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Alfalfa Cultivar Performance in the West Cross Timbers

R. M. Jones

Summary

Thirty alfalfa cultivars were grown 2 years under irrigation on Windthorst fine sandy loam soil at Stephenville. No differences were found in dry matter production among non-dormant (4.14 tons/A), semi-dormant (4.19 tons/A), and dormant (4.11 tons/A) types. Failure to detect differences among cultivars was probably due to an unknown limiting factor since all yields were lower than expected. Cotton root rot (*Phymatotrichum omnivorum*) infested portions of the test in the third year causing severe stand loss; therefore, the test was abandoned.

Introduction

The large and increasing size of the dairy cattle population in Erath and adjoining counties requires a large quantity of high-quality forage. Previous tests indicated the agronomic feasibility of local production of alfalfa with a yield potential of five to eight tons dry matter per acre (1). Economic

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production depends on yield potential of the cultivar, disease and insect management, and available water for adequate irrigation. Alfalfa cultivars from all regions of the United States, including non-dormant, semi-dormant, and dormant types were compared for adaptability and forage production in the West Cross Timbers area.

Procedure

Thirty cultivars were obtained from agricultural experiment stations and commercial seed companies across the United States. These included dormant, semi-dormant, and non-dormant types.

The test site was located on a Windthorst fine sandy loam soil with 0 to 1% slope. Agronomic details of the test are listed in Table 1. Preplant fertilizer and herbicide were incorporated by disking. A double-roller toothed implement was used to press and incorporate the seed. The test site was irrigated with one acre-inch of water to ensure a good stand. Irrigation was applied as needed throughout the test period to avoid obvious moisture stress. In 1983 harvests 3, 4, and 5 received 4, 8, and 6 acre-inches, respectively. In 1984 harvests 1-4 received 2.5, 5.5, 6, and 8 acre-inches, respectively.

Harvests generally were made when 10 to 25% of the shoots were beginning to bloom; however, rainfall delayed the June 26, 1983, harvest until it was in full bloom. Regrowth reached 8 to 10 inches after the final harvest in 1983. The area was shredded to a 4-inch height after a killing frost. Irrigation was unavailable in September 1984 thus preventing a fall harvest. Dry matter yield was determined by drying forage samples at 70°C.

The test was discontinued after the June 1985 harvest because the stand had been weakened severely by cotton root rot (*Phymatotricum omnivorum*).

The experimental design was a randomized complete-block with four replications.

TABLE 1. AGRONOMIC DATA FOR ALFALFA CULTIVAR TEST			
	1982	1983	1984
Planting Date	10/14		
Seeding rate	20 lbs/A		
Fertilizer (Preplant)	35-139-139		
Topdressed			30-120-120 Mar. 1
Plot Size	6'x18'	6'x18'	6'x18'
Harvest Area		3'x15'	3'x15'
Rainfall ¹ (inches)		10.50	6.17
Irrigation ¹ (inches)		18.00	22.00
Weed control ¹			
Tolban	1.5 pts/A Sept. 30		
Kerb50w		2.61 lb/A Feb. 16	2.61 lb/A Feb. 16
Insect control			
Sevin XLR (alfalfa weevil)			40 oz/A Apr. 5
Malathion (pea aphids)			1.5 pts/A Apr. 19
¹ April 1 through final harvest.			

Results and Discussion

Mean dry matter yields for the 2 years ranged from 3.54 to 5.00 tons/A (Table 2). Yield of Ariz.LRS and Baron were statistically greater than Pioneer 531 and Moapa 69. The eight highest ranked cultivars (including LRS) were statistically higher in yield than Moapa 69. Ariz.LRS is a lateral root synthetic from Arizona thought originally to be tolerant or resistant to cotton root rot (2). there were no differences among cultivars in 1983 or 1984 although there were small differences in individual harvests (not shown). The 2-year mean dry matter yield was 4.14 tons/A for non-dormant types, 4.19 tons/A for semi-dormant types, and 4.11 tons/A for dormant types. The coefficient of variation for each year was below 19% and indicates that experimental error probably did not obscure yield differences among cultivars.

The test was abandoned after the first harvest in 1985 because of declining stand caused by cotton root rot. Cotton root rot frequently causes stand loss in central Texas and occurs in warm, moist soils. No cultivars showed resistance or tolerance to the organism.

Literature Cited

1. Jones, R. M. 1981. Evaluation of alfalfa varieties for yield and crude protein. p. 90-94. *In* Forage Research in Texas, Dept. Technical Report No. 81-12. Soil and Crop Sci. Dept., Texas Agri. Exp. Sta.
2. Personal Communication. Dr. Melvin H. Schonhorst, Univ. of Arizona, Tucson, AZ 85721.

TABLE 2. TOTAL SEASON DRY MATTER YIELDS FOR ALFALFA CULTIVARS

Cultivar	Source	Type	Dry Matter (Tons/A)		
			1983	1984	Mean ³
Cuf 101	Calif. AES ¹	ND	4.93	3.15	4.04bcd
So. Special	WL Research	ND	5.14	3.35	4.25bcd
DeKalb 120	DeKalb-Pfizer	D	4.83	3.05	3.94bcd
Liberty	NC/Okla. AES	D	5.62	3.14	4.38abc
Florida 77	Fla. AES & Pioneer	ND	5.20	3.20	4.20bcd
DeKalb 130	DeKalb-Pfizer	D	5.11	3.20	4.16bcd
WL 318	WL Research	D	5.54	3.30	4.42abc
Armor	N.A. Plant Breeder	D	5.46	3.17	4.31bcd
Mesilla	N. Mexico AES	SD	4.84	3.02	3.93bcd
HiPhy	FFR Corp. ²	D	5.31	2.86	4.08bcd
Apollo	N.A. Plant Breeder	D	5.03	3.19	4.11bcd
Sonora 70-pm	Ariz. AES	ND	5.09	3.10	4.10bcd
NK 81416	NorthrupKing	D	5.40	3.14	4.27bc
NK 79178	NorthrupKing	SD	5.40	3.27	4.33bc
Classic	FFR Corp.	D	5.35	3.15	4.25bcd
Ariz. LRS	Ariz. AES	ND	5.23	4.77	5.00a
Riley	Kansas AES	D	5.19	3.16	4.17bcd
Baron	N.A. Plant Breeder	SD	5.55	3.47	4.51 ab
Perry	Neb. AES	D	4.89	2.91	3.90bcd
Arc	N.C. AES	D	5.03	2.97	4.00bcd
Cimarron	G. Plains Research	D	4.98	2.93	3.95bcd
Rincon	N. Mexico AES	SD	4.71	3.07	3.89bcd
Pioneer 555	Pioneer Hi-Bred	D	4.92	3.08	4.00bcd
Pierce	NorthrupKing	ND	4.74	3.30	4.02bcd
Shenandoah	G. Plains Research	ND	5.20	3.15	4.17bcd
Pioneer 531	Pioneer Hi-Bred	D	4.56	2.95	3.75cd
Team	N.C. AES	D	5.07	2.95	4.01bcd
Pike	NorthrupKing	SD	5.32	3.22	4.27bc
Moapa 69	Calif. Nev. AES	ND	3.99	3.10	3.54d
WL 515	WL Research	ND	4.86	3.07	3.97bcd
Mean			5.08	3.18	4.13
CV%			11.17	18.67	14.05

¹ Agricultural Experiment Station.² Farmers Forage Coop.³ Means followed by the same letter within a column are not statistically significant (p=0.05).⁴ D=Dormant SD=Semi-dormant ND=Non-dormant.