PUBLICATIONS
1986

FORAGE AND LIVESTOCK RESEARCH - 1986

RESEARCH CENTER TECHNICAL REPORT 86-1

Texas A&M University Agricultural Research
and Extension Center at Overton

Texas Agricultural Experiment Station
Texas Agricultural Extension Service

Overton, Texas

April 24, 1986

SEASONAL PRODUCTION OF ANNUAL FORAGE LEGUMES AT OVERTON, 1983-1985

G. R. Smith and C. L. Gilbert

SUMMARY

Thirty-four annual clovers, including arrowleaf, crimson, subterranean, berseem, ball, and rose, were evaluated for forage production and adaptation at Overton in 1983-84. Twenty-seven annual clovers and six vetches were evaluated in 1984-85. 'Chief' crimson and 'Wilton' rose clover were the top forage producers in 1983-84, with yields of 4411 and 3878 lbs DM/acre, respectively. In 1984-85 'Meechee' arrowleaf topped the annual clover trial with 3100 lbs DM/acre. Vetch yields ranged from 3549 to 244 lbs DM/acre for 'Hairy' and 'Vantage', respectively. Ten rose clover experimental lines, in production trials for the first time, were all higher yielding than the three check varieties.

OBJECTIVES

The objectives of these experiments were: 1) to determine seasonal distribution of annual forage legume dry matter production; and 2) to observe the general adaptation of annual forage legumes to East Texas soil and climatic conditions.

PROCEDURE

Eighteen annual clovers were drilled into a native sod of common bermudagrass and Paspalum setaceum on October 14, 1983. Twenty-seven annual clovers and six vetches were drilled into a mixed 'Coastal' and common bermudagrass sod on October 11, 1984. Stands were lost in 1984 on 14 annual clovers, including arrowleaf, ball, berseem, and crimson, due to grasshopper and/or cricket damage. These clovers were replanted on November 12, 1984. A small-plot drill with six double disk openers, spaced nine inches apart, was used to place seed one-half inch deep in 5x7 foot plots. Fertilizer and lime were applied according to soil test (Table 1). The clovers were harvested at 2.25 inches and the vetch at 1.75 inches with a rotary mower.

Sixteen varieties or experimental lines of subterranean (sub) clover were established in 6x12 foot plots on a prepared seedbed

September 17, 1981. These plots were fertilized at planting and in the fall of 1982 with 0-20-20 at 450 lbs/ac. Summer growth of grass and weeds was removed prior to planting by mowing at 2 inches. In September 1983, fertilizer was applied according to soil test (Table 1). The sub clover was harvested with a rotary mower at 1.25 inches.

Seeding rates and Rhizobium inoculants for each legume species are shown in Table 2. Peat inoculant, supplied by the Nitragin Co., was applied at 1 oz. per pound of seed with Pelgel solution used as an adhesive to stick inoculant to the seed.

Each experiment was arranged in a randomized complete block design with 4 replications. At each harvest, forage samples were weighed, dried at 70°C for 48 hours and weighed again. Percent dry matter of the samples was used to calculate dry matter yield per acre.

RESULTS

1983-84

Total production in the sod-seeded annual clover test ranged from 4411 to 1189 lbs DM/acre for 'Chief' crimson and 'CH-N' crimson clover, respectively (Table 3). The annual clovers produced more in May with the exception of 'Autauga', 'Tibbee', 'Dixie' crimson, and 'Kondinin' rose clover which peaked in April. Tibbee, Autauga and Chief crimson were the highest yielding at the first harvest. Arrowleaf clover yields at Overton in 1983-84 were lower than expected. Total rainfall during March, April, and May 1984 was five inches below the 17-year average. This low soil moisture condition was a factor in reducing arrowleaf clover yields at the last harvest in May.

Production of sub clover varieties and lines in their second reseeding stand ranged from 3206 to 1349 lbs DM/acre for lines 209924 and 319145, respectively (Table 4). The reseeding sub clover test was harvested twice with P.I. 209924 and 'Woogenellup' as the highest producers during the March harvest. The experimental line 209924 produced more forage during both the 1982-83 and the 1983-84 seasons than in 1984-85.

In late December 1983 extreme cold temperatures were recorded (3 consecutive nights below 10°F). Performance of both the reseeding sub clover test and the newly established annual clover test was

diminished by these adverse conditions. However, even with these conditions, no clover lines in these tests were rated as winter-killed.

1984-85

Total production in the sod-seeded annual clover test ranged from 3100 to 1866 lbs DM/ac for 'Meechee' arrowleaf and Autauga crimson, respectively (Table 5). Tibbee and Dixie crimson were the highest yielding at the first harvest. Although total production was lower than the last few years, possibly due to the later planting date, ball clover production was higher.

Forage production for the rose clover variety test ranged from 2617 lbs DM/ac for M-13 to 647 lbs DM/ac for 'Hykon'. M-13 and D-17 rose clover produced higher yields during the March harvest (Table 6). At the April harvest, the varieties Hykon and Kondinin were in full bloom, 'Wilton' was in partial bloom and the experimental lines were still vegetative or in the bud stage. These experimental rose clovers were developed at Overton with selection for improved forage production and late maturity. Although grasshopper damage caused stand losses in the 1984 annual clover test, no insect damage was noted on the rose clover lines in this test.

Total production for the vetch test ranged from 3549 to 244 lbs DM/acre for 'Hairy' and 'Vantage' vetch, respectively (Table 7). 'Cahaba White' was not included in the analysis due to cold damage and stand loss. Hairy vetch yielded the most during the first harvest while Woodford produced more at the May harvest. 'Nova II' and Vantage did not regrow after the March harvest.

TABLE 1. SOIL pH, FERTILIZER, AND LIME FOR FORAGE LEGUME PRODUCTION TRIALS IN 1983-85

Experiment	Year	Soil Type	Soil pH	Fertilizer and Lime			
				P_2O_5	K_2O	S	Lime
				----------lbs/ac---------			
Annual clover[1]	1983	Sawtown	6.8	90	90	0	0
Reseeding sub[1]	1983	Bowie	7.1	90	90	0	0
Annual clover	1984	Sawtown	5.9	72	116	44[2]	2000
Rose clover	1984	Sawtown	5.9	72	116	44[2]	2000
Vetch	1984	Sawtown	5.9	72	116	44[2]	2000

[1]Established in 1981

[2]Applied as K-Mag, supplied by Duval Corporation

TABLE 2. SEEDING RATES AND RHIZOBIUM INOCULANTS USED IN EVALUATION OF ANNUAL FORAGE LEGUMES

Species	Seeding Rate	Inoculant Type[1]
	--lbs/acre--	
Arrowleaf	14.3	O
Ball	3.6	B
Berseem and Crimson	19.6	R
Rose and Subterranean	19.6	WR
Common Vetch	35.0	C
Hairy and Big Flower Vetch	25.0	C

[1]Supplied by the Nitragin Co., Milwaukee, WI. Applied at 1.0 oz. per pound of seed with Pelgel solution as an adhesive.

TABLE 3. SEASONAL PRODUCTION OF ANNUAL CLOVERS AT OVERTON, TX, 1983-84

Variety	Harvest Date 3-19	4-12	5-11	Total	
	lbs DM/acre				
Chief[3]	564	1914	1933	4411	a[1]
Wilton Rose	293	1472	2113	3878	ab
Autauga[3]	797	1752	915	3464	abc
Tibbee[3]	872	1595	838	3305	abc
287973 Rose	151	1121	1978	3250	abc
RRPS-5[2]	265	666	2123	3054	abc
Dixie[3]	522	1487	1029	3038	abc
Kondinin Rose	548	1241	1014	2803	abcd
Meechee[2]	117	430	2249	2796	abcd
Syn 4[2]	174	658	1891	2723	bcd
Yuchi[2]	256	659	1657	2572	bcd
Syn 2[2]	87	489	1912	2488	bcd
Syn 3[2]	78	650	1738	2466	bcd
Amclo[2]	103	756	1472	2331	bcd
Segrest Ball	0	392	1565	1957	cd
Common Ball	0	373	1500	1873	cd
Bigbee Berseem	124	360	751	1235	d
CH-N[3]	175	447	567	1189	d

C.V. = 21.1%

[1]Yields followed by the same letter are not significantly different at the 0.01 level using Student Newman-Keuls Multiple Range Test.

[2]Arrowleaf clover

[3]Crimson clover

TABLE 4. SEASONAL PRODUCTION OF RESEEDING SUBTERRANEAN CLOVER AT OVERTON, TX, 1983-84

Variety	Harvest Date 3-28	Harvest Date 5-14	Total
	lbs DM/acre		
209924	2132	1074	3206 a[1]
Woogenellup	2040	970	3010 a
Tallarook	1683	1233	2916 a
Miss. Ecotype	1344	1301	2645 a
239907	1213	1363	2576 a
319146	1057	1474	2531 a
Nangeela	1259	1175	2434 a
291917	768	1629	2397 a
311499	744	1571	2315 a
168638	636	1586	2222 a
311498	660	1455	2115 a
184962	858	1230	2088 a
209927	588	1350	1937 a
Mt. Barker	578	1392	1970 a
319145	463	886	1349 a
Nungarin[2]	0	0	
C.V. = 18.4%			

[1]Yields followed by the same letter are not significantly different at the 0.05 level using Student Newman-Keuls Multiple Range Test.

[2]Did not reseed in 1981-82. Not included in statistical analysis.

TABLE 5. SEASONAL PRODUCTION OF ANNUAL CLOVERS AT OVERTON, TEXAS, 1984-85

Variety	Harvest Date 3-29	4-30	Total
	lbs DM/acre		
Meechee[2]	643	2457	3100 a[1]
Segrest Ball	609	2353	2962 a
Amclo[2]	551	2310	2861 a
Chief[3]	736	2109	2845 a
Common Ball	524	2210	2734 a
Yuchi[2]	761	1962	2723 a
Tibbee[3]	1129	1483	2612 a
Dixie[3]	941	1597	2538 a
Syn 2[2]	392	1937	2329 a
Syn 3[2]	381	1681	2062 a
Syn 4[2]	429	1578	2007 a
Yl[2]	405	1477	1882 a
Bigbee Berseem	405	1464	1869 a
Autauga[3]	635	1231	1866 a

C.V. = 22%

[1]Yields followed by the same letter are not significantly different at the 0.01 level using the Student Newman-Keuls Multiple Range Test.

[2]Arrowleaf clover

[3]Crimson clover

TABLE 6. FORAGE PRODUCTION OF ROSE CLOVER AT OVERTON, TEXAS, 1984-85

Variety[2]	Harvest Date 3-26	4-16	5-14	Total
	lbs DM/acre			
M-13	824	1546	247	2617 a[1]
F-20	704	1668	187	2559 a
D-17	801	1383	214	2398 ab
M-16	629	1510	163	2302 ab
R-12	501	1388	309	2198 ab
J-3	534	1511	118	2163 ab
O-15	531	1310	207	2048 abc
H-18	495	1300	188	1983 abc
H-7	398	1345	238	1981 abc
D-3	465	1275	136	1876 abc
Wilton	292	953	215	1460 bcd
Kondinin	401	637	87	1125 cd
Hykon	299	315	33	647 d

C.V. = 19.6%

[1]Yields followed by the same letter are not significantly different at the 0.01 level using the Student Newman-Keuls Multiple Range Test.

[2]Entries identified by letter-number combinations are experimental rose clover lines from the Overton clover breeding program.

TABLE 7. SEASONAL PRODUCTION OF VETCH AT OVERTON, TEXAS, 1984-85

Variety	Harvest Date 3-26	5-1	Total
	lbs DM/acre		
Hairy	1595	1954	3549 a[1]
Woodford	353	2318	2671 a
Vanguard	414	1039	1453 b
Nova II	466		466 bc
Vantage	244		244 c
Cahaba White[2]			

C.V. = 24.4

[1]Yields followed by the same letter are not significantly different at the 0.01 level using Student Newman-Keuls Multiple Range Test.

[2]Not included in the analysis