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# Alfalfa Cultivar Yield Test for South Dakota: 1998 Report

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# ALFALFA CULTIVAR YIELD TEST

*for South Dakota:*

1998  
Report



# ALFALFA CULTIVAR YIELD TEST

*for South Dakota:*

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## 1998 Report

Plant Science Department  
South Dakota State University

The South Dakota Alfalfa Cultivar Yield Test reports relative forage production characteristics for available cultivars at several locations in South Dakota. Alfalfas are entered in the test by seed companies and public breeders at their own discretion. A list of the cultivars and the companies marketing them is at the end of this bulletin.

### Cultivar selection

The large number of alfalfa cultivars on the market makes it difficult to select the "right" one for your needs.

When evaluating alfalfa cultivars, consider the characteristics of each before finalizing your decision. Major attributes to think about include yield, fall dormancy and winterhardiness, disease and insect resistance, and cost per unit of pure live seed.

### Yield

Yield information in this and other reports represents seeding year or post-seeding-year averages. Generally, yield data for several years of production are the most meaningful.

If possible, use data from test locations that most nearly resemble growing conditions on your farm. However, evaluating results from other trials will also be helpful in

determining how cultivars perform under a wide range of growing conditions.

To measure significant differences in yield between cultivars, a statistical measure known as the least significant difference (LSD) is used. If the difference in yield between any two cultivars exceeds the LSD value, the higher yielding cultivar performed better at that particular site.

Two cultivars may appear to differ in yield; however, if the difference between any two cultivars is less than the LSD value, there is no evidence that the two cultivars yielded differently.

In some cases, the abbreviation NS (not significant) replaces the LSD value and designates that no yield differences were detected among any of the cultivars at that site for a given cutting, total, or average yield.

### Fall dormancy

Fall dormancy ratings (Table 8) range from 1 (very dormant) to 9 (non-dormant).

Since fall dormancy is thought to be related to winterhardiness, severe South Dakota winters necessitate that this rating (actual winterhardiness ratings can be obtained for some cultivars) be used in cultivar selection. Traditionally, very fall-dormant cultivars (rating

of 1 or 2) are considered to be very winterhardy, whereas cultivars with a rating of 3 or 4 are considered to be winterhardy to moderately winterhardy.

In general, alfalfa cultivars grown in eastern or southern South Dakota should have a fall dormancy rating of 2, 3, or 4. A fall dormancy score of 1, 2, or 3 is probably more appropriate for northern South Dakota.

Alfalfa breeders are working to develop winterhardy cultivars that produce high yields late in the season (fall dormancy rating of 5). Nonetheless, cultivars with ratings of 6 to 8 are generally not winterhardy enough to survive South Dakota winters, although these cultivars may be used as annual forages.

### Disease and insect resistance

Disease resistance ratings (Appendix) are important indicators of a cultivar's potential to perform in situations where specific diseases limit production or persistence. Major diseases that may affect the productivity of alfalfa in South Dakota include bacterial wilt and *Phytophthora* root rot. Other diseases, such as *Verticillium* wilt, anthracnose, leaf spots, *Fusarium* wilt, and other root and crown rots may be problems at particular sites.

In general, planting a resistant cultivar is the most effective control for most disease problems.

Dominant insect pests of alfalfa include potato leafhopper, alfalfa weevil, pea aphid, and grasshoppers. Several companies have released cultivars resistant to potato leafhopper during the last 2 years. While these cultivars do demand a premium, they may help reduce the impact of this insect pest in areas of the state where potato leafhoppers are fairly common.

### Cost of Pure Live Seed (PLS)

Alfalfa seed costs vary according to two major factors:

1. Type of seed purchased. Modern proprietary cultivars are typically more expensive than older proprietary, public, or common seed.

In the last 10 years, however, most modern cultivars have yielded up to 10% more than older cultivars.

2. Types of seed treatments applied. Alfalfa seed may be pretreated with inoculant, fungicide, clay/lime coatings, or any combination of the three.

While seed treatments may be very useful, it is imperative to remember that application of any of these materials will reduce the amount of PLS per bag due to an increase in inert matter.

No single factor will make an alfalfa cultivar or group of cultivars consistently superior to any others. Therefore, you should carefully evaluate the characteristics discussed above before making your selection. Once you have gathered sufficient information, you can then make an informed decision regarding your next variety of alfalfa.

## Materials, Methods

Alfalfa was planted between mid-April and mid-May into a firmly packed seedbed at a seeding rate of 15 lb pure live seed (PLS) per acre at all locations. A preplant (3.43 pints of Eptam 7E per acre) or postemergence (4 fluid oz of Pursuit 2L per acre) herbicide was used for weed control during alfalfa establishment. Soils were fertilized according to soil test results the entire length of a trial.

Alfalfa was evaluated for stage of maturity at time of harvest for all experiments using the mean-stage-by-count scheme developed by Kalu and Fick (1981, Crop Science 21:267-271) as shown in Table 1. Experiments were harvested up to four times each year; however, growth conditions at some locations often limited harvest frequencies.

• Table 1. Kalu and Fick<sup>a</sup> maturity index for phenological development of alfalfa.

Stage number	Stage name
0	Early vegetative
1	Mid-vegetative
2	Late vegetative
3	Early bud
4	Late bud
5	Early flower
6	Late flower
7	Early seed pod
8	Late seed pod
9	Ripe seed pod

<sup>a</sup>Kalu, B.A., and G.W. Fick. 1981. Quantifying morphological development of alfalfa for studies of herbage quality. Crop Sci. 21:267-271.

## 1998 Results

The example table on the next page shows typical data obtained

from the South Dakota Alfalfa Cultivar Yield Test. It can be used to help you interpret information in tables 2 through 7.

### South Dakota Crop Improvement Research Farm, Aurora

Inadequate precipitation severely limited alfalfa production during the entire growing season (Fig 1). In fact, between April 1 and October 1, precipitation was 7.2 inches below normal at Aurora.

As a result of these dry conditions, each of the three trials was harvested only once in 1998 (Tables 2 to 4). Aurora was even drier in 1997; therefore, very little soil moisture carried over into the 1998 growing season.

#### Site 1 (Established in 1995)

The only harvest at this site was taken 26 May, somewhat earlier than normal, as a result of an early spring (Table 2).

Alfalfa harvested on this date was at the mid- to late-bud stage of maturity. In eastern South Dakota, many producers desiring dairy quality alfalfa hay had also harvested by the end of May. Inclement weather during the first 2 weeks of June prevented many growers from producing high quality hay if the first harvest was delayed past the end of May.

The 3-year average (1996-1998) was rather low (2.56 tons/acre) due to inadequate moisture in 1997 and 1998 (Table 2). There were no differences in yield among cultivars for first cut in 1998, although the 3-year average does allow for separation of cultivars by yield.

Official cultivar names as provided by the seed source. Experimental entries are not included.

Number of harvests per year varies with climatic conditions.

Seeding year data are not included in long-term averages. In this example yields from 1997 and 1998 would be used to calculate the 2-year average.

Example Table. Example forage yield of 5 alfalfa cultivars planted 22 May 1996 at a research station in South Dakota. Plots were fertilized annually, if necessary, according to soil test recommendations.

Cultivar	1996	1997	1998			Total	2-year average	% of 2-year average
	1-cut	3-cut	Cut 1	Cut 2	Cut 3			
	Total	Total	1 June	10 July	25 Aug			
	tons dry matter/acre							
Entry 1	1.05	5.10	3.10	1.63	1.57	6.30	5.70	103
Entry 2	1.07	4.89	3.02	1.54	1.56	6.12	5.51	100
Entry 3	0.95	4.98	2.99	1.55	1.52	6.06	5.52	100
Entry 4	0.89	5.25	2.65	1.60	1.41	5.66	5.46	99
Entry 5	1.07	5.30	2.63	1.49	1.35	5.47	5.39	98
AVERAGE	1.01	5.10	2.88	1.56	1.48	5.92	5.52	
Maturity			3.9	4.2	4.5			
LSD (P=0.05)	NS	0.26	0.31	NS	0.20	0.55	0.29	

Least significant difference values. Two cultivars differ in forage production when the difference between them is greater than the LSD value for that cutting or for the total. For example, the LSD value for 1997 3-cut total is 0.26. Entry 4 outyielded entries 2 and 3 because the difference in yield was greater than the LSD. Entry 4 did not differ in production from entries 1 and 5 because yield differences were less than the LSD value.

NS indicates not significant. This means that none of the cultivars differed in yield.

Kalu and Fick maturity values. See Table 1 for a complete description. A value of 4.5 indicates that alfalfa was harvested between the late-bud and early flower stage of maturity.

#### Site 2 (Established in 1996)

This trial was harvested on 27 May, when alfalfa was near the late-bud stage of development (Table 3).

There were significant differences among cultivars in cut 1 and 2-year average yields. The 2-year (1997 and 1998) average of 1.89 tons/acre was very low due to severe moisture stress in both years. This site will continue to be evaluated in 1999.

#### Site 3 (Established in 1998)

A new site with 20 cultivars was established at Aurora in 1998 (Table 4). Weed control measures

were taken to ensure a pure alfalfa stand in the establishment year.

One cut, at the early- to late-bud stage of maturity, was taken on 23 July, but there were no differences in yield among cultivars. Initially, we had planned to harvest the second growth of alfalfa; however, grasshoppers and inadequate moisture prohibited further harvests.

#### Southeast Experiment Farm, Beresford

Alfalfa at this site was established in the spring of 1997, but no harvests were taken in the estab-

lishment year due to excessive pressure from potato leafhoppers.

Nearly normal temperature and precipitation patterns (Fig 1) allowed us to harvest four cuttings in 1998 (Table 5). Cuts 1 and 2 were taken when alfalfa was beginning to flower, whereas cuts 3 and 4 were harvested when alfalfa was at late bud and early bud, respectively.

Total yields for the current season were excellent, ranging from 8.04 to 9.50 tons dry matter/acre. While total production and yields from cuts 1, 2, and 3 varied significantly among entries, it is important to recognize that 9 of the 27

cultivars were within 0.63 tons/acre (the LSD value) of the top yielding cultivar.

### **Central Research Station, Highmore**

Fifteen alfalfa cultivars were established at this site in the spring of 1998 (Table 6). Precipitation was lower than normal during the growing season (Fig 1).

One harvest, at the early- to late-bud stage of maturity, on 21 July yielded 0.82 to 1.03 tons/acre, but there were no differences among cultivars (Table 6).

Cultivars were evaluated for potato leafhopper resistance when pressure from this insect pest devel-

oped prior to the 21 July harvest. Pioneer Brand 53V63, the only cultivar with some genetic resistance to potato leafhopper, exhibited less damage from this insect than 11 of the remaining 14 cultivars.

Alfalfa weevils were also present at Highmore during the early part of the growing season, and the entire experiment farm was sprayed to control this pest.

### **Northeast Research Station, Watertown**

Precipitation at Watertown (Fig 1) permitted three harvests in 1998 (Table 7). Because of inclement weather, cut 1 was not taken until alfalfa had reached the

early- to late-flower stage of development. Subsequent harvests were taken when alfalfa was at the late-bud stage of maturity.

Total yields for the season ranged from 4.40 to 6.15 tons/acre with an average total yield of 5.66 tons/acre (Table 7).

The 2-year (1997 and 1998) average ranged from 3.89 to 5.46 tons/acre, with 12 of the 27 varieties falling within 0.48 tons/acre (the LSD value) of the top yielding cultivar.

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Fig 1. Average daily temperature and total monthly precipitation at alfalfa cultivar testing sites in South Dakota, 1998.

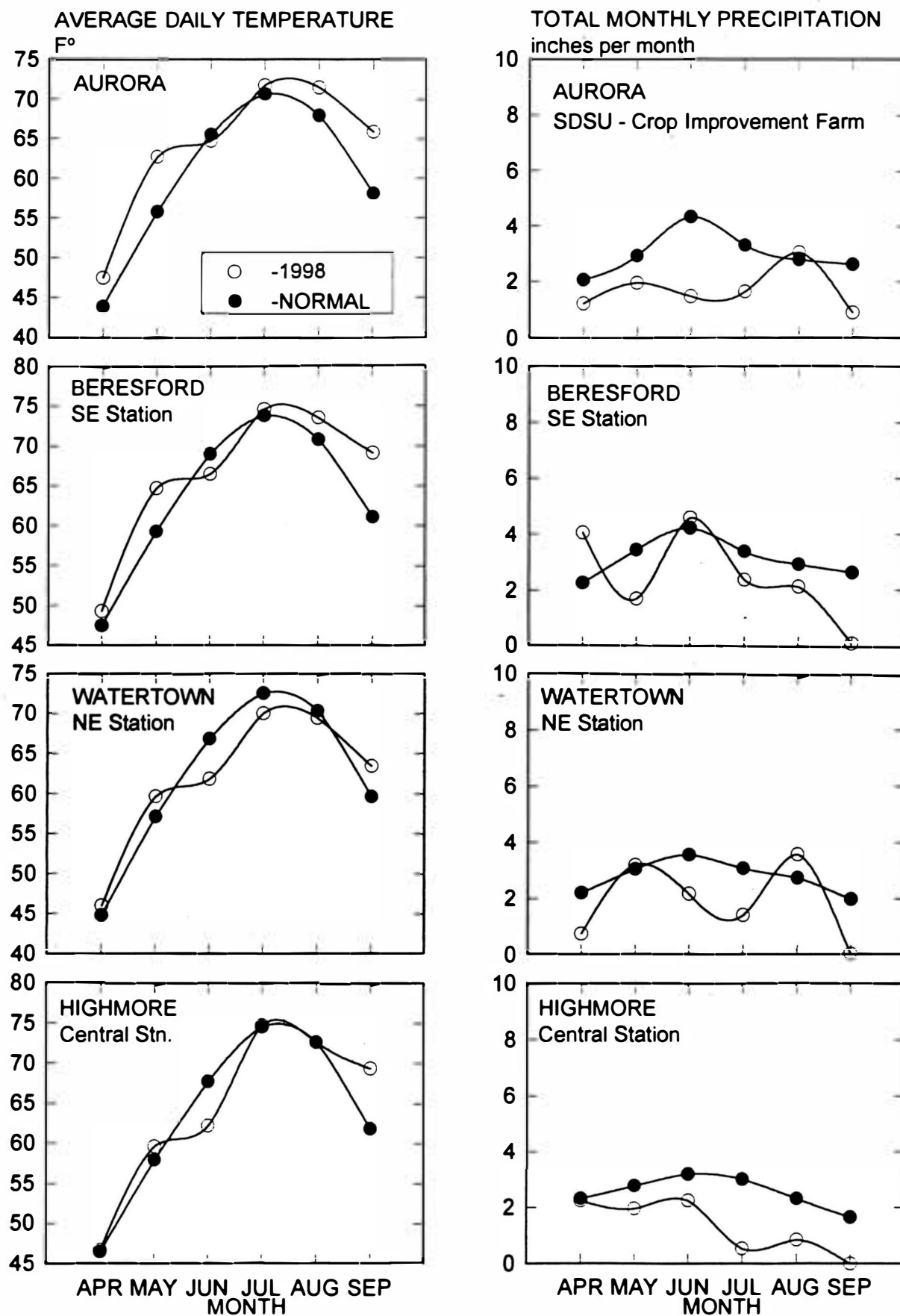


Table 2. Forage yield of 35 alfalfa cultivars planted 26 April 1995 at the South Dakota Crop Improvement Research Farm near Aurora, S.D. Plots were fertilized annually, if necessary, according to soil test recommendations.

Cultivar	1995	1996	1997	1998		% of 3-year average
	2-cut Total	3-cut Total	2-cut Total	Cut 1 26 May	3-year average <sup>a</sup>	
	tons dry matter/acre					%
Pioneer Brand 5454	3.15	4.07	3.12	1.62	2.94	115
WL 252HQ	3.38	4.02	2.90	1.54	2.82	110
2555-ML	3.37	4.09	2.82	1.47	2.79	109
Dividend	3.17	3.90	2.83	1.51	2.75	107
Defiant	3.08	3.72	2.82	1.60	2.71	106
DK 122	3.15	3.75	2.91	1.46	2.71	106
AlfaLeaf II	3.25	3.82	2.85	1.45	2.71	106
Rushmore	3.11	3.70	2.77	1.61	2.70	105
Proof	3.13	3.77	2.82	1.48	2.69	105
3452 ML	3.10	3.77	2.72	1.59	2.69	105
DK 127	3.23	3.73	2.73	1.61	2.69	105
AlfaStar	3.06	3.79	2.73	1.48	2.67	104
GGG01	3.00	3.61	2.91	1.46	2.66	104
WL 323	3.15	3.83	2.67	1.39	2.63	103
MP 2000	3.26	3.75	2.65	1.45	2.62	102
Excalibur II	3.05	3.76	2.64	1.45	2.61	102
Majestic	3.11	3.67	2.65	1.42	2.58	101
ICI 631	3.03	3.60	2.69	1.39	2.56	100
Innovator +Z	3.01	3.53	2.65	1.50	2.56	100
Ciba 2888	3.30	3.55	2.46	1.55	2.52	99
Sterling	3.08	3.63	2.45	1.47	2.52	98
Imperial	3.14	3.34	2.56	1.63	2.51	98
Paramount	3.00	3.62	2.60	1.29	2.50	98
Pioneer Brand 5262	2.94	3.42	2.59	1.39	2.46	96
Spartan	3.21	3.52	2.44	1.41	2.46	96
Avalanche +Z	2.96	3.46	2.57	1.31	2.45	96
ICI 645	3.04	3.32	2.56	1.46	2.45	96
Alfagraze	2.99	3.24	2.66	1.40	2.43	95
Saranac AR	3.09	3.25	2.67	1.28	2.40	94
TMF Generation	3.02	3.35	2.43	1.36	2.38	93
ICI 620	3.07	3.46	2.28	1.38	2.37	93
Vernal	3.14	3.15	2.42	1.52	2.36	92
Travois	2.77	3.05	2.22	1.47	2.25	88
Baker	2.97	2.92	2.40	1.39	2.23	87
Riley	2.96	2.99	2.40	1.28	2.22	87
AVERAGE	3.10	3.57	2.65	1.46	2.56	
Maturity <sup>b</sup>				3.3		
LSD (P=0.05) <sup>c</sup>	0.26	0.5	0.38	NS <sup>d</sup>	0.3	

(a) 3-year average does not include yields from the establishment year.

(b) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of maturity values.

(c) LSD = Least Significant Difference. The difference in yield between any two varieties must be greater than the LSD value in order to say confidently that one variety performed better than another.

(d) NS = Not significant; differences between cultivars are not statistically significant.



Table 3. Forage yield of 29 alfalfa cultivars planted 23 April 1996 at the South Dakota Crop Improvement Research Farm near Aurora, S.D. Plots were fertilized annually, if necessary, according to soil test recommendations.

	1996	1997	1998		
Cultivar	2-cut Total	2-cut Total	Cut 1 27 May	2-year average <sup>a</sup>	% of 2-year average
	tons dry matter/acre				%
Complete	1.81	2.75	1.57	2.16	114
AlfaStar	1.83	2.80	1.43	2.12	112
Depend +EV	1.91	2.70	1.40	2.05	109
Big Horn	1.89	2.73	1.38	2.05	109
Columbia 2000	2.09	2.75	1.33	2.04	108
TMF Multi-plier II	1.94	2.70	1.35	2.03	107
DK 122	1.88	2.74	1.29	2.02	107
Pioneer Brand 5312	1.95	2.74	1.27	2.00	106
MAX329	1.94	2.56	1.38	1.97	104
GH 766	1.91	2.61	1.33	1.97	104
DK 127	1.98	2.64	1.25	1.94	103
ALPHA 2001	2.10	2.72	1.17	1.94	103
WL 325HQ	1.99	2.62	1.24	1.93	102
A-395	1.84	2.42	1.42	1.92	101
Stetson II+	2.04	2.53	1.28	1.91	101
Good as Gold	2.00	2.58	1.21	1.89	100
ICI 645	1.80	2.54	1.24	1.89	100
Bounty	1.80	2.34	1.37	1.86	98
Pioneer Brand 5454	1.89	2.54	1.10	1.82	96
WL 324	1.89	2.45	1.20	1.82	96
Vernal	1.71	2.33	1.29	1.81	96
Riley	1.89	2.42	1.20	1.81	96
CIBA 2444	1.88	2.32	1.27	1.79	95
Crystal	1.96	2.41	1.15	1.78	94
ABT 205	1.83	2.36	1.19	1.77	94
Rainier	2.08	2.33	1.12	1.73	91
Alfaleaf II	1.87	2.23	1.12	1.68	89
Saranac AR	1.76	2.27	1.07	1.67	88
Baker	1.78	2.09	1.02	1.55	82
AVERAGE	1.90	2.52	1.26	1.89	
Maturity <sup>b</sup>			3.9		
LSD (P=0.05) <sup>c</sup>	0.25	0.3	0.27	0.25	

(a) 2-year average does not include yields from the establishment year.

(b) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of maturity values.

(c) LSD = Least Significant Difference. The difference in yield between any two varieties must be greater than the LSD value in order to say confidently that one variety performed better than another.

Table 4. Forage yield of 20 alfalfa cultivars planted 22 April 1998 at the South Dakota Crop Improvement Research Farm near Aurora, S.D. Plots were fertilized with 50 lbs P<sub>2</sub>O<sub>5</sub>/Acre before planting, according to soil test recommendations.

Cultivar	1998	% of 1998 average
	Cut 1 23 July tons dry matter/acre	
Husky Supreme	1.38	117
Gold Rush 747 Brand	1.27	108
Vernal	1.26	107
WinterStar	1.24	105
DK 140	1.22	103
Feast +EV	1.21	102
Geneva	1.20	102
Rainier	1.19	101
Yielder	1.19	101
DK 134	1.18	100
ABT 350	1.16	98
Target II Plus	1.15	98
WinterKing	1.15	98
Pioneer Brand 53Q60	1.15	97
Pioneer Brand 53V63	1.14	97
Magnum V	1.13	95
Frontier 2000 Brand	1.12	95
Ace	1.10	93
TMF 421	1.07	91
WL 232HQ	1.06	90
AVERAGE	1.18	
Maturity <sup>a</sup>	3.3	
LSD (P=0.05) <sup>b</sup>	NS <sup>c</sup>	

(a) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of maturity values.

(b) LSD = Least Significant Difference. The difference in yield between any two varieties must be greater than the LSD value in order to say confidently that one variety performed better than another.

(c) NS = Not significant; differences between cultivars are not statistically significant.

Table 5. Forage yield of 26 alfalfa cultivars planted 25 April 1997 at the Southeast South Dakota Experiment Farm near Beresford, S.D. Plots were fertilized annually, if necessary, according to soil test recommendations.

Cultivar	1998				Total	% of 1998 average
	Cut 1 8 June	Cut 2 9 July	Cut 3 17 Aug	Cut 4 1 Oct		
	tons dry matter/acre					%
CIBA 2888	3.92	2.35	2.00	1.23	9.50	109
Pioneer Brand 5312	3.57	2.34	2.05	1.23	9.19	105
Rhino	3.50	2.25	2.08	1.26	9.08	104
Excalibur II	3.44	2.27	2.02	1.33	9.06	104
Pioneer Brand 5347LH	3.61	2.26	1.98	1.15	9.00	103
WL 325HQ	3.23	2.37	2.06	1.32	8.98	103
Rainier	3.43	2.36	1.95	1.18	8.91	102
Asset	3.50	2.29	1.98	1.13	8.89	102
CIBA 2444	3.45	2.32	2.02	1.10	8.89	102
DK 140	3.50	2.28	1.92	1.12	8.82	101
Amerigraze 401 +Z	3.40	2.25	1.98	1.14	8.77	101
Depend +EV	3.27	2.24	2.02	1.22	8.75	100
TMF Multi-plier II	3.66	2.10	1.82	1.17	8.75	100
620	3.28	2.26	2.09	1.08	8.70	100
WL 324	3.34	2.25	1.89	1.22	8.70	100
Spartan	3.47	2.19	1.96	1.07	8.68	100
Avalanche +Z	3.40	2.30	1.86	1.09	8.65	99
631	3.33	2.23	1.92	1.08	8.56	98
DK 127	3.44	2.15	1.88	1.08	8.56	98
Pioneer Brand 5454	3.38	2.22	1.84	1.07	8.52	98
Spur	3.56	2.16	1.67	1.14	8.52	98
Complete	3.10	2.27	1.96	1.14	8.46	97
Innovator +Z	3.23	2.25	1.86	1.02	8.36	96
DK 142	3.23	2.15	1.87	1.06	8.31	95
Vernal	3.18	2.10	1.89	0.96	8.12	93
Ace	2.96	2.11	1.87	1.10	8.04	92
AVERAGE	3.40	2.24	1.94	1.14	8.72	
Maturity <sup>a</sup>	4.5	4.5	3.8	3.1		
LSD (P=0.05) <sup>b</sup>	0.25	0.16	0.21	NS <sup>c</sup>	0.63	

(a) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of maturity values.

(b) LSD = Least Significant Difference. The difference in yield between any two varieties must be greater than the LSD value in order to say confidently that one variety performed better than another.

(c) NS = Not significant; differences between cultivars are not statistically significant.

Table 6. Forage yield of 15 alfalfa cultivars planted 5 May 1998 at the Central Crops and Soils Research Farm, Highmore, S.D. Plots were fertilized with 50 lbs P<sub>2</sub>O<sub>5</sub>/Acre before planting, according to soil test recommendations.

Cultivar	1998		PLH <sup>a</sup> rating
	Cut 1 21 July tons dry matter/acre	% of 1998 average %	
Vernal	1.03	109	1.8
Magnum V	1.03	109	1.8
WL 232HQ	1.02	109	1.8
DK 140	0.99	105	1.8
620	0.97	104	1.7
WL 325HQ	0.97	103	2.3
Husky Supreme	0.96	102	1.7
WL 324	0.93	99	2.0
Frontier 2000 Brand	0.93	99	1.8
Pioneer Brand 53Q60	0.92	98	2.2
Pioneer Brand 53V63	0.91	97	1.3
TMF Multi-plier II	0.90	96	1.7
TMF 421	0.88	94	2.3
DK 134	0.88	93	2.0
Gold Rush 747 Brand	0.82	88	2.0
AVERAGE	0.94		1.89
Maturity <sup>b</sup>	3.3		
LSD (P=0.05) <sup>c</sup>	NS <sup>d</sup>		0.45

- (a) PLH = Potato leafhopper Resistance Rating as prescribed by the North American Alfalfa Improvement Conference.  
1 = No apparent injury.  
2 = Very minor stunting and yellowing.  
3 = Moderate stunting, yellowing is evident on 20 - 40% of leaves.  
4 = Significant injury, plant showing significant stunting with yellowing on 40 - 60% of leaves.  
5 = Severe injury. Plants with severe stunting; yellowing or reddening evident on 60 - 100% of leaves.
- (b) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of maturity values.
- (c) LSD = Least Significant Difference. The difference in yield or PLH rating between any two varieties must be greater than the LSD value in order to say confidently that one variety performed better than another.
- (d) NS = Not significant; differences between cultivars are not statistically significant.

Table 7. Forage yield of 27 alfalfa cultivars planted 22 May 1996 at the Northeast Research Station near Watertown, S.D. Plots were fertilized annually, if necessary, according to soil test recommendations.

Cultivar	1996	1997	1998			Total	2-year average <sup>a</sup>	% of 2-year average
	1-cut Total	3-cut Total	Cut 1 18 June	Cut 2 14 July	Cut 3 21 Aug			
	tons dry matter/acre							%
WL 324	1.09	4.78	2.99	1.65	1.50	6.15	5.46	110
DK 127	1.07	4.55	3.01	1.45	1.64	6.10	5.33	107
AlfaStar	1.06	4.26	3.26	1.49	1.56	6.31	5.28	106
Columbia 2000	0.92	4.91	2.74	1.45	1.47	5.66	5.28	106
Pioneer Brand 5454	0.97	4.56	2.80	1.49	1.60	5.90	5.23	105
CIBA 2444	0.95	4.86	2.60	1.52	1.42	5.55	5.20	105
Saranac AR	1.05	4.38	3.19	1.66	1.16	6.01	5.19	105
ICI 631	1.06	4.46	2.81	1.63	1.48	5.92	5.19	104
Pioneer Brand 5312	0.84	4.42	2.79	1.86	1.29	5.94	5.18	104
Viking 1	0.85	4.33	2.99	1.51	1.48	5.99	5.16	104
HayGrazer	0.95	4.48	2.76	1.48	1.52	5.76	5.12	103
A-395	1.11	4.57	2.78	1.38	1.48	5.64	5.10	103
WL 325HQ	1.08	4.55	2.60	1.49	1.40	5.49	5.02	101
TMF Multi-plier II	0.91	4.26	2.94	1.34	1.36	5.63	4.95	100
DK 122	0.98	4.09	3.16	1.38	1.26	5.79	4.94	99
Bounty	0.97	4.00	3.19	1.42	1.24	5.85	4.93	99
Defiant	1.05	4.22	2.92	1.42	1.27	5.61	4.91	99
WL 252HQ	0.89	4.22	2.83	1.37	1.33	5.53	4.87	98
Riley	0.92	3.95	2.73	1.39	1.61	5.73	4.84	97
Big Horn	0.80	3.96	3.05	1.29	1.34	5.69	4.82	97
LegenDairy 2.0	1.04	4.09	2.77	1.32	1.40	5.49	4.79	96
ABT 205	0.96	4.14	2.44	1.64	1.29	5.37	4.75	96
Vernal	0.98	4.15	2.69	1.27	1.39	5.35	4.75	96
Baker	0.77	4.16	2.71	1.22	1.31	5.24	4.70	95
Rainier	1.00	3.91	2.64	1.27	1.41	5.32	4.62	93
ICI 620	0.95	3.91	2.44	1.59	1.29	5.31	4.61	93
Travois	0.80	3.37	2.35	1.01	1.04	4.40	3.89	78
AVERAGE	0.96	4.28	2.82	1.44	1.39	5.66	4.97	
Maturity <sup>b</sup>			5.3	4.1	4.0			
LSD (P=0.05) <sup>c</sup>	0.26	0.63	NS <sup>d</sup>	0.33	0.25	0.58	0.48	

(a) 2-year average does not include yields from the establishment year.

(b) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of maturity values.

(c) LSD = Least Significant Difference. The difference in yield between any two varieties must be greater than the LSD value in order to say confidently that one variety performed better than another.

(d) NS = Not significant; differences between cultivars are not statistically significant.

**Appendix. Listing of alfalfa cultivars, developers, suppliers, and agronomic characteristics.<sup>a</sup>**

Developer/Supplier	Cultivar	FD <sup>b</sup>	Disease and Insect Resistance <sup>c</sup>					
			BW	VW	FW	An	PRR	PA
Agribiotech, Inc.	ABT 205	2	HR	HR	HR	HR	HR	R
	ABT 350	3	HR	HR	HR	HR	HR	R
AgriPro Seeds	Amerigraze 401 +Z	4	HR	HR	HR	HR	HR	R
	Defiant	2	HR	HR	HR	R	HR	R
	Depend +EV	4	HR	HR	HR	HR	HR	R
	Feast +EV	3	HR	HR	HR	R	HR	MR
	Yielder	3	HR	R	R	R	HR	R
Agway/Allied Seed	Columbia 2000	3	R	MR	R	MR	MR	MR
	Dividend	2	HR	R	HR	HR	HR	R
	Majestic	3	R	HR	HR	HR	R	- - -
America's Alfalfa	Alfagraze	2	R	- - -	R	MR	LR	R
	Avalanche +Z	2	HR	HR	HR	HR	HR	R
	Innovator +Z	3	HR	HR	HR	HR	HR	R
Arrow Seed/Fontanelle Hybrids	Complete	3	HR	HR	HR	HR	HR	R
Cargill	Big Horn	4	HR	R	HR	HR	HR	R
	Sterling	2	HR	R	HR	HR	HR	R
Cenex/Land O'Lakes	LegenDairy 2.0	3	HR	R	HR	HR	HR	HR
	MP2000	3	HR	R	HR	HR	HR	HR
CIBA-GEIGY	CIBA 2444	3	HR	R	HR	HR	HR	MR
	CIBA 2888	3	HR	R	HR	HR	HR	MR
Coyote Seed	Asset	4	HR	R	R	R	HR	R
	Spartan	3	HR	R	HR	HR	HR	R
Dairyland Seed	Magnum V	4	HR	R	HR	R	HR	R
Dekalb Plant Genetics	DK 122	2	HR	R	R	HR	HR	R
	DK 127	3	HR	R	R	HR	HR	HR
	DK 134	3	HR	HR	HR	HR	HR	HR
	DK 140	4	HR	R	HR	HR	HR	R
	DK 142	4	HR	R	HR	R	HR	HR
Den Besten Seed Co.	Frontier 2000 Brand	2	R	R	HR	HR	MR	- - -
	Gold Rush 747 Brand	2	MR	MR	MR	MR	MR	MR
	Husky Supreme	3	R	R	R	MR	MR	R
Domestic Seed	Excalibur II	4	HR	R	HR	HR	HR	R

**Appendix (continued). Listing of alfalfa cultivars, developers, suppliers, and agronomic characteristics.<sup>a</sup>**

Developer/Supplier	Cultivar	FD <sup>b</sup>	Disease and Insect Resistance <sup>c</sup>					
			BW	VW	FW	An	PRR	PA
Garst Seeds	620	2	HR	R	HR	HR	HR	MR
	631	4	HR	R	HR	R	HR	HR
	645	3	HR	R	R	HR	HR	R
Geertson Seed Farms	Rhino	3	HR	R	R	R	R	HR
Golden Harvest	GH 766	3	HR	R	HR	HR	HR	R
Great Plains Research Co.	HayGrazer	4	HR	R	HR	R	R	R
Great Lakes Hybrids	ALPHA 2001	4	HR	HR	HR	HR	HR	R
Green Genes, Inc./Geertson Seed Farms	GGG01	3	R	LR	R	LR	MR	HR
Hoffman Seed/Sexauer	AlfaStar	4	HR	R	HR	HR	HR	---
Keltgen Seed/Lynks Seed	Proof	3	HR	R	HR	HR	HR	R
L.L. Old's Seed/Payco Seeds/Interstate	2555-ML	2	HR	R	HR	HR	HR	HR
	3452-ML	2	HR	R	HR	R	HR	HR
Mycogen Seeds	TMF 421	2	HR	HR	R	HR	HR	HR
	TMF Generation	4	HR	HR	HR	HR	HR	R
	TMF Multi-plier II	3	HR	HR	HR	HR	HR	---
New York Ag. Exp. Stn.	Saranac AR	4	MR	---	R	HR	---	---
Northrup King	Geneva	4	HR	HR	HR	HR	HR	HR
	Rushmore	4	HR	R	HR	HR	HR	R
	Viking 1	2	R	HR	HR	R	R	MR
Novartis Seeds, Inc.	Rainier	3	HR	R	HR	HR	HR	HR
PGI/MBS	A-395	3	HR	R	HR	HR	HR	MR
	Bounty	2	HR	R	HR	HR	HR	---
	Crystal	4	HR	R	HR	R	HR	R
	Stetson II+	4	HR	R	HR	R	HR	---
Pioneer Hi-Bred Int.	Brand 5262	2	HR	LR	MR	---	R	R
	Brand 5312	3	HR	HR	HR	HR	HR	HR
	Brand 5347LH	3	HR	R	HR	HR	HR	HR
	Brand 53Q60	3	HR	R	R	HR	HR	MR
	Brand 53V63	3	HR	HR	HR	HR	HR	---
	Brand 5454	4	R	MR	HR	HR	HR	R
Plains Alfalfa	AlfaLeaf II	4	R	R	HR	HR	HR	---
Producers Hybrids	Target II Plus	3	HR	R	HR	R	HR	R

**Appendix (continued). Listing of alfalfa cultivars, developers, suppliers, and agronomic characteristics.<sup>a</sup>**

Developer/Supplier	Cultivar	FD <sup>b</sup>	Disease and Insect Resistance <sup>c</sup>					
			BW	VW	FW	An	PRR	PA
Public Cultivars	Baker	2	HR	- - -	R	LR	- - -	HR
	Riley	4	HR	LR	- - -	MR	- - -	HR
	Travois	1	R	- - -	- - -	- - -	- - -	S
	Vernal	2	R	- - -	MR	- - -	- - -	- - -
Seed Mart, Inc.	MAX329	3	HR	HR	HR	HR	HR	- - -
Sexauer	Spur	4	HR	R	HR	HR	HR	HR
Top Farm Hybrids	Good as Gold	4	HR	R	HR	R	HR	HR
	Imperial	3	HR	R	HR	HR	HR	HR
UAP Seeds	Ace	4	HR	R	HR	HR	HR	R
W-L Research	WL 232HQ	2	HR	HR	HR	HR	HR	R
	WL 252HQ	2	HR	R	HR	HR	HR	R
	WL 323	4	HR	R	HR	HR	HR	R
	WL 324	3	HR	R	HR	HR	HR	HR
	WL 325HQ	3	HR	R	HR	HR	HR	R
Wensman Seed Co.	WinterKing	3	HR	HR	HR	HR	HR	HR
	WinterStar	2	HR	HR	HR	HR	HR	R
Wyffels Hybrids/Chemgro	Paramount	3	HR	R	HR	HR	HR	HR

a Ratings obtained from: (1) Fall Dormancy and Pest Resistance Ratings for Alfalfa Varieties, 1998/99 Edition. Alfalfa Council, Davis, CA 95617—1017; or (2) Alfalfa marketers.

b FD = Fall Dormancy Index, 1 = greatest fall dormancy; 9 = absence of fall dormancy.

c Refer to pest resistance rating below:

BW = Bacterial Wilt  
VW = Verticillium wilt  
FW = Fusarium wilt

An = Anthracnose  
PRR = Phytophthora Root Rot  
PA = Pea Aphid

**Pest Resistance Rating**

% Resistant plants	Resistance class
0 - 5%	Susceptible (S)
6 - 14%	Low Resistance (RS)
15 - 30%	Moderate Resistance (MR)
31 - 50%	Resistance (R)
> 50%	High Resistance (HR)

d Blank spaces indicate cultivar is susceptible or has not been adequately tested.



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