locations causing ryegrass to initiate new growth from the crowns therefore, delaying early spring harvest (Fig.1).



Figure 1. Ryegrass variety trial in McNeill demonstrating significant height differences in early maturing cultivars due to the extreme frost in December (left) and the residual damage of ryegrass in Starkville after regrowth had occurred.

Table 2. Annual ryegrass production by harvest date and total yield (lb/A) in Starkville, MS.

Variety	Harvest Date			Total Yield
	3/6/23	4/12/23	5/10/23	
Andes	1606	3111	1685	6401
Angusta	1545	3114	1541	6200
Centurion	1685	3377	1709	6771
Credence	1139	2993	1549	5681
Dexter	1220	3047	1775	6041
Diamond T	1309	2957	1713	5979
Double Diamond	1142	3602	1737	6480
Earlyploid	1736	2877	1543	6156
Flying A	950	2801	1287	5038
Frost Proof	1372	2466	1517	5355
GO-MOT	1195	3087	1752	6034
Green Dragon	1532	3541	1635	6708
Grits	1255	2201	1161	4617
Gulf	1325	3274	1586	6185
Jackson	781	3401	1368	5550
Lonestar	1269	3249	1411	5929
Mantis	1629	3499	1814	6941
Marshall	1529	3471	1445	6445
ME-4	1479	3341	1408	6228
ME-94	954	3033	1309	5296
Nelson	1195	3249	1526	5970
PPER7	894	3063	1484	5441
Prine	1622	3182	1655	6459
Ranahan	1304	2736	1698	5738
Rapido	1278	2901	1316	5495
Ration	1424	2821	1652	5896
RM4L	1378	3265	1647	6291
TAMTBO	1664	2833	1599	6096
TAS-TARG-21	1113	3235	1739	6087
Tetrastar	1392	3310	1524	6226
Triangle T	1410	3586	1553	6549
Winterhawk	1243	3460	1499	6202
WMWL	1235	3559	1457	6251
WMWL-2	1304	3682	1351	6337
Mean	1327	3157	1548	6032
LSD 0.05	547	NS	NS	NS
CV, %	29	18	19	16

Planted: 10/20/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/a of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Savannah fine sandy loam

Table 3. Annual ryegrass production by harvest date and total yield (lb/A) in Newton, MS.

Variety	Harvest Date				Total Yield
	2/20/23	3/16/2023	4/11/23	5/8/23	
	lb/A	lb/A	lb/A	lb/A	
Andes	945	1475	889	1688	4997
Angusta	1237	1723	788	1610	5358
Centurion	1225	1622	1175	1872	5895
Credence	835	1273	935	1582	4625
Dexter	896	1402	935	1548	4781
Diamond T	1118	1444	823	1687	5072
Double Diamond	1060	1676	1036	1843	5616
Earlyploid	1397	1862	729	1714	5702
Flying A	866	1482	909	1830	5088
Frost Proof	1571	1937	804	1861	6174
GO-MOT	1008	1548	1069	1290	4915
Green Dragon	1047	1714	800	1748	5309
Grits	1127	1761	750	1747	5385
Gulf	761	1360	910	1723	4755
Jackson	738	1530	1157	1795	5220
Lonestar	1275	1859	924	1945	6003
Mantis	1085	1672	1045	1868	5670
Marshall	1597	2077	1068	1850	6592
ME-4	1453	2033	1273	2007	6767
ME-94	1201	1863	1271	1750	6085
Nelson	1018	1494	1062	1908	5483
PPER7	958	1553	953	1850	5314
Prine	1296	1721	808	1700	5524
Ranahan	1082	1538	986	1660	5266
Rapido	986	1665	946	1788	5385
Ration	957	1596	844	1715	5112
RM4L	980	1533	818	1625	4956
TAMTBO	1149	1721	890	1644	5404
TAS-TARG-21	1332	1465	929	1586	5313
Tetrastar	1049	1614	1020	1915	5599
Triangle T	1144	1476	1006	1570	5197
Winterhawk	1029	1412	1060	1859	5360
WMWL	1214	1861	933	1777	5785
WMWL-2	1104	1686	953	1804	5547
Mean	1110	1637	956	1746	5449
LSD 0.05	351	438	NS	419	990
CV, %	22	19	25	17	12

Planted: 10/20/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Prentiss sandy loam

Table 4. Annual ryegrass production by harvest date and total yield (lb/A) in McNeill, MS.

Variety	Harvest Date		Total Yield
	3/20/23	5/12/23	
	lb/A	lb/A	
Andes	3277	6314	9592
Angusta	4199	5819	10018
Centurion	2205	4576	6780
Credence	3507	4042	7549
Dexter	917	3307	4224
Diamond T	3270	3949	7220
Double Diamond	2222	5666	7889
Earlyploid	3899	3274	7173
Flying A	3475	3679	7154
Frost Proof	3519	4198	7717
GO-MOT	1581	6761	8342
Green Dragon	3030	2875	5905
Grits	3745	4249	7994
Gulf	2011	1842	3853
Jackson	2173	5262	7435
Lonestar	2445	2944	5389
Mantis	2553	5748	8301
Marshall	1597	5676	7272
ME-4	2930	6585	9514
ME-94	2172	6133	8305
Nelson	2750	6518	9268
PPER7	2162	4478	6639
Prine	2494	4897	7391
Ranahan	2437	5556	7992
Rapido	4227	1231	5458
Ration	2679	5225	7905
RM4L	2420	6167	8588
TAMTBO	3382	4683	8064
TAS-TARG-21	2701	5757	8458
Tetrastar	3152	4089	7242
Triangle T	3138	5191	8329
Winterhawk	3441	2681	6122
WMWL	2259	5525	7783
WMWL-2	2580	5020	7600
Mean	2781	4703	7484
LSD 0.05	1352	1292	2466
CV, %	34	13	16

Planted: 11/9/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Ruston fine sandy loam

Table 5. Annual ryegrass production by harvest date and total yield (lb/A) in Brooksville, MS.

Variety	Harvest Date		Total Yield
	3/22/23	5/11/23	
	lb/A	lb/A	
Andes	1103	6365	7467
Angusta	717	4934	5651
Centurion	873	5314	6187
Credence	788	5163	5951
Dexter	1048	7046	8094
Diamond T	638	6704	7342
Double Diamond	876	4691	5567
Earlyploid	913	4041	4954
Flying A	483	5325	5809
FrostProof	1183	5147	6330
GO-MOT	1021	7248	8269
Green Dragon	688	5218	5906
Grits	996	5592	6588
Gulf	448	4140	4588
Jackson	467	5141	5608
Lonestar	1306	5488	6794
Mantis	1028	5411	6439
Marshall	947	5524	6470
ME-4	749	5047	5796
ME-94	934	5779	6712
Nelson	856	5020	5876
PPER7	724	5418	6142
Prine	1151	6385	7536
Ranahan	1154	5730	6884
Rapido	775	5010	5785
Ration	979	5174	6153
RM4L	1337	7542	8878
TAMTBO	769	4654	5422
TAS-TARG-21	1053	8163	9215
Tetrastar	911	6093	7004
Triangle T	568	4911	5479
Winterhawk	547	3950	4497
WMWL	729	5848	6576
WMWL-2	724	5884	6609
Mean	867	5562	6429
LSD 0.05	NS	NS	NS
CV, %	36	19	23

Planted: 10/24/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Silty Clay

SMALL GRAINS VARIETY TEST

INTRODUCTION

In Mississippi, small grains (oat, wheat, rye and triticale) are not used as extensively for forage production as annual ryegrass because of lower annual DM yields. However, some small grains tend to be more drought and cold tolerant than ryegrass and can provide highly digestible forage when other forages are not available. They can also be used for early grazing

during the transition period from summer perennial grasses to annual ryegrass grazing. Cereal rye and triticale have greater cold tolerance among small grains; therefore, they have the potential to continue vegetative growth during the fall and winter months in Mississippi.



RESULTS

Data in Table 6-9 represent forage DM yields in Starkville, Brooksville, Newton, and McNeill. The greatest yields for the small grain test were observed in Starkville. In general, small grain yields were

relatively low compared to other years. Most were severely damaged by the extreme frost in December but the impact on oats was most severe (Fig 2).



Figure 2. Small grain frost damage in Newton, MS.

Table 6. Small grain production by harvest date and total yield (lb/A) in Starkville, MS.

Species	Variety	Harvest Date		Total Yield
		3/7/23	4/12/23	
		lb/A	lb/A	
Oats	Bob	1206	1605	2811
	Buck Forage	1533	1389	2922
	Ram	1145	909	2054
Rye	Elbon	1127	2363	3489
	Rynin	652	1290	1942
Wheat	EK102	1179	1461	2640
	SS130-06	609	1440	2049
Mean		1064	1494	2558
LSD 0.05		NS	NS	NS
CV, %		35	34	38

Planted: 10/20/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Savannah fine sandy loam

Table 7. Small grain production by harvest date and total yield (lb/A) in Brooksville, MS.

Species	Variety	Harvest Date
		3/22/23
		lb/A
Oats	Bob	1900
	Buck Forage	2480
	Ram	2054
Rye	Elbon	2340
	Rynin	1696
Wheat	EK102	1976
	SS130-06	1916
Mean		2052
LSD (0.05)		NS
CV, %		38

Planted: 10/24/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of GrazonNext® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Silty clay

Table 8. Small grain production by harvest date and total yield (lb/A) in Newton, MS.

Species	Variety	Harvest Date		Total Yield
		3/16/23	4/11/23	
		lb/A		
Oats	Bob	1601	331	1932
	Buck Forage	2235	278	2513
	Ram	1402	487	1889
Rye	Elbon	1537	704	2241
	Rynin	912	486	1398
Wheat	EK102	1442	687	2128
	SS130-06	1268	740	2008
Mean		1485	530	2016
LSD 0.05		NS	193	NS
CV, %		38	24	34

Planted: 10/28/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and the 1st harvest; herbicide: 1 qt/A of GrazonNext® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Prentiss Sandy Loam

Table 9. Small grain production by harvest date and total yield (lb/A) in McNeill, MS.

Species	Variety	Harvest Date
		3/20/23
		lb/A
Oats	Bob	2837
	Buck Forage	2921
	Ram	2320
Rye	Elbon	876
	Rynin	117
Wheat	EK102	986
	SS130-06	488
Mean		1506
LSD (0.05)		1182
CV, %		36

Planted: 11/9/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Ruston fine sandy loam

LEGUME VARIETY TEST

INTRODUCTION

The addition of annual clovers may reduce some nitrogen input needs and improve the nutritive value of pastures. For this reason, they can be beneficial in Mississippi when interseeded into annual cool-season grass pastures. Crimson clover is an early-maturing clover that produces excellent forage though it has relatively poor reseeding abilities, necessitating reseeding each fall. Crimson clover will produce more

forage at lower temperatures than other clovers. Ball clover is very tolerant to poor drainage, more tolerant to acidity than crimson clover, and tolerates heavy grazing while maintaining good reseeding potential. Berseem clover is tolerant of alkaline and wet soils, though most varieties are not cold tolerant. Balansa, berseem, and arrowleaf are the most late-maturing clovers.



RESULTS

Annual clovers were not severely damaged by the extreme freeze relative to ryegrass and small grains due to minimal growth at the time of the freeze event. The clover trial in Starkville was infested with ryegrass

and therefore was not considered for data collection. The greatest mean yield was achieved in Brooksville (4632 lb/A). Hairy vetch, Persian and crimson clovers tended to be the greatest yielders across locations.

Table 10. Annual Clover production by harvest date and total yield (lb/A) in Newton, MS.

Species	Variety	Harvest Date		Total Yield
		4/11/23	5/8/23	
		lb/A		
Balansa	Viper	3716	941	4658
	Fixation	1465	1049	2514
Berseem	Frosty	1256	1092	2348
Crimson	Dixie	2644	1137	3781
	Kentucky Pride	1846	1383	3229
Hairy Vetch	Patogonia	1371	1609	2981
Persian	eNhance	2146	1260	3406
	Nitro	1086	1275	2361
Mean		1941	1218	3160
LSD (0.05)		NS	NS	NS
CV, %		38	36	33

Planted: 10/28/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Prentiss Sandy Loam

Table 11. Annual Clover production by harvest date and total yield (lb/A) in Brooksville, MS.

Species	Variety	Harvest Date		Total Yield
		4/25/23	5/25/23	
		lb/A		
Balansa	Viper	3391	407	3798
	Fixation	2983	66	3049
Berseem	Frosty	2830	66	2896
Crimson	Dixie	4178	118	4296
	Kentucky Pride	3917	2470	6387
Hairy Vetch	Patogonia	5649	43	5692
Persian	eNhance	5125	2803	7928
	Nitro	2786	227	3013
Mean		3857	775	4632
LSD (0.05)		1178	691	1287
CV, %		20	38	18

Planted: 10/24/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Silty Clay

Table 12. Annual Clover production by harvest date and total yield (lb/A) in McNeill, MS.

Species	Variety	Harvest Date		Total Yield
		3/20/23	5/12/23	
		lb/A		
Balansa	Viper	2005	2599	4605
	Fixation	633	1387	2020
Berseem	Frosty	1711	960	2671
	Dixie	1861	3861	5722
Crimson	Kentucky Pride	.	.	.
	Patogonia	2342	1923	4265
Persian	eNhance	1453	1074	2527
	Nitro	1516	1553	3069
Mean		1646	1908	3554
LSD (0.05)		683	1623	1973
CV, %		26	42	41

Planted: 10/28/22; Fertilizer: 50 lb N/A (33-0-0S) after planting and after the 1st harvest; Herbicide: 1 qt/A of Grazon-Next® (aminopyralid & 2,4-D) after the first harvest; Soil Type: Ruston fine sandy loam

Table 13. Seed sources for the 2022-2023 annual cool-season forage variety testing program.

Variety	Seed company/source	Variety	Seed company/source
Annual Ryegrass		Small Grains	
Andes	DLF Pickseed USA	Bob	Check
Angusta	DLF Pickseed USA	Buck Forage	Check
Centurion	MVS	Ram	Ragan and Massey
Credence	DLF Pickseed USA	Elbon	Check
Dexter	Smith Seed Service	Rynin	Check
Diamond T	DLF Pickseed USA	EK102	Check
Double Diamond	DLF Pickseed USA	SS130-06	Specialty Seed
Earlyploid	Ragan and Massey		
Flying A	DLF Pickseed USA		
FrostProof	Smith Seed Service	Annual Clovers	
GO-MOT	GO Seed	Viper	Check
Green Dragon	Smith Seed Service	Fixation	GO seed
Grits	Lewis Seed Company	Frosty	GO seed
Gulf	Smith Seed Service	Dixie	Check
Jackson	The Wax Company, LLC	Kentucky Pride	GO seed
Lonestar	GO Seed	Patogonia	Check
Mantis	Smith Seed Service	eNhance	GO seed
Marshall	The Wax Company, LLC	Nitro	Check
ME-4	The Wax Company, LLC		
ME-94	The Wax Company, LLC		
Nelson	The Wax Company, LLC		
PPER7	Pennington		
Prine	Ragan and Massey		
Ranahan	MVS		
Rapido	Smith Seed Service		
Ration	Thomas AG		
RM4L	Ragan and Massey		
TAMTBO	DLF Pickseed USA		
TAS-TARG-21	Thomas AG		
Tetrastar	GO Seed		
Triangle T	DLF Pickseed USA		
Winterhawk	DLF Pickseed USA		
WMWL	The Wax Company, LLC		
WMWL-2	The Wax Company, LLC		



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