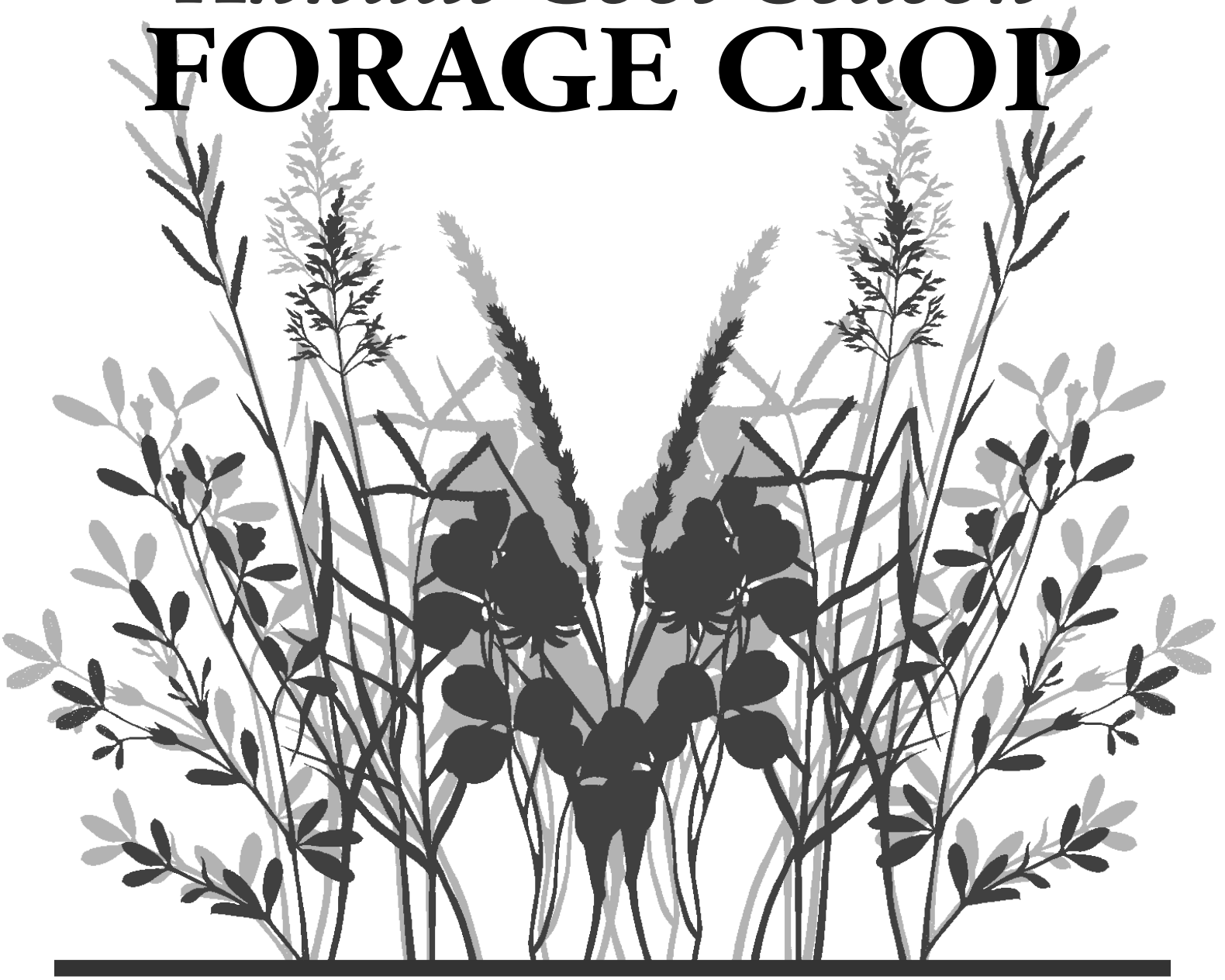
Information Bulletin 479 August 2013

Mississippi *Annual Cool-Season* FORAGE CROP



VARIETY TRIALS, 2012–13

MAFES

Mississippi Agricultural & Forestry Experiment Station • George M. Hopper, Director

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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 12 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 12.

Mississippi Annual Cool-Season Forage Crop Variety Trials, 2012–13

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Mississippi Annual Cool-Season Forage Crop Variety Trials, 2012–13

Introduction

Several varieties of forage crops are evaluated every year in Mississippi Agricultural and Forestry Experiment Station (MAFES) small-plot forage trials. 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 may be added by MAFES as a reference for comparison purposes. In addition, varieties of interest may also be added when applicable. Sources of seed are presented in Table 20. This report contains data from 11 small grain varieties, 30 ryegrass varieties, and 10 annual clover varieties. Testing during 2012–13 was done at North Mississippi Branch Experiment Station at Holly Springs, Leveck Animal Research Center Forage Unit at Mississippi State, Coastal Plain Branch Experiment Station at Newton, and White Sands Research Unit at Poplarville. Table 1 shows the total monthly rainfall during the growing season at each location. Average high and low temperatures can be used from Table 2 as a reference to evaluate relative cold tolerance among varieties.

Data presented in Tables 4–19 can be 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) at the probability level of $\alpha = 0.05$. The LSD value represents the amount of yield (pounds per acre) that must be observed between any two varieties to determine if the difference was due to variety variation alone.

Table 1. Rainfall at each location from September 2012 to May 2013.

Location	2012				2013					Total
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
Holly Springs	4.16	6.99	2.07	6.12	9.09	4.79	5.21	7.69	6.95	53.07
Starkville	5.36	4.91	2.23	6.93	8.53	6.36	6.89	6.72	4.97	52.90
Newton	3.32	5.36	2.68	10.18	7.31	8.26	2.82	5.68	7.93	53.54
Poplarville	5.70	2.57	2.07	8.99	8.95	6.78	1.56	8.28	4.89	49.79
Mean	4.64	4.96	2.26	8.05	8.47	6.54	4.12	7.09	6.18	52.31

Table 2. Average high and low temperatures for each location from September 2012 to May 2013.

Month	Holly Springs		Starkville		Newton		Poplarville	
	H	L	H	L	H	L	H	L
	°F	°F	°F	°F	°F	°F	°F	°F
				2012				
Sept.	85	59	86	62	86	62	86	67
Oct.	71	46	73	49	75	49	77	53
Nov.	63	33	65	38	66	35	67	45
Dec.	58	37	61	40	63	39	60	40
				2013				
Jan.	52	32	57	38	59	39	62	44
Feb.	54	33	58	36	60	36	64	43
March	57	34	61	37	64	35	65	42
April	70	46	73	50	74	49	74	54
May	79	56	80	59	79	57	80	61

Protocol

Ryegrass, small grains, and annual clover trials across the state were established from late September until the first week of October in 2012. At all locations, soil samples were taken and analyzed by the Mississippi State University Soil Testing Laboratory. Trial area was fertilized with lime, phosphorus (P_2O_5), and potassium (K_2O) according to the soil test recommendations. The ryegrass and small grain trials were fertilized with 300 pounds of 15-5-10 at the time of planting and 50 pounds of nitrogen per acre after each harvest using urea ammonium sulfate (33-0-0S). Annual clover trials were fertilized with 50 pounds of 0-0-60 (potash) at planting and an additional 100 pounds of phosphorus (P_2O_5) and potassium (K_2O) early in the spring using 0-20-20. Plots were 6×11 feet and planted using a precision cone seeder on a prepared seedbed. Trial design was a randomized complete block replicated four times. Recommended seeding rates for individual trials were used and are presented in Table 3. All trials were harvested when 75% of the plots achieved 15 inches of growth. All plots were harvested to a stubble height of 3 inches. Plots were harvested using a Ferris z-turn mower equipped with a bagging system that collected a 4.3×11-foot swath to calculate total yield. A subsample was collected and dried at 55°C until constant weight was achieved to calculate dry matter percentage (DM). Data were analyzed using the General Linear Model (PROC GLM) of SAS and mean separation was conducted using the LSD at $\alpha = 0.05$.

Table 3. Seeding rates.

Genus/Species	Seed weight
	lb/A
Small Grains	
Rye	100.0
Oats	100.0
Ryegrass	30.0
Annual Clovers	
Arrowleaf	10.0
Berseem	25.0
Balansia	4.5
Ball	3.0
Crimson	30.0

Annual Ryegrass

Annual ryegrass is the most important and versatile cool-season annual grass for livestock producers in Mississippi. In pasture and hay systems, annual ryegrass is popular forage because of its ease of establishment, high nutritive value, high yields, 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 main staple for many cool-season grazing programs in Mississippi. Planting date varies with location. Overall, the best planting time is September for prepared seedbeds or October if overseeded on a warm-season perennial grass pasture. Seeding rates are 30 pounds per acre for pure stands and 20 pounds per acre for mixtures with small grains and/or clovers. Annual ryegrass grows best at a soil pH of 6.0 to 7.0. Phosphorus and potassium levels should be above the medium range for optimum yields. Annual ryegrass is very responsive to nitrogen fertilizer, and its use should be split into two to four applications during the growing season. When established with clovers, a single nitrogen application in early winter is often recommended to limit annual ryegrass competition with the clover. 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 a height of 8 inches before grazing begins. Normal stocking rates are 700 pounds per acre in winter and 1,400–2,000 pounds per acre in spring. Typically, average daily gains for respective animal class are 2.75 pounds, suckling calves; 2.3 pounds, stocker calves; 1.75 pounds, yearling horses; and 0.3 pounds, lambs. However, all of these factors are greatly influenced by environmental conditions and management factors. Tables 4–7 detail the yield performance of ryegrass varieties at four locations within the state, ranging from Holly Springs in the north to Poplarville in the south. Entries were further analyzed by ploidy level represented in tables 8–11. Ploidy level refers to the amount of chromosomes in a biological cell and is often used in characterizing ryegrass varieties as either diploid (2n) or tetraploid (4n). Whether ploidy level is advantageous to a specific variety in regards to performance is more dependent on location. The following data shows the overall advantage of diploid varieties in Mississippi, especially in the first and last harvest.

Table 4. Ryegrass yields by harvest and total yields, Holly Springs.[1]

Variety	Harvest date			Total yield
	1/24/2013	3/28/2013	4/18/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
Barmultra II (Italian)	400	795	1601	2796
Bulldog Grazer	1195	901	1934	4031
Chuckwagon	1042	981	1497	3520
Diamond T	844	925	1810	3579
Earlyploid	646	926	1776	3349
Flying A	1500	661	1490	3651
Fria	813	877	1893	3584
Grits	1133	980	1799	3912
Jackson	1083	1094	1376	3554
Jumbo	654	927	1600	3181
Lonestar	962	1043	1620	3624
LWD9	669	549	1729	2947
LWT13M3	910	999	1594	3502
LWT-14	1164	1124	2504	4792
M2GVS	215	859	1997	3071
Marshall	875	939	1967	3781
Marshall 1996	692	903	1714	3309
Marshall 2005	358	937	1972	3267
Marshall 2012	531	1038	2056	3626
Maximus	1029	969	1265	3262

Continued

Table 4 (continued). Ryegrass yields by harvest and total yields, Holly Springs.[1]

Variety	Harvest date			Total yield
	1/24/2013	3/28/2013	4/18/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
ME4	866	1077	1841	3784
ME-94	1138	905	1685	3729
Nelson	515	1097	1777	3389
Passerel Plus	1119	567	1621	3306
PPG-LWT103	781	997	1630	3408
Prine	539	999	1448	2987
Swipar L2DM	666	1048	1869	3583
TAMTBO	591	943	1477	3011
Tetrastar	1131	957	1329	3417
Winterhawk	1112	904	1704	3720
Mean	839	931	1719	3489
LSD (0.05)	521	NS[2]	488	690
CV, %	44	25	20	14

[1]Planted: September 28, 2012 Fertilizer: 300 lb/A of 15-5-10 at planting and 50 lb of N (33-0-0S) after each harvest
Herbicide: 1 qt/A of GrazonNext (aminopyralid and 2,4-D) after first harvest Soil type: Grenada Silt Loam
[2]NS = Not significant

Table 5. Ryegrass yields by harvest and total yields, Starkville.[1]

Variety	Harvest date				Total yield
	12/14/2012	1/24/2013	2/28/2013	4/8/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Barmultra II (Italian)	677	507	911	2407	4502
Bulldog Grazer	732	559	991	1971	4252
Chuckwagon	1002	670	929	2450	5051
Diamond T	1006	508	1177	2389	5080
Earlyploid	867	599	961	2009	4436
Flying A	1087	558	1082	2199	4925
Fria	1230	487	1204	2564	5484
Grits	1068	823	1050	2124	5065
Jackson	986	607	953	2310	4855
Jumbo	747	515	1079	2616	4957
Lonestar	898	652	1179	2533	5263
LWD9	1227	536	997	2255	5015
LWT13M3	923	618	1054	2316	4911
LWT-14	653	608	942	2605	4808
M2GVS	859	577	1280	2615	5329
Marshall	991	582	1079	2935	5587
Marshall 1996	851	335	1156	2762	5103
Marshall 2005	942	569	1009	2330	4850
Marshall 2012	1042	610	1235	2955	5841
Maximus	1108	525	1020	2564	5217
ME4	808	596	1103	3020	5527
ME-94	759	639	821	2936	5155
Nelson	975	493	945	2845	5257
Passerel Plus	1200	758	903	2406	5267
PPG-LWT103	977	550	982	2200	4708
Prine	1058	442	935	2499	4934
Swipar L2DM	826	546	842	2165	4378
TAMTBO	899	572	1054	2640	5164
Tetrastar	1135	439	1027	2367	4968
Winterhawk	894	802	999	2150	4844
Mean	947	576	1030	2471	5024
LSD (0.05)	NS[2]	NS	NS	555	NS
CV, %	27	31	26	16	12

[1]Planted: September 25, 2012 Fertilizer: 300 lb/A of 15-5-10 at planting and 50 lb of N (33-0-0S) after each harvest
Herbicide: 1 qt/A of GrazonNext (aminopyralid & 2,4-D) after first harvest Soil type: Marietta Fine Sandy Loam
[2]NS = Not significant

Table 6. Ryegrass yields by harvest and total yields, Newton.[1]

Variety	Harvest date			Total yield
	2/8/2013	3/21/2013	4/26/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
Barmultra II (Italian)	707	1134	1567	3409
Bulldog Grazer	601	1492	1318	3411
Chuckwagon	541	1348	1464	3353
Diamond T	814	1248	1639	3701
Earlyploid	1019	2038	1238	4296
Flying A	431	1363	1522	3316
Fria	928	1567	1494	3989
Grits	668	1747	1300	3715
Jackson	588	1501	1428	3517
Jumbo	518	1152	1658	3328
Lonestar	935	1416	1504	3855
LWD9	800	1578	1977	4355
LWT13M3	1074	1220	1544	3838
LWT-14	697	1500	1750	3946
M2GVS	1059	1550	2178	4786
Marshall	999	1382	1975	4356
Marshall 1996	700	1360	2213	4273
Marshall 2005	564	1733	1978	4276
Marshall 2012	456	1750	2270	4477
Maximus	634	1390	1767	3790
ME4	523	1664	2026	4213
ME-94	522	1405	1786	3713
Nelson	606	1505	1795	3906
Passerel Plus	815	1346	1326	3486
PPG-LWT103	833	1501	1582	3916
Prine	561	1339	1657	3558
Swipar L2DM	581	1468	1306	3355
TAMTBO	753	1367	1594	3714
Tetrastar	671	1430	1632	3733
Winterhawk	1097	1457	1606	4160
Mean	723	1465	1670	3858
LSD (0.05)	307	380	338	3949
CV, %	30	18	14	26

[1]Planted: September 28, 2013 Fertilizer: 300 lb/A of 15-5-10 at planting and 50 lb of N (33-0-0S) after each harvest
Herbicide: 1 qt/A of GrazonNext (aminopyralid and 2,4-D) after first harvest Soil type: Prentiss Fine Sandy Loam

Table 7. Ryegrass yields by harvest and total yields, Poplarville.[1]

Variety	Harvest date				Total yield
	12/14/2012	1/24/2013	3/8/2013	4/13/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Barmultra II (Italian)	774	660	2212	2169	5814
Bulldog Grazer	705	681	2707	2748	6841
Chuckwagon	666	707	2113	2193	5679
Diamond T	498	648	2680	2596	6421
Earlyploid	550	591	3048	2108	6297
Flying A	555	695	1961	2727	5937
Fria	710	708	2845	2174	6436
Grits	586	841	2524	2929	6881
Jackson	718	709	2242	2725	6394
Jumbo	568	702	2814	2621	6705
Lonestar	644	689	2621	2811	6765
LWD9	637	519	1886	2357	5398
LWT13M3	428	598	1805	3106	5937

Continued

Table 7 (continued). Ryegrass yields by harvest and total yields, Poplarville.[1]

Variety	Harvest date				Total yield
	12/14/2012	1/24/2013	3/8/2013	4/13/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
LWT-14	651	767	2846	2686	6950
M2GVS	653	734	2532	2801	6719
Marshall	797	803	2291	2766	6656
Marshall 1996	813	585	2193	2834	6425
Marshall 2005	645	718	3355	3315	8033
Marshall 2012	798	779	2564	3355	7496
Maximus	506	746	1972	3087	6311
ME4	598	663	2773	2945	6979
ME-94	579	696	2295	2499	6069
Nelson	578	765	2579	2664	6587
Passerel Plus	786	627	1816	2172	5401
PPG-LWT103	518	768	2387	2226	5900
Prine	563	617	2605	2368	6154
Swipar L2DM	648	669	2892	2231	6441
TAMTBO	627	622	2163	2699	6111
Tetrastar	605	629	2253	2002	5489
Winterhawk	586	695	2434	2255	5969
Mean	633	688	2447	2606	6373
LSD (0.05)	213	NS2	709	507	965
CV, %	24	25	21	14	11

[1]Planted: October 2, 2012 Fertilizer: 300 lb/A of 15-5-10 at planting and 50 lb of N (33-0-0S) after each harvest
Herbicide: 1 qt/A of GrazonNext (aminopyralid and 2,4-D) after first harvest Soil type: Basin Loam
[2]NS = Not significant

Table 8. Ryegrass yield by ploidy level, Holly Springs.

Ploidy	Harvest date			Total yield
	1/24/2013	3/28/2013	4/18/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
Diploid (n=15)	906	912	1777	3596
Tetraploid (n=11)	743	956	1564	3263
Mean	825	934	1671	3430
LSD (0.05)	NS	NS	129	190
CV, %	51	24	20	14

Table 9. Ryegrass yield by ploidy level, Starkville.

Ploidy	Harvest date				Total yield
	12/14/2012	1/24/2013	2/28/2013	4/8/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Diploid (n=15)	956	610	1069	2520	5155
Tetraploid (n=11)	949	529	1001	2453	4932
Mean	953	570	1035	2487	5044
LSD (0.05)	NS	73	NS	NS	NS
CV, %	28	32	25	18	12

Table 10. Ryegrass yield by ploidy level, Newton.

Ploidy	Harvest date			Total yield
	2/8/2013	3/21/2013	4/26/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
Diploid (n=15)	831	1515	1728	4166
Tetraploid (n=11)	574	1404	1599	3738
Mean	703	1460	1664	3952
LSD (0.05)	96	NS	NS	453
CV, %	34	21	64	29

Table 11. Ryegrass yield by ploidy level, Poplarville.

Ploidy	Harvest date				Total yield
	12/14/2012	1/24/2013	3/8/2013	4/13/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Diploid (n=15)	678	708	2476	2737	6600
Tetraploid (n=11)	586	677	2438	2430	6133
Mean	632	693	2457	2584	6367
LSD (0.05)	61	NS	NS	178	317
CV, %	24	24	23	17	13

Small Grains

In Mississippi, small grains (oats, wheat, rye, and triticale) are not utilized for forage as extensively as annual ryegrass because of lower annual yields. However, some small grains tend to be more drought 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. Rye and triticale are the most cold tolerant of forage crops and therefore have potential to continue vegetative growth during the fall and winter months in Mississippi. Mississippi only utilizes about 154,000 acres in small-grain forages with the majority of those sown in oats or rye. Differences among varieties regardless of species are presented in Tables 12–14, whereas differences among species regardless of variety are presented in Tables 15–17. The following data contains only rye and oat entries, revealing that rye entries had a total yield advantage in the northern locations (Starkville and Holly Springs), while oat entries had superior yields in southern Mississippi (Poplarville).

Table 12. Small grain yields by harvest and total yield, Holly Springs.[1]

Variety	Harvest date			Total yield
	2/15/2013	3/8/2013	4/18/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
		Oats		
12604	908	—	1690	2598
Naked Oats	498	—	1167	1665
NF27	662	—	1825	2487
NF95418	1026	—	1654	2680
Shooter	728	—	1108	1836
XPWG0912	573	—	1738	2312

Continued

Table 12 (continued). Small grain yields by harvest and total yield, Holly Springs.[1]

Variety	Harvest date			Total yield
	2/15/2013	3/8/2013	4/18/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
		Rye		
Bates RS4	1477	679	1262	3418
Maton II	1416	900	1130	3446
NF95307A	1716	527	1115	3357
NF95319B	1666	545	1303	3515
NF97326	1447	425	1173	3044
Mean	1101	615	1379	2760
LSD (0.05)	458	NS[2]	500	715
CV,%	29	34	25	18

[1]Planted: September 25, 2012 Fertilizer: 300 lb/A of 15-5-10 at planting and 50 lb of N (33-0-0S) after each harvest
Herbicide: 1 qt/A of GrazonNext (aminopyralid and 2,4-D) after first harvest Soil type: Grenada Silt Loam
[2]NS = Not significant

Table 13. Small grain yields by harvest and total yields, Starkville.[1]

Variety	Harvest date			Total yield
	12/11/2012	2/4/2013	3/19/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
		Oats		
12604	754	880	1190	2824
Naked Oats	768	—	126	894
NF27	416	860	1366	2641
NF95418	516	789	1396	2700
Shooter	658	441	542	1641
XPWG0912	698	819	1163	2680
		Rye		
Bates RS4	752	856	1229	2838
Maton II	601	767	1636	3004
NF95307A	1048	968	1364	3380
NF95319B	770	939	1440	3149
NF97326	735	869	1322	2925
Mean	701	744	1161	2607
LSD (0.05)	321	375	306	553
CV,%	31	34	18	14

[1]Planted: September 25, 2012 Fertilizer: 300 lb/A of 15-5-10 at planting and 50 lb of N (33-0-0S) after each harvest
Herbicide: 1 qt/A of GrazonNext (aminopyralid and 2,4-D) after first harvest Soil type: Marietta Fine Sandy Loam

Table 14. Small grain yields by harvest and total yields, Poplarville.[1]

Variety	Harvest date				Total yield
	12/14/2012	1/24/2013	3/8/2013	4/13/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
			Oats		
12604	686	503	1667	2427	5283
Naked Oats	754	229	926	1054	2964
NF27	648	365	1603	2338	4954
NF95418	567	502	2202	1845	5116
Shooter	831	266	1361	1565	4024
XPWG0912	737	289	1710	1977	4713
			Rye		
Bates RS4	981	402	1136	762	3281
Maton II	948	434	1070	1097	3548
NF95307A	995	396	893	932	3216
NF95319B	1175	460	1094	1133	3862
NF97326	981	399	1000	907	3286
Mean	846	386	1333	1458	4022
LSD (0.05)	256	NS[2]	375	646	820
CV,%	21	36	19	30	14

[1]Planted: October 2, 2012 Fertilizer: 300 lb/A 15-5-10 at planting and 50 lb of N (33-0-0S) after each harvest
Herbicide: 1 qt/A of GrazonNext (aminopyralid and 2,4-D) after first harvest Soil type: Basin Loam
[2]NS = Not significant

Table 15. Small grain yields by species, Holly Springs.

Species	Harvest date			Total yield
	2/15/2013	3/8/2013	4/18/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
Oats	732	—	1530	2262
Rye	1544	615	1196	3355
Mean	1138	615	1363	2809
LSD (0.05)	199	NS	233	331
CV,%	30	41	28	20

Table 16. Small grain yields by species, Starkville.

Species	Harvest date			Total yield
	2/11/2013	2/4/2013	3/19/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*
Oats	635	640	964	2239
Rye	781	880	1398	3059
Mean	708	760	1181	2649
LSD (0.05)	NS[1]	211	259	405
CV,%	35	45	36	25

[1]NS = Not Significant

Table 17. Small grain yields by species, Poplarville.

Species	Harvest date				Total yield
	12/14/2012	1/24/2013	3/8/2013	4/13/2013	
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Oats	704	359	1578	1867	4508
Rye	1022	418	1031	970	3441
Mean	863	389	1305	1419	3975
LSD (0.05)	113	NS	244	346	525
CV,%	21	39	29	37	21

Annual Clover

Annual clovers may reduce nitrogen input and improve forage quality. For these reasons, they are heavily relied upon in Mississippi when interseeded into annual cool-season grass pastures. Arrowleaf clover has been a highly productive clover with excellent reseeding potential. It matures later than most annual legumes and can grow 2 to 4 feet tall. Arrowleaf clover remains more productive if grazed to a height of 2 to 4 inches in early spring. However, if it is cut too late in maturity, regrowth will be limited. One variety of arrowleaf, Blackhawk, had to be replanted after insufficient seed germination at all locations. As a result, stands of Blackhawk were only maintained in Starkville. Crimson clover is an early-maturing clover that produces excellent forage, but it has relatively poor reseeding abilities and requires reseeding each fall. Crimson clover produces more forage at lower temperatures than other clovers as was evident in the first harvests in Holly Springs and Starkville. Ball clover is very tolerant to poor drainage. Ball clover is 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. One variety of berseem performed similarly to arrowleaf and crimson varieties in total yield, and it maintained consistent yields throughout the spring. Clover stands in Poplarville either failed to germinate or germinated and died; as a result, data was not presented in the following tables for that location.

Table 18. Annual clover yields and harvest yields, Holly Springs.[1]

Species/Variety	Harvest date		Total
	4/18/2013	5/29/2013	
	lb/A	*lb/A*	*lb/A*
Arrowleaf			
Apache	2671	680	3351
Blackhawk[2]	—	—	—
MSU 2012-01	1304	650	1954
Yuchi	2849	943	3792
Balansia			
GO-Bal-10	1955	770	2725
Ball			
AU Don	689	985	1674
Grazers Select	—	1266	1266
Berseem			
GO-Ber-10	1400	1415	2815

Continued

Table 18 (continued). Annual clover yields and harvest yields, Holly Springs.[1]

Species/Variety	Harvest date		Total
	4/18/2013	5/29/2013	
	lb/A	*lb/A*	*lb/A*
Crimson			
Bolsena	1473	312	1785
Common	1525	657	2182
Mean	1733	853	2394
LSD (0.05)	707	467	907
CV,%	27	33	28

[1]Planted: September 28, 2012 Fertilizer: 100 lb 0-0-60
Herbicide: 5 oz/A of Pursuit (imazethapyr) Soil type: Grenada Silt Loam
[2]Seed used was not viable, resulting in poor germination

Table 19. Annual clover yields and harvest yields, Starkville.[1]

Species/Variety	Harvest date		Total
	4/18/2013	5/29/2013	
	lb/A	*lb/A*	*lb/A*
Arrowleaf			
Apache	357	816	1173
Blackhawk[2]	223	631	854
MSU 2012-01	222	586	808
Yuchi	141	667	808
Balansia			
GO-Bal-10	—	378	378
Ball			
AU Don	222	594	816
Grazers Select	150	588	738
Berseem			
GO-Ber-10	892	565	1456
Crimson			
Bolsena	617	752	1369
Common	853	626	1479
Mean	409	620	988
LSD (0.05)	349	NS[3]	558
CV,%	49	38	42

[1]Planted: September 25, 2012 Fertilizer: 100 lb 0-0-60
Herbicide: 5 oz/A of Pursuit (imazethapyr) Soil type: Marietta Fine Sandy Loam
[2]Seed used was not viable in first planting but was replanted with a different seed supply
[3]NS = Not Significant

Table 20. Sources of seed, 2012–13.

Variety	Seed company/source	Variety	Seed company/source
Ryegrass		**Small Grains**	
Fria	Allied Seed, LLC	L-Oats	Buck Buster Seed Co.
Bulldog Grazer	Athens Seed Co.	NF95418	Noble Foundation
Swipar L2DM	Auburn University	NF27	Noble Foundation
Barmultra II (Italian)	Barenbrug USA	12604	Oregro Seeds Inc.
Maximus	Barenbrug USA	Shooter	Oregro Seeds Inc.
Jumbo	Barenbrug USA	XPWG0912	Wildwood Genetics
PPG-LWT103	Columbia Seeds, LLC	Bates RS4	Athens Seed Co.
LWT-14	DLF International Seeds	Bates RS4	Noble Foundation
LWD9	DLF International Seeds	Maton II	Noble Foundation
LWT13M3	DLF International Seeds	NF95307A	Noble Foundation
Tetrastar	Grassland Oregon	NF95319B	Noble Foundation
Lonestar	Grassland Oregon	NF97326	Noble Foundation
Grits	Lewis Seed Co.		
Chuckwagon	Lewis Seed Co.	**Annual Clover**	
Marshall 2012	MSU	Yuchi	Check Variety
Marshall 1996	MSU	Apache	Agrilife
Marshall 2005	MSU	MSU 2012-01	MSU
Diamond T	Oregro Seeds Inc.	Blackhawk	Oregro Seeds Inc.
TAMTBO	Oregro Seeds Inc.	GO-Bal-10	Grassland Oregon
Flying A	Oregro Seeds Inc.	Grazers Select	Fairlie Seed Company
Winterhawk	Oregro Seeds Inc.	AU Don	Fairlie Seed Company
Passerel Plus	Pennington Seed	Go-Ber-10	Grassland Oregon
Earlyploid	Ragan & Massey/Lewis Seed Co.	Common	Check Variety
Prine	Ragan & Massey/Lewis Seed Co.	Bolsena	Oregro Seeds Inc.
Marshall	The Wax Company, LLC		
Jackson	The Wax Company, LLC		
Nelson	The Wax Company, LLC		
ME-94	The Wax Company, LLC		
ME4	The Wax Company, LLC		
M2GVS	The Wax Company, LLC		

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