

Alfalfa Variety Trial on Heavy Clay Soil in Graham County Arizona, 1999

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Abstract

Twenty four alfalfa varieties with fall dormancy ratings of 8 or 9 were tested in a replicated small plot trial on a heavy clay loam soil on the Safford Agricultural Center. This was the fourth year of the study. WL 91-224F was the highest yielding variety in 1999, but that still left it in second place behind Cuf 101 for the four year average. WL 91-224F yield was 8.35 tons per acre which is very close to its four year average of 8.32 tons per acre. CUF 101 only had the heaviest yield in one out of the past four years, but its high 1998 yield gave it the highest average yield over the four years of the study, at 8.37 tons per acre per year. Heat units with thresholds of 77° F and 41° F are included for each cutting in the study.

Introduction

This is the fourth year of a new study which includes the best varieties from the previous trial along with several new varieties that seemed promising. Another study was started on lighter soil because the yield relations by variety were quite different on this heavy soil compared with previous studies in Safford. This other study will be reported on in another report in this document. This is the 24th year of continuous alfalfa variety testing in Graham county.

Materials and Methods

Twenty four alfalfa varieties with fall dormancy ratings ranging from 8 to 10 are included in this test. Plots were planted by hand using a Precision Garden Seeder Model 1001A from Earthway Products. Four rows on six inch spacings were planted 20 feet long with twelve inch spacings between varieties. Replicates were placed in a 2 by 2 arrangement to reduce errors due to soil variation.

Crop History:

Location: Safford Agricultural Center, Graham County
Elevation: 2950 feet above sea level
Soil type: Guest clay
Planting date: 26 September, 1995 Rate: 25 lbs/acre
Herbicide: None
Fertilizer: 300 lbs/ac 16-20-0 at planting
Insecticide: Treatment to control alfalfa weevil
Irrigation: Border, 15 irrigations (ca. 75 acre inches)
Harvest strategy: Cut around 10% bloom to optimize quantity and stand longevity.
Plot size: 2.5 feet by 20 feet
Replicates: Four

Plots were cut by hand using a Troy mower and raked and weighed immediately to prevent loss of moisture. Weights were converted to dry weight at 0% moisture for reporting purposes.

Results

The results of the study are recorded in tables below. Table 1 provides the yields per cutting in the current year and Table 2 gives a summary of the four years of the study. It should be noted that this varietal evaluation was grown on a heavy clay soil and the highest yielding varieties differ when grown on lighter soils

Table 1. Fourth year yield summary for 24 alfalfa varieties grown at 2950 feet above sea level grown in heavy clay soil in southeastern Arizona. Yields are in tons per acre corrected to 0% moisture, ranks are in parentheses. (Graham county, Safford Agricultural Center. 32° 49' S. Latitude)

Variety	Cut 1 5/1	Cut 2 6/4	Cut 3 7/1	Cut 4 8/11	Cut 5 10/1	Cut 6 11/19	Total 1999	% of Cuf 101
WL91-224F	1.95 (2)	1.66 (1)	1.62 (1)	1.37 (5)	0.86 (14)	00.89 (1)	8.35 a	106.5
UC 331	1.87 (6)	1.53 (4)	1.46 (6)	1.14 (22)	1.02 (2)	0.88 (3)	7.90 ab	100.8
9390 APH	1.98 (1)	1.56 (3)	1.49 (4)	1.25 (19)	0.87 (12)	0.73 (10)	7.87 ab	100.4
Cuf 101	1.83 (7)	1.63 (2)	1.56 (2)	1.05 (24)	0.90 (9)	0.87 (3)	7.84 abc	100.0
DK 189	1.92 (3)	1.45 (6)	1.48 (5)	1.26 (13)	0.91 (8)	0.74 (9)	7.75 abc	98.9
Prestige	1.83 (8)	1.40 (7)	1.49 (3)	1.18 (21)	0.99 (3)	0.83 (4)	7.71 a-d	98.3
SW 14	1.91 (4)	1.48 (5)	1.40 (8)	1.13 (23)	0.85 (19)	0.72 (12)	7.49 a-e	95.5
Pio 5888	1.89 (5)	1.38 (8)	1.33 (12)	1.27 (12)	0.83 (21)	0.75 (5)	7.45 a-e	95.0
Mecca	1.58 (16)	1.34 (11)	1.28 (14)	1.48 (2)	0.97 (4)	0.73 (11)	7.36 a-e	93.9
WL 525 HQ	1.63 (13)	1.36 (9)	1.46 (7)	1.26 (16)	0.91 (7)	0.75 (6)	7.36 a-e	93.9
ABI 9194	1.81 (9)	1.35 (10)	1.12 (13)	1.22 (20)	0.89 (11)	0.75 (7)	7.33 a-e	93.5
WL 88-137	1.57 (16)	1.33 (12)	1.33 (11)	1.46 (3)	0.90 (10)	0.69 (14)	7.26 a-e	92.6
SW 9301	1.67 (12)	1.24 (14)	1.34 (10)	1.25 (18)	0.86 (13)	0.75 (8)	7.10 a-e	90.6
9393 APH	1.79 (10)	1.23 (15)	1.27 (15)	1.26 (14)	0.86 (15)	0.65 (18)	7.05 a-e	89.9
WL 612	1.58 (15)	1.31 (13)	1.34 (9)	1.33 (6)	0.79 (23)	0.68 (15)	7.03 a-e	89.7
Falcon	1.71 (11)	1.13 (21)	1.11 (20)	1.51 (1)	0.92 (5)	0.60 (19)	6.97 a-e	88.9
Pio 5939	1.49 (22)	1.14 (19)	1.05 (23)	1.45 (4)	1.09 (1)	0.67 (16)	6.88 b-e	87.8
UC 340	1.50 (20)	1.14 (20)	1.20 (16)	1.29 (9)	0.92 (6)	0.70 (13)	6.74 b-e	86.0
UC Cibola	1.61 (14)	1.22 (16)	1.19 (17)	1.25 (17)	0.75 (24)	0.67 (17)	6.69 b-e	85.3
Pio 5715	1.56 (8)	1.19 (17)	1.18 (18)	1.27 (10)	0.85 (18)	0.57 (21)	6.61 b-e	84.3
Maricopa	1.45 (23)	1.14 (18)	1.13 (19)	1.26 (15)	0.85 (17)	0.58 (20)	6.4 cde	81.6
SW 8210	1.52 (19)	1.00 (24)	1.07 (22)	1.31 (7)	0.82 (22)	0.57 (22)	6.28 de	80.1
Mecca II	1.49 (21)	1.11 (22)	1.01 (24)	1.27 (11)	0.85 (20)	0.48 (23)	6.20 e	79.1
Mesa	1.32 (24)	1.02 (23)	1.09 (21)	1.30 (8)	0.86 (16)	0.48 (24)	6.05 e	77.2
Average	1.68	1.30	1.30	1.28	0.89	0.70	7.15	--
LSD(05)	0.51	0.39	0.34	0.33	0.18	0.23	1.44	--
CV(%)	21.6	21.2	18.3	18.3	14.8	23.4	14.3	--
HU(77/41°F)	1823	734	901	1335	1605	1075	7473	

1. Values followed by the same letter are not significantly different at the 5% level of probability.

Table 2. Four year yield summary for 24 alfalfa varieties grown at 2950 feet above sea level grown in heavy clay soil in southeastern Arizona. Yields are in tons per acre corrected to 0% moisture, ranks are in parentheses.

Variety	Source	Fall Dormancy Rating	1996 Yield Average	1997 Yield Average	1998 Yield Average	1999 Yield Average	Four year Average	Percent of Cuf 101
Cuf 101	Public	9	9.12 (2)	7.55 (4)	10.29(1)	7.84 (4)	8.37 a¹	100.0
WL 91-224F	W-L Research		8.63 (4)	7.60 (2)	9.88(2)	8.35 (1)	8.32 ab	99.4
SW 14	S&W Seeds	9	8.83 (3)	7.60 (3)	9.32(11)	7.49 (7)	8.12 abc	97.0
DK 189	DeKalb	8	8.62 (5)	7.40 (6)	9.70(5)	7.75 (5)	8.08 abc	96.5
Pioneer 5888	Pioneer HiBred	8	9.19 (1)	7.25 (9)	9.08(13)	7.45 (8)	8.10 abc	96.8
UC 331	Univ. of Calif.		8.30 (6)	7.68 (1)	9.46(9)	7.90 (2)	8.08 abc	96.5
9390 APH	AgriPro		8.28 (7)	7.10 (12)	9.69(6)	7.87 (3)	7.94 abc	94.9
Prestige	Cargill	8	8.26 (8)	7.15 (11)	9.40(10)	7.71 (6)	7.84 abc	93.7
ABI 9194	AgriPro		8.20 (11)	7.30 (7)	9.06(15)	7.33 (11)	7.76 abc	92.7
Mecca	PGI/MBS	9	7.54 (20)	7.43 (5)	9.56(8)	7.36 (9)	7.56 a-d	90.3
SW 9301	S&W Seeds	9	7.97 (14)	7.28 (8)	9.19(12)	7.10 (13)	7.59 a-d	90.7
WL 612	W-L Research	9	8.21 (10)	6.38 (23)	9.85(3)	7.03 (15)	7.39 a-d	88.3
WL 525 HQ	W-L Research	8	7.85 (16)	6.68 (19)	9.65(7)	7.36 (10)	7.48 a-d	89.4
WL 88-137	W-L Research		7.98 (13)	6.75 (16)	9.08(14)	7.26 (12)	7.48 a-d	89.4
9393 APH	AgriPro		8.24 (9)	6.80 (15)	8.52(18)	7.05 (14)	7.48 a-d	89.4
Maricopa	PGI/MBS	8	6.98 (24)	6.95 (13)	9.81(4)	6.40 (21)	6.99 cd	83.5
Pioneer 5939	Pioneer HiBred	9	7.26 (21)	6.73 (18)	8.95(16)	6.88 (17)	7.09 cd	84.7
UC Cibola	Univ. of Calif.	9	8.02 (12)	6.53 (21)	8.21(21)	6.69 (19)	7.17 bcd	85.7
SW 8210	S&W Seeds	8	7.95 (15)	7.15 (10)	7.51(24)	6.28 (22)	7.21 a-d	86.1
Falcon	Lohse Mill	8	7.16 (23)	6.75 (17)	8.80(17)	6.97 (16)	7.06 cd	84.3
UC 340	Univ. of Calif.		7.65 (19)	6.50 (22)	8.23(20)	6.74 (18)	7.06 cd	84.3
Mecca II	PGI/MBS	9	7.68 (18)	6.80 (14)	8.01(22)	6.20 (23)	6.96 cd	83.2
Pioneer 5715	Pioneer Hi-Bred	8	7.77 (17)	6.58 (20)	7.86(23)	6.61 (20)	7.02 cd	83.9
Mesa	PGI/MBS	8	7.19 (22)	5.85 (24)	8.29(19)	6.05 (24)	6.52 d	77.9
Average			8.03	6.99	9.06	7.15	7.53	--
LSD(05)			1.27	1.14	1.47	1.44	1.18	--
CV(%)			11.2	11.5	13.45	12.3	11.1	--
Heat Units	(77/41 °F)		7338	6502	7242	7473	7139	--

1. Values followed by the same letter are not significantly different at the 5% level of probability using Duncan's Multiple Range Test.