The 2003 New Mexico Alfalfa Variety Test Report

Agricultural Experiment Station
College of Agriculture and Home Economics

The 2003 New Mexico Alfalfa Variety Test Report

L.M. Lauriault, I.M. Ray, C.A. Pierce, D.A. McWilliams, L.M. English, R.P. Flynn, S.J. Guldan, and M.K. O'Neill[1]

Introduction

In 2003, 250,000 acres of alfalfa (*Medicago sativa*) remained in production in New Mexico yielding an estimated 1.3 million tons of hay. Because of prolonged drought, hay stocks in New Mexico and throughout the Southwest are dwindling, resulting in higher prices. At an average of $144/ton (up from $138 in 2001), gross returns will total approximately $187 million, ensuring that alfalfa hay remains New Mexico's No. 1 cash crop (New Mexico Agricultural Statistics Service, www.nass.usda.gov/nm).Alfalfa also is the legume of choice in irrigated perennial pastures.

Choosing a good alfalfa variety is a key step in establishing a highly productive stand of alfalfa whether for hay or pasture. Differences between the highest- and lowest-yielding varieties in tests included in this report ranged from 0.48 to 2.79 tons per acre in 2003. If sold as hay, this translates to a difference in returns of $69 to $402 per acre due to variety. Stand longevity, as affected by winter hardiness and pest resistance, also is partially determined by variety.

This report, which is a collaborative effort of New Mexico State University scientists at agricultural science centers throughout the state, provides yield data for alfalfa varieties included in yield trials in New Mexico and guidelines for variety selection.

Considerations in Selecting an Alfalfa Variety

Local adaptation and persistence. Consistently high yields in variety tests over a number of years and locations within a region are the best indication of varietal adaptation and persistence. Select varieties based on unbiased information collected from trials conducted by NMSU scientists. Look at data collected from the agricultural science center(s) closest to you. Data from the centers is grouped by latitude and elevation, which affect winter hardiness and, thus, yield and persistence.

Persistence is the ability of individual plants to survive field conditions over time and is strongly influenced by winter hardiness, harvest frequency, and pest resistance. Higher persistence will permit a longer stand life in which to recover establishment costs. Alfalfa stands should be replaced when plant density drops to less than 5 plants (or 40 stems) per square foot. Producers should rotate to another irrigated crop for at least one year before reseeding alfalfa into the same field to avoid autotoxicity. If stand life expectancy is only 3 to 4 years, as is the case in a crop rotation system, higher yields in those early years are more important than persistence.

Winter hardiness. Alfalfa's winter hardiness is determined by its ability to survive cold temperatures. In the past, winter hardiness was given by the fall dormancy (FD) rating, which indicates the variety's tendency to stop growing in the fall. Fall dormancy categories range from 1 (very dormant) to 9 (nondormant). The more dormant (FD 1 to 3) varieties will be slower to "green up" in the spring and quicker to stop growing in the fall, regardless of local climate. This will have an impact on yield in areas with warmer climates. Additionally, nondormant varieties (FD 7 to 9) tend to yield more because of earlier spring "green up" and later fall production but might not survive severe winters. These varieties might be suitable for use in a short-term rotation system, where alfalfa is used for 4 years or less, but there is risk of early stand loss if a severe winter does occur. Otherwise, producers should select varieties with sufficient dormancy to survive winter conditions at their location, while optimizing forage production during the growing season.

The North American Alfalfa Improvement Council has developed another classification for winter hardiness, Winter Survival (WS), because some varieties are more able to withstand low temperatures than their fall dormancy category indicated. This system rates varieties from 1 to 6, where a rating of 1 indicates little or no winter injury and 6 indicates plant death. Ratings are made after the first winter for spring seedings. At least two location years are required for the standard test. Because these tests are conducted in areas that have severe winters, only varieties in fall dormancy categories 6 or less currently are being rated for winter survival.

Variety test reports, such as this one, also are valuable tools for determining the true winter survivability of any alfalfa variety, particularly in the northern half of New Mexico and the north-central mountains where several nondormant (FD 7-9) varieties have performed well. When using the winter survival data, keep in mind that these tests usually are conducted in the northern states, and varieties that will not survive their more severe winters might survive in New Mexico.

Disease resistance. New Mexico alfalfa producers should select adapted varieties with the highest available resistance, preferably an "R" (resistant) or greater rating to bacterial

[1]College assistant professor and Forage agronomist, NMSU Agricultural Science Center at Tucumcari; Associate professor and Alfalfa breeder, NMSU, Las Cruces; Forage research specialist, NMSU, Las Cruces; Assistant professor and Extension agronomist, NMSU, Las Cruces; Professor and Superintendent, NMSU Agricultural Science Center at Los Lunas; Superintendent, NMSU Agricultural Science Center at Artesia; Associate professor and Superintendent, NMSU Sustainable Agriculture Science Center at Alcalde; and Assistant professor and Superintendent, NMSU Agricultural Science Center at Farmington, respectively.

wilt (Bw), Fusarium wilt (Fw), Phytophthora root rot (PRR), and anthracnose (An) (Alfalfa Analyst, Certified Alfalfa Seed Council).

Bacterial and Fusarium wilt are water-conducting tissue infections of alfalfa's roots. These diseases prevent water flow to leaves, resulting in wilted shoots and, eventually, death of infected plants. Roots infected with bacterial wilt often will have a yellowish brown discoloration of the taproot's inner woody cylinder. Fusarium infection, on the other hand, is recognized by brown to red streaks in the taproot's inner woody cylinder.

Phytophthora root rot is a fungal disease associated with excessive soil moisture. This disease causes yellowish to brown areas on roots and crowns that eventually become black and rotten. Top growth of infected plants appears stunted and yellow.

Anthracnose, also caused by a fungus, attacks alfalfa stems, preventing water flow to the rest of the shoot and causing sudden wilting. These wilted shoots have a characteristic "shepherd's crook" appearance. Anthracnose also can cause a bluish black crown rot.

Many other alfalfa diseases also occur in New Mexico, the best protection against which is proper management.

Insect resistance. There are many insects that feed on alfalfa in New Mexico. Varietal resistance is available for spotted alfalfa aphid (SAA), pea aphid (PA) and blue alfalfa aphid (BAA). As with disease resistance, select varieties that have at least an "R" rating for each of the insects. Varieties with resistance to insects that are not adapted to your area might not be preferred, due to a historical decrease in yield associated with the resistance.

Another insect, cowpea aphid, has been found in alfalfa fields in several areas of New Mexico in recent years. Adult cowpea aphids are smaller than other common aphids. They are black with white or yellow markings on legs and antennae. Nymphs are gray to purple and can be confused with blue alfalfa aphid. Critical infestations can occur in early spring when alfalfa breaks dormancy. Plants are severely stunted, reducing first cutting yields and causing possible stand loss if not controlled.

Currently no resistant varieties have been released, but they are being developed. Predatory insects can help control cowpea aphid populations. Unfortunately, the predators might not be active in early spring when the alfalfa greens up. Chemical control might be the only option in early spring. Scout several areas in each field for the presence of aphids (purple or black) and stunted plants. When infestations are found, immediate treatment is imperative to prevent further damage and stand loss. Contact your county Cooperative Extension Service office or a licensed pesticide applicator about what products can be used to control cowpea aphids. Even if infestation is found in only one field, it might be advisable to spray all fields to prevent migration or to control infestations previously undetected.

Varietal resistance to other insects, such as alfalfa weevil and potato leafhopper, also might be available in the near future. Currently, the best protection against these insect pests is proper harvest management and pesticide use.

Nematodes. Root-knot nematodes (southern, northern, and Columbia root-knot nematodes) have probably been an undetected cause of yield and stand reduction on many farms in New Mexico. Root-knot nematodes prefer sandy loam soils and rarely damage alfalfa in heavier textured soils. In addition to direct damage from these nematodes, a second concern is that they become an avenue for infection by other pathogens. The incidence and severity of Fusarium wilt and Phytophthora root rot are increased, causing wilting and reduced yield and stand life in alfalfa. While root-knot nematode populations may damage alfalfa, they usually cause more damage to other crops in the rotation that are more susceptible, like edible dry beans, green beans, peanuts (northern root-knot nematode only), potatoes, cotton and chile peppers. High carry-over populations of southern root-knot nematodes from summer rotation crops, like silage corn, can cause serious damage to fall-planted alfalfa. Resistant alfalfa varieties are available for both southern and northern root-knot nematodes, but resistance to both species is not often available in the same variety. Still, producers should select varieties that have at least an R rating to every species of nematode likely to be on their farm.

Stem nematodes can also be a serious problem in alfalfa. These nematodes infect crown buds after cutting if the soil is moist and humidity is high. Infected stems are stunted and have swollen nodes. The bud and leaf nematode, another nematode usually found with stem nematodes, can cause leaves to become distorted and turn white during warm weather. Both of these nematodes occur mainly in heavy soils. Stem nematodes have been reported from northern New Mexico, but don't seem to cause the serious problems found elsewhere in the western U.S. Alfalfa varieties with good resistance to stem nematodes are available and producers should again select varieties that have an R rating for stem nematodes if they have seen symptoms of this nematode on their farm (S.H. Thomas, NMSU Nematologist).

Grazing and traffic tolerance. A number of alfalfa varieties have been developed for tolerance to frequent defoliation and hoof damage. These varieties have a broad crown set below the soil surface. This trait gives protection from hoof damage and permits retention of greater root carbohydrate reserves for continued growth. The deep-set crown also helps prevent damage by other factors, such as equipment traffic. Grazing-tolerant alfalfa varieties also have the ability to produce and retain leaves below the grazing horizon, which allows photosynthesis to continue even under frequent defoliation of upper leaves. The development of grazing tolerance was accomplished using continuous grazing during the growing season. However, in New Mexico, many alfalfa fields are used for overwintering pastures and the effects of this practice have not yet been fully measured.

Seed quality. Selecting an alfalfa variety based on seed cost is like playing Russian roulette. Seed labeled "common," "variety not stated," or "variety unknown" are of unknown genetic background and may or may not be locally adapted or have the necessary disease or insect resistance. To be assured of achieving a long-lasting, highly productive stand, buy either certified or Plant Variety Protected (PVP) seed, which guarantees the genetics and performance. Look for a blue tag, which must be attached to all bags of certified seed, or Plant Variety Protection labeling, which is the proprietor's guarantee. Be sure to read

the seed tag, which provides important information about the seed, including purity, amounts of other crop and weed seed (including any noxious weed seed), germination, and the test date (within the previous 9 months). Order seed well in advance of planting time to assure that it will be available when needed.

Forage quality. High quality alfalfa hay possesses the following characteristics: greater than 19 percent crude protein, less than 31 percent acid detergent fiber, less than 40 percent neutral detergent fiber, leafiness, and free of foreign material. Varietal differences in quality are relatively small compared to other factors. Cultural and management practices, such as soil fertility, irrigation, weed and insect control, maturity at cutting, baling, and storage conditions, are major factors that affect alfalfa quality.

As an example, table 1 gives quality data for alfalfa varieties in a test sown in 2001 at Farmington. No differences existed between varieties across fall dormancy categories, but there are differences between fall dormancy categories. Standard Deviations (SD) of variety means are included for each quality variable. The SD measures the variability between different samples of the same variety. For example, each variety in the 2001 Farmington test was sampled (replicated) four times. The crude protein (CP) of any of the four samples for any variety can vary from the average for that variety by as much as the associated SD. The lack of difference between varieties is demonstrated, in that, the largest SD given for any variable is nearly equal to the difference between the means of the highest and lowest varieties for each variable.

Differences in quality between fall dormancy categories are likely due to stage of maturity at harvest. Recovery after harvest is faster as fall dormancy category increases from 1 to 9 (from dormant to nondormant). Therefore, if varieties in different fall dormancy categories are always harvested on the same day, as is the case for most variety tests, those in lower fall dormancy categories usually will be at an earlier stage of maturity than those in higher categories. Harvesting earlier might give lower yields, but it also will likely give higher quality.

The optimum balance between forage yield, quality, and plant persistence occurs at 1-10 percent bloom. Harvesting at prebloom increases quality but sacrifices yield. Continued harvesting at prebloom reduces stand life, because the plant is not able to replenish root reserves for subsequent growth and overwintering. Since some hay buyers specify prebloom, producers should weigh price against decreased yields and shorter stand life. Prebloom harvests in the middle cuttings are likely to be less detrimental to stand life than the first and last cuttings. Cutting at greater than 10 percent bloom increases yield, but quality declines rapidly as fiber increases and mineral content decreases (Alfalfa for Dairy Animals, Certified Alfalfa Seed Council). Insect feeding, maturity and harvesting affect leaf retention and, therefore, forage quality, because the digestibility and nutrient content in leaves is greater than in stems.

Description of Tests

Replicated alfalfa variety tests included in this report were conducted under research controls at NMSU's agricultural science centers at Las Cruces (sown in 1999), Artesia (1999, 2000 and 2001), Tucumcari (1999 and 2001), Los Lunas (1999 and 2001), Alcalde (2001, ungrazed and grazed in winter) and Farmington (1999 and 2001).

Weather data for 2001 and the long-term averages from all locations are presented in table 2. Yield data (on a dry matter basis) are presented in tables 3-13. Varieties are listed in order from highest to lowest average annual production. Yields are given by cutting for 2003 and by year for each production year. Statistical analyses were performed on all alfalfa yield data (including experimentals) to determine if the apparent differences are truly due to variety or just to chance. The variety with the highest numerical yield in each column is marked with two asterisks (**), and those varieties not significantly different from that variety are marked with one asterisk (*). To determine if two varieties are truly different, compare the difference between the two varieties to the Least Significant Difference (LSD) at the bottom of the column. If the difference is equal or greater than the LSD, the varieties are truly different in yield when grown under the conditions at a given location. There was no statistical difference between the highest and lowest yielding varieties if NS is given for the LSD. The Coefficient of Variation (CV), which is a measure of the variability of the data, is included for each column of means. Low variability (<20 percent) is desirable, and increased variability within a study results in higher CVs and larger LSDs. There might be a difference between previously published data and the data given in this publication for the same tests because of differences in the programs used for statistical analysis.

A comparison of grazing tolerance can be made between tables 10 and 11. Grazing reduced yields by approximately 2.5 tons/acre. There was a difference in response to grazing during winter between varieties in 2003 total yield such that all varieties had statistically significant lower yields, except Common, NM. This is preliminary data and, while the yield reduction due to the grazing pressure was real, the complete effect regarding the interaction between varieties might not be realized until more data is collected.

Table 14 summarizes information about proprietors, winter survival (measured in the northern United States), fall dormancy, pest resistance and yield performance across years and locations for all varieties currently included in NMSU's alfalfa variety testing program. Varieties are listed alphabetically by fall dormancy category. Be cautious in using the winter survival data, because it might not accurately reflect a variety's winter survivability in New Mexico. Long-term performance in the northern half of the state should be a good indication of winter hardiness. In table 14, shaded areas indicate that the variety was not in that particular test (labeled at the top of the column), while clear blocks mean that the variety was in the test. As before, a double asterisk (**) indicates that the variety had the highest yield in the test for that year, and a single asterisk (*) means that the variety

was not significantly different from the highest-yielding variety based on the 5 percent LSD. It is best to choose a variety that has performed well over several years and locations.

Once varietal choices are made using table 14, look at cutting data (tables 3 to 14) to make sure the variety will be productive during the desired season. Varieties selected for grazing should produce over a longer season. Those used for hay should produce well in times that avoid potential problems. For instance, horse hay should be harvested early in the season to avoid blister beetle infestations that might occur in the later cuttings. Higher-value dairy hay might be produced later in the season to avoid spring weed problems.

Regarding "common" varieties, notice that the same variety might yield well in one area but not another. And those that do yield well might not do so consistently across years. Generally, those that produce well will do so until a pest problem occurs. Then the stand can be lost, requiring a waiting period before reseeding.

Also, in regard to New Mexico Common, seed used in all tests throughout the state has come from the same supplier and seed field. Seed purchased from other dealers may or may not be of the same quality and performance.

Summary

Consistent production of high alfalfa yields is the result of selecting good varieties and implementing good management techniques. Soil fertility should be maintained at recommended levels based on soil tests, and weeds and insects should be controlled using appropriate cultural and/or chemical methods. For dormant (FD 1 to 3) and semidormant (FD 4 to 6) varieties, a 6-week rest period before a dormancy-inducing freeze (27°F) is recommended to allow plants to replenish root reserves for winter survival and initiate spring growth, after which harvesting might be done either mechanically or by grazing. Removing fall growth is beneficial to reducing weevil populations the following year as eggs are laid in and overwinter in stems. Harvesting established stands at early bloom would result in 3 to 5 cuttings per year before initiation of the rest period in most of New Mexico. For further information about alfalfa management, refer to the other NMSU Cooperative Extension Service publications listed in table 15.

Table 1. Forage quality† of alfalfa varieties sown August 2001, at the NMSU Agricultural Science Center at Farmington, 2002‡.

Variety	Fall dor-mancy	CP, %		ADF, %		NDF, %		RFV		Fall dormancy means			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	CP, %	ADF, %	NDF, %	RFV
Champ	3	22.03*	±0.52	29.30*	±0.99	34.45*	±1.02	179.08*	±6.43	22.03**	29.30*	34.45	179.08*
DKA42-15	4	21.57*	±0.72	27.83*	±0.98	33.32*	±1.52	188.73**	±10.27				
WL327	4	22.17*	±1.13	28.36*	±0.80	33.61*	±2.32	187.11*	±15.76				
Megaton 3.5	4	22.06**	±1.68	28.05*	±0.94	33.85*	±1.25	184.82*	±8.88				
Geneva	4	21.50*	±1.09	28.41*	±0.92	33.77*	±1.17	184.68*	±7.91				
Legend	4	21.38*	±0.97	28.31*	±1.46	34.09*	±1.30	183.27*	±9.70				
Delta526	4	21.58*	±1.12	29.10*	±1.85	33.86*	±1.36	182.80*	±10.00				
Focus HSN	4	21.31*	±0.61	29.20*	±1.16	34.23*	±1.88	181.04*	±12.30				
Magnum V	4	21.36*	±0.76	28.52*	±0.56	34.44*	±0.95	180.28*	±4.93				
Forcast 1001	4	21.16*	±0.85	29.48*	±1.31	34.51*	±0.95	177.95*	±7.51				
HybriGreen 41	4	21.12*	±1.53	29.21*	±0.62	34.88*	±0.85	176.63*	±4.09				
WL342	4	20.98*	±1.00	28.78*	±0.63	35.24*	±1.49	176.20*	±5.51				
54V54	4	20.89*	±0.46	29.41*	±0.91	35.66*	±0.81	172.27*	±5.25				
HybriForce 400	4	20.54*	±0.43	30.12*	±1.53	35.74*	±1.31	170.61*	±9.07	21.36*	28.83*	34.40	180.49**
5-Star	5	21.36*	±0.40	28.81*	±0.59	33.92*	±1.15	182.88*	±7.35				
Archer II	5	20.92*	±0.33	29.72*	±1.18	35.50*	±0.68	172.46*	±5.29	21.14*	29.26*	34.71	177.67*
Dona Ana	8	19.95*	±0.61	30.55**	±0.91	37.33*	±0.72	162.48*	±4.55	19.95	30.55**	37.33*	162.48
NM-9D11A-PAR	?	20.83*	±1.80	29.54*	±1.22	37.65**	±1.87	163.22*	±8.07	20.83	29.54*	37.65**	163.22
Mean		21.26		29.04		34.78		178.14					
Variety LSD, 0.05		Ns		Ns		Ns		Ns		1.28	Ns	1.79	11.85
CV, %		4.21		3.55		3.60		4.65					

†Appreciation is expressed to the Navajo Agricultural Products Industry Research and Testing Laboratory for conducting the analys

‡Data are the means of two harvests taken 18 July and 27 August 2002.

CP, ADF, NDF, RFV, SD, LSD, Ns, and CV signify crude protein, acid detergent fiber, neutral detergent fiber, relative feed value, standar tion, least significant difference, not significantly different based on a protected statistical analysis, and coefficient of variation, resp The SD gives and indication of the variability was found within a variety. Generally, individual observations (4 replicates for each va the data presented in this table) can be expected vary from the mean by as much as the SD. If the difference between means within a is equal to or greater than the LSD given at the bottom of that column, we are 95% certain that they are truly different. The CV gives cation of the amount of variation accounted for in the statistical analysis of a variable. Sources of variation included in the statistica these data include replicate, fall dormancy, and variety.

**Highest numerical value in the column.

*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Table 13. Dry matter yields (tons/acre) of alfalfa varieties sown August 23, 2001, at NMSU's Agricultural Science Center at Farmington and sprinkler-irrigated three times per week.

Variety	2002 Total	Yield (dry tons/acre)				2003 Total	2-yr Average
		6-Jun	15-Jul	22-Aug	22-Oct		
HybriGreen 41	8.18**	2.07	1.90*	1.47	1.01*	6.45*	7.32**
5-Star	7.40	2.52*	2.10**	1.50	1.02*	7.14**	7.27*
Megaton 3.5	7.43	2.38*	1.91*	1.72**	1.05*	7.05*	7.24*
Focus HSN	7.44	2.55**	1.88*	1.63*	0.93	6.99*	7.21*
HybriForce 400	7.59*	2.30*	1.88*	1.47	0.93	6.58*	7.08*
Archer II	7.95*	1.95	1.85*	1.46	0.90	6.16	7.05*
Magnum V	7.04	2.36*	1.97*	1.58*	1.09*	6.99*	7.01*
54V54	7.59*	2.17*	1.90*	1.42	0.80	6.29	6.94*
Legend	7.53*	2.17*	1.74	1.42	1.00*	6.32	6.92*
Forcast 1001	7.55*	2.07	1.81	1.49	0.88	6.25	6.90*
Champ	7.45	2.15*	1.77	1.56*	0.88	6.35	6.90*
Dona Ana	7.50	1.83	1.85*	1.43	1.14**	6.25	6.87*
DK A42-15	7.58*	2.08	1.66	1.43	0.78	5.94	6.76*
Geneva	7.15	2.28*	1.71	1.42	0.88	6.28	6.72*
WL 327	7.20	1.98	1.73	1.44	0.92	6.07	6.63*
WL 342	7.53*	1.90	1.71	1.31	0.75	5.67	6.60*
NM-9D11A-PAR	6.89	2.07	1.48	1.33	0.98	5.85	6.37*
Delta 526	6.64	2.17*	1.64	1.28	0.71	5.80	6.22*
Mean	7.42	2.17	1.80	1.46	0.92	6.36	6.89
LSD (0.05)	0.68	0.42	0.28	0.22	0.16	0.76	NS
CV%	6.46	13.74	10.88	10.41	12.37	8.46	7.82

Yield data from previous years may be different than that presented in other publications due to a difference in statis analysis methods.
2002 Harvest dates: 29-May, 3-Jul, 6-Aug, and 24-Sep.
**Highest numerical value in the column.
*Not significantly different from the highest numerical value in the column based on the 5% LSD.
LSD (0.05) stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a is equal to or greater than the LSD, it is 95% certain that they are different.
NS means that there were no significant differences between varieties within that column at the 5% level.

Table 14. Characteristics and performance of alfalfa varieties across years and tests in New Mexico.		Varietal Characteristics[1]											Las Cruces				Artesia						Tucumcari						Los Lunas						Alcalde				Farmington					
																																			2001									
				Pest resistance									1999[2]				1999				2001		1999				2001		1999				2001		U[3]		G		1999				2001	
Variety	Proprietor	WS	FD	BW	PRR	FW	AN	SAA	PA	BAA	SN	RKN	00[4]	01	02	03	00	01	02	03	02	03	00	01	02	03	02	03	00	01	02	03	02	03	02	03	02	03	00	01	02	03	02	03
Common, African	New Mexico grown, VNS	?	?	?	?	?	?	?	?	?																	*	*							*	*	*	*						
Common, CO	Colorado, VNS	?	?	?	?	?	?	?	?	?																									*		*							
Common, NM	New Mexico VNS	?	?	?	?	?	?	?	?	?			*	*	*	*						*		*			*	*					*	*	*		*	*						
Common, SD	South Dakota VNS	?	?	?	?	?	?	?	?	?														*	*																			
NM Stress 94	New Mexico State University	?	?	?	?	?	?	?	?	?			*	*	*	**																												
NM9D11A-PAR	New Mexico State University	?	?	?	?	?	?	?	?	?			**	*	*	*	*		*	*		*	*	*	*	*	*	*					*	*										
Rio Penasco	New Mexico grown, VNS	?	?	?	?	?	?	?	?	?																																		
RSC 681	Roth Seed Co.		?	?	?	?	?	?	?	?																	*	*																
Spredor-3	Syngenta	1.0	1	HR	MR	HR	R	S	MR	?	MR	?																							*		*							
AlfaGraze	America's Alfalfa	2.2	2	R	LR	R	MR	?	?	?	R	R																							*		*							
ABT350	AgriBioTech	2.9	3	HR	HR	HR	HR	R	R	?	?	?																																
BPR379	Dairyland Seed Co.	2.3	3	HR	HR	HR	R	R	R	?																									*	*	**	*						
Champ	Union Seed	3.0	3	HR	R	R	R	?	R	?																																		
Deepkrown	Corland Seeds	?	3	HR	HR	HR	R	R	R	MR	MR	LR																							*	*	*							
GH766	Golden Harvest	2.0	3	HR	HR	HR	HR	?	R	R	R	?																																
MagnaGraze	Dairyland Seed Co.	2.4	3	HR	HR	HR	R	R	R	MR	LR	?																							*		*							
Somerset	Syngenta	2.0	3	HR	HR	HR	HR	R	?	?	?	?																											*	*	*	*		
SS120	Arkansas Valley Seed Solutions	3.0	3	HR	R	R	R	R	R	R																									*	*	*							
54Q53	Pioneer HiBred Int'l	?	4	HR	HR	R	R	MR	MR	?	HR	HR												*	*	*																		
54V54	Pioneer HiBred Int'l	2.7	4	HR	HR	HR	HR	R	?	S	?	?																															*	
ABT400SCL	AgriBioTech	?	4	HR	HR	HR	HR	R	HR	?	?	?																																
Affinity + Z	America's Alfalfa	2.7	4	HR	HR	HR	HR	?	R	?	R	?																											*	*	**	**		
AmeriGraze-401 + Z	America's Alfalfa	2.6	4	HR	HR	HR	HR	?	R	?	R	?																							*		*							
Ameristand 403T	America's Alfalfa	2.1	4	HR	HR	HR	HR	MR	R	?	MR	?															*	*							*	*	*							
Cimarron 3i	Great Plains Research	?	4	HR	R	HR	HR	R	R	?	R	?												*	*								*	*										
Delta 526	Four Star Seed		4	HR	HR	HR	HR	HR	HR	HR																																		
DK142	Monsanto	2.9	4	HR	HR	HR	R	?	HR	HR	?	?																											*	*	*	*		
DKA42-15	Monsanto	1.0	4	HR	HR	HR	HR	HR	R	HR	?	?																															*	
DS9705	Dairyland Seed Co.	1.6	4	HR	HR	HR	R	R	R	?																									*	**	*							
DS9706	Dairyland Seed Co.	2.0	4	HR	HR	HR	R	R	R	?																									*	*	*							
Focus HSN	Arkansas Valley Seed Solutions	3.0	4	HR	HR	HR	HR	HR	MR	?	HR	R																											*	*	*	*		*
Forecast 1001	Dairyland Seed Co.	2.3	4	HR	HR	HR	R	MR	R	MR	R	HR															*	*																
Garst 6420	Garst Seed Co.	2.6	4	HR	HR	HR R	R	R	R	?	R	?												*	*																			
Geneva	Syngenta	2.0	4	HR	HR	HR	HR	HR	R	?	?	?																											*	*	*	*		
GH750	Golden Harvest	3.0	4	H	HR	HR	HR	R	R	R																																		
Haygrazer	Great Plains Research		4	HR	R	HR	R	R	R	?																	*	*							*	*	*							
HybriForce 400	Dairyland Seed Co.	1.6	4	HR	HR	HR	R	R	R	?	R	?															*	*					*	*									*	*
HybriGreen 41	Kelly Green Seed	2.0	4	HR	HR	HR	R	R	R	?																	*	*					*	*									**	*

Table 14. Characteristics and performance of alfalfa varieties across years and tests in New Mexico.

		Varietal Characteristics[1]											Las Cruces				Artesia						Tucumcari						Los Lunas						Alcalde				Farmington					
																																			2001									
				Pest resistance									1999[2]				1999				2001		1999				2001		1999				2001		U[3]		G		1999				2001	
Variety	Proprietor	WS	FD	BW	PRR	FW	AN	SAA	PA	BAA	SN	RKN	00[4]	01	02	03	00	01	02	03	02	03	00	01	02	03	02	03	00	01	02	03	02	03	02	03	02	03	00	01	02	03	02	03
Jade II	NC+ Hybrids	2.7	4	HR	HR	HR	R	R	R	MR	R	?															*	*																
Legend	Arkansas Valley Seed Solutions	3.0	4	HR	HR	HR	HR	R	LR	?																																	*	
Magnum V	Dairyland Seed Co.	2.0	4	HR	HR	HR	R	R	R	MR	HR	HR												*																				*
Megaton 3.5	PGI Alfalfa	2.5	4	HR	HR	HR	R	MR	R	MR																																		*
Millennia	IFA	?	4	HR	HR	HR	HR	R	R	?	HR	MR																											**	*	*	*		
PGI 4372	PGI Alfalfa	2.4	4	HR	HR	HR	R	?	?	?																																		
Select	IFA/Curtis and Curtis	2.7	4	HR	HR	HR	HR	R	R	MR	HR	R															*	*											*	**	*	*		
WL327	WL Research	2.8	4	HR	HR	HR	HR	R	?	?														*	*																			
WL342	WL Research	1.7	4	HR	HR	HR	HR	R	R	MR	?	?																															*	
WR9801	Great Plains Research		4	HR	HR	HR	HR	R	HR	R																	*	*					**	**										
5-Star	Croplan Genetics	?	5	R	R	HR	R	R	R	?	?	?																																**
Abilene + Z	America's Alfalfa	3.2	5	HR	HR	HR	HR	MR	HR	MR	R	?												*																				
Archer	America's Alfalfa	4.0	5	MR	R	HR	R	HR	HR	R	R	R															*	*					*	*	**	*	*							
Archer II	America's Alfalfa	4.0	5	R	HR	HR	HR	R	MR	HR	HR	R											*	*	*	*													*	*	*	*	*	
Dagger+EV	AgriPro	3.5	5	HR	HR	HR	HR	MR	HR	MR	R	LR												*																				
DU-201	Great Plains Research		5	HR	HR	HR	R	R	HR	?																									*	*	*							
Garst 6550	Garst Seed Co.		5	HR	HR	HR	HR	?	?	?																																		
ZG0152A	ABI Alfalfa	3.4	5	HR	R	HR	R	R	R	MR																									*	*	*							
ZX9351	ABI Alfalfa	n/r	5	R	R	HR	MR	R	R	?																													*	*	*	*		
5681	Pioneer HiBred Int'l		6	R	HR	HR	HR	HR	R	HR													*	*	*																			
Aspire	Monsanto	n/r	6	HR	HR	HR	HR	HR	HR	R																							*	*										
C/W 55112	Cal/West Seeds	n/r	6	?	HR	HR	HR	R	HR	R																			**	*	**	**												
C/W 5567	Cal/West Seeds	n/r	6	?	HR	HR	HR	R	HR	R																			*	*	*	*												
C/W 6699	Cal/West Seeds	n/r	6	?	HR	HR	HR	HR	?	HR																			*	*	*	*												
Express	Union Seed Co.	4.0	6	MR	HR	HR	R	HR	R	?																	*	*																
Magna 601	Dairyland Seed Co.	3.0	6	R	HR	HR	R	HR	HR	R	R	R									*		*	*	*		**	*					*	*										
NC+ 605	NC+ Hybrids		6	MR	HR	HR	HR	HR	HR	R													**	*	*	*																		
Ram	Great Plains Research		6	HR	HR	HR	HR	HR	R	MR													*	*	*																			
Tahoe	Syngenta	5.0	6	MR	HR	HR	HR	HR	HR	R	R	R																																
Tango	Eureka Seeds	4.0	6	HR	HR	HR	HR	HR	HR	R	R	R															*	*							*		*							
Tru Test	Union Seed Co.	4.0	6	MR	HR	HR	HR	HR	HR	HR	HR	R									*																							
Wilson	New Mexico State University	?	6	R	?	R	?	MR	R	?	MR	?		*	*	*							*	*	**	**	*	**							*	*	*	*						
WL414	WL Research	n/r	6	R	HR	HR	R	HR	HR	HR							*	*	*	*																								
ZX9362	ABI Alfalfa	n/r	6	R	R	HR	HR	?	?	?													*	*	*																			
57Q77	Pioneer HiBred Int'l		7	LR	HR	MR	MR	HR	HR	HR			*	*		*	*	*	*	*		*																						
AmericGraze 701	America's Alfalfa	n/r	7	HR	R	HR	R	R	MR	R							*	*	*	*																								
AmeriLeaf 721	America's Alfalfa	n/r	7	R	R	HR	HR	HR	R	MR	MR	R	*	*																														
Arriba	America's Alfalfa	n/r	7	R	R	HR	R	HR	HR	HR	HR	MR	*	*			*		*	*																								

Table 14. Characteristics and performance of alfalfa varieties across years and tests in New Mexico.

		Varietal Characteristics[1]											Las Cruces				Artesia						Tucumcari						Los Lunas						Alcalde				Farmington					
																																			2001									
				Pest resistance									1999[2]				1999				2001		1999				2001		1999				2001		U[3]		G		1999				2001	
Variety	Proprietor	WS	FD	BW	PRR	FW	AN	SAA	PA	BAA	SN	RKN	00[4]	01	02	03	00	01	02	03	02	03	00	01	02	03	02	03	00	01	02	03	02	03	02	03	02	03	00	01	02	03	02	03
Artesian Sunrise	Croplan Genetics	6.0	7	?	HR	HR	HR	HR	R	R	R	R					**	*	*	*									*	**	*	*												
C/W 5666	Cal/West Seeds	n/r	7	?	HR	HR	HR	HR	HR	HR			*	*	*	*	*	*	*	*																								
Dona Ana	New Mexico State University	?	7	MR	R	MR	LR	MR	R	?	?	?		*		*								*	*		*	*																
DS 771	Dairyland Seed Co.	n/r	7	MR	HR	HR	MR	HR	HR	R							*	*	*	*																								
DS 981	Dairyland Seed Co.	n/r	7	MR	HR	HR	LR	HR	HR	HR							*	*	*	*																								
DS7117	Kelly Green Seed	n/r	7	?	?	?	?	?	?	?											*																							
Rio	Great Plains Research	?	7	R	R	HR	HR	HR	HR	HR	MR	?																					*	*										
Signal 7000	Helena Chemical		7	R	R	HR	R	R	R	MR																																		
Sutter	PGI Alfalfa	5.0	7	R	HR	HR	?	HR	R	MR	R	HR												*	*																			
WL442	WL Research	n/r	7	R	HR	HR	HR	HR	HR	HR	?	R	*				*		*	*			*		*																			
ZL9876	ABI Alfalfa	n/r	7	?	?	HR	?	?	?	?																																		
5715	Pioneer HiBred Int'l		8	LR	R	HR	HR	HR	HR	HR			*			*																												
58N57	Pioneer HiBred Int'l		8	LR	HR	R	HR	R	HR	HR	MR	HR					*	*	*	*	*																							
AL299	Great Plains Research		8	HR	HR	HR	HR	HR	HR	R											*																							
AmeriStand 801S	America's Alfalfa	n/r	8	R	R	HR	R	HR	MR	HR	MR	HR					*	*	*	*		*																						
AmeriStand 802	America's Alfalfa	n/r	8	?	HR	?	R	?	?	HR	R	HR					*	*	**	**	*	**																						
C/W 5875	Cal/West Seeds	n/r	8	HR	HR	HR	HR	HR	HR	HR			*	*	*	*	*	*	*	*																								
C/W 68115	Cal/West Seeds	n/r	8	HR	HR	HR	HR	HR	HR	HR			*	*	**	*	*	*	*	*																								
C/W 78122	Cal/West Seeds	n/r	8	HR	HR	HR	HR	HR	?	HR			**	*	*	*		*	*	*																								
CutMor	Union Seed Co.	6.0	8	LR	HR	HR	R	HR	HR	HR	R	R	*			*	*		*	*		*																						
DK180ML	Monsanto	6.0	8	MR	HR	HR	HR	HR	HR	HR							*	*	*	*																								
DS8181	Kelly Green Seed	n/r	8	?	?	?	?	?	?	?											**																							
Duran 2-2	Great Plains Research		8	R	HR	HR	HR	HR	HR	R											*	*																						
GT 13-R Plus	America's Alfalfa	n/r	8	R	R	HR	?	R	MR	LR			*	*	*	*																												
Magna 801FQ	Dairyland Seed Co.	n/r	8	R	HR	HR	MR	HR	R	R							*		*	*																								
Mesa	PGI Alfalfa	5.4	8	MR	R	HR	?	HR	HR	R	R	R	*	*	*	*																												
Pershing	PGI Alfalfa	5.3	8	HR	HR	HR	LR	HR	R	R	R	R	*			*																												
PGI 8000	PGI Alfalfa	5.5	8	?	?	?	?	?	?	?			*	*																														
Rio Grande	Great Plains Research		8	MR	HR	HR	HR	HR	HR	HR	R	?	*	*									*	**	*																			
Signal 8000	Helena Chemical		8	?	?	?	?	?	?	?			*	**		*																												
WL525HQ	WL Research	n/r	8	MR	HR	MR	?	HR	HR	HR						*	*	*	*	*																								
ZG9891	ABI Alfalfa	n/r	8	?	R	HR	HR	?	?	R			*			*																												
ZX9889B	ABI Alfalfa	n/r	8	?	R	?	R	?	?	R			*	*		*																												
Magna 901	Dairyland Seed Co.	n/r	9	MR	HR	HR	R	HR	R	HR	R	R					*	*	*	**	*																							
Salado	America's Alfalfa	n/r	9	?	LR	R	LR	R	MR	HR	MR	HR																																
WL612	WL Research	n/r	9	?	HR	HR	LR	HR	HR	HR			*	*		*																												
WL625HQ	WL Research	n/r	9	MR	HR	HR	LR	HR	HR	HR	R	HR																																
ZS9992	ABI Alfalfa	n/r	9	?	R	R	HR	?	?	?												*																						
ZX9393	ABI Alfalfa	n/r	9	MR	R	HR	R	HR	R	HR							*	*	*	*																								

Table 14. Characteristics and performance of alfalfa varieties across years and tests in New Mexico.

		Varietal Characteristics[1]											Las Cruces				Artesia						Tucumcari						Los Lunas						Alcalde 2001				Farmington					
				Pest resistance									1999[2]				1999				2001		1999				2001		1999				2001		U[3]		G		1999				2001	
Variety	Proprietor	WS	FD	BW	PRR	FW	AN	SAA	PA	BAA	SN	RKN	00[4]	01	02	03	00	01	02	03	02	03	00	01	02	03	02	03	00	01	02	03	02	03	02	03	02	03	00	01	02	03	02	03
ZX9894	ABI Alfalfa	n/r	9	?	R	HR	R	?	HR	R						*																												
ZS0000	ABI Alfalfa	n/r	10	?	R	HR	?	R	?	R												*																						

[1]WS=Winter Survival (1=No injury, 6=Dead plants), FD=Fall Dormancy (2=Vernal, 3=Ranger, 4=Saranac, 5=Archer, 6=ABI 700, 7=Dona Ana, 8=Maricopa, 9-CUF101), Bw=Bacterial wilt, PRR=Phytophthora root rot, Fw=Fusarium wilt, An=Anthracnose, SAA=Spotted alfalfa aphid, PA=Pea aphid, BAA=Blue alfalfa aphid, SN=Stem nematode, RKN=Rootknot nematode (Southern or Northern); (S=Susceptible, LR=Low Resistance, MR=Moderate Resistance, R=Resistant, HR=High Resistance).

[2]Establishment year.

[3]U=ungrazed; G=Grazed from mid-November through mid-May and harvested for hay during the summer.

[4]Harvest Year.

Shaded boxes indicate that the variety was not in the test.

**Highest yielding variety in the test for that year.

*Not significantly different from the highest yielding variety in the test for that year.

L.M. Lauriault, I.M. Ray, C.A. Pierce, D.A. McWilliams, L.M. English, R.P. Flynn, S.J. Guldan, and M.K. O'Neill. New Mexico St. Univ. College of Agric. and Home Ec. Agric. Exp. Stn and Coop. Ext. Ser.

Table 15. New Mexico State University Cooperative Extension Service publications related to alfalfa management.

Number	Title	Online ?
A-107	Managing saline soils	Y
A-113	Selection of fertilizers	Y
A-114	Test your soil	Y
A-122	Soil test interpretations	Y
A-123	Sampling for plant tissue analysis	Y
A-128	Fertilizer guide for New Mexico	Y
A-128	Nitrogen fixation by legumes	Y
A-130	Inoculation of legumes	Y
A-131	Certified seed	Y
A-133	Calculating fertilizer costs	Y
A-134	Selecting synthetic fertilizers in New Mexico	Y
A-18	Micronutrient fertility guide	Y
A-216	Know what is in a bag of seed	Y
A-309	Alfalfa weevil and clover leaf weevil	Y
A-316	Structure of a hay bale	Y
A-317	Alfalfa fertilization in New Mexico	Y
A-318	Reducing alfalfa harvest losses	Y
A-325	Managing weeds in alfalfa	Y
A-327	Introduction to hay testing	Y
A-328	Sampling guidelines for hay testing	Y
A-329	Variations in hay grading	Y
A-330	Alfalfa growth stages	Y
A-331	Alfalfa quality definitions	Y
B-115	Balancing forage supply and demand	Y
CR-536	Blister beetles in alfalfa	Y
CR-581	Drought strategies for alfalfa	Y
CR-585	Species selection and establishment for irrigated pastures in New Mexico	Y
CR-586	Grazing systems and management for irrigated pastures in New Mexico	Y
HB-11	Suggestions for managing insects in alfalfa and clover 1996	
W-01	Submitting plants for plant tissue analysis	
W-13	Alfalfa disease control	

These publications, and alfalfa variety test reports from previous years are available at www.cahe.nmsu.edu/pubs/