

The 1999 New Mexico Alfalfa Variety Test Report



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SUMMARY

Consistently high alfalfa yields are the result of selecting a good variety 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 7-week rest period before a dormancy inducing freeze (27°F) is recommended to allow the plant to replenish root reserves for winter survival and initiate of spring growth, after which harvesting may be done either mechanically or by grazing. Harvesting established stands at early bloom will result in 4 to 5 cuttings per year before the rest period begins in most areas of New Mexico. For further information about alfalfa management, refer to the New Mexico State University Cooperative Extension Service publications listed in table 10.

CONTENTS

Introduction	1
Considerations in selecting an alfalfa variety	1
Local adaptation and persistence	1
Winter hardiness	1
Disease resistance	2
Insect resistance	2
Seed quality	2
Forage quality	2
Description of tests	3
Tables 1-10	4-12

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INTRODUCTION

In 1999 there were 290,000 acres of alfalfa (*Medicago sativa*) in production in New Mexico. An estimated 1.5 million tons of hay were harvested from this acreage at an average of \$116/ton. Gross returns totaled nearly \$175 million, making alfalfa hay New Mexico's No. 1 cash crop (New Mexico Agricultural Statistics Service Weekly AgUpdate, Issue 50-07). Alfalfa is the legume of choice in irrigated perennial pastures as well. Choosing a good alfalfa variety is a key step in establishing a highly productive alfalfa stand whether for hay or pasture. Differences between the highest and lowest yielding varieties in tests included in this report ranged from 0.62 to 2.21 tons per acre in 1999. If sold as hay, this translates to a difference in returns of \$72 to \$256 per acre due to variety. In addition, stand longevity, as affected by winter hardiness and pest resistance, is partially determined by variety.

This report provides current yield data on alfalfa varieties included in yield trials in New Mexico, as well as guidelines for variety selection.

CONSIDERATIONS IN SELECTING AN ALFALFA VARIETY

Local adaptation and persistence

High yields in variety tests over a range of years and locations within a region are the best indication that a variety is locally adapted and persistent. In addition to personal observations, New Mexico alfalfa producers are encouraged to select varieties based on information collected from trials conducted at New Mexico State University agricultural science centers located throughout the state. Since these tests are conducted by the

university, they are independent of any company bias. Look first at data collected from the agricultural science center(s) closest to you. For your convenience, data from the centers are grouped by similarity of latitude and elevation, which will affect winter hardiness and thus, yield and persistence. Persistence—the ability of individual plants to survive field conditions over time—is strongly influenced by winter hardiness, harvest frequency, and pest resistance. Higher persistence will permit a longer economical stand life, allowing more time to recover establishment costs. Alfalfa stands should be replaced when there are less than 5 plants (or 40 stems) per square foot. Producers should rotate to another irrigated crop for at least 1 year before reseeding alfalfa into the same field to avoid seedling death due to autotoxicity. If stand life expectancy is only 3 to 4 years, as would be 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. A good indication of winter hardiness is given by the fall dormancy rating (FD), 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) will yield more because of earlier spring "green up" and later fall production, but they may not survive severe winters. These varieties may be suitable for use in a short-term rotation system where alfalfa is used for 4 years or less. Otherwise, producers should select varieties with sufficient dor-

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mancy to survive winter conditions at their location, while optimizing forage production during the growing season.

Disease resistance

In New Mexico, alfalfa producers should select adapted varieties that have the highest available resistance, preferably moderate resistance (MR) or greater rating to bacterial wilt (Bw), fusarium wilt (Fw), Phytophthora root rot (PRR), and anthracnose (An) (Alfalfa Analyst, Certified Alfalfa Seed Council).

Bacterial and fusarium wilt are infections of the water-conducting tissues of alfalfa's roots that do not cause any noticeable root rot. These diseases prevent water flow to leaves, resulting in wilting of shoots and the eventual death of infected plants. Roots infected with bacterial wilt often will have a yellowish-brown discoloration of the taproots's inner woody cylinder. Fusarium infection can be 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. The 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 can cause a bluish-black crown rot as well.

There are many other diseases of alfalfa that occur in New Mexico to which resistance has not yet been developed. The best protection against these diseases is proper management. But as any producer knows, even that at times is not sufficient.

Insect resistance

There are many insects that feed on alfalfa. Currently, the most detrimental insects to alfalfa production in New Mexico for which varietal resistance is available include spotted alfalfa aphid (SAA), pea aphid (PA), and blue alfalfa aphid (BAA). As with disease resistance, select varieties having at least an MR rating for each of these insects. If a particular insect is not adapted to your area, varieties without resistance may be preferable due to a historical decrease in yield associated with the resistance. Varietal resistance to other insects, such as alfalfa weevil and potato leafhopper may be available in the near future. However, historic resistance has not protected the plant, but rather masked the symptoms. Currently, the best protection against those insect pests is through good harvest management or proper pesticide

use. Pesticide use may be necessary even with resistant varieties, when pest pressure is excessive.

Seed quality

Selecting an alfalfa variety based on seed cost is like playing Russian roulette. Seed labeled as "common," "variety not stated", or "variety unknown" are of unknown genetic background and may or may not be locally adapted or have necessary disease or insect resistance. To assure a long-lasting, highly productive stand, buy either certified or Plant Variety Protected (PVP) seed, which will guarantee that the genetics and performance you are paying for are in the bag. Look for the blue tag, which must be attached to all bags of certified seed or look for PVP labeling, which is the proprietor's guarantee. Regardless of the variety, be sure to read the seed tag, which gives other important information about the particular seed you are buying, including: purity, amounts of other crop and weed seed (as well as listing the species and number of any noxious weed seed present), germination, and the test date, which should be within the previous 9 months to accurately reflect the germination. 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: >19% crude protein, <31% acid detergent fiber, <40% 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 soil fertility, irrigation, weed and insect control, maturity at cutting, baling, and storage conditions, are major factors affecting alfalfa quality. The optimum balance between forage yield and quality occurs at 1-10% bloom. Harvesting at prebloom increases quality but sacrifices yield. Continually 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 must weigh price against decreased yields and stand life. Prebloom harvests in the middle cuttings are likely to be less detrimental to stand life than the first and last cuttings of any given year. Cutting at >10% bloom increases yield, but quality declines rapidly as fiber increases and mineral content decreases (Alfalfa for Dairy Animals, Certified Alfalfa Seed Council). Leaf retention, affected by insect feeding, maturity (as the plant matures the lower leaves drop), and baling, is important 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 the NMSU's agricultural science centers at Artesia (sown in 1996), Clovis (1997), Tucumcari (1997), Los Lunas (1996), and Farmington (1996). Weather data for 1997 to 1999 and the long-term averages from these locations are presented (table 1). Total annual yields of each variety tested are given (tables 2–8) for each production year as well as the average annual production. Management information pertinent to individual trials are given at the bottom of the data table for each test. Statistical analyses were performed on all alfalfa yield data (including experimentals) to determine if the apparent differences are truly due to variety or just due to chance (Agrobase). 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 to or greater than the LSD, the

varieties are truly different in yield when grown under the conditions at a given location. The Coefficient of Variation (CV), which is a measure of the data's variability, is included for each column of means. Low variability (<20%) is desirable and increased variability within a study results in higher CVs and larger LSDs.

Table 9 summarizes information about proprietors, fall dormancy, pest resistance, and yield performance across years and locations for all varieties currently included in the New Mexico State University Alfalfa Variety Testing Program. Varieties are listed by alphabetical order within fall dormancy. 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 was the highest yielding variety 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% LSD. It is best to choose a variety that has performed well over several years and locations as indicated by the asterisks. Tests are grouped by location, and locations are grouped by similarity in elevation and latitude within New Mexico.

Table 1. Temperature and precipitation data for 1997 to 1999 and the long-term averages for the New Mexico Alfalfa Variety Test locations.

Location Elevation Latitude	Artesia 3376 ft. 32 %45' N			Clovis 4281 ft. 34 %35' N			Tucumcari 4091 ft. 35 %12' N			Los Lunas 4842 ft. 34 %16' N			Farmington 5577 ft. 36 %41' N				
	1997	1998	1999	1997	1998	1999	1997	1998	1999	1997	1998	1999	1997	1998	1999		
	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term		
-----Temperature, °F-----																	
Jan.	39	41	43	34	37	44	35	42	44	38	33	37	39	34	35	29	
Feb.	41	45	49	38	46	47	40	43	49	42	40	40	42	36	35	33	
Mar.	54	50	53	49	47	51	52	46	50	49	50	46	50	46	42	43	
Apr.	56	55	60	49	57	54	51	54	56	57	52	51	53	47	47	50	
May	68	71	68	65	71	66	65	69	64	66	65	62	63	61	61	59	
June	77	79	75	74	71	74	74	77	74	75	71	72	72	70	67	70	
July	80	83	88	79	80	77	80	81	80	79	77	-	77	74	77	75	
Aug.	79	78	80	77	75	76	76	76	79	77	76	76	75	73	74	74	
Sep.	74	76	71	74	74	69	73	75	70	70	71	72	65	68	70	66	
Oct.	60	63	59	60	60	58	59	62	60	59	56	57	62	52	54	53	
Nov.	47	51	52	46	50	51	45	51	53	47	43	46	46	41	42	40	
Dec.	34	42	39	37	42	40	35	41	41	39	31	37	33	31	31	31	
Mean	59	61	61	57	60	59	57	60	60	58	55	-	56	52	53	52	
-----Precipitation, inches-----																	
Jan.	0.45	0.00	0.57	0.16	0.00	0.48	0.35	0.03	1.68	0.35	0.86	0.07	0.12	1.03	0.12	0.14	0.51
Feb.	1.15	0.18	0.00	0.45	1.07	0.00	0.81	0.61	0.00	0.37	0.19	1.20	0.00	0.48	0.61	0.05	0.43
Mar.	0.11	0.52	0.91	0.00	1.53	1.10	0.09	2.59	1.25	0.69	0.12	2.97	1.05	0.03	0.65	0.13	0.69
Apr.	1.37	0.05	1.11	4.99	1.37	2.32	4.89	1.23	1.79	1.13	1.82	0.03	0.81	2.88	0.73	1.21	0.59
May	1.43	0.00	4.35	2.28	0.00	2.83	1.47	0.08	5.83	1.98	0.90	0.00	1.02	0.82	0.03	1.26	0.53
June	1.66	0.25	3.82	3.96	0.14	1.29	3.39	0.14	1.73	1.92	0.87	0.14	1.12	0.62	0.02	0.44	0.28
July	0.60	1.01	2.17	1.88	1.71	2.52	3.25	2.45	0.55	2.66	2.07	-	2.43	1.28	1.38	2.51	0.84
Aug.	1.87	1.84	0.98	2.70	1.39	4.18	4.54	4.77	2.34	2.74	2.65	1.29	3.83	1.12	1.48	2.99	1.05
Sep.	2.37	0.44	0.63	1.68	0.56	2.44	1.25	0.61	1.98	1.50	2.21	0.28	1.22	2.68	0.68	0.25	1.11
Oct.	2.71	2.34	0.70	1.30	8.87	0.00	0.64	4.60	0.65	1.27	0.28	2.37	0.38	0.43	2.07	0.01	0.95
Nov.	0.52	0.09	0.00	0.37	0.43	0.01	0.56	0.42	0.05	0.65	0.43	0.57	0.00	0.67	1.27	0.06	0.74
Dec.	1.97	0.78	0.27	0.87	0.13	0.52	2.70	0.17	0.82	0.58	1.28	0.29	0.18	0.80	0.06	0.12	0.43
Total	16.21	7.49	15.51	20.64	17.20	17.39	23.94	17.70	18.67	15.95	13.68	-	12.16	12.84	9.10	9.17	8.15

Table 2. Total annual dry matter yields (tons/acre) of alfalfa varieties sown in September 1996, at NMSU's Agricultural Science Center at Artesia.

Variety	FD	1997	1998	1999	Average
6B77	6	10.10**	9.79**	8.42*	9.44**
Parade	7	9.83*	9.66*	8.53*	9.34*
Monsanto 166	6	10.03*	9.35*	8.62*	9.33*
Rio	7	9.98*	9.11*	8.49*	9.19*
C/W 4791	7	9.98*	8.86*	8.64**	9.16*
5681	6	10.05*	8.96*	8.41*	9.14*
LM 459	5	9.56*	9.22*	8.47*	9.09*
C/W 4692	6	9.53*	9.47*	8.08*	9.02*
C/W 4598	6	9.80*	9.06*	8.10*	8.99*
Pecos	7	9.47*	8.79*	8.52*	8.93*
C/W 46106	7	9.74*	9.19*	7.66	8.86*
5715	8	9.45*	8.57*	8.57*	8.86*
LM 455	6	9.33	8.87*	8.33*	8.84*
WL414	7	8.88	9.46*	8.10*	8.81*
ABI9193	8	9.04	8.89*	8.34*	8.76*
WL525HQ	8	9.07	8.55*	8.17*	8.59
5939	9	8.55	8.33*	8.06*	8.31
WL325HQ	3	8.40	8.51*	7.46	8.12
Salado	9	7.87	8.48*	7.08	7.81
Mean		9.38	9.01	8.21	8.85
CV, %		5.21	10.47	6.18	9.16
LSD _{0.05}		0.69	ns	0.72	0.66

Harvest dates:

1997: 30 Apr, 28 May, 23 Jun, 21 Jul, 29 Aug, and 1 Oct.
 1998: 13 Apr, 4 Jun, 30 Jun, 25 Jul, 25 Aug, and 28 Sep.
 1999: 7 May, 8 Jun, 6 Jul, 5 Aug, 7 Sep, and 22 Oct.

**Highest numerical value in the column.

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

LSD_{0.05} stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a column is equal to or greater than the LSD_{0.05}, then we are 95% certain that they are truly different.

ns means that there are no significant differences between the varieties at the 5% level.

Notes:

- Soil type was Reagan Loam.
- The test was irrigated by sprinkler.

Table 3. Total annual dry matter yields (tons/acre) of fully irrigated alfalfa varieties sown 19 March 1997, at NMSU's Agricultural Science Center at Clovis.

Variety	FD	1998	1999	Average
Jade II	4	6.43*	6.49**	6.46**
6B77	6	6.49**	6.28*	6.38*
Monsanto 133	4	6.25*	6.26*	6.26*
5681	6	6.32*	6.18*	6.25*
Rio	7	6.17*	6.07	6.12*
5396	4	5.95	6.20*	6.08
LM 455	6	6.17*	5.96	6.06
WL325HQ	3	6.01	6.05	6.03
5454	4	6.00	6.04	6.02
Parade	7	6.18*	5.82	6.00
LM 459	5	5.99	5.86	5.93
WL414	6	5.83	5.74	5.78
Mean		6.15	6.08	6.11
CV, %		5.85	5.25	8.18
LSD _{0.05}		0.36	0.32	0.36

Harvest dates:

1998: 18 May, 23 Jun, 23 Jul, 27 Aug, and 7 Oct.
 1999: 4 Jun, 9 Jul, 19 Aug, and 23 Sep.

**Highest numerical value in the column.

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

LSD_{0.05} stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a column is equal to or greater than the LSD_{0.05}, then we are 95% certain that they are truly different.

ns means that there are no significant differences between the varieties at the 5% level.

Notes:

- Soil type was Olton Silt Loam.
- The test was under drip irrigation.

Table 4. Total annual dry matter yields (tons/acre) of alfalfa varieties receiving limited irrigation sown 19 March 1997, at NMSU's Agricultural Science Center at Clovis.

Variety	FD	1998	1999	Average
Monsanto 133	4	6.21*	6.75**	6.48**
5396	4	6.10*	6.70*	6.40*
Jade II	4	6.24**	6.51*	6.38*
Rio	7	6.20*	6.52*	6.36*
6B77	6	6.21*	6.50*	6.35*
LM 459	6	6.08*	6.44*	6.26*
LM 455	5	6.13*	6.34	6.23*
5681	6	6.05*	6.38	6.22*
Parade	7	5.96*	6.32	6.14
5454	4	5.76	6.45*	6.10
WL325HQ	3	5.85	6.28	6.06
WL525HQ	8	5.72	5.94	5.83
Mean		6.04	6.43	6.23
CV, %		5.71	5.17	6.53
LSD _{0.05}		0.34	0.33	0.29

Harvest dates:

1998: 18 May, 23 Jun, 23 Jul, 27 Aug, and 7 Oct.

1999: 4 Jun, 9 Jul, 19 Aug, and 23 Sep.

**Highest numerical value in the column.

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

LSD_{0.05} stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a column is equal to or greater than the LSD_{0.05}, then we are 95% certain that they are truly different.

ns means that there are no significant differences between the varieties at the 5% level.

Notes:

-Soil type was Olton Silt Loam.

-The test was under drip irrigation at the half rate of the test described in table 3.

Table 5. Total annual dry matter yields (tons/acre) of alfalfa varieties of different fall dormancy categories sown 30 April 1997, at NMSU's Agricultural Science Center at Tucumcari.

Variety	FD	1997	1998	1999	Average
Signal 7000	7	4.36**	8.76*	8.09*	7.07**
Wilson	6	3.76	8.78**	8.67**	7.07**
Dona-Ana	7	4.22*	8.49*	8.22*	6.97*
Tahoe	6	4.13*	8.68*	7.93	6.91*
Landmark	4	3.45	8.73*	8.40*	6.86*
13R-Supreme	8	3.78	8.22*	8.54*	6.85*
WL612	9	3.85	8.19*	8.20*	6.75*
WL525HQ	8	3.94*	8.02	8.26*	6.74*
Archer	5	3.60	8.56*	7.96	6.71*
Jade II	4	3.48	8.66*	7.92	6.69*
Salado	9	4.06*	8.14*	7.59	6.59*
Baralfa54	5	3.24	8.15*	7.61	6.33*
Viking I	2	3.48	7.92	7.55	6.32*
Garst645	3	3.09	7.65	7.75	6.17
Rainier	3	3.29	7.80	7.23	6.12
Monsanto 127	3	3.11	7.56	7.48	6.05
Mean		3.68	8.27	7.96	6.64
CV, %		12.08	8.08	7.33	14.45
LSD _{0.05}		0.44	0.66	0.58	0.79

Harvest dates:

1997: 21 Jul, 8 Aug, 16 Sep, and 28 Oct.

1998: 12 May, 16 Jun, 21 Jul, 17 Aug, 15 Sep, and 29 Oct.

1999: 21 May, 16 Jun, 13 Jul, 11 Aug, 9 Sep, and 25 Oct.

**Highest numerical value in the column.

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

LSD_{0.05} stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a column is equal to or greater than the LSD_{0.05}, then we are 95% certain that they are truly different.

ns means that there are no significant differences between the varieties at the 5% level.

Notes:

-Soil type was Caney Fine Sandy Loam.

-The test was furrow irrigated.

Table 6. Total dry matter yields for 1999 (tons/acre) of alfalfa varieties sown in different soil moisture constraints on 19 September 1997, at NMSU's Agricultural Science Center at Tucumcari.

Variety	FD	Standard Irrigation	Dryland	Winter Irrigation	Poorly Drained/ High Salt
OK49	5	5.08**	1.73*	8.17*	3.72*
Salado	9	4.37*	1.78**	7.58*	4.15**
Supercuts	4	3.97	1.14*	7.42*	2.97
ABT405	4	3.90	0.86	5.96*	2.75
AmeriGraze 401+Z	4	3.21	1.41*	7.65*	3.00
CO Common	?	3.18	1.40*	8.22**	2.90
AlfaGraze	2	3.04	0.90	7.65*	2.83
Mean		3.82	1.32	7.52	3.19
CV, %		19.59	33.85	16.75	16.70
LSD _{0.05}		1.11	0.66	ns	0.79

Harvest dates:

No data was collected in 1998.

1999: 21 May, 16 Jun, 13 Jul, 11 Aug, 9 Sep, and 25 Oct.

**Highest numerical value in the column.

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

LSD_{0.05} stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a column is equal to or greater than the

LSD_{0.05}, then we are 95% certain that they are truly different.

ns means that there are no significant differences between the varieties at the 5% level.

Notes:

-Typical irrigation study:

Soil types are Canez and Quay Fine Sandy Loams.

The test was furrow irrigated once for each harvest.

-Dryland study:

Soil type is Quay Fine Sandy Loam.

The test was furrow irrigated once after seeding.

-Winter irrigation study:

Soil type is Canez Fine Sandy Loam.

The test was furrow irrigated once for each harvest and monthly during the winter (1-Nov to 1-Apr).

-Poorly drained/high salt study:

Located in a tail water area draining 36 ha.

Soil type is Canez Fine Sandy Loam, Calcereous Variant (impermeable caliche layer at 60-90 cm, causing poor drainage) having a Na content of >700 ppm in the surface 15 cm.

Irrigations, by furrow, were applied as needed to maintain wet soil conditions.

Table 7. Total annual dry matter yields (tons/acre) of alfalfa varieties sown 9 September 1996, at NMSU's Agricultural Science Center at Los Lunas.

Variety	FD	1997	1998	1999	Average
Archer	5	6.59**	8.23**	7.86**	7.59**
ABI9252	6	6.11*	8.11*	7.52*	7.22*
6B77	6	6.04*	7.85*	7.31*	7.03*
WL414	6	5.88*	7.68*	7.08*	6.94*
WL235HQ	3	5.76*	7.82*	7.14*	6.86*
Pecos	7	5.67*	7.35*	7.24*	6.77*
Mean		6.01	7.84	7.36	7.07
CV, %		9.26	6.99	6.86	10.57
LSD _{0.05}		ns	ns	ns	ns

Harvest dates:

1997: 29 May, 27 Jun, 15 Aug, and 27 Sep.

1998: 19 May, 29 Jun, 1 Aug, 8 Sep, and 12 Oct.

1999: 1 Jun, 2 Jul, 10 Aug, and 4 Oct.

**Highest numerical value in the column.

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

LSD_{0.05} stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a column is equal to or greater than the LSD_{0.05}, then we are 95% certain that they are truly different.

ns means that there are no significant differences between the varieties at the 5% level.

Notes:

-Soil type was Vinton Loamy Fine Sand.

-The test was flood irrigated.

Table 8. Total annual dry matter yields (tons/acre) of alfalfa varieties sown 26 August 1996, at NMSU's Agricultural Science Center at Farmington.

Variety	FD	1997	1998	1999	Average
Legend	4	5.13*	6.78**	5.83**	5.92**
Rio	7	5.34**	6.30*	5.67*	5.77*
Monsanto 127	3	5.01*	6.37*	5.87*	5.75*
Rushmore	4	4.62*	6.40*	5.78*	5.60*
Evergreen	6	5.05*	6.22*	5.23*	5.50*
WL324	3	4.48*	6.36*	5.61*	5.48*
C/W 4599	5	4.61*	6.00*	5.61*	5.41*
UN44	4	4.73*	6.16*	5.31*	5.40*
Champ	3	4.52*	6.07*	5.55*	5.38*
Archer	5	4.72*	5.76*	5.56*	5.35*
C/W 4693	6	4.69*	6.16*	5.19*	5.35*
WL325HQ	3	4.59*	5.76*	5.49*	5.28*
330	3	4.36*	5.64*	5.65*	5.22*
Benchmark	3	4.62*	5.36*	5.56*	5.18*
Vernema	4	4.48*	5.66*	5.24*	5.13*
3L171	3	4.69*	5.71*	4.70*	5.04*
Ranger	3	3.87*	5.42*	5.19*	4.83*
Parade	7	4.25*	5.07*	4.86*	4.72*
Mean		4.65	5.96	5.44	5.35
CV, %		14.18	17.55	9.37	19.28
LSD _{0.05}		ns	ns	ns	ns

Harvest dates:

1997: 3 Jun, 8 Jul, 29 Aug, and 8 Oct.

1998: 9 Jun, 10 Jul, 12 Aug, and 23 Sep.

1999: 4 Jun, 7 Jul, 24 Aug, and 4 Oct.

**Highest numerical value in the column.

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

LSD_{0.05} stands for the Least Significant Difference at the 5% level. If the difference between two numbers within a column is equal to or greater than the LSD_{0.05}, then we are 95% certain that they are truly different.

ns means that there are no significant differences between the varieties at the 5% level.

Notes:

-Soil type was Doak Fine Sandy Loam.

-The test was sprinkler irrigated.

Table 9. Characteristics and performance of alfalfa varieties across years and tests in New Mexico.		Varietal Characteristics ¹								Artesia			Clovis				Tucumcari					Los Lunas			Farmington					
										1996 ²			1996				1997					1996			1996					
		FD ¹¹	Disease & Insect Resistance ³								97 ¹²	98	99	Full ⁴		Half ⁵		FD ⁶			D ⁷	S ⁸	T ⁹	W ¹⁰	97	98	99	97	98	99
			Ratings ³											Dormancy ⁴																
Variety	Proprietor	BW	PR	FW	AN	SA	PA	BA	98	99	98	99	97	98	99	99	99	99	99	99	99	99	97	98	99	97	98	99		
Common, CO	Colorado Variety Not Stated	?	?	?	?	?	?	?									*			**										
AlfaGraze	America's Alfalfa	2	R	LR	R	MR	?	R	?										*											
Viking I	Novartis Seeds	2	R	R	HR	R	?	MR	MR																					
Benchmark	Research Seeds	3	HR	HR	HR	HR	?	?	?																	*	*	*		
Champ	Research Seeds	3	R	MR	HR	?	?	HR	?																	*	*	*		
Garst 645	Garst Seed	3	HR	HR	R	HR	MR	R	?																					
Monsanto 127	Monsanto Global Seed Group	3	HR	HR	R	HR	HR	HR	?																	*	*	*		
Rainier	Novartis Seeds	3	HR	HR	HR	HR	HR	HR	?																					
Ranger	Public	3	ME	LR	LR	LR	LR	LR	LR																	*	*	*		
WL324	WL Research	3	HR	HR	HR	HR	R	HR	?																	*	*	*		
WL325HQ	WL Research	3	HR	HR	HR	HR	R	R	MR		*												*	*	*	*	*	*		
330	Union Seed	4	HR	HR	HR	HR	HR	R	R																	*	*	*		
3L171	Forage Genetics	4	HR	HR	HR	HR	HR	R	?																	*	*	*		
5396	Pioneer HiBred Int'l	4	R	R	R	HR	R	R	MR				*	*	*															
5454	Pioneer HiBred Int'l	4	R	HR	HR	HR	HR	R	R					*																
ABT405	AgriBioTech	4	HR	HR	HR	HR	?	R	?										*			*								
AmeriGraze 401+Z	America's Alfalfa	4	HR	HR	HR	HR	?	R	?								*			*										
Landmark	Geertson Farms	4	R	HR	R	R	?	R	?					*	*															
Legend	Cenex	4	HR	HR	HR	HR	LR	R	?																	*	**	**		
Monsanto 133	Monsanto Global Seed Group	4	HR	HR	HR	HR	R	R	?				*	*	*	**														
Jade II	NC+ Hybrids	4	MR	R	HR	MR	R	R	MR					*																
Rushmore	Novartis Seeds	4	HR	HR	HR	HR	HR	R	?																	*	*	*		
Supercuts	AgriBioTech	4	HR	HR	HR	HR	?	R	?							*			*											
UN 44	Union Seed	4	HR	HR	HR	HR	?	HR	?																	*	*	*		
Vernema	Public	4	MR	LR	?	LR	MR	?	?																	*	*	*		
Archer	America's Alfalfa	5	MR	R	HR	R	HR	HR	R					*									**	**	**	*	*	*		
Baralfa54	Barenbrug USA	5	R	HR	HR	HR	HR	HR	?					*																
C/W 4599	Cal/West Seeds	5	?	HR	?	HR	HR	HR	HR																	*	*	*		
LM 459	Lohse Mill	5	R	R	HR	LR	R	HR	R	*	*	*		*	*															
OK49	Cal/West Seeds	5	MR	MR	R	MR	R	?	LR							*	*	**	*											
5681	Pioneer HiBred Int'l	6	R	HR	HR	HR	HR	R	HR	*	*	*	*	*	*															
6B77	Forage Genetics	6	MR	HR	HR	HR	HR	R	?	**	**	*	**	*	*	*						*	*	*						

							T																													
ABI9252	ABI Alfalfa	6	R	R	R	R	HR	R	R																		*	*	*							
C/W 4598	Cal/West Seeds	6	HR	HR	HR	HR	HR	R	HR	*	*	*																								
C/W 4692	Cal/West Seeds	6	?	HR	?	HR	HR	?	HR	*	*	*																								
C/W 4693	Cal/West Seeds	6	?	HR	?	HR	HR	?	HR																				*	*	*					
Evergreen	Arkansas Valley Seeds	6	R	R	HR	HR	R	R	R																				*	*	*					
LM 455	Lohse Mill	6	R	R	HR	LR	HR	HR	R		*	*	*		*																					
Monsanto 166	Monsanto Global Seed Group	6	R	MR	R	?	HR	HR	R	*	*	*																								
Tahoe	Novartis Seeds	6	MR	HR	HR	HR	HR	HR	R					*	*																					
Wilson	NMCIA/Public	6	R	?	R	?	MR	R	?										**	**																
WL414	WL Research	6	R	HR	HR	R	HR	HR	HR		*	*											*	*	*											
C/W 46106	Cal/West Seeds	7	?	HR	?	HR	HR	?	HR	*	*	*																								
C/W 4791	Cal/West Seeds	7	R	HR	HR	HR	HR	R	HR	*	*	**																								
							E																													
Dona Ana	NMCIA/Public	7	MR	R	MR	LR	MR	R	?					*	*	*																				
Parade	Union Seed	7	MR	HR	HR	HR	HR	HR	R	*	*	*	*		*													*	*	*						
Pecos	America's Alfalfa	7	MR	R	HR	MR	R	R	MR	*	*	*										*	*	*												
Rio	Great Plains	7	R	HR	HR	HR	HR	HR	HR	*	*	*	*		*	*											*	*	*							
Signal 7000	Helena Chemical	7	R	R	HR	R	R	R	MR					**	*																					
13R Supreme	America's Alfalfa	8	MR	R	R	MR	R	R	MR						*	*																				
5715	Pioneer HiBred Int'l	8	LR	R	HR	HR	HR	HR	HR	*	*	*																								
ABI9193	ABI Alfalfa	8	MR	R	HR	R	HR	R	R		*	*																								
WL525HQ	WL Research	8	MR	HR	MR	?	HR	HR	HR		*	*			*	*	*																			
5939	Pioneer HiBred Int'l	9	LR	HR	HR	R	HR	R	R		*	*																								
Salado	America's Alfalfa	9	?	LR	R	LR	R	MR	HR		*				*	*		**	**	*	*															
WL612	WL Research	9	?	HR	HR	LR	HR	HR	HR		*	*																								

¹FD=Fall Dormancy, Bw=Bacterial wilt, PR=Phytophthora root rot, Fw=Fusarium wilt, An=Anthracnose, SA=Spotted alfalfa aphid, PA=Pea aphid, BA=Blue alfalfa aphid.
²Establishment year ³Pest Resistance Ratings: S=Susceptible, LR=Low Resistance, MR=Moderate Resistance, R=Resistant, HR=High Resistance.
⁴Test sown under drip irrigation and received the full irrigation level. ⁵Test sown under drip irrigation but received half the full irrigation level.
⁶Test sown to determine which FD category was best suited to the Tucumcari area. ⁷Dryland: Test irrigated once after seeding.
⁸Test sown in soil having 700 ppm Na and poorly drained; irrigated as needed. ⁹Typical: Test is irrigated once before each harvest.
¹⁰Winter: Same as Typical but also irrigated monthly during winter. ¹¹FD: 2=Vernal, 3=Ranger, 4=Saranac, 5=Archer, 6=ABI 700, 7=Dona Ana, 8=Maricopa, 9=CUF101
¹²Harvest 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.A. Ray, R.D. Baker, C.E. Barnes, L.M. English, and C. Owen. NMSU CAHE AES CES

Table 10. New Mexico State University's Cooperative Extension Service publications related to alfalfa management.

Number	Title	On-line ?
A-107	Managing saline soils	
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	
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	
A-216	Know what is in a bag of seed	Y
A-309	Alfalfa weevil and clover leaf weevil	
A-316	Structure of a hay bale	
A-317	Alfalfa fertilization in New Mexico	
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
HB-11	Suggestions for managing insects in alfalfa 19 and clover 1996	
W-01	Submitting plants for plant tissue analysis	
W-13	Alfalfa disease control	

These publications are available from county Extension offices.
To view publications online, visit www.cahe.nmsu.edu/cahe

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To find more resources for your home, family, or business, visit the College of Agriculture and Home Economics on the World Wide Web at <http://www.cahe.nmsu.edu>.