

ALFALFA VARIETY PERFORMANCE IN CENTRAL TEXAS

Eric P. Prostko, Assistant Professor and Extension Agronomist - Stephenville

James P. Muir, Assistant Professor and Forage Physiologist - Stephenville

M. David Vestal, Eastland County Extension Agent

Sandy R. Stokes, Assistant Professor and Extension Dairy Specialist - Stephenville

Summary

A field trial was conducted in 1998 near Gorman, TX to evaluate the performance of 13 alfalfa varieties. The average yield of all varieties was 3.8 tons/A. Varieties which produced better than average included Amerigraze 701 (4.1 tons/A), DK 166 (4.9 tons/A), Durango (4.7 tons/A), OK 49 (4.1 tons/A), Rio (4.6 tons/A), and Tahoe (4.7 tons/A). However, the yields of these varieties were not significantly different from each other. No differences in crude protein, ADF, and NDF between varieties were observed.

Key words: acid detergent fiber, ADF, *Medicago sativa*, neutral detergent fiber, NDF, protein, quality, yield.

Introduction

A substantial decrease in peanut acreage in central Texas has growers in this region searching for alternative crops that can be produced in place of and in rotation with peanuts. The central Texas dairy industry imports an estimated \$30 million dollars worth of alfalfa hay every year (S. Stokes, personal communication, 1998). Consequently, a strong market exists for alfalfa hay. Previous attempts to produce alfalfa in this region have been unsuccessful due to cotton root rot (*Phymatotrichum omnivorum*). Limited research on alfalfa production for this region has been conducted (Jones 1981, 1989). Thus, the objective of this research was to evaluate the performance of new alfalfa varieties for their potential to be grown in central Texas.

Procedure

Thirteen alfalfa varieties were planted with a billion seeder on September 19, 1997 in a producer's field near Gorman, TX. The seeding rate was 24 lbs/A. Each variety was replicated 3 times in plots 10' X 230' in size. A complete listing of the varieties can be found in Table 1. Prior to planting the field was

fertilized with 150 lbs/A of 18-46-0 and 300 lbs/A of 0-0-60. In 1996, the field had been planted in corn. After the first harvest, Pursuit 2AS was applied at 4 oz/A for general weed control. Poast Plus @ 1.5-2.0 pts/A was applied on June 23 and August 29 to control Texas panicum (*Panicum texanum*).

Alfalfa stand and vigor ratings were made throughout the winter to evaluate establishment. Stand was determined by counting the number of plants per square foot. Vigor ratings were made visually utilizing a scale of 1 to 10, with 1 = poor vigor and 10 = excellent vigor.

Yields were obtained seven times throughout the growing season by harvesting a 28 ft² area across each variety with a self-propelled sickle-bar mower. After harvesting, the plot samples were oven-dried at 50^oC for 3-4 days and yields were converted to lbs dry matter (DM)/A. Final yields are also expressed in tons/A @ 10% moisture for standardization. Yields from the second harvest on May 21 were analyzed for crude protein, acid detergent fiber (ADF), and neutral detergent fiber (NDF) contents using traditional wet chemistry techniques.

The plot area was located at the end of an irrigated peanut field, thus center pivot irrigation was available. The plot area received 1" of irrigation on September 17, 2 days prior to planting. It was not irrigated again until July when the regular peanut irrigation schedule was initiated. Approximately 1.5" of water was applied weekly throughout July, August, and September.

All data were subjected to analysis of variance and means separated using Duncan Multiple Range Test at the 0.05 probability level.

Results and Discussion

Alfalfa Establishment. Results of the stand and vigor ratings are summarized in Table 2. A minimum of 20 plants/ft² in the establishment year is considered optimum. Only four varieties (Amerigraze 701, Cimarron 3I, Durango, and Haygrazer) had at least 20 plants/ft² on December 12, 1997. Other varieties had less plant numbers but this did not seem to influence yields. Varieties with vigor ratings greater than 7 on December 12 and February 24 included DK 166, Durango, Rio, and Tahoe. By March 17, less differences in vigor were observed.

Alfalfa Yield. Complete yield results from the seven harvests can be found in Table 3. Average yield was 3.8 tons /A @ 10% moisture. Varieties which produced better than average included Amerigraze 701 (4.1 tons/A), DK 166 (4.9 tons/A), Durango (4.7 tons/A), OK 49 (4.1 tons/A), Rio (4.6 tons/A), and Tahoe (4.7 tons/A). However, the yields of these varieties were not significantly different from each other.

Alfalfa Quality. Protein, ADF, and NDF values for each variety can be found in Table 4. Average protein, ADF, and NDF values was 17.4, 25.5, and 33.8, respectively. No statistical differences in quality between varieties were observed. It is important to note that these varieties were harvested on a time schedule (~ 27 days) rather than a quality schedule (i.e. pre-bloom). Quality differences might exist if each variety was harvested at the pre-bloom stage of growth.

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Table 1. Alfalfa variety characteristics.

Variety	Source	Fall Dormancy ^a
Amerigraze 701	AgriPro	7
Ciba 2888	Novartis	4
Ciba 2444	Novartis	3
Cimarron 3I	Great Plains	4
DK 133	Dekalb	4
DK 166	Dekalb	6
Durango	Great Plains	7
Haygrazer	Great Plains	4
OK 49	Cal-West	5
Ranger	??	??
Rio	Great Plains	7
Rushmore	Novartis	4
Tahoe	Novartis	5

^aFall Dormancy: 1= most dormant; 9 = least dormant.

Table 2. Alfalfa variety stand and vigor, Gorman, TX, 1997-98.

Variety	# Plants/ft ^{2a} 12-17-97	Vigor 12-17-97 (1-10) ^b	Vigor 2-24-98 (1-10) ^b	Vigor 3-17-98 (1-10) ^b
Amerigraze 701	20.0 abc ^c	5.0 de	5.3 bc	7.2 d
Ciba 2444	12.0 cd	3.7 ef	2.7 e	5.7 f
Ciba 2888	8.7 d	4.3 def	4.0 de	6.3 ef
Cimarron 3I	26.7 a	5.7 cd	5.0 cd	7.0 de
DK 166	16.7 a-d	8.0 a	8.3 a	8.7 ab
DK 133	18.7 a-d	4.7 def	4.0 de	6.2 f
Durango	21.3 abc	7.3 abc	7.7 a	8.0 bc
Haygrazer	23.3 ab	6.0 bcd	5.7 bc	7.0 de
OK 49	17.0 a-d	5.7 cd	6.3 b	7.7 cd
Ranger	13.0 cd	3.0 f	3.3 e	5.0 g
Rio	18.3 a-d	7.7 ab	8.0 a	8.0 bc
Rushmore	16.0 bcd	3.0 f	3.0 e	5.8 f
Tahoe	18.0 a-d	7.0 abc	8.0 a	9.0 a
CV	29.4	17.6	13.3	5.6

^a20-50 plants/ft² during seeding year is considered optimum.

^b1=poor; 10=excellent.

^cMeans in the same column with the same letter are not significantly different according to DMRT (P= 0.05).

Table 3. The yield of 13 alfalfa varieties, Gorman, TX, 1997-98.

Variety	Yield (lbs/A DM) 4-20-98	Yield (lbs/A DM) 5-21-98	Yield (lbs/A DM) 6-17-98	Yield (lbs/A DM) 7-14-98	Yield (lbs/A DM) 8-27-98	Yield (lbs/A DM) 9-24-98	Yield (lbs/A DM) 11-4-98	Total Yield (lbs/A DM)	Total Yield (tons/A @ 90% DM)
Amerigraze 701	1357.4 bc	451.3 a	1592.7 abc	911.8 a	952.6 a	1212.4 bcd	861.4 abc	7339.6 abc	4.1 abc
Ciba 2444	831.0 c	304.0 a	1235.0 bcd	714.9 a	863.9 a	1084.0 b-e	534.7 de	5567.5 cde	3.1 cde
Ciba 2888	1385.5 bc	308.2 a	1211.5 cd	795.6 a	819.9 a	986.6 c-f	488.4 de	5995.7 cde	3.3 cde
Cimarron 3I	1448.4 bc ^a	317.7 a	1549.8 a-d	737.6 a	901.8 a	1068.8 b-e	788.5 a-d	6812.6 bcd	3.8 bcd
DK 166	2125.8 ab	444.3 a	1583.3 abc	1027.0 a	1217.5 a	1263.0 b	1076.0 a	8736.9 a	4.9 a
DK 133	1083.8 c	336.2 a	1177.8 d	798.9 a	631.7 a	806.5 f	535.1 de	5370.0 de	3.0 de
Durango	2517.0 a	496.0 a	1628.2 ab	855.8 a	883.7 a	1086.1 b-e	906.6 ab	8373.4 ab	4.7 ab
Haygrazer	1319.8 bc	326.3 a	1421.2 a-d	643.9 a	981.3 ab	981.3 def	708.0 bcd	6381.8 cde	3.5 cde
OK 49	1315.8 bc	410.2 a	1627.5 ab	880.0 a	1115.7 a	1087.6 b-e	910.7 ab	7347.6 abc	4.1 abc
Ranger	697.1 c	186.3 a	1251.6 bcd	583.3 a	841.5 a	871.9 ef	358.3 e	4790.0 e	2.7 e
Rio	1966.6 ab	434.0 a	1684.6 a	865.4 a	1108.2 a	1235.6 bc	997.5 ab	8291.9 ab	4.6 ab
Rushmore	710.9 c	195.6 a	1152.3 d	735.5 a	681.8 a	788.0 f	593.7 cde	4857.9 e	2.7 e
Tahoe	1507.7 bc	459.9 a	1618.7 ab	932.5 a	1367.2 a	1554.6 a	1033.9 a	8474.5 ab	4.7 ab
CV	32.2	37.1	14.6	24.3	31.9	12.2	21.2	14.1	14.1

^aMeans in the same column with the same letter are not significantly different according to DMRT (P=0.05).

Table 4. The quality of second harvest alfalfa, Gorman, TX, 1997-98.

Variety	Crude Protein (%)	ADF (%)	NDF (%)
Amerigraze 701	16.4 a	28.2 a	37.1 a
Ciba 2444	15.3 a	24.5 a	32.8 a
Ciba 2888	15.6 a	25.6 a	33.5 a
Cimarron 3I	19.2 a ^a	24.8 a	34.1 a
DK 166	17.9 a	24.9 a	34.4 a
DK 133	18.3 a	25.4 a	33.2 a
Durango	16.9 a	25.5 a	33.3 a
Haygrazer	16.9 a	25.0 a	32.6 a
OK 49	19.3 a	28.3 a	38.1 a
Ranger	17.5 a	24.8 a	32.9 a
Rio	16.9 a	26.6 a	33.7 a
Rushmore	18.6 a	23.7 a	31.9 a
Tahoe	17.4 a	24.0 a	31.8 a
CV	13.5	11.2	9.1

^aMeans in the same column with the same letter are not significantly different according to DMRT (P=0.05).