

Two Year Evaluation of Nine Alfalfa Varieties Grown Under Grower Conditions on the Colorado River Indian Tribes Reservation

Michael D. Rethwisch, Miguel Torres, Michael Kruse and Javier Torres

Abstract

Nine alfalfa varieties, most not previously tested under field conditions in Arizona, were planted October 29, 1997, using the same setting on a Great Plains Solid Stand 13 End Wheel drill. Varieties differed in lbs. of seed/acre planted, ranging from 28.0 for CUF 101 to 21.3 for Alto. Seven cuttings were obtained in 1998, a year characterized by much cooler than normal temperatures during April through early July. The variety Alto yielded significantly more hay than CUF 101 in the first cutting and had the highest total yield (10.61 tons hay/acre) in 1998, 4.9% greater than the area standard, CUF 101. Varieties with fall dormancy class ratings of 8 (Alto, WL 525 HQ, and Baralfa 85) had the highest yields during 1998, yielding at least 103% of CUF 101. During 1999, the top yielding varieties were Baralfa 92, Beacon, and Baralfa 85, which all yielded at least 105% of CUF 101. These varieties in addition to Alto yielded 103+% of CUF 101 through the first two years of production.

Introduction

New alfalfa varieties continue to increase in availability, especially those in fall dormancy class 9, with newly certified varieties available annually. This experiment was begun to collect yield and other varietal information under field conditions on many varieties that had not previously been tested in Arizona as part of the University of Arizona alfalfa variety testing program.

Methods and Materials

Nine alfalfa varieties (Alto, Baralfa 85, Baralfa 92, Beacon, DK191, CUF 101, SW 9301, WL 525 HQ and WL 612) were planted October 29, 1997, with a Great Plains Solid Stand 13 End Wheel Drill into a field located approximately five miles south of Poston, AZ, on the Colorado River Indian Tribes Reservation. Field soil types consist of approximately 98% Cibola-Agualt clay loam and 2% Holtville-Kofa complex.

All varieties were planted using the same planter setting, which was expected to apply 27 lbs./acre of CUF 101. Plots were 0.741 acres in size (26 feet long x 1,241 ft. long), and experimental design was a randomized block with four replications. Fields were treated with the herbicide Poast Plus for reed canarygrass control on Dec. 11, 1997.

Seven harvests were obtained in 1998. Plots were cut on March 13, May 2, June 3-4, July 8-9, August 11, Sept. 24, and Nov. 13 using normal grower practices and, after curing, were baled. After baling, bales for each plot were counted, and several bales (3-5) per plot were weighed to obtain average weight for each plot. Yields were then calculated on a per acre basis.

The field was harvested seven times 1999. Data from the July 24 cutting was not able to be obtained due to a very strong wind storm the night prior to scheduled baling which moved windrows. Prior to the windstorm the windrows had a north-south orientation within each plot, after the wind the orientation was primarily east-west and made data collection for individual plots impossible to obtain.

An area of the field began dying out in the western replicate, with some yield reduction noticed beginning with the August 11 cutting. This area continued to expand thereafter, causing substantial yield loss among the affected plots. Varietal plots affected were Alto, WL 525HQ, CUF 101, WL 612, DK 191, and SW 9301. Affected plots were not included in yield calculations for the last two harvests of 1998 or for any of the 1999 harvests, leaving three replicates; all other varieties had four replicates. Grower cooperators were unsatisfied with stand across northern half of field in the fall of 1999, in part due to plants dying from various causes. This section of the field was disced and replanted, thus bringing a planned three experiment to an end at this time.

Quality samples were taken from the August 1998 and June 1999 harvests by coring several bales/plot with a Utah sampler, combining samples to make a composite sample for each variety. Samples were submitted for near infrared (NIR) analysis to Stanworth Crop Consultants, Blythe, CA.

Results

Differences existed in amount of seed planted per acre, with CUF 101 planting more lbs. of seed/acre than other varieties and Alto planting the least. This was thought to be due to seed size with the smaller seeded varieties planting more lbs./acre than the larger seeded and coated varieties.

Three varieties (CUF 101, Baralfa 85, and Baralfa 92) had more vigorous growth early after germination than other varieties being evaluated. First cutting yields in 1998 did not correlate with the early vigorous growth, however, although some weed suppression was visually noted in these varieties but not documented.

Alto was the highest yielding variety in the trial in 1998, and the dormancy class 8 varieties (Alto, WL525HQ, and Baralfa 85) were the highest yielding varieties, with each yielding at least 103% of CUF 101. This may be due in part to the spring and early summer temperatures being below normal, favoring the class 8 fall dormancy varieties. This growing period represented approximately 60% of the alfalfa hay tonnage in 1998. The variety Alto yielded significantly more hay than CUF 101 in the first cutting and had the highest total yield (10.61 tons hay/acre) in 1998, 4.9% greater than CUF 101, the area standard.

CUF 101 was the highest yielding variety in the last two cuttings of 1998 and was the only variety to average over one ton of hay/cutting (1.03 tons/cutting) during this time period. Alto was the lowest yielding variety in both the September and November harvests. Of the fall dormancy 9 varieties, Beacon had the highest yield in 1998 with 10.44 tons/acre, equivalent to 102.9% of CUF 101. Beacon and CUF 101 were the only varieties to average more than 1.2 tons/acre over the final three harvests.

In 1999, three varieties (Baralfa 92, Beacon and Baralfa 85) yielded 105% of CUF 101 yields, with two varieties yielding less than CUF 101 (WL 525 HQ and DK 191). When combining the data from the two years, DK 191 and WL 612 yielded less than CUF 101, while four varieties (Baralfa 95, Beacon, Baralfa 85 and Alto) have produced 3+% more tonnage than CUF 101.

DK 191 yielded the least amount of hay among varieties included in this trial in 1999, but it also had the highest quality in the June 1999 cutting, and has the highest average quality from the two harvests sampled. Data indicate that average varietal hay quality is very similar, but greater differences in terms of relative feed value and acid detergent fiber occur for each individual harvest.

Acknowledgements

This study is supported in part by Barenbrug USA, Germain's Seeds, Great Plains Research, Kamprath Seed Co., S&W Seed Co., and Union Seed. We also thank Ken Kruse, Brent Woodard, Dale Kruse, Chris Shelton, and John Nelson for assistance with data collection.

Table 1. First year (1998) yields in tons/acre and lbs./acre of seed planted of nine alfalfa varieties planted October 1997 on the Colorado River Indian Tribes Reservation.

Variety	Dormancy class	lbs. seed/acre	Cutting date							Total (tons/acre)	% of CUF101
			March 13	May 2	June 3-4	July 7-8	August 11	Sept. 24	Nov. 13		
Baralfa 85	8	25.0	1.06 b	1.65a	2.13a	2.09a	1.63ab	1.11ab	0.79abc	10.45a	103.0
Beacon	9	25.3	1.03 b	1.65a	2.02a	2.11a	1.66a	1.07abc	0.90ab	10.44a	102.9
Baralfa 92	9	23.8	1.19ab	1.60a	1.98a	2.10a	1.68a	0.99 bcd	0.84abc	10.37a	102.2
Alto	8	21.3	1.39a	1.71a	2.11a	2.21a	1.50ab	0.95 d	0.74 c	10.61a	104.6
WL 525 HQ	8	23.4	1.22ab	1.71a	2.01a	2.15a	1.53ab	1.19a	0.75 bc	10.55a	104.0
CUF 101	9	28.0	1.05 b	1.56a	1.89a	2.02a	1.56ab	1.15ab	0.91a	10.15a	100.0
WL 612	9	25.3	1.24ab	1.62a	1.97a	2.07a	1.48 b	1.01 cd	0.75 bc	10.13a	99.9
DK 191	9	22.8	1.15ab	1.53a	2.08a	2.14a	1.49 b	0.97 d	0.79abc	10.14a	99.9
SW 9301	9	26.0	1.05 b	1.64a	1.93a	2.10a	1.54ab	1.12abc	0.78abc	10.16a	100.1

Means in the same column followed by the same letter are not significantly different at the $P \leq 0.05$ level (Fishers LSD test).

Table 2. Second year yields (tons/acre) of nine alfalfa varieties planted fall 1997 on the C.R.I.T. Reservation.

<u>Variety</u>	<u>Cutting Date</u>							<u>Total</u>	<u>% CUF</u>
	<u>March 5</u>	<u>April 17</u>	<u>May 18</u>	<u>June 19</u>	<u>July 24</u>	<u>Sept. 3</u>	<u>Oct. 8</u>		
Baralfa 92	1.42a	1.41a	1.60a	2.22a	<i>No</i>	1.58a	0.61ab	8.79	109.5
Beacon	1.51a	1.30a	1.53a	2.13ab	<i>data</i>	1.46a	0.63ab	8.56	106.6
Baralfa 85	1.39a	1.43a	1.51ab	2.12ab	<i>due</i>	1.34a	0.63ab	8.43	105.0
Alto	1.36a	1.34a	1.49ab	2.07 b	<i>to</i>	1.41a	0.63ab	8.28	103.1
SW 9301	1.41a	1.24a	1.46ab	2.04 b	<i>wind</i>	1.48a	0.63ab	8.27	103.0
WL 612	1.47a	1.19a	1.44ab	2.07b	<i>storm</i>	1.32a	0.53 b	8.03	100.0
CUF 101	1.32a	1.21a	1.50a	2.10ab	<i>which</i>	1.30a	0.59ab	8.03	100.0
WL 525 HQ	1.28a	1.23a	1.40ab	2.03 b	<i>rolled</i>	1.37a	0.72a	8.01	99.8
DK 191	1.36a	1.21a	1.30 b	2.03 b	<i>windrows</i>	1.25a	0.54 b	7.69	95.7

Means in the same column followed by the same letter are not significantly different at the $P \leq 0.05$ level (Fishers LSD test).

Table 3. Two Year (1998-1999) comparison of alfalfa yields (tons/acre) from nine varieties planted fall, 1997, on the Colorado River Indian Tribes Reservation.

<u>Variety</u>	<u>1998</u>	<u>1999</u>	<u>Total</u>	<u>Percent of CUF 101</u>
Baralfa 92	10.37 (5)	8.79 (1)	19.16	105.4
Beacon	10.44 (4)	8.56 (2)	19.00	104.5
Alto	10.61 (1)	8.28 (4)	18.89	103.9
Baralfa 85	10.45 (3)	8.43 (3)	18.87	103.8
WL 525 HQ	10.55 (2)	8.01 (8)	18.56	102.1
SW 9301	10.16 (6)	8.27 (5)	18.43	101.4
CUF 101	10.15 (7)	8.03 (7)	18.18	100.0
WL 612	10.13 (9)	8.03 (6)	18.16	99.9
DK 191	10.14 (8)	7.69 (9)	17.83	98.1

Number in parentheses is yield rank of that variety for the year indicated.

Table 4. Hay quality components of nine alfalfa varieties (August 1998) after wind and rain damage to hay in windrows.

<u>Variety</u>	<u>Dormancy Class</u>	<u>Crude Protein</u> ¹	<u>Acid Detergent Fiber</u> ¹	<u>Total Digestible Nutrients</u> ²	<u>Relative Feed Value</u>
WL 525 HQ	8	17.6	35.0	50.5	135.4
Alto	8	17.6	34.4	50.9	133.6
DK 191	9	17.7	35.6	50.1	130.2
CUF 101	9	17.1	36.2	49.7	130.0
Beacon	9	17.3	36.5	49.4	129.7
Baralfa 92	9	16.7	36.1	49.7	128.8
SW 9301	9	17.4	36.7	49.3	128.1
Baralfa 85	8	15.1	39.1	47.7	123.9
WL 612	9	16.1	38.6	48.0	119.5

¹ Reported using a 100% dry matter basis

² Reported using a 90% dry matter basis

Table 5. Hay quality components of nine alfalfa varieties (June 1999).

<u>Variety</u>	<u>Dormancy Class</u>	<u>Crude Protein</u> ¹	<u>Acid Detergent Fiber</u> ¹	<u>Total Digestible Nutrients</u> ²	<u>Relative Feed Value</u>
DK 191	9	22.6	27.7	55.5	166.9
SW 9301	9	21.5	30.3	53.7	155.4
Baralfa 92	9	21.4	29.9	53.9	155.2
WL 612	9	20.8	30.6	53.4	152.7
CUF 101	9	21.1	30.5	53.5	152.4
Baralfa 85	8	20.5	31.5	52.9	147.1
WL 525 HQ	8	20.6	31.4	52.9	146.6
Alto	8	20.8	31.8	52.6	146.4
Beacon	9	19.5	33.1	51.8	141.9

¹ Reported using a 100% dry matter basis

² Reported using a 90% dry matter basis

Table 6. Average summer quality hay components of nine alfalfa varieties (August 1998, June 1999).

<u>Variety</u>	<u>Dormancy Class</u>	<u>Crude Protein</u> ¹	<u>Acid Detergent Fiber</u> ¹	<u>Total Digestible Nutrients</u> ²	<u>Relative Feed Value</u>
DK 191	9	20.15	31.65	52.8	148.55
Baralfa 92	9	19.05	33.0	51.8	142.0
SW 9301	9	19.45	33.5	51.5	141.75
CUF 101	9	19.1	33.35	51.6	141.2
WL 525 HQ	8	19.1	33.2	51.7	141.0
Alto	8	19.2	33.1	51.7	140.0
WL 612	9	18.45	34.6	50.7	136.1
Beacon	9	18.4	34.8	50.6	135.8
Baralfa 85	8	17.8	35.3	50.3	135.5

¹ Reported using a 100% dry matter basis

² Reported using a 90% dry matter basis