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Alfalfa Cultivar Yield Test for South Dakota: 1996 Report

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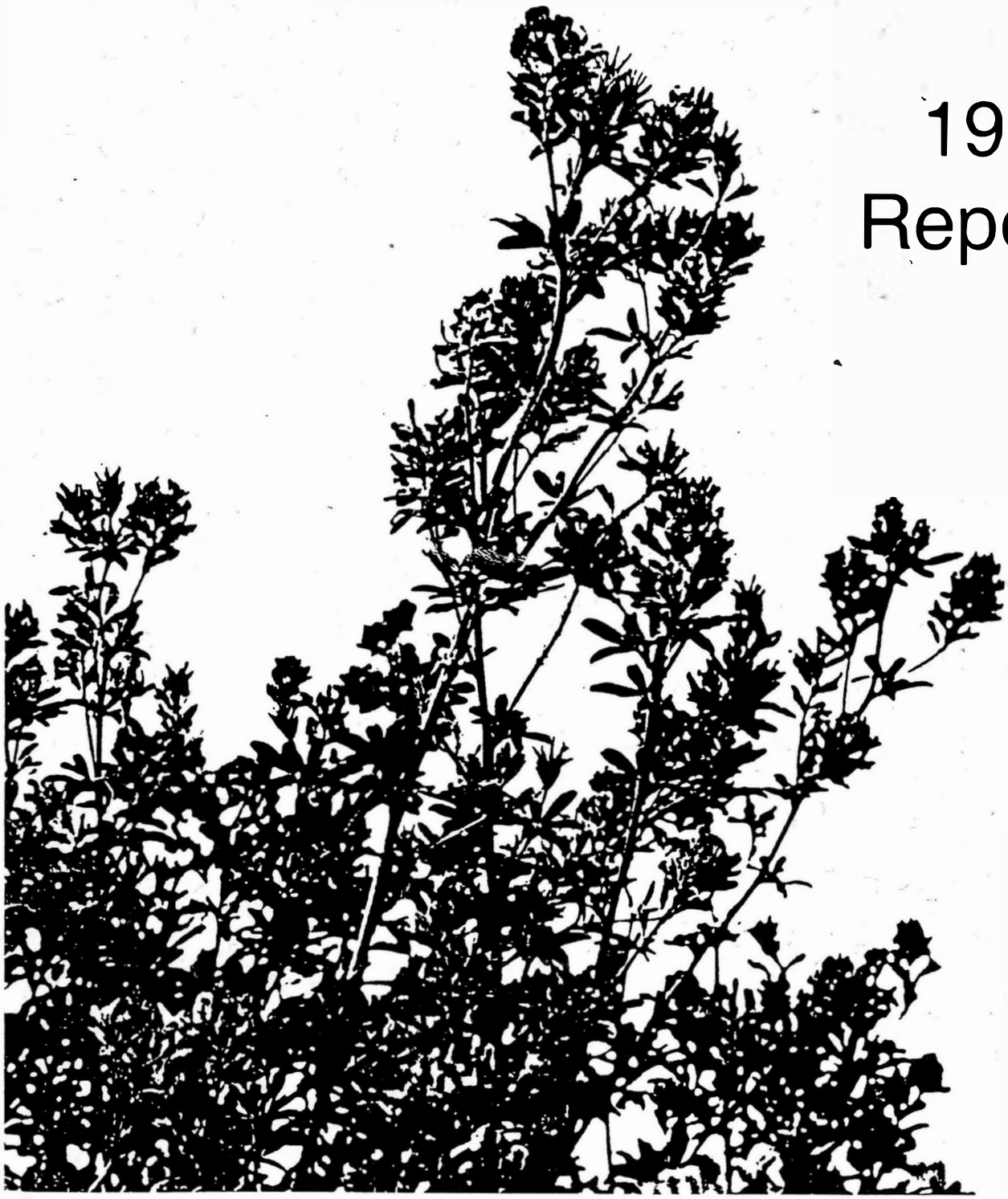

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ALFALFA CULTIVAR YIELD TEST

for South Dakota:

1999 Report

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

Cultivar Selection

The large number of alfalfa cultivars on the market makes cultivar selection decisions difficult. When evaluating alfalfa cultivar test information, consider the characteristics of each cultivar before finalizing a decision. Major attributes you should 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) is used in place of the LSD value to designate 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 (see Appendix) 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 be used in cultivar selection (actual winterhardiness ratings can be obtained for some cultivars).

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). 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 (see 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 cause 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 3 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 outlined below:

1) Type of seed purchased. Modern proprietary cultivars are typically more expensive than older proprietary, public, or common seed. In the last 10 years, most modern cultivars have yielded up to 10% more than older cultivars, however.
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 then can make an informed decision regarding your next variety of alfalfa.

Materials and 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 seeded prior to 1999. A seeding rate of 20 lb PLS per acre was used at the new Watertown site. A preplant (3.43 pints Eptam 7E per acre or 1.5 pints Treflan 4L per acre) or postemergence (4 fluid oz Pursuit 2L per acre) herbicide was used for weed control during alfalfa establishment. Superphosphate (50 lb/acre) was incorporated during seedbed preparation. Soils are fertilized after establishment according to soil test results.

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. Weather information for the various sites is provided in Table 2.

Acknowledgments

The authors express their gratitude to research station managers and personnel Robert Berg, Todd Bortnem, Allen Heuer, Jim Smolik, and Mike Volek for their assistance in conducting this research.

Table 1. Kalu and Fick[a] 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

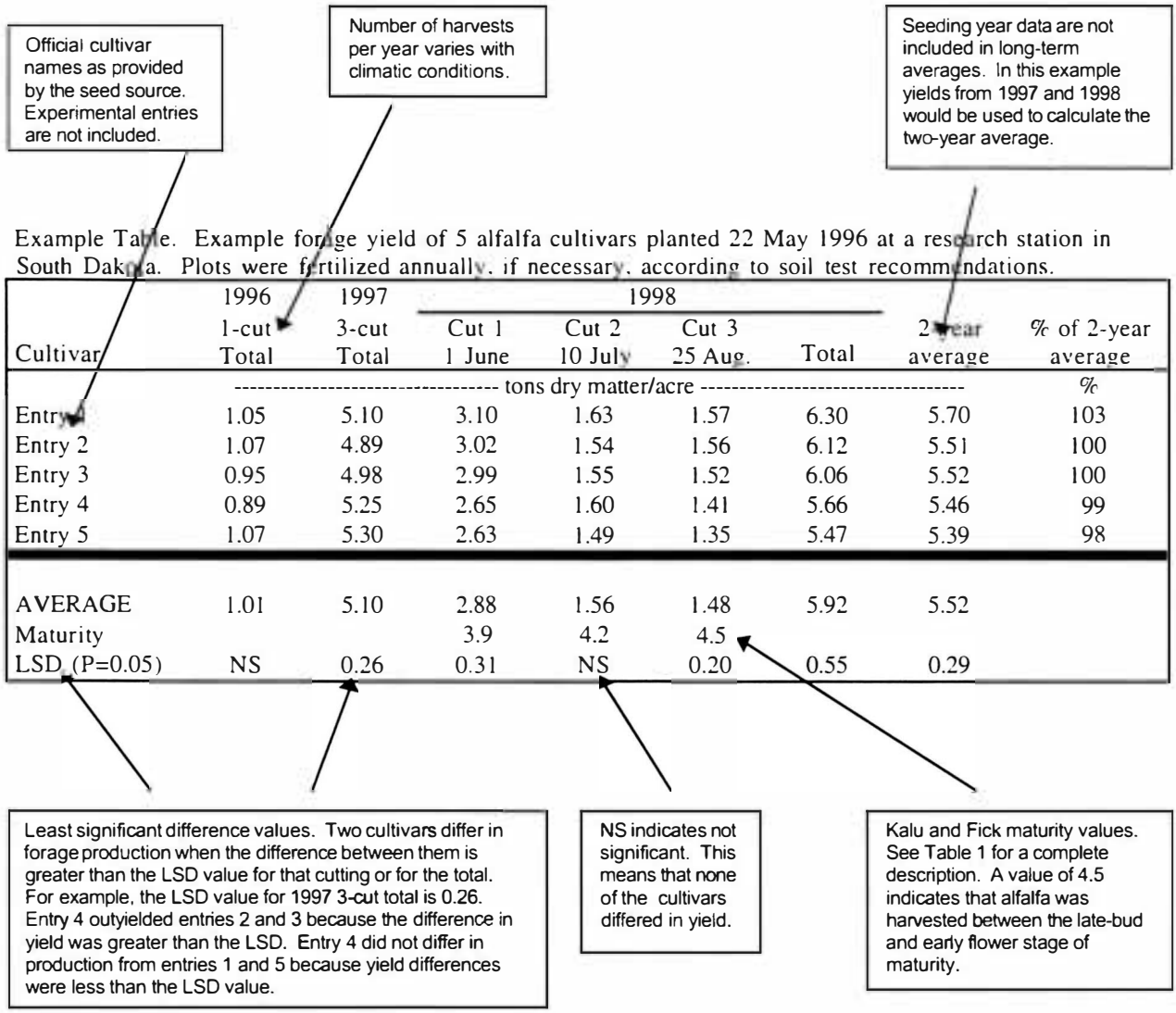
[a]Kalu, B.A., and G.W. Fick. 1981. Quantifying morphological development of alfalfa for studies of herbage quality. Crop Science. 21:267-271.

Table 2. Temperature and precipitation patterns throughout the growing season at or near locations where alfalfa trials are conducted.

	Temperature				Precipitation	
	High		Low			
Month	Actual	30-year mean	Actual	30-year mean	Actual	30-year mean
Watertown (Northeast Station)						
April	54.5	59.4	33.4	34.3	1.30	2.18
May	66.8	71.6	45.6	46.0	2.25	3.03
June	74.1	80.4	54.1	55.7	4.10	3.53
July	82.8	85.5	60.5	60.8	1.39	3.05
Aug.	80.3	83.2	56.2	58.2	1.11	2.72
Sep.	67.6	73.6	44.9	58.2	2.04	1.97
Oct.	57.2	61.4	32.4	37.1	0.16	1.87
Aurora/Brookings (SD Crop Improvement Research Farm)						
April	56.2	54.9	36.1	33.0	4.42	2.07
May	70.1	67.9	47.9	43.7	2.17	2.93
June	76.7	77.3	56.5	53.8	3.04	4.34
July	83.0	82.7	62.0	58.7	2.76	3.32
Aug.	79.7	80.3	55.7	55.7	1.83	2.81
Sep.	71.5	70.4	45.4	46.0	2.40	2.64
Oct.	61.1	58.4	32.7	33.9	0.77	1.66
Beresford (Southeast Station)						
April	58.1	59.8	38.2	35.1	3.48	2.27
May	71.5	71.8	48.8	46.8	3.01	3.44
June	77.6	81.4	58.1	56.6	4.98	4.22
July	89.0	86.2	66.0	61.3	2.96	3.38
Aug.	84.8	83.4	59.8	58.1	0.40	2.93
Sep.	76.4	74.3	47.2	47.8	0.20	2.64
Oct.	68.1	62.6	36.3	35.4	0.16	1.71
Highmore (Central Research Station)						
April	58.1	60.1	33.6	32.8	3.22	2.32
May	67.9	72.0	44.9	43.8	4.70	2.77
June	76.8	81.8	55.1	53.6	5.47	3.19
July	84.8	89.3	60.9	59.6	2.30	3.01
Aug.	86.6	87.8	57.9	57.4	2.88	2.32
Sep.	70.4	76.7	44.5	40.9	1.97	1.65
Oct.	64.7	63.3	34.2	35.5	NA	1.35

Interpreting Yield Results

The following diagram and table provide an example of typical data obtained from the South Dakota Alfalfa Cultivar Yield Test. It can be used to help you interpret information in the tables.



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.

	1996	1997	1998					
Cultivar	1-cut Total	3-cut Total	Cut 1 1 June	Cut 2 10 July	Cut 3 25 Aug.	Total	2-year average	% of 2-year average
	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	

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.

Cultivar	1996 Total	1997 Total	1998 Total	1999 Cut 1 28 May	1999 Cut 2 8 July	1999 Total	3-year average	% of 3-year average[a]	1999 Cut 2 8 July PLH rating[b]
	Dry matter yield (tons/acre)								
GH 766	1.91	2.61	1.33	1.63	0.81	2.44	2.13	108	2.8
Pioneer Brand 5454	1.89	2.54	1.10	1.59	0.73	2.36	1.99	101	2.3
Stetson II+	2.04	2.53	1.28	1.58	0.69	2.32	2.03	103	2.3
Complete	1.81	2.75	1.57	1.53	0.76	2.29	2.20	112	2.8
DK 127	1.98	2.64	1.25	1.47	0.76	2.24	2.04	104	3.0
Bounty	1.80	2.34	1.37	1.51	0.71	2.22	1.98	101	2.5
Big Horn	1.89	2.73	1.38	1.44	0.78	2.22	2.11	107	2.5
Pioneer Brand 5312	1.95	2.74	1.27	1.44	0.76	2.20	2.07	106	2.8
TMF Multi-plier II	1.94	2.70	1.35	1.55	0.62	2.18	2.07	106	2.5
ALPHA 2001	2.10	2.72	1.17	1.49	0.71	2.17	2.03	104	2.5
Columbia 2000	2.09	2.75	1.33	1.52	0.62	2.15	2.07	106	3.0
645	1.80	2.54	1.24	1.49	0.67	2.13	1.98	101	2.8
A-395	1.84	2.42	1.42	1.54	0.61	2.12	1.99	102	2.0
WL 325 HQ	1.99	2.62	1.24	1.48	0.63	2.11	1.99	101	2.5
DK 122	1.88	2.74	1.29	1.51	0.62	2.11	2.06	105	2.8
Depend +EV	1.91	2.70	1.40	1.44	0.59	2.08	2.05	105	2.3
ABT 205	1.83	2.36	1.19	1.52	0.59	2.07	1.88	96	2.5
Rainier	2.08	2.33	1.12	1.39	0.71	2.07	1.85	94	2.5
Good as Gold	2.00	2.58	1.21	1.44	0.55	2.04	1.93	98	3.0
Vernal	1.71	2.33	1.29	1.41	0.60	2.01	1.88	96	3.0
MAX329	1.94	2.56	1.38	1.38	0.63	2.00	1.98	101	2.5
AlfaStar	1.83	2.80	1.43	1.30	0.70	2.00	2.07	106	2.0
Crystal	1.96	2.41	1.15	1.46	0.53	1.99	1.85	94	2.3
2444	1.88	2.32	1.27	1.41	0.61	1.99	1.87	95	2.0
WL 324	1.89	2.45	1.20	1.40	0.55	1.92	1.86	95	3.0
Saranac AR	1.76	2.27	1.07	1.32	0.51	1.88	1.73	88	3.0
Riley	1.89	2.42	1.20	1.31	0.52	1.79	1.81	93	2.8
AlfaLeaf II	1.87	2.23	1.12	1.26	0.51	1.78	1.71	87	2.5
Baker	1.78	2.09	1.02	1.34	0.31	1.62	1.59	81	3.0
Average	1.91	2.53	1.26	1.45	0.63	2.09	1.96		2.6
Maturity[c]				3.5	4.3				
LSD (P=0.05)[d]	NS[e]	0.37	0.27	0.17	NS	0.35	0.23		0.6
CV (%)	9.3	10.8	15.0	8.4	26.4	11.7	8.5		16.6

(a) 2-year average does not include yields from the establishment year.
(b) Potato leafhopper resistance ratings: 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 stunting with yellowing on 40-60% of leaves
5 Severe injury, plants with severe stunting, yellowing or reddening evident on 60-100% of leaves
(c) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of values.
(d) LSD = Least Significant Difference. Two cultivars are considered different if their yields exceed the LSD value.
(e) NS = Not significant; differences between cultivars are not statistically significant.

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 annually, if necessary, according to soil test recommendations.

		1999			
Cultivar	1998 Total	Cut 1 3 June	Cut 2 8 July	Total	% of 1-year Total[a]
	----------Dry matter yield (tons/acre)----------				
Magnum V	1.13	2.25	1.58	3.83	113
Geneva	1.20	2.20	1.55	3.74	110
WinterStar	1.24	2.15	1.47	3.62	107
Pioneer Brand 53Q60	1.15	2.15	1.45	3.60	106
Husky Supreme	1.38	2.13	1.43	3.55	105
WinterKing	1.15	2.06	1.46	3.52	104
Feast +EV	1.21	2.09	1.36	3.45	102
Rainier	1.19	2.09	1.34	3.43	101
DK 140	1.22	2.13	1.27	3.40	100
ABT 350	1.16	2.05	1.34	3.39	100
Target II Plus	1.15	2.06	1.30	3.36	99
Pioneer Brand 53V63	1.14	2.05	1.31	3.36	99
WL 232 HQ	1.06	2.15	1.17	3.33	98
Frontier 2000 Brand	1.12	2.01	1.27	3.29	97
Vernal	1.26	2.16	1.11	3.27	97
Goldrush 747 Brand	1.27	2.09	1.18	3.27	96
Ace	1.10	1.94	1.31	3.25	96
TMF 421	1.07	2.03	1.18	3.20	94
Yielder	1.19	1.95	1.13	3.08	91
Average	1.17	2.08	1.31	3.39	
Maturity[b]		3.8	4.4		
LSD (P=0.05)[c]	NS[d]	NS	0.29	0.32	
CV (%)	14.0	8.6	19.1	8.2	

(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 values.
(c) LSD = Least Significant Difference. Two cultivars are considered different if their yields exceed the LSD value.
(d) 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	1999 Cut 1 27 May	1999 Cut 2 7 July	1999 Cut 3 5 Aug.	1999 Cut 4 1 Oct.	1999 Total	2-year average[a]	% of 3-year average	Cut 2 7 July PLH rating[b]
	Dry matter yield (tons/acre)								
2444	8.89	2.30	1.51	1.76	0.78	6.35	7.62	105	2.0
Pioneer Brand 5454	8.52	2.25	1.38	1.89	0.72	6.25	7.39	101	2.3
Amerigraze 401+Z	8.77	2.21	1.37	1.82	0.82	6.21	7.49	103	2.0
631	8.56	2.18	1.37	1.89	0.77	6.20	7.38	101	2.3
Avalanche +Z	8.65	2.17	1.43	1.82	0.78	6.20	7.43	102	2.2
Depend +Ev	8.75	2.12	1.40	1.83	0.84	6.20	7.48	103	2.0
TMF Multi-plier II	8.75	2.66	1.20	1.63	0.69	6.18	7.46	102	3.2
WL 325 HQ	8.98	2.25	1.31	1.76	0.83	6.16	7.57	104	2.7
DK 140	8.82	2.19	1.32	1.85	0.69	6.06	7.47	103	2.0
Asset	8.89	2.13	1.37	1.78	0.79	6.06	7.44	102	2.7
Pioneer Brand 5312	9.19	2.13	1.32	1.88	0.71	6.03	7.61	105	2.7
Excalibur II	9.06	2.13	1.26	1.80	0.80	6.00	7.53	103	2.3
2888	9.50	2.15	1.27	1.75	0.72	5.89	7.69	106	2.8
DK 127	8.56	2.25	1.28	1.70	0.64	5.87	7.22	99	2.2
WL 324	8.70	2.06	1.32	1.69	0.80	5.87	7.28	100	2.8
Rhino	9.08	1.95	1.32	1.78	0.80	5.83	7.46	102	2.8
Pioneer Brand 5347LH	9.00	2.00	1.38	1.76	0.69	5.82	7.41	102	2.5
Innovator +Z	8.36	2.12	1.34	1.72	0.62	5.80	7.08	97	2.2
Spartan	8.68	2.08	1.30	1.74	0.68	5.80	7.24	99	2.7
620	8.70	2.01	1.40	1.70	0.66	5.77	7.24	99	2.2
Complete	8.46	2.07	1.30	1.70	0.70	5.76	7.11	98	2.0
DK 142	8.31	2.05	1.28	1.75	0.65	5.73	7.33	101	2.5
Rainier	8.91	2.08	1.28	1.71	0.66	5.73	7.13	98	2.5
Spur	8.52	2.06	1.22	1.72	0.73	5.73	7.02	96	2.5
Ace	8.04	1.99	1.17	1.72	0.70	5.56	6.80	93	3.0
Vernal	8.12	1.87	1.24	1.61	0.53	5.24	6.68	92	2.7
Average	8.68	2.12	1.31	1.75	0.7	5.88	7.28		2.5
Maturity[c]		4.0	5.0	4.1	3.5				
LSD (P=0.05)[d]	0.63	0.25	0.13	0.16	NS[e]	0.58	0.56		0.5
CV (%)	6.4	10.4	8.9	8.0	28.0	8.6	6.7		19.1

(a) 2-year average does not include yields from the establishment year.
(b) Potato leafhopper resistance ratings: 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 stunting with yellowing on 40-60% of leaves
5 Severe injury, plants with severe stunting, yellowing or reddening evident on 60-100% of leaves
(c) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of values.
(d) LSD = Least Significant Difference. Two cultivars are considered different if their yields exceed the LSD value.
(e) 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 near Highmore. S.D. Plots were fertilized annually. if necessary. according to soil test recommendations.

Cultivar	1998 Total	1999 Cut 1 26 May	1999 Cut 2 6 July	1999 Cut 3 3 Aug	1999 Total	% of 1-year total[a]	Cut 2 6 July PLH rating[b]
	----------Dry matter yield (tons/acre)----------						
Magnum V	1.03	1.83	1.61	0.87	4.31	107	2.3
WL 324	0.93	1.81	1.55	0.88	4.24	105	1.7
TMF 421	0.88	1.75	1.60	0.83	4.18	104	1.8
Husky Supreme	0.96	1.69	1.62	0.87	4.17	104	2.0
Vernal	1.03	1.81	1.56	0.77	4.13	102	2.5
620	0.97	1.75	1.54	0.81	4.11	102	1.2
WL 325 HQ	0.97	1.67	1.54	0.89	4.09	102	2.3
Pioneer Brand 53Q60	0.92	1.68	1.54	0.86	4.07	101	1.8
DK 140	0.99	1.76	1.52	0.79	4.07	101	2.0
WL 232 HQ	1.02	1.68	1.50	0.81	3.98	99	2.3
Goldrush 747 Brand	0.82	1.65	1.50	0.81	3.95	98	2.5
TMF Multi-plier II	0.90	1.61	1.48	0.75	3.83	95	2.2
Pioneer Brand 53V63	0.91	1.54	1.55	0.75	3.83	95	1.2
Frontier 2000 Brand	0.93	1.42	1.44	0.71	3.56	88	2.5
Average		1.69	1.53	0.81	4.03		2.0
Maturity[c]		2.9	5.5	5			
LSD (P=0.05)[d]		0.15	NS[e]	NS	0.37		0.6
CV (%)		7.6	8.5	16.2	8.0		24.9

(a) 2-year average does not include yields from the establishment year.
(b) Potato leafhopper resistance ratings: 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 stunting with yellowing on 40-60% of leaves
5 Severe injury, plants with severe stunting, yellowing or reddening evident on 60-100% of leaves
(c) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of values.
(d) LSD = Least Significant Difference. Two cultivars are considered different if their yields exceed the LSD value.
(e) 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	1999					
	1-cut Total	3-cut Total	3-cut Total	Cut 1 1 June	Cut 2 14 July	Cut 3 16 Aug.	Total	3-year average[a]	% of 3-year average
	----------Dry matter yield (tons/acre)----------								
Bounty	0.97	4.00	5.85	2.17	2.16	0.83	5.15	5.00	104
AlfaStar	1.06	4.26	6.31	2.18	2.14	0.82	5.13	5.24	108
WL 325 HQ	1.08	4.55	5.49	2.25	1.94	0.80	4.98	5.01	104
Viking 1	0.85	4.33	5.99	2.24	1.91	0.81	4.96	5.09	105
DK 127	1.07	4.55	6.10	1.96	2.00	0.96	4.92	5.19	107
2444	0.95	4.86	5.55	2.08	1.92	0.84	4.84	5.08	105
631	1.06	4.46	5.93	2.06	1.90	0.82	4.78	5.06	105
HayGrazer	0.95	4.48	5.76	2.08	1.89	0.80	4.76	5.00	103
WL 324	1.09	4.78	6.14	1.97	1.96	0.84	4.75	5.23	108
Pioneer Brand 5454	0.97	4.56	5.90	2.01	1.92	0.81	4.74	5.07	105
Pioneer Brand 5312	0.84	4.42	5.94	1.91	1.90	0.86	4.66	5.01	104
Columbia 2000	0.92	4.91	5.66	1.98	1.86	0.82	4.66	5.08	105
BigHorn	0.80	3.96	5.69	1.95	1.87	0.76	4.57	4.74	98
DK 122	0.98	4.09	5.79	1.93	1.82	0.78	4.54	4.81	99
Riley	0.92	3.95	5.73	1.84	1.91	0.79	4.54	4.74	98
A-395	1.11	4.57	5.64	1.97	1.87	0.67	4.50	4.90	101
620	0.95	3.91	5.31	1.96	1.82	0.72	4.50	4.57	95
TMF Multi-plier II	0.91	4.26	5.63	1.89	1.74	0.79	4.42	4.77	99
Rainier	1.00	3.91	5.33	1.78	1.76	0.84	4.38	4.54	94
WL 252 HQ	0.89	4.22	5.53	1.77	1.83	0.72	4.32	4.69	97
Saranac AR	1.05	4.38	6.01	1.94	1.65	0.71	4.29	4.89	101
Vernal	0.98	4.15	5.35	1.77	1.79	0.70	4.26	4.58	95
Baker	0.77	4.16	5.24	1.85	1.72	0.69	4.25	4.55	94
Defiant	1.05	4.22	5.61	1.76	1.81	0.69	4.25	4.69	97
LegenDairy 2.0	1.04	4.09	5.49	1.75	1.75	0.74	4.24	4.61	95
ABT 205	0.96	4.14	5.37	1.80	1.75	0.63	4.17	4.56	94
Travois	0.80	3.37	4.40	1.66	1.44	0.50	3.60	3.79	78
Average	0.96	4.29	5.65	1.94	1.84	0.77	4.55	4.83	
Maturity[b]	3.5			3.5	4.2	4			
LSD (P=0.05)[c]	NS[d]	0.63	0.77	NS	NS	0.17	0.74	0.51	
CV (%)	18.9	10.4	9.6	16.1	12.6	15.9	11.6	7.4	

(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 values.
(c) LSD = Least Significant Difference. Two cultivars are considered different if their yields exceed the LSD value.
(d) NS = Not significant; differences between cultivars are not statistically significant.

Table 8. Forage yield of 28 alfalfa cultivars planted 23 April 1999 at the Northeast Research Station near Watertown, S.D. Plots were fertilized before planting, if necessary, according to soil test recommendations. Most weeds were controlled with a preplant application of Treflan.

	1999				
Cultivar	Cut 1 14 July	Cut 2 16 Aug.	Total	% of 1999 total[a]	Cut 2 16 Aug.
	-----Dry matter yield (tons/acre)-----				PLH rating[b]
Garst 645-II	2.69	1.04	3.72	109	2.2
AlfaStar	2.64	0.97	3.61	106	2.2
Spirit	2.58	1.03	3.61	106	2.7
620	2.73	0.85	3.57	105	1.8
FQ 314	2.57	0.94	3.51	103	2.3
Abound	2.54	0.95	3.50	103	2.5
ABT 350	2.50	1.00	3.50	103	2.3
6410	2.50	0.99	3.49	103	2.2
Rebound 4.2	2.49	0.97	3.46	102	2.7
Award	2.61	0.85	3.45	102	2.5
Pioneer Brand 53Q60	2.44	0.99	3.44	101	2.8
FQ 315	2.55	0.87	3.42	100	2.5
GH 766	2.47	0.94	3.41	100	2.2
Macon	2.47	0.94	3.41	100	2.2
WinterStar	2.49	0.90	3.40	100	2.0
Legend Gold	2.56	0.84	3.40	100	1.8
Excalibur II	2.52	0.86	3.38	99	2.0
WL 232 HQ	2.43	0.94	3.37	99	2.7
WinterKing	2.49	0.88	3.37	99	1.7
A-395	2.42	0.90	3.32	98	2.0
DK 124	2.45	0.86	3.32	98	2.5
Pioneer Brand 54V54	2.39	0.86	3.25	96	2.2
6420	2.30	0.94	3.24	95	2.8
Sprint	2.40	0.84	3.23	95	1.8
DK 140	2.32	0.88	3.19	94	2.3
TMF 421	2.44	0.73	3.17	93	2.2
Vernal	2.28	0.83	3.12	92	3.7
Average	2.49	0.91	3.40		2.3
Maturity[c]	5.6	3.4			
LSD (P=0.05)[d]	0.23	0.16	NS[e]		0.7
CV (%)	8.0	15.1	8.5		26.6

(a) 2-year average does not include yields from the establishment year.
(b) Potato leafhopper resistance ratings: 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 stunting with yellowing on 40-60% of leaves
5 Severe injury, plants with severe stunting, yellowing or reddening evident on 60-100% of leaves
(c) Maturity = Kalu and Fick maturity index, mean stage by count. Refer to Table 1 for explanation of values.
(d) LSD = Least Significant Difference. Two cultivars are considered different if their yields exceed the LSD value.
(e) NS = Not significant; differences between cultivars are not statistically significant.

Appendix. Listing of alfalfa cultivars, developers, suppliers, and agronomic characteristics.

Cultivar	Developer/Supplier	FD[a]	BW	VW	FW	An	PRR
620	Garst Seed Co.	2	HR	R	HR	HR	HR
631	Garst Seed Co.	4	HR	R	HR	R	HR
645	Garst Seed Co.	3	R	R	R	HR	HR
645-II	Garst Seed Co.	3	HR	HR	R	HR	HR
6410	Garst Seed Co.	4	HR	HR	HR	HR	HR
6420	Garst Seed Co.	4	HR	R	HR	R	HR
A-395	PGI/MBS	3	HR	R	HR	HR	HR
Abound	Asgrow Seed	3	HR	HR	HR	HR	HR
ABT 350	Agribiotech, Inc.	3	HR	HR	HR	HR	HR
ABT 205	Seed Mart, Inc.	2	HR	R	HR	R	HR
Ace	UAP Seeds	4	HR	R	HR	HR	HR
AlfaLeaf II	Plains Alfalfa	4	R	R	HR	HR	HR
AlfaStar	Hoffman Seed/Sexauer	4	HR	R	HR	HR	HR
ALPHA 2001	Great Lakes Hybrids	4	HR	HR	HR	HR	HR
Amerigraze 401+Z	AgriPro Seeds	4	HR	HR	HR	HR	HR
Arrow	America's Alfalfa	3	HR	R	HR	MR	HR
Asset	Coyote Seed	4	HR	R	R	R	HR
Avalanche +Z	America's Alfalfa	2	HR	HR	HR	HR	HR
Award	Asgrow Seed	4	HR	HR	HR	HR	HR
Baker	Public Cultivars	2	HR	—	R	LR	—
Big Horn	Cargill Hybrid Seeds	4	HR	R	HR	HR	HR
Bounty	PGI/MBS	2	HR	R	HR	HR	HR
2444	Novartis Seeds, Inc.	3	HR	R	HR	HR	HR
2888	Novartis Seeds, Inc.	3	HR	HR	HR	HR	HR
Columbia 2000	Agway/Allied Seed	4	R	R	R	LR	LR
Complete	Arrow Seed/Fontanelle Hybrids	3	HR	HR	HR	HR	HR
Crystal	PGI/MBS	4	HR	R	HR	R	HR
Defiant	AgriPro Seeds	2	HR	HR	HR	R	HR
Depend +EV	AgriPro Seeds	4	HR	HR	HR	HR	HR
DK 122	Monsanto	2	HR	R	R	HR	HR
DK 124	Monsanto	2	HR	HR	HR	HR	HR
DK 127	Monsanto	3	HR	R	R	HR	HR
DK 134	Monsanto	3	HR	HR	HR	HR	HR
DK 140	Monsanto	4	HR	R	HR	HR	HR
DK 142	Monsanto	4	HR	R	HR	R	HR
Excalibur II	Domestic Seed	4	HR	R	HR	HR	HR
Feast +EV	AgriPro Seeds	3	HR	HR	HR	R	HR
FQ 314	Cargill Hybrid Seeds	3	HR	HR	HR	HR	HR
FQ 315	Cargill Hybrid Seeds	3	HR	R	HR	HR	HR
Frontier 2000 Brand	Den Besten Seed Co.	2	R	R	HR	HR	MR
Geneva	Northrup King	4	HR	HR	HR	HR	HR
GH 766	Golden Harvest	3	HR	R	HR	HR	HR
GoldRush 747 Brand	Den Besten Seed Co.	2	MR	MR	MR	MR	MR
Good as Gold	Top Farm Hybrids	4	HR	R	HR	R	HR
HayGrazer	Great Plains Research Co.	4	HR	R	HR	R	R
Husky Supreme	Den Besten Seed Co.	3	R	R	R	MR	MR
Innovator +Z	America's Alfalfa	3	HR	HR	HR	HR	HR
LegenDairy 2.0	Cenex/Land O'Lakes	3	HR	R	HR	HR	HR
Legend Gold	Legend Seeds	3	HR	HR	HR	HR	HR

Appendix. Listing of alfalfa cultivars, developers, suppliers, and agronomic characteristics.

Cultivar	Developer/Supplier	FD[b]	BW	VW	FW	An	PRR
Macon			Information not available for Macon				
Magnum V	Dairyland Seed	4	HR	R	HR	R	HR
MAX329	Seed Mart, Inc.	3	HR	HR	HR	HR	HR
Pioneer Brand 5312	Pioneer Hi-Bred Int.	3	HR	HR	HR	HR	HR
Pioneer Brand 5347LH	Pioneer Hi-Bred Int.	3	HR	R	HR	HR	HR
Pioneer Brand 53Q60	Pioneer Hi-Bred Int.	3	HR	R	R	HR	HR
Pioneer Brand 53V63	Pioneer Hi-Bred Int.	3	HR	HR	HR	HR	HR
Pioneer Brand 5454	Pioneer Hi-Bred Int.	4	R	MR	HR	HR	HR
Pioneer Brand 54V54	Pioneer Hi-Bred Int.						
Rainier	Novartis Seeds, Inc.	3	HR	R	HR	HR	HR
Rebound 4.2	Croplan Genetics	4d	HR	HR	HR	HR	HR
Rhino	Geertson Seed Farms	3	HR	R	R	R	R
Riley	Public Cultivars	4	HR	LR	---	MR	---
Saranac AR	New York Ag. Exp. Stn.	4	MR	---	R	HR	---
Spartan	Coyote Seed	3	HR	R	HR	HR	HR
Spirit	Fontanelle Hybrids/PGI/MBS	3	HR	R	HR	R	HR
Sprint	Specialty Seeds	3	HR	R	HR	R	HR
Spur	Sexauer	4	HR	R	HR	HR	HR
Stetson II+	PGI/MBS	4	HR	R	HR	R	HR
Target II Plus	Producers Hybrids	3	HR	R	HR	R	HR
TMF 421	Mycogen Seeds	2	HR	HR	R	HR	HR
TMF Multi-plier II	Mycogen Seeds	3	HR	HR	HR	HR	HR
Travois	Public Cultivars	1	R	---	---	---	---
Vernal	Public Cultivars	2	R	---	MR	---	---
Viking I	Northrup King	2	R	HR	HR	R	R
WinterKing	Wensman Seed Co.	3	HR	HR	HR	HR	HR
WinterStar	Wensman Seed Co.	2	HR	HR	HR	HR	HR
WL 232 HQ	W-L Research	2	HR	HR	HR	HR	HR
WL 252 HQ	W-L Research	2	HR	R	HR	HR	HR
WL 324	W-L Research	3	HR	R	HR	HR	HR
WL 325 HQ	W-L Research	3	HR	R	HR	HR	HR
Yielder	AgriPro Seeds	3	HR	R	R	R	HR

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