

Alfalfa Variety Trial, 1996-2000

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Abstract

A trial including 28 released and experimental alfalfa varieties was established at the Klamath Experiment Station (KES) in 1996. Varieties were arranged in a randomized complete block design with four replications. Individual plots were 4.5 by 20 ft. Harvested area of the plots were 3 by 15.5 ft or 46.5 ft². The crop was sprinkler-irrigated with a solid-set system to meet crop needs. Plants were allowed to grow through the 1996 season without cutting. From 1997 through 2000 plants were harvested under a three-cutting management with harvests scheduled when plants reached bud stage.

In 1998 and 1999, small but significant forage yield differences were observed in the third cutting. In 1999, significant differences of at least 0.56 ton/acre in total yield for three cuttings were found among varieties with a range from 5.53 to 6.63 ton/acre. In all other comparisons, no differences were noted for forage yield. Mean total yields were 6.22, 7.39, 6.07, and 6.44 ton/acre in 1997, 1998, 1999, and 2000, respectively.

Forage quality, as measured by crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), total digestible nutrients (TDN), and relative feed value (RFV), was determined from samples of the second cutting in each year. In

addition, determinations of these quality parameters were completed on the first and third cuttings in 2000. No significant differences were observed in any of the second-cutting quality parameters monitored in any year. However, alfalfa varieties differed in CP, NDF, and RFV in the first cutting. In the third cutting, in addition to these three quality parameters, differences were seen for ADF and TDN. Alfalfa varieties WL 252 HQ, DK127, Accord, Oneida VR, and Magnum III all ranked in the top 10 for RFV in both the first and third cuttings. Stand persistence was acceptable for all varieties over 4 years.

Introduction

Alfalfa accounts for more than 51,000 acres within Klamath Irrigation Project lands, and close to 40,000 acres is produced in Klamath County. Major markets include dairies, cattle ranches, and horse farms in Oregon and California. As with other forages grown for hay, alfalfa yield increases with time. However, this yield increase is accompanied by a decrease in forage quality, caused by increases in fibers, ADF and NDF, and declines in CP.

In the Oregon hay market, alfalfa classes are based on RFV. Though these values cannot be used in ration development, it does provide a system that can rank forages in regard to animal

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nutritive value. RFVs are calculated using determined values for ADF, as a measure of digestibility, and NDF, as a measure of forage intake. Equation 1 is used in this RFV calculation where concentrations of ADF and NDF are based on 100 percent dry matter (DM).

$$\text{Equation 1: RFV} = \left\{ \left[\frac{120}{\text{NDF}} \right] * \left[88.90 - (0.779 * \text{ADF}) \right] \right\} / 1.29$$

In the California hay market, alfalfa classes are assigned through concentrations of ADF or TDN. This classification scheme is important to Klamath Basin producers since much of their hay is sold in California. TDN is a calculated value derived from ADF levels and is reported on 90 percent DM basis. Equation 2 is used in this TDN calculation where ADF values are based on 100 percent DM.

$$\text{Equation 2: TDN} = \left[82.38 - (0.7515 * \text{ADF}) \right] * 0.9$$

A new quality class has recently been added in alfalfa market classifications. This "Supreme" class of alfalfa must have a RFV greater than 180, ADF less than 27 percent, TDN greater than 55.9 percent and CP greater than or equal to 22 percent. This is in contrast to the standard "Premium" alfalfa class where RFV is between 150 and 180, ADF is between 27 and 29 percent, TDN is between 54.5 and 55.9 percent, and CP is between 20 and 22 percent. The "Good" alfalfa class requires RFV to be between 125 and 150, ADF to be between 29 and 32 percent, TDN to be between 52.5 and 54.5 percent, and CP to be between 18 and 20 percent.

For producers to meet this Supreme grade of alfalfa, strict management practices must be followed. Harvesting needs to be

done at early growth stages (pre-bud), and more attention must be given to weed control. Producers will have to determine if it will be economical to follow these practices considering potential effects to yield and stand persistence.

Alfalfa breeding programs are striving for improved quality and are marketing varieties reported to have superior quality factors. These advances are due to increased leafiness and finer stem material. In the KES trial, differences were shown in forage quality between the varieties tested.

A frost in late May, with temperatures dipping down to 20⁰F, resulted in considerable damage to the first cutting of alfalfa for the 2000 growing season. In the basin, this injury was most severe in the Poe, Swan Lake, Yonna, and Langell valleys. Many producers harvested their alfalfa immediately after this frost in order to ensure proper regrowth due to meristematic injury.

The alfalfa weevil (*Hyper postica*) also affected the first cutting in the 2000 season. Chemical control measures are effective for this pest but require at least a 7-day period between treatment and harvest. Delaying harvest following treatment causes a decline in alfalfa forage quality. Harvesting alfalfa as soon as the weevil surpasses economic threshold levels can lessen damage; however, if weevil populations are high early, this results in reduced yields for that cutting.

The production of high yields of high-quality alfalfa is hindered by the extreme weather patterns experienced in the Klamath Basin. Though an aid in allowing slow growth and thus increasing potential quality of locally grown alfalfa, mild days and cool night-time temperatures reduce yield potential. Cold winter temperature stresses stands, resulting in reduced stand

persistence. These and other factors justify local variety trials for the area. Trials at KES attempt to differentiate superior varieties of alfalfa for this region. This report summarizes an alfalfa variety test conducted at KES from 1996 to 2000.

Procedures

A trial was established on a Poe fine sandy loam soil at KES in August 1996 to evaluate 28 released and experimental alfalfa varieties. Varieties were arranged in a randomized complete block design with four replications. Fertilizer was applied preplant according to recommendations based on analysis of soil samples from the field. Seed was drilled to a depth of one-fourth in at a rate of 20 lb/acre using a modified Kincaid (Kincaid Equipment Manufacturing) planter. Individual plots were 4.5 by 20 ft, with 3 by 15.5 ft harvested. Sprinkler irrigation was applied with a solid-set system according to crop needs.

Plants were allowed to grow through the fall of 1996 without cutting. Alfalfa was harvested in a three-cutting management schedule in subsequent years with harvest timing scheduled to coincide with bud stage. The crop was harvested with a Carter (Carter MFG Co. Inc.) self-propelled flail harvester with a 3-ft-wide header. Random samples of about 1.0 lb from each plot were oven dried to determine dry matter yield. Dried samples from the second cutting in each year were ground to 2-mm-sieve size in a Wiley Mill (Arthur H. Thomas Co.) and to 1-mm-sieve size in a Udy Mill (UDY Corporation) before being analyzed in a near infrared spectrophotometer (NIRS) (NIRSystems) to determine forage quality. Samples of the first and third cuttings were also handled as above for the 2000 season.

Forage yield and quality data were analyzed statistically using SAS software.

Single cutting data were analyzed using a randomized complete block design. Seasonal data were analyzed using a split-plot design with cutting as the main plot and variety as the subplot. Multi-year data were analyzed using a split-plot design with year as the main plot and variety as the subplot. Least significant differences (LSD) are based on student's *t* at the 5 percent probability level.

Results and Discussion

For the 2000 season, forage yields for each cutting, total yield for three cuttings, and total yield rank are presented in Table 1. No significant differences among varieties were noted in this year. Table 2 includes the data averaged across varieties for each of the three cuttings. These data indicate that the first-cutting yield was greater than that for the second cutting, and both were greater than the harvested alfalfa yield for the third cutting. This decline through the growing season would be expected even though a hard frost of 24⁰F occurred 2 weeks before the first cutting.

The total yields for each of the 4 years of the alfalfa trial, the total of all 4 years, and the ranking from the total yields are included in Table 3. No differences were noted in total yield through the seasons except in 1999, when 13 alfalfa varieties yielded significantly less than the top variety.

Across years, average yields for the three cuttings, total yield, and the ranking according to total yield for the varieties are included in Table 4. Within the alfalfa varieties, only the first cutting showed differences. Thirteen varieties fell within the top yield range. Higher yields in the first cutting could be related to low fall dormancy ratings (FDR) and superior overwintering ability. However, within the 13

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varieties in the top yielding group, FDR values ranged from 2 to 5.

Following split-plot statistical analysis on total yearly yields across cuttings, differences were shown between years but not among varieties. The results for the different year yields are included in Table 5. Total yields across varieties were 18 percent higher for 1998 compared with the low yield year of 1999. Cool growing conditions in the summer of 1999 would explain some of this difference.

Alfalfa forage quality determined by CP, ADF, NDF, TDN, and TDN, and sorted on RFV for the tested varieties for each of the three harvests in 2000 are included in Tables 6, 7, and 8. Differences were exhibited among the varieties in the first and third cuttings. However, as was the case in the previous years, second-cutting forage quality did not vary due to variety. For the first cutting, concentrations of CP and NDF, and the calculated values for RFV varied among varieties. For CP, NDF, and RFV, differences of 5, 4, and 6 percent, respectively, would constitute a true difference. Sixteen, 16, and 17 varieties, respectively, differed from the highest-ranking variety in these three quality parameters. Considering RFV requirements in regard to alfalfa marketing classifications, all varieties meet requirements for “Good” classification.

For the third cutting, concentrations of CP, ADF, and NDF, and the calculated values for TDN and RFV varied among varieties. For the above factors, differences of 7, 9, 7, 4, and 8 percent, respectively, would constitute a true difference. With these five quality parameters 13, 16, 8, 17, and 11 varieties, respectively, differed from the highest-ranking variety. Considering RFV requirements in regard to alfalfa marketing classifications, 17 of the varieties

would be graded “Premium” with the remaining falling into the “Good” classification. With California’s TDN requirements for classifying alfalfa, 8 of the varieties would be graded “Premium” with the remaining classified “Good”.

With cutting considered the main plot and varieties the subplot in a split-plot design, differences in yield among varieties were not noted. However, differences among varieties did occur for the five forage quality factors considered (Table 9). For CP, ADF, NDF, TDN, and RFV, differences of 4, 4, 3, 3, and 5 percent, respectively, would constitute a true difference. For these five quality parameters, 20, 17, 11, 8, and 17 alfalfa varieties, respectively, were different from the highest-ranking variety.

When considering forage quality differences due to cutting, included in Table 10, the second cutting produced the lowest-quality forage in regard to ADF, NDF, TDN, and CP. The highest forage quality was produced with the third cutting.

Data were compiled from company and breeder information or from the Certified Seed Council’s “Fall Dormancy and Pest Resistance Rating for Alfalfa Varieties” concerning FDR or resistance to various pests. This information for the tested varieties is included in Table 11.

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Table 1. 2000 forage yield of 28 alfalfa varieties planted at KES, Klamath Falls, OR, 1996.

Entry	Company	Cut 1	Cut 2	Cut 3	Total	Rank
Rushmore	Novartis Seeds	2.53	2.17	1.99	6.70	6
Aspen	Eureka Seeds	2.14	2.30	1.97	6.41	14
Innovator + Z	America's Alfalfa	2.72	2.04	1.97	6.73	5
Affinity + Z	America's Alfalfa	2.39	2.11	1.90	6.40	15
ABI 9352	America's Alfalfa	2.24	2.16	1.71	6.10	26
LM-331	Loshe Mill	2.34	2.21	1.88	6.43	11
H 154	Loshe Mill	2.31	2.04	1.89	6.24	23
LM 459	Loshe Mill	2.44	2.23	2.17	6.84	2
Accord	Union Seed/Chemgro	2.51	2.07	1.76	6.34	20
DK127	Dekalb Genetics Corp.	2.57	2.03	2.08	6.68	9
5396	Pioneer Hi-Breed Int.	2.66	2.24	2.00	6.90	1
5246	Pioneer Hi-Breed Int.	2.72	2.19	1.88	6.79	3
Extend	Grasslands West	2.18	2.29	1.78	6.25	22
Charger	Grasslands West	2.19	2.15	1.76	6.10	27
Webfoot MPR	Great Lakes Hybrids	2.70	2.04	1.95	6.69	7
Excalibur II	Allied Seed	2.40	2.02	1.96	6.38	17
Magnum III	Dairyland	2.41	2.06	1.95	6.42	12
Oneida VR	Public	2.12	2.15	1.68	5.95	28
Vernal	Public	2.84	1.94	1.91	6.68	8
Vernema	Public	2.44	2.03	1.92	6.39	16
W45	Public	2.52	1.94	1.99	6.45	10
HayGrazer	Great Plains Research	2.45	2.17	1.76	6.38	19
WL 252 HQ	WL Research Inc.	2.29	2.11	1.91	6.30	21
Blazer	Croplan Genetics	2.55	2.05	1.78	6.38	18
Blazer XL	Croplan Genetics	2.71	1.82	1.88	6.41	13
Baralfa 54	Barenbrug, USA	2.36	2.40	1.98	6.74	4
Baralfa 32 IQ	Barenbrug, USA	2.28	1.97	1.90	6.15	24
Ranger	Public	2.35	2.00	1.78	6.13	25
Mean		2.44	2.11	1.90	6.44	
CV (%)		13	10	13	8	
LSD (.05)		NS	NS	NS	NS	

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Table 2. 2000 average total yield across 28 alfalfa varieties planted in 1996 at KES, Klamath Falls, OR.

Cutting	Yield
	ton/acre
1	2.44a ¹
2	2.10b
3	1.90c
Mean	2.15
CV (%)	23
LSD (.05)	0.16

¹Values followed by the same letter are not significantly different at P = 0.05.

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Table 3. Total forage yield of 28 alfalfa varieties planted in 1996 at KES, Klamath Falls, OR.

Entry	Company	1997	1998	1999	2000	Total	Rank
		ton/acre					
Rushmore	Novartis Seeds	6.10	7.39	5.84	6.70	26.03	17
Aspen	Eureka Seeds	6.06	7.20	5.75	6.41	25.42	26
Innovator + Z	America's Alfalfa	6.32	7.81	6.15	6.73	27.01	2
Affinity + Z	America's Alfalfa	6.09	7.55	6.57	6.40	26.61	4
ABI 9352	America's Alfalfa	5.98	7.02	6.08	6.10	25.18	27
LM-331	Loshe Mill	6.12	7.51	5.96	6.43	26.02	18
H 154	Loshe Mill	5.90	8.30	5.97	6.24	26.41	6
LM 459	Loshe Mill	6.14	7.11	6.17	6.84	26.26	10
Accord	Union Seed/Chemgro	6.33	7.65	5.94	6.34	26.26	11
DK127	Dekalb Genetics Corp.	6.25	7.75	5.53	6.68	26.21	12
5396	Pioneer Hi-Breed Int.	6.38	7.73	6.56	6.90	27.57	1
5246	Pioneer Hi-Breed Int.	5.70	7.26	6.33	6.79	26.08	16
Extend	Grasslands West	6.32	7.67	5.91	6.25	26.15	13
Charger	Grasslands West	6.22	7.07	6.28	6.10	25.67	24
Webfoot MPR	Great Lakes Hybrids	6.38	7.48	5.77	6.69	26.32	8
Excalibur II	Allied Seed	6.57	7.37	6.05	6.38	26.37	7
Magnum III	Dairyland	6.33	7.06	6.63	6.42	26.44	5
Oneida VR	Public	6.45	6.86	5.87	5.95	25.13	28
Vernal	Public	6.18	7.92	6.14	6.68	26.92	3
Vernema	Public	5.96	7.18	6.18	6.39	25.71	23
W45	Public	5.91	7.04	6.09	6.45	25.49	25
HayGrazer	Great Plains Research	6.33	7.26	6.15	6.38	26.12	14
WL 252 HQ	WL Research Inc.	6.44	7.33	5.83	6.30	25.90	20
Blazer	Croplan Genetics	6.41	7.45	5.71	6.38	25.95	19
Blazer XL	Croplan Genetics	6.07	7.27	6.07	6.41	25.82	22
Baralfa 54	Barenbrug, USA	6.35	7.17	6.04	6.74	26.30	9
Baralfa 32 IQ	Barenbrug, USA	6.37	7.14	6.18	6.15	25.84	21
Ranger	Public	6.38	7.50	6.10	6.13	26.11	15
Mean		6.22	7.39	6.07	6.44	26.12	
CV (%)		6	8	7	8	3	
LSD (.05)		NS	NS	0.56	NS	NS	

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Table 4. Average 1997-2000 forage yield of 28 alfalfa varieties planted in 1996 at KES, Klamath Falls, OR.

Entry	Company	Cut 1	Cut 2	Cut 3	Total	Rank
		ton/acre				
Rushmore	Novartis Seeds	2.76	1.88	1.87	6.51	17
Aspen	Eureka Seeds	2.49	2.04	1.82	6.35	26
Innovator + Z	America's Alfalfa	2.92	2.05	1.78	6.75	2
Affinity + Z	America's Alfalfa	2.73	2.07	1.85	6.65	4
ABI 9352	America's Alfalfa	2.60	1.96	1.73	6.29	27
LM-331	Loshe Mill	2.72	2.01	1.78	6.51	18
H 154	Loshe Mill	2.80	2.02	1.78	6.60	6
LM 459	Loshe Mill	2.67	2.05	1.85	6.57	10
Accord	Union Seed/Chemgro	2.87	1.95	1.74	6.57	11
DK127	Dekalb Genetics Corp.	2.76	1.94	1.86	6.55	12
5396	Pioneer Hi-Breed Int.	3.02	2.00	1.87	6.89	1
5246	Pioneer Hi-Breed Int.	2.71	2.01	1.81	6.52	16
Extend	Grasslands West	2.64	2.07	1.83	6.53	13
Charger	Grasslands West	2.71	1.95	1.75	6.42	24
Webfoot MPR	Great Lakes Hybrids	2.81	1.97	1.80	6.58	8
Excalibur II	Allied Seed	2.76	1.99	1.84	6.59	7
Magnum III	Dairyland	2.87	1.96	1.78	6.61	5
Oneida VR	Public	2.55	2.04	1.70	6.28	28
Vernal	Public	2.97	1.96	1.80	6.73	3
Vernema	Public	2.68	1.99	1.76	6.43	23
W45	Public	2.66	1.88	1.84	6.38	25
HayGrazer	Great Plains Research	2.68	2.08	1.77	6.53	14
WL 252 HQ	WL Research Inc.	2.72	1.93	1.82	6.47	20
Blazer	Croplan Genetics	2.76	1.96	1.76	6.49	19
Blazer XL	Croplan Genetics	2.76	1.89	1.80	6.45	22
Baralfa 54	Barenbrug, USA	2.54	2.19	1.84	6.57	9
Baralfa 32 IQ	Barenbrug, USA	2.81	1.91	1.74	6.46	21
Ranger	Public	2.67	2.00	1.86	6.53	15
Mean		2.74	1.99	1.80	6.53	
CV (%)		7	6	5	3	
LSD (.05)		0.27	NS	NS	NS	

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Table 5. 1997-2000 average total yield across 28 alfalfa varieties planted in 1996 at KES, Klamath Falls, OR.

Year	Yield
	ton/acre
1997	6.22bc ¹
1998	7.39a
1999	6.06c
2000	6.44b
Mean	6.53
CV (%)	17
LSD (.05)	0.33

¹Values followed by the same letter are not significantly different at P = 0.05.

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Table 6. 2000 first-cutting alfalfa forage quality as measured by crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), total digestible nutrients (TDN), and relative feed value (RFV) of 28 varieties planted in 1996 at KES, Klamath Falls, OR. Varieties are sorted by RFV.

Entry	Company	CP	ADF	NDF	TDN	RFV
		%				
DK127	Dekalb Genetics Corp.	23.2	32.4	41.4	52.2	143.1
Charger	Grasslands West	22.6	32.9	41.9	51.9	141.2
Ranger	Public	22.7	32.6	42.0	52.1	140.9
WL 252 HQ	WL Research Inc.	23.4	32.4	42.2	52.2	140.3
Baralfa 32 IQ	Barenbrug, USA	22.3	33.7	41.9	51.3	138.9
W45	Public	22.2	34.4	41.8	50.9	138.5
Aspen	Eureka Seeds	22.4	33.5	42.3	51.5	138.4
Accord	Union Seed/Chemgro	22.5	33.6	42.4	51.4	137.8
Magnum III	Dairyland	22.6	33.2	42.7	51.7	137.5
Oneida VR	Public	22.1	33.5	42.7	51.5	137.0
Affinity + Z	America's Alfalfa	22.4	33.8	42.8	51.3	136.1
Webfoot MPR	Great Lakes Hybrids	22.1	33.2	43.6	51.7	134.9
Rushmore	Novartis Seeds	22.3	34.3	42.9	50.9	134.8
Innovator + Z	America's Alfalfa	22.3	33.9	43.2	51.2	134.8
Excalibur II	Allied Seed	21.9	34.0	43.1	51.1	134.8
Extend	Grasslands West	22.4	33.3	43.6	51.6	134.5
HayGrazer	Great Plains Research	22.1	34.1	43.2	51.1	134.4
Blazer XL	Croplan Genetics	22.4	34.4	43.2	50.9	134.1
Vernema	Public	21.8	34.1	43.3	51.1	134.1
Baralfa 54	Barenbrug, USA	22.6	34.1	43.7	51.1	132.7
Blazer	Croplan Genetics	21.7	34.5	43.6	50.8	132.6
5396	Pioneer Hi-Breed Int.	21.4	34.9	43.5	50.5	132.3
LM-331	Loshe Mill	22.1	35.2	43.7	50.3	130.9
5246	Pioneer Hi-Breed Int.	21.6	35.5	43.6	50.1	130.6
LM 459	Loshe Mill	21.4	35.6	43.8	50.1	130.5
Vernal	Public	21.8	34.1	44.6	51.1	130.3
ABI 9352	America's Alfalfa	21.8	35.5	44.0	50.1	129.4
H 154	Loshe Mill	21.5	34.9	44.7	50.6	129.2
Mean		22.2	34.0	43.1	51.2	135.2
CV (%)		3	4	3	3	4
LSD (.05)		1.1	NS	1.7	NS	8.2

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Table 7. 2000 second-cutting alfalfa forage quality as measured by crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), total digestible nutrients (TDN), and relative feed value (RFV) of 28 varieties planted in 1996 at KES, Klamath Falls, OR. Varieties are sorted by RFV.

Entry	Company	CP	ADF	NDF	TDN	RFV
		%				
Charger	Grasslands West	23.1	33.2	43.4	51.7	135.3
Affinity + Z	America's Alfalfa	22.7	33.3	44.1	51.6	133.3
WL 252 HQ	WL Research Inc.	22.4	33.6	44.6	51.4	131.4
Baralfa 32 IQ	Barenbrug, USA	22.6	34.2	44.2	51.0	131.1
HayGrazer	Great Plains Research	22.7	34.1	44.4	51.1	130.8
Excalibur II	Allied Seed	21.5	34.3	44.8	51.0	130.2
5396	Pioneer Hi-Breed Int.	22.0	34.4	44.6	50.9	129.7
H 154	Loshe Mill	22.2	33.7	45.1	51.4	129.6
DK127	Dekalb Genetics Corp.	22.2	34.3	44.9	50.9	128.8
Vernal	Public	22.3	34.5	45.0	50.8	128.5
Accord	Union Seed/Chemgro	22.0	34.7	44.9	50.7	128.4
Rushmore	Novartis Seeds	22.2	34.5	45.4	50.8	128.3
Oneida VR	Public	21.3	34.5	45.3	50.8	127.4
Innovator + Z	America's Alfalfa	22.1	35.2	45.2	50.4	127.1
Ranger	Public	21.1	35.6	44.9	50.0	127.0
Baralfa 54	Barenbrug, USA	21.1	35.0	45.5	50.5	126.3
Webfoot MPR	Great Lakes Hybrids	21.6	35.2	45.4	50.3	126.2
Blazer	Croplan Genetics	21.5	35.6	45.7	50.1	124.7
Blazer XL	Croplan Genetics	21.1	35.4	45.8	50.2	124.6
LM 459	Loshe Mill	21.3	35.6	45.8	50.0	124.6
LM-331	Loshe Mill	22.2	35.1	46.0	50.4	124.6
Magnum III	Dairyland	21.1	35.2	46.3	50.3	123.6
Aspen	Eureka Seeds	21.1	35.6	46.5	50.1	122.9
5246	Pioneer Hi-Breed Int.	21.2	36.8	45.8	49.2	122.6
ABI 9352	America's Alfalfa	21.7	35.2	46.9	50.3	122.2
Extend	Grasslands West	21.4	35.8	47.3	49.9	120.7
W45	Public	20.3	36.5	47.8	49.5	117.9
Vernema	Public	20.7	37.4	47.9	48.8	116.4
Mean		21.7	35.0	45.5	50.5	126.6
CV (%)		6	6	5	4	7
LSD (.05)		NS	NS	NS	NS	NS

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Table 8. 2000 third-cutting alfalfa forage quality as measured by crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), total digestible nutrients (TDN), and relative feed value (RFV) of 28 varieties planted in 1996 at KES, Klamath Falls, OR. Varieties are sorted by RFV.

Entry	Company	CP	ADF	NDF	TDN	RFV
		%				
WL 252 HQ	WL Research Inc.	24.0	27.5	38.4	55.6	163.7
Excalibur II	Allied Seed	23.4	28.2	38.4	55.0	162.5
Vernal	Public	23.1	28.1	38.7	55.1	161.4
Accord	Union Seed/Chemgro	22.9	28.6	38.7	54.8	160.4
LM-331	Loshe Mill	23.6	28.3	38.9	55.0	159.9
HayGrazer	Great Plains Research	23.0	28.7	39.5	54.7	157.3
Oneida VR	Public	22.0	29.2	39.4	54.4	156.1
DK127	Dekalb Genetics Corp.	22.8	29.7	39.3	54.1	156.1
Affinity + Z	America's Alfalfa	22.7	29.6	39.4	54.1	155.4
Magnum III	Dairyland	22.3	29.1	40.1	54.5	153.8
Aspen	Eureka Seeds	22.6	29.4	40.1	54.2	153.8
Ranger	Public	22.1	29.0	40.2	54.5	153.4
Extend	Grasslands West	22.3	29.4	40.3	54.2	153.0
Rushmore	Novartis Seeds	22.6	30.0	40.3	53.8	152.9
5396	Pioneer Hi-Breed Int.	22.3	29.5	40.2	54.2	152.8
W45	Public	22.3	29.5	40.2	54.2	152.7
Charger	Grasslands West	22.4	29.6	40.2	54.1	152.3
Baralfa 32 IQ	Barenbrug, USA	21.4	30.3	40.7	53.7	149.6
Vernema	Public	21.7	30.2	40.9	53.7	149.5
Blazer	Croplan Genetics	22.0	30.0	40.8	53.9	149.4
Innovator + Z	America's Alfalfa	21.4	30.6	40.8	53.5	149.3
ABI 9352	America's Alfalfa	22.0	30.3	41.0	53.7	148.6
Webfoot MPR	Great Lakes Hybrids	21.7	30.3	41.1	53.7	147.7
Blazer XL	Croplan Genetics	21.7	30.9	41.1	53.3	146.9
H 154	Loshe Mill	21.4	30.7	41.4	53.4	146.0
5246	Pioneer Hi-Breed Int.	21.7	30.7	41.5	53.3	145.7
Baralfa 54	Barenbrug, USA	20.9	31.3	42.1	53.0	142.7
LM 459	Loshe Mill	20.1	32.8	43.4	52.0	136.0
Mean		22.2	29.7	40.3	54.1	152.5
CV (%)		6	6	4	3	6
LSD (.05)		1.7	2.4	2.5	2.0	13.0

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Table 9. 2000 alfalfa total yield and average over three cuttings of forage quality as measured by crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), total digestible nutrients (TDN), and relative feed value (RFV) of 28 varieties planted in 1996 at KES, Klamath Falls, OR, 1996. Varieties are sorted by RFV.

Entry	Company	Yield	CP	ADF	NDF	TDN	RFV
		Ton/acre	%				
WL 252 HQ	WL Research Inc.	6.30	23.3	31.1	41.7	53.1	145.1
Charger	Grasslands West	6.10	22.7	31.9	41.8	52.6	142.9
DK127	Dekalb Genetics Corp.	6.68	22.8	32.1	41.9	52.4	142.7
Excalibur II	Allied Seed	6.38	22.3	32.2	42.1	52.4	142.5
Accord	Union Seed/Chemgro	6.34	22.5	32.3	42.0	52.3	142.2
Affinity + Z	America's Alfalfa	6.40	22.6	32.3	42.1	52.3	141.6
HayGrazer	Great Plains Research	6.38	22.6	32.3	42.3	52.3	140.8
Ranger	Public	6.13	22.0	32.4	42.3	52.2	140.4
Oneida VR	Public	5.95	21.8	32.4	42.5	52.2	140.2
Vernal	Public	6.68	22.4	32.2	42.8	52.3	140.1
Baralfa 32 IQ	Barenbrug, USA	6.15	22.1	32.7	42.3	52.0	139.9
Rushmore	Novartis Seeds	6.70	22.4	32.9	42.9	51.9	138.6
LM-331	Loshe Mill	6.43	22.7	32.9	42.9	51.9	138.5
Aspen	Eureka Seeds	6.41	22.0	32.8	43.0	51.9	138.4
Magnum III	Dairyland	6.42	22.0	32.5	43.0	52.2	138.3
5396	Pioneer Hi-Breed Int.	6.90	21.9	33.0	42.8	51.9	138.2
Innovator + Z	America's Alfalfa	6.73	22.0	33.2	43.1	51.7	137.1
W45	Public	6.45	21.6	33.4	43.3	51.5	136.3
Webfoot MPR	Great Lakes Hybrids	6.69	21.8	32.9	43.4	51.9	136.3
Extend	Grasslands West	6.25	22.0	32.9	43.7	51.9	136.1
Blazer	Croplan Genetics	6.38	21.7	33.4	43.4	51.6	135.6
Blazer XL	Croplan Genetics	6.41	21.7	33.6	43.4	51.4	135.2
H 154	Loshe Mill	6.24	21.7	33.1	43.7	51.8	134.9
Baralfa 54	Barenbrug, USA	6.74	21.5	33.5	43.8	51.5	133.9
ABI 9352	America's Alfalfa	6.10	21.8	33.7	44.0	51.4	133.4
Vernema	Public	6.39	21.4	33.9	44.0	51.2	133.3
5246	Pioneer Hi-Breed Int.	6.79	21.5	34.4	43.7	50.9	133.0
LM 459	Loshe Mill	6.84	20.9	34.7	44.3	50.7	130.4
Mean		2.15	22.1	32.9	42.9	51.9	138.1
CV (%)		12	5	5	4	3	6
LSD (.05)		NS	0.9	1.4	1.4	1.4	6.6

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Table 10. 2000 season average forage quality across alfalfa varieties as measured by crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), total digestible nutrients (TDN), and relative feed value (RFV) of 28 varieties planted in 1996 at KES, Klamath Falls, OR.

Cutting	CP	ADF	NDF	TDN	RFV
	————— % —————				
1	22.2	34.0 b ¹	43.0 b	51.1 b	135.2 b
2	21.7	34.9 a	45.5 a	50.5 b	126.6 c
3	22.2	29.7 c	40.3 c	54.1 a	152.5 a
Mean	22.1	32.9	42.9	58.5	138.1
CV (%)	9	8	12	5	14
LSD (.05)	NS	0.8	1.7	0.9	6.1

¹Values followed by the same letter are not significantly different at P = 0.05.

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Table 11. Alfalfa variety fall dormancy rating (FD); and resistance to bacterial wilt (BW), verticillium wilt (VW), fusarium wilt (FW), anthracnose (AN), phytophthora root rot (PRR), spotted alfalfa aphid (SAA), pea aphid (PA), blue alfalfa aphid (BAA), stem nematode (SN), aphanomyces root rot race 1 (APH), southern root knot nematode (SRKN), and northern root knot nematode (NRKN). Data taken from Certified Seed Council's "Fall Dormancy and Pest Resistance Ratings for Alfalfa Varieties", 1997/98 Edition unless otherwise stated.

Variety	FD	BW	VW	FW	AN	PRR	SAA	PA	BAA	SN	APH	SRKN	NRKN
Rushmore	4	HR ¹	R	HR	HR	HR	HR	HR		MR	HR		
Aspen	4	HR	R	HR	HR	HR	HR	HR		R	R		R
Innovator + Z	3	HR	HR	HR	HR	HR	MR	R	S	R	R		
Affinity + Z	4	HR	HR	HR	HR	HR		R		R	R		
ABI 9352 ²	5	R	HR	HR	HR	R	R	MR	HR	R			HR
LM-331 ²	4	R	R	HR	R	R	MR	MR		HR	MR		
H-154	5			HR		R	HR	HR	R	R		R	
LM 459	5	MR	MR	HR	R	R	HR	HR	R	R			R
Accord	4	HR	R	HR	HR	HR		HR		MR	R		MR
DK127	3	HR	R	R	HR	HR	HR	HR		R	HR		R
53962	3	HR	HR	R	R	R	R	R		MR	MR		MR
5246	3	R	R	R	HR	R	R	R		HR	R		
Extend	3	HR	R	HR	HR	HR				R	R		
Charger ²	3	HR	R	HR	HR	HR				R	R		
Webfoot MPR	4	HR	HR	HR	HR	HR		R			R		
Excalibur II ²		HR	R	HR	HR	HR	HR	R		MR	R		MR
Magnum III	4	R	MR	R	MR	R	MR	R	MR	MR	LR		
Oneida VR	3	R	HR	HR	MR	MR							
Vernal	2	R		MR									MR
Vernema	4	MR	MR		LR	LR	MR			HR			
W45 ²	5	MR	LR	HR			R			R			
HayGrazer	4	HR	R	HR	R	R	R	R	R		MR	MR	
WL 252 HQ	2	HR	HR	HR	HR	HR	MR	R		MR	R		
Blazer	3	HR	LR	R	LR	MR		HR		HR			
Blazer XL	3	R	R	HR	HR	HR	HR	R		R	R		
Baralfa 54 ²	5	R	R	HR	HR	HR	HR	HR	MR	R			
Baralfa 32 IQ ²	3	HR	R	HR	HR	HR	HR	R	R	R	HR		
Ranger ²	3	LR		MR									

¹HR = highly resistant, R = resistant, MR = moderately resistant, S = susceptible, LR = low resistance.

²Data based on company or breeder information.