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Seasonal Production of Alfalfa and Red Clover, 1982-85

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Summary

Fourteen alfalfa and two red clover varieties were evaluated for seasonal forage production and stand persistence at Overton from 1982 to 1985. Seedling year total yields of alfalfa ranged from 5,720 to 3,947 lb dry matter per acre (DM/A). Second year yields of alfalfa ranged from 5,913 to 4,453 lb DM/A. Red clover yields in the seedling year were 5,075 and 5,009 lb DM/A for the varieties Kenland and Kenstar, respectively. Red clover yields in the second year fell to 3,885 and 3,515 lb DM/A for Kenland and Kenstar, respectively. By the

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beginning of the third production season, stands of both red clover varieties were less than 6 percent and only six alfalfa varieties had stands greater than 20 percent. The range in stand for these six alfalfas was 27.5 to 53.8 percent for Weevilchek and Vancor, respectively.

Introduction

Alfalfa is a warm-season perennial legume used primarily for hay in high summer rainfall regions of the United States or in areas where irrigation water is available. Alfalfa is not generally grown on the sandy, acid soils of the southern region due to high fertility/lime requirements, pest problems, and lack of stand persistence. Red clover is sometimes used in the southern region as a late-producing, cool-season annual. In mid-south areas like Kentucky, red clover lives through the summer and often produces well for 2-3 years. Red clover is classified as a biennial. Our objectives in this study were: (1) to measure, under sod-seeding conditions with no herbicides or irrigation, the seasonal dry matter yield of alfalfa and red clover; (2) to determine the potential stand longevity for these two legume species; and (3) to assess potential pest problems with alfalfa and red clover.

Procedure

Fourteen alfalfa varieties and two red clover varieties were drilled into a native sod (common bermudagrass and *Paspalum setaceum* Michx.) in 5x7-foot plots October 13, 1982. A small plot drill with six double disk openers was used to place the seed at a one-half inch depth. Soil pH was 6.8 (0-6 inches) and soil test ratings of phosphorus and potassium were low and very low, respectively. Prior to planting, 450 lb/A of 0-20-20 were applied to the Sawtown fine sandy loam soil. Four hundred and fifty pounds of 0-20-20 fertilizer were also applied in September 1983 and in October 1984. The grass was mowed to 2 inches prior to sod-seeding. Alfalfa was seeded at 20 lb/A and *Rhizobium* type A inoculant was applied at 1 oz/lb of seed. Seeding rate for the red clover was 14 lb/A and *Rhizobium* type B inoculant was applied at 1 oz/lb of seed. Peat inoculant was supplied by the Nitragin Company. Pelgel solution was used as an adhesive to stick inoculant to the seed.

Due to the infestation of alfalfa weevil larvae, this experiment was sprayed with Sevin 805 (1.5 lb/A) five times. Furadan 4F (1 pt/A) was also applied in March 1984 and March 1985.

The alfalfa and red clover lines were arranged in a randomized complete block design with four replications. The experiment was harvested to 3 inches with a rotary mower when the alfalfa was in approximately one-tenth bloom. Plot fresh weights were recorded in the field. Subsamples were weighed, dried at 70°C for 48 hours, and weighed again. Percent dry matter of subsamples was used to calculate dry matter yield per acre.

A percent stand rating was taken at the beginning and end of each season. Plot weights were not recorded from the first harvest in 1983 due to high weed infestations.

Results and Discussion

Forage production of the sodseeded alfalfa (Table 1) ranged from 5,720 to 3,997 lb DM/A for Southern Special and WL-512, respectively, during the 1982-83 season. The variety Florida 77 was the second highest in yield at 5,565 lb DM/A. Florida 77 started with only 80 percent stand but sustained no stand loss during the first year. Stand losses ranged from 14 to 35.3 percent during the first season for Southern Special and Vancor, respectively. Forage production for the red clover during the first season (Table 1) was 5,364 lb DM/A for Kenland and 5,075 lb DM/A for Kenstar. Stand loss between the second and fourth cut were 5.3 percent for Kenland and 2.0 percent for Kenstar.

During the second season (1983-84) the first and fourth replications were eliminated because of stand loss. Total production during the 1983-84 season ranged from 5,913 to 4,453 lb DM/A for Apollo and Classic, respectively (Table 2). Over the season, Florida 77 came in third with a yield of 5,659 lb DM/A. Stand ratings taken June 6, 1985 showed a range of 32.2 percent loss for Vancor to a 77.5 percent loss for Florida 77. Production on the red clovers for the second season was 3,885 lb DM/A for Kenland and 3,515 lb DM/A for Kenstar. The red clover varieties started the 1984 season with a stand percent of 89.5 for Kenland and 94.8 for Kenstar, but neither made regrowth after the second cut.

Both alfalfa and red clover have the potential to produce high quality forage with no nitrogen fertilizer inputs. This late spring/summer forage production is highly dependent upon rainfall and for the alfalfa, timely insect control. Rainfall at Overton for the months of June-September during the seedling year of this experiment was close to the 17-year average of 13 inches. In

TABLE 1. SEASONAL PRODUCTION OF ALFALFA AND RED CLOVER AT OVERTON, TEXAS, 1982-83

Variety	Harvest Date ²			Total
	June 16	July 19	Aug. 23	
	Pounds Dry Matter Per Acre			
Southern Special	2,005	2,399	1,316	5,720 a ¹
Florida 77	1,831	2,457	1,277	5,565 ab
Kenland Red Clover	2,053	2,184	1,127	5,364 ab
Kenstar Red Clover	2,055	1,966	1,054	5,075 ab
Apollo	1,823	2,170	1,016	5,009 ab
Vanguard	2,048	2,146	782	4,976 ab
Arc	2,092	1,958	884	4,934 ab
Cimarron	1,978	2,056	857	4,891 ab
Weevilchek	1,917	2,111	848	4,876 ab
Classic	1,835	1,960	838	4,633
Team	1,878	1,770	811	4,459 ab
Vancor	1,762	1,843	769	4,374 ab
Saranac AR	1,663	1,781	881	4,325
Defender	1,755	1,834	570	4,159 a
Hi-Phy	1,566	1,868	697	4,131 a
WL-512	1,625	1,821	551	3,997 a

C.V. = 24.4 percent

¹Test planted October 13, 1982.

²Yields followed by the same letter are not significantly different using LSD (0.05).

TABLE 2. SEASONAL PRODUCTION OF ALFALFA AND RED CLOVER AT OVERTON, TEXAS, 1983-84

Variety	Harvest Date ¹				Total
	Apr. 17	May 25	June 21	July 24	
	Pounds Dry Matter Per Acre				
Apollo	2,129	2,121	995	668	5,913 a ²
Vancor	2,021	2,088	990	633	5,732 a
Florida	1,990	1,984	981	704	5,659 ab
Cimarron	1,925	2,048	727	648	5,348 abc
Hi-Phy	1,820	1,784	823	645	5,072 abc
Southern Special	1,529	1,950	811	619	4,909 abc
Team	1,794	1,796	615	480	4,685 abc
Saranac AR	1,697	1,644	708	561	4,610 abc
Weevilchek	1,500	1,814	713	558	4,585 abc
Classic	1,519	1,710	693	531	4,453 abc
Kenland Red	2,380	1,505			3,885 bc
Kenstar Red	2,142	1,373			3,515 c
Vanguard ³					
Arc ³					
Defender ³					
WL-512 ³					

C.V. = 17.1 percent

¹Planted October 13, 1982.

²Yields followed by the same letter are not significantly different using LSD (0.05).

³Stands were too low to evaluate for yield.

the second year (1984), for the same time period, total rainfall was 5.7 inches. This resulted in severe stand losses ranging from 100 to 47 percent (Table 3). Once established, alfalfa appears more drought tolerant than red clover on the sandy soils of East Texas. Well distributed summer rainfall is required to insure the summer survival of red clover in East Texas.

Although alfalfa endured low soil moisture better than red clover, alfalfa weevil and three-cornered alfalfa hopper were major pests on the alfalfa in this study. Alfalfa weevil larvae were noted feeding in terminal buds whenever spring growth of alfalfa started. Application of Sevin at 1.5 lb/A gave only marginal control

TABLE 3. STAND DECLINE OF SOD-SEEDED ALFALFA AND RED CLOVER THROUGH TWO PRODUCTION SEASONS AT OVERTON, TEXAS

Variety	June 16,	Aug. 23,	Apr. 12,	June 7,
	1983	1983	1984	1985
	Percent Stand			
Kenland Red	98.3	93.0	89.5	2.8
Kenstar Red	98.0	96.0	94.8	5.0
Apollo	90.3	71.3	90.8	35.0
Arc	95.3	68.8	0.0	0.0
Cimarron	93.5	62.5	87.5	37.0
Classic	86.0	62.5	85.0	29.5
Defender	74.3	51.3	0.0	0.0
Florida 77	80.0	81.0	88.0	10.5
Hi-Phy	80.0	47.8	79.5	28.8
Saranac AR	83.8	50.0	72.5	19.5
Southern Special	93.3	79.3	81.0	15.8
Team	88.3	57.5	76.3	20.0
Vancor	90.3	55.0	86.0	53.8
Vanguard	89.5	65.0	0.0	0.0
Weevilchek	91.3	62.5	78.8	27.5
WL-512				
WL-512	73.8	46.3	0.0	0.0

Mean of two evaluators and four replications.

and required multiple treatments to control the alfalfa weevil. Three-cornered alfalfa hopper damage was observed in July 1982 and was controlled by Sevin at 1.5 lb/A. Furadan 4F at 1 pt/A controlled alfalfa weevil with one application.

Forage legumes, either reseeding annuals or persistent perennials, are needed to increase quality and/or decrease nitrogen fertilizer inputs for warm-season pastures and hay across the southern region. Research at Overton indicates that alfalfa and red clover have the seasonal growth patterns and forage production potential to partially meet these needs in East Texas. However, neither legume species maintained an acceptable stand after a low rainfall summer and alfalfa required intensive insect control to maintain production. Further research with alfalfa and red clover is required to determine their place in East Texas forage systems.