

Minnesota Agricultural Experiment Station

VARIETY TRIALS

Alfalfa



Locations of alfalfa trials.

Successful alfalfa production depends on selecting the best varieties for a particular farm. Varieties are compared for yield in trial plots on Minnesota Agricultural Experiment Station fields at Rosemount, Waseca, Lamberton, Morris, Crookston, and Grand Rapids. These plots are handled so that the factors affecting yield and winter survival and forage quality are as nearly the same for all varieties.

Test results of varieties available in Minnesota, old or new, are published as accumulated performance years averaged as a percent of Vernal or other check varieties over locations representative of risk of winter injury in specific regions of Minnesota: Rosemount & Waseca, Southeastern Minnesota; Lamberton, Southwest Minnesota; Morris and Crookston, West central, Central, and Northwestern Minnesota; and Grand Rapids, Northeastern Minnesota. Varieties of alfalfa are also tested under identical tests for winter survival and forage quality at selective experiment station fields of University of Minnesota and University of Wisconsin-Madison.

Variety Classifications

Alfalfa varieties are classified by dormant (varieties developed to over winter Minnesota conditions) and non-dormant (varieties not expected to over winter in Minnesota). Disease resistance and fall dormancy information, as classified by the variety developer and published in Certified Alfalfa Seed Council Publication, *Fall Dormancy & Pest Resistance Ratings for Alfalfa*, is listed alphabetically in Table 1A.

Performance information for varieties approved for Seed Certification and available in Minnesota is published in this report. Developers and marketers of alfalfa varieties are listed in Table 1B.

Contact information for these distributors, address and telephone number, is provided in Table 5. Only varieties with yield, winter survival or forage quality performance information are listed in Tables 2 through 4.

Interpreting the Tables

Yield and forage quality information is expressed as a percent of Vernal, a winter-hardy, national check variety. Yield and forage quality are also reported by locations, averaged over test sites and production years. Performance of a variety is best determined by using test data from three test sites and three production years. Test data within a test site-region of the state is less reliable than performance over several sites.

The LSD (Least Significant Difference) figures listed for forage quality performance in Table 4, under columns of tests at Rosemount and Arlington, are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two quality tests are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

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ALFALFA **VARIETY TRIALS**

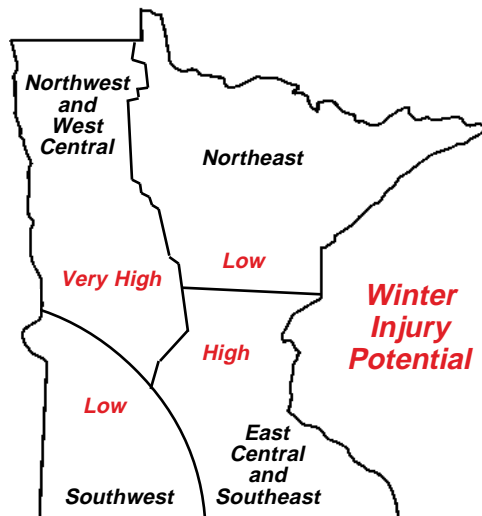
Minnesota Agricultural Experiment Station — University of Minnesota
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Results of Public and Private Alfalfa Tests Conducted by the Minnesota Agricultural Experiment Station. Prepared by Neal P. Martin, extension agronomist-forages, Craig C. Sheaffer, agronomist, Duane A. Schriever, scientist, and Doug Swanson, associate scientist, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108.

Winter hardiness, Winter Survival, and Fall Dormancy

Severe winters make winter hardiness a primary consideration in variety selection for most areas of Minnesota. The 1989–90, 1991–92, and 1994–95 winters were very damaging to alfalfa stands over wide areas of the state. These test winters confirmed previous observations about areas of the state most subject to winter injury.

The greatest winter hardiness is needed in the west central and northwest Minnesota area. Because of the high frequency of severe winters in this area, only winter-hardy or very winter-hardy varieties should be selected. The east central and southeast area also experience frequent severe winters. Winter-hardy varieties with high levels of disease resistances should be selected for this area. The southwest area seldom experiences severe winter injury because of dry soils, high soil potassium levels and neutral soil pH. The northeast area also seldom experiences severe winter injury because of dependable snow cover. For these reasons, both winter-hardy and moderately winter-hardy varieties have been profitable in those areas.



Winter hardiness of varieties is extremely difficult to determine because winter injury can occur as a result of many different weather events and alfalfa plants of differing ages respond differently to various weather events. A new test called “Winter Survival” is used to determine winter hardiness of varieties. This standardized test, North American Alfalfa Conference Win-

ter Survival Test, measures the survival of a variety after a severe winter. Tests are conducted annually at four locations, Arlington and Marshfield, Wisconsin, and Rosemount and Morris, Minnesota, providing a winter survival index (WSI).(Table 3)

The WSI was pooled over all tests (Rosemount trial in 1995 did not meet test criteria due to uncontrolled ice sheeting) to provide an estimate of winter hardiness. This is presented with yield data in Table 2A. Varieties are rated from 'superior' to 'adequate' in winter survivability. Vernal, a traditional winter-hardy variety to which other varieties are often compared, is rated superior. Varieties rated 'adequate' in winter survivability are expected to be injured the most after a severe winter. Varieties not tested for winter survival are listed in Table 2B and ranked alphabetically. If a variety does not have a WSI, the fall dormancy index is the next best indicator of winter hardiness (1 = very winter-hardy; 2 = winter-hardy; 3 or 4 = moderately winter-hardy).

Fall dormancy ratings of varieties are listed alphabetically in Table 1A. Varieties that are very fall dormant produce very little fall growth and are slow to recover after cutting. They usually are not high yielding, recover slowly for the second crop and produce only a small third crop because of early cessation of growth. Nevertheless, these are very dependable varieties in areas where frequent winter injury is expected and where soil moisture limits third crop yields. These types of varieties survived the 1989-90 and 1991-92 winters with little injury.

Fall dormant varieties are adaptable to all areas of the state. Forage yields vary among varieties in this group, primarily because of winter hardiness and disease resistance. Three or four years of consistent production can be expected from fall dormant varieties with high levels of winter hardiness.

Moderately fall dormant varieties produce good fall growth, are characterized by rapid recovery after harvest, and usually reach 10 percent bloom several days earlier than more dormant varieties. The general pattern of production for moderately dormant varieties under a four-harvest management has been to produce high yields during the first year after seeding, good yields for year two—similar to winter-hardy, fall dormant varieties—and reduced yields in years three and four. The reduced yields in years three and four are usually associated with winter injury.

Alfalfa yield of a given variety is predicted best after three test locations have been measured over four years of stand life (three years after seeding). Variety yield performance is not significantly different the first two years after seeding. Thus, to choose a variety for short term stands, use the "all location" yield for "1–2 years" after seeding. For long-term stands, choose varieties based on their performance over all locations three years after seeding. Varieties with less than nine location-test years (three locations X three years) are not accurately characterized for yield performance (Tables 2C-1 and 2C-2).

Non-dormant varieties are characterized by extremely tall fall growth that continues until fall freeze-up. They produce similar yields as the moderately dormant varieties during the summer, but will produce more forage growth during the fall growth period. They will not survive most winters. These non-dormant varieties should only be grown for plow-down in the seeding year.

The Minnesota Agricultural Experiment Station and USDA released the non-dormant non-winter-hardy variety, Nitro, in 1986. Nitro is a special-purpose alfalfa designed as a one-year hay source and a fall plow down crop. It was selected in Minnesota for increased concentration of nitrogen in the roots and for larger roots in which to store nitrogen. Nitro is the first alfalfa variety with specialized nitrogen accumulation attributes.

Other nonwinter-hardy varieties not listed in the tables include 5715, 5888, 13R Supreme, ABT 805, Condor, DK 189, El Grande, Falcon, GT 13R Plus, Kem, Magna 8, Maricopa, Mesa, Moapa 69, Pierce, Prestige, SW 8210, WL 516, WL 525 HQ, Yolo, 5939, Baralfa 92, Coronado, CUF 101, Mecca, Mecca II, Sundor, SW 14, UC Cibola, WL 605, and WL 612.

Forage Quality

Alfalfa varieties differ in forage quality or feeding value. Alfalfa varieties have been evaluated for forage quality at Rosemount on a fee basis since 1991 (Table 4). A Standardized Forage Quality Test has been performed at Arlington, Wisconsin and Rosemount, Minnesota since 1995. Varieties in the seeding year are evaluated on one cut taken in late August. Production year evaluation (first year after seeding only) is done by analyzing each of three cuttings taken at late bud to 10 percent bloom stages of maturity.

Relative feed value index ranks varieties on their potential digestible dry matter intake. Milk per acre is estimated using a variety's crude protein and neutral detergent fiber concentrations to determine the amount of alfalfa needed to match the protein and energy needs of a 1,350 pound cow producing 60 pounds of milk per day with a diet including corn grain and minerals. Milk per acre quantifies the forage quality of an alfalfa variety as "tons per acre" multiplied by "milk per ton" (theoretical milk production per ton, calculated from protein and fiber values).

Disease Resistance and Stand Persistence

Alfalfa root and crown diseases occur in most Minnesota soils. The most important diseases are: bacterial wilt, Phytophthora root rot, Fusarium wilt, anthracnose, Verticillium wilt, and Aphanomyces root rot. Plant resistance is available for all six diseases. The variety resistance ratings for each disease are presented in Table 1. Moderate resistance (MR) to a disease will provide protection to a variety under most conditions. However, either resistance (R) or high resistance (HR) are required for protection under severe disease conditions.

Winter injury can be the result of a combination of injury from cold temperatures and from root and crown diseases. Under some conditions disease resistances can compensate for lesser levels of cold tolerance. All varieties can benefit from improved disease resistance. However, it is especially important for moderately fall dormant varieties to have at least R levels of disease resistance to stay productive for more than two years after the seeding year under intensive management (four cuts per season) in the east central and southeast area of Minnesota.

Bacterial Wilt—This disease is prevalent in most areas of the state. Wilt-susceptible varieties are poor risks and should not be grown. They generally show losses in stand by the

end of the second year after seeding. In some cases where infection is severe, stand losses are often observed by the end of the first year after seeding. Stand reductions after winter are often due to a combination of wilt damage and winter injury.

Phytophthora Root Rot—This fungal disease is a major concern on poorly drained soils especially in the east central and southeast area of the state. It can cause stand losses of seedlings, and can contribute to lower productivity in older stands if the soil remains wet for a week or more.

Fusarium Wilt—The fungus that causes Fusarium wilt is present in most soils. It contributes to stand decline mainly in combination with other disease organisms. Therefore, resistance to Fusarium wilt in addition to resistance to both bacterial wilt and Phytophthora root rot contributes to longer lived stands.

Anthracnose—This fungus disease was first found in Minnesota in 1978 and has become more prevalent each year, but only in the east central and southeast area. It infects stems and crowns and kills susceptible plants. The disease is favored by hot, moist conditions, and will therefore be most frequently observed in southeast Minnesota.

Verticillium Wilt—This potentially destructive fungus disease was first found in several eastern Minnesota fields in 1981. It has usually been found in two- or three-year-old fields. Its spread in the state has been slow. Planting resistant varieties will help provide insurance for long-lived stands. Varieties having at least a low level of resistance are indicated in Table 2.

Aphanomyces Root Rot—This is a new disease associated with very slowly drained soils and is easily confused with Phytophthora root rot. It stunts and kills seedlings as well as causing a chronic root disease in established plants. Few cases of this disease have been identified in Minnesota, but if Phytophthora root rot resistant varieties fail to persist, then consider planting a variety with Aphanomyces resistance.

Table 1A. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Note Key:

[1] Varieties includes those marketed in Minnesota for which disease resistance ratings were provided. Varieties which are not seeded in a Minnesota yield trial are excluded from Table 2.

[2] Fall Dormancy and Pest Resistance Ratings as reported in CASC publication, or provided by a developer (-). Dormancy is based on fall growth in mid-October after cutting 1st week of September . . . 9=tallest (tend to be least winter-hardy), 1=shortest.

[3] Diseases: BW=Bacterial Wilt, PRR=Phytophthora Root Rot, FW=Fusarium Wilt, AN=Anthracnose, VW=Verticillium Wilt, APH=Aphanomyces Root Rot.

[4] CASC Resistance Rating (percent resistant plants): HR=high resistance (51 +), R=resistant (31-50), MR=moderate resistance (16-30), LR=low resistance (6-15), and S=susceptible (0-5).

Variety[1]	FD[2]	Disease Resistance Ratings [3, 4]					
		BW	PRR	FW	AN	VW	APH
Dormant							
120	3	HR	R	R	LR	—	—
2555ML	2	HR	HR	HR	HR	R	R
2833	3	HR	HR	HR	HR	R	—
329	3~	HR	HR	HR	HR	HR	R
3324	4~	HR	HR	HR	HR	R	R
3452-ML	3	HR	HR	HR	HR	R	R
5246	3	HR	HR	HR	HR	R	MR
5262	2	HR	R	MR	—	LR	—
5312	3	HR	HR	HR	HR	HR	R
5347LH	3~	HR	HR	HR	HR	MR	R
5454	4	R	HR	HR	HR	MR	LR
620	2	HR	HR	HR	HR	R	R
630	4	HR	R	R	MR	MR	—
631	4	HR	HR	HR	R	R	MR
8498	3~	HR	HR	HR	HR	R	R
9323	3	HR	HR	HR	R	R	HR
9326	3~	HR	HR	HR	R	R	R
A-295	2	HR	HR	HR	R	R	R
A-395	3	HR	HR	HR	HR	R	R
ABT 205	2~	HR	HR	HR	HR	HR	R
ABT 405	4~	HR	HR	HR	HR	HR	R
Ace	4	HR	HR	HR	HR	R	R
Achieva	3	R	HR	HR	HR	R	R
Affinity+Z	4	HR	HR	HR	HR	R	R
Agate	2	HR	R	HR	MR	—	—
Aggressor	4	HR	HR	HR	HR	R	MR
Alfagraze	2	R	LR	R	MR	—	—
AlfaStar	4	HR	HR	HR	HR	R	R
Allegro	4	HR	HR	HR	HR	R	R
ALPHA 2001	4	HR	HR	HR	HR	HR	R

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD[2]	Disease Resistance Ratings [3, 4]					
		BW	PRR	FW	AN	VW	APH
Alpine	2	R	R	R	R	R	—
Apollo Supreme	4	HR	R	HR	HR	R	—
Arrest	3~	HR	HR	R	HR	R	R
Aspen	4	HR	HR	HR	HR	R	R
Asset	4	HR	HR	R	R	R	MR
Avalanche+Z	2	HR	HR	HR	HR	HR	R
Banquet	4	HR	HR	HR	HR	HR	R
Belmont	5	HR	R	HR	HR	R	—
Big Horn	4	HR	HR	HR	HR	R	HR
Blazer XL	3	R	HR	HR	HR	R	R
Bolt ML	3	R	HR	HR	HR	R	HR
Bounty	2	HR	HR	HR	HR	R	R
Break-Thru	3	HR	HR	HR	MR	R	—
Centurion	3	HR	R	R	R	R	—
CIBA 2444	3	HR	HR	HR	HR	R	R
CIBA 2888	3	HR	HR	HR	HR	HR	R
Cimarron VR	4	HR	R	HR	HR	R	MR
Clipper	2	HR	R	HR	R	R	—
Columbia 2000	2~	R	MR	R	MR	MR	—
Complete	3	HR	HR	HR	HR	HR	R
Crown	3	R	R	R	HR	R	—
Crown II	3	HR	HR	HR	HR	R	—
Crystal	4	HR	HR	HR	R	R	LR
Cut 'N' Graze	3	R	R	HR	MR	LR	LR
Dart	3	HR	HR	HR	R	R	—
Dawn	3~	HR	HR	HR	R	R	MR
Defiant	2	HR	HR	HR	R	HR	R
Demand	3	HR	HR	HR	HR	HR	R
Depend+EV	4	HR	HR	HR	HR	HR	R
Dividend	2	HR	HR	HR	HR	R	R
DK 122	2	HR	HR	R	HR	R	—
DK 127	3	HR	HR	R	HR	R	HR
DK 133	4	HR	HR	HR	HR	R	R
Dominator	4	HR	HR	HR	HR	R	R
Dual	4~	HR	R	HR	R	R	MR
Empire	2~	HR	HR	HR	HR	R	R
Enhancer	4	HR	HR	HR	R	R	MR
Envy	3	HR	R	HR	HR	R	—
Evolution	2	HR	HR	HR	HR	R	R
Exceed	3~	HR	HR	HR	HR	R	R
Extend	4	HR	HR	R	HR	R	R
Forerunner	2	HR	HR	HR	HR	HR	R
Fortress	4	R	HR	R	—	R	—
G 2841	3	HR	R	R	R	R	—
Garst 636	2	HR	R	R	MR	R	—

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD[2]	Disease Resistance Ratings [3, 4]					
		BW	PRR	FW	AN	VW	APH
Garst 645	3	HR	HR	R	HR	R	MR
GH 755	4	HR	HR	HR	HR	R	R
GH 767	2	HR	HR	HR	HR	R	R
GH 777	3	HR	HR	HR	R	R	R
GH 787	3	HR	HR	R	HR	R	R
GH 766	3	HR	HR	HR	HR	R	R
Good as Gold	4	HR	HR	HR	R	R	LR
Gourmet Hay	4	HR	R	HR	HR	R	—
Green Field	3	HR	HR	HR	HR	R	R
Guardian	3	HR	HR	HR	HR	HR	R
HayGrazer	4~	HR	R	HR	R	R	MR
Imperial	3	HR	HR	HR	HR	R	R
Innovator +Z	3	HR	HR	HR	HR	HR	R
Iroquois	2	HR	S	MR	S	S	—
Jade	4	HR	HR	R	R	R	—
Jade II	4~	HR	HR	HR	R	R	MR
Lactator	2	HR	R	HR	HR	HR	R
Laser	4	HR	HR	HR	R	R	MR
Legend	4	HR	HR	HR	HR	R	—
LegenDairy	2	HR	HR	HR	HR	HR	R
LegenDairy 2.0	2~	HR	HR	HR	HR	R	R
Lightning	3	HR	HR	HR	HR	HR	R
MagnaGraze	3	HR	HR	HR	R	R	R
Magnum III	4	R	R	R	MR	MR	LR
Magnum III-Wet	3	R	R	R	MR	MR	MR
Magnum IV	4	HR	HR	HR	R	R	MR
Maxi-Graze 67	2~	HR	HR	HR	R	R	R
MP2000	3	HR	HR	HR	HR	R	HR
Muiti-plier	3	HR	HR	HR	HR	R	—
MultiKing 1	3	HR	R	HR	R	R	—
MultiMist	3	HR	HR	HR	HR	R	R
MultiQueen	4	HR	HR	HR	HR	R	R
Notice	3	HR	HR	HR	HR	R	R
Oneida	3	HR	HR	HR	S	—	—
Oneida VR	3	R	MR	HR	MR	HR	—
Ovation	4	HR	HR	HR	HR	HR	R
Pacesetter	2	HR	HR	R	HR	R	—
Paramount	3	HR	HR	HR	HR	R	HR
Persist	4	HR	HR	HR	R	R	MR
Profit	2	HR	R	HR	MR	R	—
Proof	3	HR	HR	HR	HR	R	R
Quantum	2	HR	HR	HR	HR	HR	R
Rainier	3	HR	HR	HR	HR	R	HR
Ranger	3	MR	S	MR	S	S	—
RFV-2000	3	HR	HR	HR	HR	R	LR

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD[2]	Disease Resistance Ratings [3, 4]					
		BW	PRR	FW	AN	VW	APH
Royalty	3	HR	HR	HR	HR	R	LR
Rushmore	4	HR	HR	HR	HR	R	HR
Rustler II	4~	HR	HR	HR	HR	HR	R
Saranac	4	R	S	R	S	S	—
Sierra	3	HR	HR	HR	R	R	MR
SMA-Forecast 1000	3~	HR	HR	HR	R	R	R
SMA-Forecast 3000	4~	HR	R	HR	R	R	MR
Spartan	3~	HR	HR	HR	HR	R	R
Spirit	3	HR	HR	HR	R	R	MR
Spredor 3	1	HR	MR	HR	R	MR	S
Stampede	3	HR	HR	R	—	R	R
Sterling	2	HR	HR	HR	HR	R	R
SuperCuts	4	HR	HR	HR	HR	HR	R
Surpass	3	HR	R	HR	MR	R	—
Synergy	3	HR	HR	HR	HR	R	R
Target II	4	HR	R	R	R	R	—
Teton	1	LR	LR	MR	S	—	—
Thrive	3	HR	HR	HR	HR	R	—
TMF Generation	4	HR	HR	HR	HR	HR	R
TMF Multi-plier II	3~	HR	HR	HR	HR	HR	R
Total+Z	3	HR	HR	HR	HR	HR	R
Travois	1	R	S	MR	S	—	—
Treasure	3	HR	R	HR	HR	R	—
Trident II	3	HR	HR	R	R	R	MR
UltraLeaf 87	3	HR	HR	HR	HR	R	R
Venture	4	HR	R	R	HR	R	R
Vernal	2	R	—	MR	—	—	—
Viking 1	2	R	R	HR	R	HR	—
Voyager II	4	HR	HR	HR	R	R	MR
Webfoot	3	R	R	MR	—	—	—
Webfoot MPR	4	HR	HR	HR	HR	HR	R
WetLand	3	R	HR	R	R	MR	MR
Wintergeen	3	HR	HR	HR	HR	HR	R
Winterstar	2	HR	HR	HR	HR	HR	R
WL 226	3	HR	HR	HR	HR	R	MR
WL 252 HQ	2	HR	HR	HR	HR	R	LR
WL 320	4	R	R	R	MR	MR	—
WL 322 HQ	4	HR	R	HR	MR	R	—
WL 323	4	HR	HR	HR	HR	R	R
WL 324	3	HR	HR	HR	HR	R	HR
WL 325 HQ	3	HR	HR	HR	HR	R	R
Wrangler	2	R	HR	R	LR	LR	—
Zenith	3	HR	HR	HR	HR	R	R

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD[2]	Disease Resistance Ratings [3, 4]					
		BW	PRR	FW	AN	VW	APH
Non-dormant							
Nitro	8	—	MR	—	R	—	—

Table 1B. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Note Key:

[1] Varieties includes those marketed in Minnesota for which disease resistance ratings were provided. Varieties which are not seeded in a Minnesota yield trial are excluded from Table 2.

[2] Developers list generally follows Certified Alfalfa Seed Council publication "Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties" (CASC 1996/97 Edition).

[3] Seed source numbers refer to the "key" number in Table 5, "1997 Forage Seed Sources."

Variety[1]	Developer or Marketer[2]	Seed Source[3]
Dormant		
120	DEKALB Genetics Corp.	20
2555ML	L.L. Olds/Interstate/Payco	34, 50
2833	Ciba Seeds	16, 48
329	Seed Mart, Inc.	59
3324	LG Seeds	41
3452-ML	L. L. Olds/Interstate/Payco	34, 50
5246	Pioneer Hi-Bred Int'l.	53
5262	Pioneer Hi-Bred Int'l.	53
5312	Pioneer Hi-Bred Int'l.	53
5347LH	Pioneer Hi-Bred Int'l.	53
5454	Pioneer Hi-Bred Int'l.	53
620	ICI Seeds	33
630	ICI Seeds	33
631	ICI Seeds	33
8498	Mallard Seeds	42
9323	Research Seeds/Shissler Seed	41
9326	Research Seeds/Shissler Seed	41
A-295	PGI/MBS, Inc.	43
A-395	PGI/MBS, Inc.	43
ABT 205	Seed Mart, Inc.	59
ABT 405	Seed Mart, Inc.	59
Ace	W-L Research	66
Achieva	Agway/Allied Seed	8, 9
Affinity+Z	America's Alfalfa	10
Agate	USDA/Minn.AES	1, 21, 54, 68

Table 1B continued. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	Developer or Marketer[2]	Seed Source[3]
Aggressor	America's Alfalfa	1, 10, 63
Alfagraze	America's Alfalfa	1, 10, 50, 63
AlfaStar	Hoffman Seed/Sexauer	32
Allegro	Keltgen Seed/Lynks Seed	45
ALPHA 2001	Great Lakes Hybrids	27
Alpine	Oasis Seed/Spangler Seeds	49, 60
Apollo Supreme	America's Alfalfa	1, 10, 63
Arrest	Northrup King Co.	48
Aspen	SeedTec/Brown Seed Farms	12
Asset	Allied Seed	9
Avalanche+Z	America's Alfalfa	1, 10, 34, 50, 63
Banquet	Tri-State	64
Belmont	Great Plains	36
Big Horn	Cargill Hybrid Seeds	15
Blazer XL	Cenex/Land O'Lakes	17
Bolt ML	Research Seeds/Jung Farms	35
Bounty	PGI/MBS	43
Break-Thru	Custom Farm Seed	18
Centurion	Agway/Allied Seed	9
CIBA 2444	Ciba Seeds	16
CIBA 2888	Ciba Seeds	16
Cimarron VR	Great Plains	36
Clipper	Interstate/Payco Seed	34
Columbia 2000	Kaltenburg Seed Farms	1, 9, 36
Complete	Arrow Seed/Fontanelle Hybrids	23, 52
Crown	Cargill Hybrid Seeds	15
Crown II	Cargill Hybrid Seeds	15
Crystal	PGI/MBS	43
Cut 'N' Graze	AgriPro Seeds	2
Dart	AgriPro Seeds	2
Dawn	AgriPro Seeds, Inc.	2
Defiant	AgriPro Seeds	2
Demand	AgriPro Seeds	2
Depend+EV	AgriPro Seeds	2
Dividend	Agway/Allied Seed	9, 51
DK 122	DEKALB Genetics Corp.	20
DK 127	DEKALB Genetics Corp.	20
DK 133	DEKALB Genetics Corp.	20
Dominator	AgriPro Seeds	2
Dual	Kaltenburg	36
Empire	Brunner Seed	13
Enhancer	Rosen's, Inc.	58
Envy	Peterson Seed Co.	36
Evolution	Mycogen Seeds	45
Exceed	Specialty Seeds	61
Extend	Spangler/Grassland West	60
Forerunner	Research Seeds/Brown Seed	12
Fortress	Northrup King Co.	48
G 2841	Ciba Seeds	16, 48
Garst 636	ICI Seeds	33

Table 1B continued. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	Developer or Marketer[2]	Seed Source[3]
Garst 645	ICI Seeds	33
GH 755	Golden Harvest	25
GH 767	Golden Harvest	25
GH 777	Golden Harvest	25, 26
GH 787	Golden Harvest	25, 26
GH 766	Golden Harvest	25
Good as Gold	Top Farm/Hoegemeyer Hybrids	43, 62
Gourmet Hay	Greenwald Elevator	28
Green Field	Hoegemeyer Hybrids	31, 54
Guardian	AgVenture	3, 4, 5, 6, 7
HayGrazer	Kaltenburg Seed Farms	36
Imperial	Top Farm Hybrids/Cole Growers	62
Innovator +Z	America's Alfalfa	10, 34, 50, 63
Iroquois	Cornell Univ.	1
Jade	NC+Hybrids	46
Jade II	NC+Hybrids	46
Lactator	Elk Mound Feed & Farm Supply	22, 52
Laser	J-V Seeds/Patriot Seeds	51
Legend	Cenex/Land O'Lakes	17
LegenDairy	Cenex/Land O'Lakes	17
LegenDairy 2.0	Cenex/Land O'Lakes	17
Lightning	Jung Seeds	35
MagnaGraze	Dairyland Seed Co.	19
Magnum III	Dairyland Seed Co.	19
Magnum III-Wet	Dairyland Seed Co.	19
Magnum IV	Dairyland Seed Co.	19
Maxi-Graze 67	Croplan Genetics	17
MP2000	Cenex/Land O'Lakes	17
Multi-plier	Mycogen Seeds	45
MultiKing 1	Northrup King	48
MultiMist	Lemke Seeds	40
MultiQueen	Fred Gutwein & Sons	24, 29
Notice	Midwest Seed Genetics	44
Oneida	Cornell Univ.	—
Oneida VR	N.Y.S.I.P.	—
Ovation	Callahan Seeds	14
Pacesetter	Research Seeds/Brown Seed	12
Paramount	Wyffels Hybrids/Chempro	66
Persist	Kaltenberg Seed Farms	36
Profit	Ciba Seeds/Wensman Seed	67
Proof	Keltgen Seed	38, 45
Quantum	Renk Seed	57
Rainier	Northrup King Co.	48
Ranger	USDA/Nebr.AES	1, 21
RFV-2000	Custom Farm Seed	18
Royalty	Cargill Hybrid Seeds	15
Rushmore	Northrup King Co.	48
Rustler II	ABI/Andrews Seed	11
Saranac	Cornell Univ.	21, 54
Sierra	NC+Hybrids	46

Table 1B continued. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	Developer or Marketer[2]	Seed Source[3]
SMA-Forecast 1000	Dairyland Seed Co.	19
SMA-Forecast 3000	Dairyland Seed Co.	19
Spartan	Allied Seed	9
Spirit	Fontanelle Hybrids	23
Spredor 3	Northrup King Co.	48
Stampede	Allied Seed/Peterson Seed	52
Sterling	Cargill Hybrid Seeds	15
SuperCuts	AgriBioTech	59
Surpass	Andrews Seed	56
Synergy	Crow's Hybrid Corn	52
Target II	Bio-Plant Research	55
Teton	S.Dakota Agr.Exp.Sta.	1, 21
Thrive	Great Lakes Hybrids	27
TMF Generation	Mycogen Seeds	45
TMF Multi-plier II	Mycogen Seeds	45
Total+Z	America's Alfalfa	10, 63
Travois	S.Dakota Agr.Exp.Sta.	1, 21
Treasure	Clark Seeds	1
Trident II	Cargill Hybrid Seeds	15
UltraLeaf 87	La Crosse Seed	39
Venture	Top Farm Hybrids/Cole Growers	62
Vernal	USDA/Wisc.AES	1, 21, 54, 56, 68
Viking 1	Northrup King Co.	48
Voyager II	Lemke Seeds/Bio-Plant Res.	69
Webfoot	Great Lakes Hybrids	27
Webfoot MPR	Great Lakes Hybrids	27
WetLand	Bio-Plant Research	60, 69
Wintergeen	Renk Seed	57
Winterstar	Wensman Seed Co.	67
WL 226	W-L Research, Inc.	5, 30, 37, 47
WL 252 HQ	W-L Research, Inc.	5, 30, 37, 47
WL 320	W-L Research, Inc.	5, 30, 37, 47
WL 322 HQ	W-L Research, Inc.	5, 30, 37, 47
WL 323	W-L Research, Inc.	5, 30, 37, 47
WL 324	W-L Research, Inc.	5, 30, 37, 47
WL 325 HQ	W-L Research, Inc.	5, 30, 37, 47
Wrangler	USDA/Nebr.AES	1, 21
Zenith	ICI Seeds	33
Non-dormant		
Nitro	USDA/Minn.AES	54

Table 2A-1. Average yields of alfalfa varieties tested for Winter Survival Index expressed as percentage of Vernal for all seedings with one or more harvest years (1967-1996). Average Yield: years 1-2 after seeding and year 3 per test site. Sorted by yield for "ALL YR1-2" within each WSI category.

Note Key:

[1] Winter Survival Index from joint MN-WI trials (see Table 3).

[2] Each seeding year in any location counts as one Test Site.

[3] Total production years (after seeding year) for any location with reliable data. Two production years needed for YR1-2 data. (Seed years or production years that winterkilled or otherwise developed unacceptably variable stands are excluded.)

Locations: RoWa=Rosemount-Waseca, All Minnesota Locations=test sites including Table 2A-2.

Variety	[1] WSI	RoWa YR1-2	RoWa YR3	All Minnesota Locations		[2] Test Sites	[3] Production Yrs1-3
				YR1-2	YR3		
Superior Winter Survival							
VERNAL (T/Ac,15%MC)	1.7	6.07	5.42	5.63	5.11	70	185
ABT 205	1.6	—	—	—	—	6	3
Very Good Winter Survival							
Avalanche+Z	2.4	121	—	117	—	8	6
MP 2000	2.7	116	—	114	—	4	5
620	2.5	116	—	113	—	9	10
5454	2.3	114	—	111	110	15	21
Wintergreen	2.5	115	—	109	—	3	5
Defiant	2.3	111	—	107	—	6	8
5262	2.3	107	105	105	108	18	35
Innovator+Z	2.3	107	—	104	—	6	5
Ranger	2.8	100	101	102	102	8	24
Rushmore	2.7	107	—	101	—	5	7
DK 127	2.4	98	—	97	—	8	6
ABT 405	2.6	—	—	—	—	3	3
Notice	2.6	—	—	—	—	3	3
Good Winter Survival							
CIBA 2888	3.2	—	—	113	—	6	6
5312	3.0	113	—	107	—	8	7
Viking 1	3.0	109	95	107	100	9	17
UltraLeaf 87	3.2	107	—	107	103	6	12
Dart	3.2	108	108	106	111	13	34
Lightning	3.3	104	—	100	—	5	6
Fortress	3.8	102	84	97	90	8	24
Guardian	3.0	—	—	—	—	3	3
Columbia 2000	3.1	—	—	—	—	3	0
Rainier	3.3	—	—	—	—	3	0
SuperCuts	3.4	—	—	—	—	3	3

Table 2B-1. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1996) NOT tested for Winter Survival Index, expressed as percent of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Note Key:

[1] Each seeding year in any location counts as one Test Site.

[2] Total production years (after seeding year) for any location with reliable data. Two production years needed for YR1-2 data. (Seed years or production years that winterkilled or otherwise developed unacceptably variable stands are excluded.)

Locations: RoWa=Rosemount-Waseca, All Minnesota Locations=test sites including Table 2B-2.

Variety	RoWa	RoWa	All Minnesota		[1]	[2]
	YR1-2	YR3	Locations	YR1-2	YR3	Test Sites
120	111	115	109	112	10	29
2555 ML	112	—	112	—	6	5
2833	110	—	100	102	5	12
329	—	—	105	—	7	6
3452-ML	102	—	102	—	4	5
5246	108	98	107	103	13	24
630	110	113	107	109	11	29
631	112	—	110	—	10	12
9323	108	—	111	92	3	7
Achieva	107	91	108	91	4	9
Affinity+Z	—	—	—	—	7	4
Agate	101	110	99	106	20	56
Aggressor	101	95	101	109	10	23
Alfagraze	104	85	100	99	7	18
ALPHA 2001	—	—	—	—	4	3
Alpine	110	108	105	118	5	15
Apollo Supreme	107	108	101	105	7	20
Asset	—	85	93	98	3	8
Belmont	94	97	97	96	3	9
Blazer XL	101	—	103	101	3	8
Bounty	109	—	113	—	5	8
Break-Thru	103	95	99	95	8	21
Centurion	111	104	107	102	6	18
CIBA 2444	114	—	114	—	3	5
Cimarron VR	96	—	103	108	5	12
Clipper	104	96	103	101	10	27
Complete	—	—	—	—	3	3
Crown	109	109	107	106	6	18
Crown II	112	—	106	116	6	15
Crystal	100	95	106	112	6	14
Dawn	101	98	102	101	8	19
Demand	103	—	101	—	4	5
Depend+EV	104	—	103	—	4	5
Dividend	104	—	105	101	9	10
DK 122	104	60	104	103	18	41

Table 2B-1 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1996) NOT tested for Winter Survival Index, expressed as percent of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	RoWa		All Minnesota Locations		[1]	[2]
	YR1-2	YR3	YR1-2	YR3	Test Sites	Production Yrs1-3
DK 133	109	96	109	103	14	25
Dominator	108	108	106	108	4	9
Empire	114	—	112	—	5	7
Enhancer	—	—	108	—	6	7
Envy	111	92	105	107	7	18
Evolution	111	99	106	99	5	10
G 2841	97	81	95	95	7	21
Garst 636	108	107	106	106	8	23
Garst 645	106	102	107	127	11	21
H 755	109	91	111	91	4	9
GH 767	123	—	109	—	4	5
GH 787	104	—	106	98	5	8
Good as Gold	108	99	110	117	7	16
Gourmet Hay	101	—	106	124	3	8
Imperial	113	103	113	103	5	6
Iroquois	104	98	106	99	10	26
Jade	—	109	113	118	6	15
Laser	115	102	112	102	3	7
Legend	97	102	96	99	6	17
LegenDairy	114	—	111	100	4	9
Magnum III	110	110	110	114	9	25
Magnum III-Wet	113	—	113	—	5	9
Magnum IV	110	107	110	107	6	12
Multi-plier	109	99	102	101	16	35
MultiKing 1	101	—	105	116	5	13
MultiQueen	—	—	111	—	3	5
Oneida	105	104	103	107	17	34
Oneida VR	—	—	—	—	7	4
Ovation	103	98	107	98	3	7
Pacesetter	104	—	107	93	3	7
Paramount	—	—	—	—	3	3
Persist	113	—	113	—	5	9
Profit	107	111	105	106	13	31
Proof	116	—	100	—	5	7
Quantum	107	99	110	99	4	9
RFV-2000	110	—	106	—	4	7
Royalty	105	97	100	99	7	18
Rustler II	112	—	112	—	4	5
Saranac	104	98	104	99	23	64
Saranac AR	105	95	102	97	19	54
Sterling	110	—	102	—	6	8
Surpass	115	108	111	107	7	18
Target II	110	84	109	96	4	10
Thrive	101	89	103	101	8	17
TMF Generation	—	—	—	—	3	3

Table 2B-1 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1996) NOT tested for Winter Survival Index, expressed as percent of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	RoWa		All Minnesota Locations		[1]	[2]
	YR1-2	YR3	YR1-2	YR3	Test Sites	Production Yrs1-3
Total+Z	112	—	102	—	3	5
Trident II	105	94	106	112	8	20
Venture	103	98	103	98	3	7
Voyager II	112	—	111	—	7	7
Webfoot	105	106	103	105	8	24
Webfoot MPR	102	—	103	—	5	9
Winterstar	113	—	107	—	5	6
WL 226	—	99	109	116	3	11
WL 252 HQ	—	—	107	—	5	6
WL 320	109	110	109	105	6	18
WL 322 HQ	94	104	99	112	3	9
WL 323	107	97	106	97	6	10
Wrangler	106	107	103	101	8	23
Zenith	107	—	107	111	8	17

Table 2C-1. Average yields of alfalfa varieties with less than three seedings with one or more harvest years data (1967-1996) and NOT tested for Winter Survival Index, expressed as percentage of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Note Key:

[1] Each seeding year in any location counts as one Test Site.

[2] Total production years (after seeding year) for any location with reliable data. Two production years needed for YR1-2 data. (Seed years or production years that winterkilled or otherwise developed unacceptably variable stands are excluded.)

Locations: RoWa=Rosemount-Waseca, All Minnesota Locations=test sites including Table 2C-2.

Varieties below have fewer tests and **cannot** be reliably compared with those above in 2B.

Variety	RoWa		All Minnesota Locations		[1]	[2]
	YR1-2	YR3	YR1-2	YR3	SY96 Sites	Production Yrs1-3
3324	—	—	—	—	1	1
8498	—	—	—	—	3	0
9326	—	—	—	—	2	0
A-295	110	95	110	95	3	3
A-395	108	—	108	—	3	3
AlfaStar	—	—	—	—	2	2
Allegro	109	98	99	98	2	4
Aspen	110	—	110	—	4	2
Banquet	—	—	—	—	4	2
Big Horn	—	—	—	—	2	1

Table 2C-1 continued. Average yields of alfalfa varieties with less than three seedings with one or more harvest years data (1967-1996) and NOT tested for Winter Survival Index, expressed as percentage of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	RoWa	RoWa	All Minnesota		[1]	[2]
	YR1-2	YR3	Locations	YR1-2	YR3	SY96 Production Sites Yrs1-3
Bolt ML	111	94	111	94	1	3
Cut 'N' Graze	—	—	—	—	1	1
Exceed	—	—	—	—	3	0
Extend	110	—	110	—	4	2
Forerunner	—	—	—	—	4	1
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GH 766	—	—	—	—	3	1
GH 777	110	99	110	99	1	3
Green Field	106	100	106	100	3	5
Jade II	—	—	—	—	1	1
Lactator	107	97	107	97	3	3
<hr/>						
LegenDairy 2.0	—	—	—	—	3	1
MagnaGraze	113	—	113	—	2	3
Sierra	112	—	112	—	1	2
Spirit	—	—	—	—	2	1
Spredor 3	—	—	—	—	5	2
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Stampede	—	—	—	—	2	0
Synergy	103	—	103	—	1	2
Teton	—	—	102	102	1	3
TMF Multi-plier II	—	—	—	—	3	0
Travois	—	—	94	96	1	3
<hr/>						
Treasure	105	104	105	104	1	3
Wetland	109	—	109	—	4	3
WL 324	—	—	—	—	3	1
WL 325 HQ	—	—	—	—	2	0

Table 2A-2. Average yields of alfalfa varieties tested for Winter Survival Index expressed as percentage of Vernal for all seedings with one or more harvest years (1967-1996). Average Yield: years 1-2 after seeding and year 3 per test site. Sorted to match order in Table 2A-1.

Note Key:

[1] Winter Survival Index from joint MN-WI trials (see Table 3).

Locations: CrMo=Crookston-Morris, Lam=Lamberton, GRap=Grand Rapids

Variety	[1]	CrMo	CrMo	Lam	Lam	GRap	GRap
	WSI	YR1-2	YR3	YR1-2	YR3	YR1-2	YR3
Superior Winter Survival							
VERNAL (T/Ac,15%MC)	1.7	5.42	4.82	5.36	4.79	4.10	4.25
ABT 205	1.6	—	—	—	—	—	—

Table 2A-2 continued. Average yields of alfalfa varieties tested for Winter Survival Index expressed as percentage of Vernal for all seedings with one or more harvest years (1967-1996). Average Yield: years 1-2 after seeding and year 3 per test site. Sorted to match order in Table 2A-1.

Variety	[1] WSI	CrMo YR1-2	CrMo YR3	Lam YR1-2	Lam YR3	GRap YR1-2	GRap YR3
Very Good Winter Survival							
Avalanche+Z	2.4	—	—	—	—	—	—
MP 2000	2.7	—	—	—	—	—	—
620	2.5	112	—	—	—	—	—
5454	2.3	116	—	100	—	109	110
Wintergreen	2.5	—	—	—	—	102	—
Defiant	2.3	107	—	—	—	—	—
5262	2.3	106	107	101	113	105	107
Innovator+Z	2.3	—	—	—	—	—	—
Ranger	2.8	125	117	97	99	—	—
Rushmore	2.7	—	—	—	—	94	—
DK 127	2.4	—	—	—	—	—	—
ABT 405	2.6	—	—	—	—	—	—
Notice	2.6	—	—	—	—	—	—
Good Winter Survival							
CIBA 2888	3.2	128	—	104	—	—	—
5312	3.0	—	—	—	—	101	—
Viking 1	3.0	107	—	103	—	112	106
UltraLeaf 87	3.2	—	—	—	—	106	103
Dart	3.2	104	113	104	112	109	108
Lightning	3.3	—	—	—	—	—	—
Fortress	3.8	80	98	106	89	103	98
Guardian	3.0	—	—	—	—	—	—
Columbia 2000	3.1	—	—	—	—	—	—
Rainier	3.3	—	—	—	—	—	—
SuperCuts	3.4	—	—	—	—	—	—

Table 2B-2. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1996) NOT tested for Winter Survival Index, expressed as percent of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Note Key:

Locations: CrMo=Crookston-Morris, Lam=Lamberton, GRap=Grand Rapids

Variety	CrMo YR1-2	CrMo YR3	Lam YR1-2	Lam YR3	GRap YR1-2	GRap YR3
120	103	107	103	—	112	107
2555 ML	—	—	—	—	—	—
2833	89	102	104	101	—	—
329	108	—	107	—	—	—
3452 ML	—	—	—	—	—	—

Table 2B-2 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1996) NOT tested for Winter Survival Index, expressed as percent of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	CrMo YR1-2	CrMo YR3	Lam YR1-2	Lam YR3	GRap YR1-2	GRap YR3
5246	114	—	99	—	102	109
630	102	100	107	107	99	112
631	118	—	99	—	—	—
9323	—	—	—	—	115	92
Achieva	111	—	—	—	—	—
Affinity+Z	—	—	—	—	—	—
Agate	97	101	100	100	89	96
Aggressor	103	109	102	126	99	107
Alfagraze	—	—	101	117	103	94
ALPHA 2001	—	—	—	—	—	—
Alpine	95	120	112	123	—	—
Apollo Supreme	90	103	100	99	107	112
Asset	69	99	—	—	—	—
Belmont	105	108	94	83	—	—
Blazer XL	101	98	105	103	—	—
Bounty	116	—	—	—	—	—
Break-Thru	88	97	102	93	103	93
Centurion	100	97	104	97	114	112
CIBA 2444	—	—	—	—	—	—
Cimarron VR	110	111	110	111	100	101
Clipper	102	107	100	91	106	102
Complete	—	—	—	—	—	—
Crown	92	98	123	114	113	105
Crown II	96	107	110	124	—	—
Crystal	104	112	117	144	—	—
Dawn	107	112	—	—	94	98
Demand	—	—	—	—	—	—
Depend+EV	—	—	—	—	103	—
Dividend	—	—	—	—	115	101
DK 122	102	108	107	120	104	100
DK 133	108	115	109	—	110	98
Dominator	—	—	99	—	—	—
Empire	118	—	—	—	—	—
Enhancer	116	—	103	—	—	—
Envy	101	112	102	110	—	—
Evolution	104	—	—	—	98	—
G 2841	79	92	103	105	105	105
Garst 636	105	108	101	105	103	102
Garst 645	111	129	106	151	—	—
GH 755	117	—	—	—	—	—
GH 767	—	—	—	—	93	—
GH 787	—	—	—	—	109	98
Good as Gold	113	117	104	135	108	115
Gourmet Hay	113	130	103	118	—	—
Imperial	—	—	—	—	—	—

Table 2B-2 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1996) NOT tested for Winter Survival Index, expressed as percent of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	CrMo YR1-2	CrMo YR3	Lam YR1-2	Lam YR3	GRap YR1-2	GRap YR3
Iroquois	105	103	100	99	111	96
Jade	116	121	107	131	109	108
Laser	117	—	103	—	—	—
Legend	89	98	101	91	101	103
LegenDairy	—	—	—	—	104	100
Magnum III	106	103	116	132	104	108
Magnum III-Wet	111	—	—	—	—	—
Magnum IV	114	—	107	—	—	—
Multi-plier	100	109	99	83	100	100
MultiKing 1	109	119	117	141	96	87
MultiQueen	127	—	102	—	—	—
Oneida	102	114	94	97	105	107
Oneida VR	—	—	—	—	—	—
Ovation	113	—	—	—	—	—
Pacesetter	—	—	—	—	112	93
Paramount	—	—	—	—	—	—
Persist	121	—	105	—	—	—
Profit	104	93	106	112	101	111
Proof	—	—	—	—	90	—
Quantum	118	—	—	—	—	—
RFV-2000	107	—	101	—	—	—
Royalty	90	99	101	107	102	95
Rustler II	—	—	—	—	—	—
Saranac	106	109	102	96	—	—
Saranac AR	100	101	100	97	95	109
Sterling	—	—	—	—	94	—
Surpass	104	105	108	105	108	110
Target II	111	106	—	—	105	97
Thrive	106	103	102	—	106	110
TMF Generation	—	—	—	—	—	—
Total+Z	—	—	94	—	—	—
Trident II	106	113	108	134	104	106
Venture	—	—	—	—	—	—
Voyager II	—	—	—	—	—	—
Webfoot	104	104	100	109	102	102
Webfoot MPR	108	—	100	—	—	—
Winterstar	—	—	—	—	100	—
WL 226	112	123	111	127	—	—
WL 252 HQ	106	—	107	—	—	—
WL 320	106	102	112	105	112	102
WL 322 HQ	110	121	92	113	—	—
WL 323	109	—	101	—	—	—
Wrangler	106	103	98	106	100	91
Zenith	108	105	107	117	—	—

Table 2C-2. Average yields of alfalfa varieties with less than three seedings with one or more harvest years data (1967-1996) and NOT tested for Winter Survival Index, expressed as percentage of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Note Key:

Locations: CrMo=Crookston-Morris, Lam=Lamberton, GRap=Grand Rapids

Varieties below have fewer tests and **cannot** be reliably compared with those above in 2B.

Variety	CrMo YR1-2	CrMo YR3	Lam YR1-2	Lam YR3	GRap YR1-2	GRap YR3
3324	—	—	—	—	—	—
8498	—	—	—	—	—	—
9326	—	—	—	—	—	—
A-295	—	—	—	—	—	—
AlfaStar	97	106	—	—	—	—
Allegro	—	—	—	—	—	—
Aspen	—	—	105	109	—	—
Banquet	—	—	—	—	—	—
Bolt ML	—	—	—	—	—	—
Cut 'N' Graze	—	—	—	—	—	—
Exceed	—	—	—	—	—	—
Extend	—	—	—	—	—	—
GH 766	—	—	—	—	—	—
GH 777	—	—	—	—	—	—
Green Field	—	—	106	—	—	—
Jade II	—	—	—	—	—	—
LegenDairy 2.0	—	—	—	—	—	—
MagnaGraze	—	—	—	—	—	—
Sierra	—	—	—	—	—	—
Spirit	—	—	—	—	—	—
Stampede	—	—	—	—	—	—
Synergy	—	—	—	—	—	—
Teton	102	102	—	—	—	—
TMF Multi-plier II	—	—	—	—	—	—
Treasure	—	—	—	—	—	—
Wetland	—	—	—	—	—	—
WL 324	—	—	—	—	—	—
WL 325 HQ	—	—	—	—	—	—

Table 3. 1996 Winter Survival Test Results (joint Minnesota / Wisconsin trials).

Note Key:

Winter Survival Index categories: 1=superior; 2=very good; 3=good; 4=adequate; 5=low; 6=none.

Planted in 1995. Rated during May, 1996. Check varieties: (ck).

Variety	Winter Survival Index			Mean
	Morris MN	Arlington WI	Marshfield WI	
Norseman (ck)	1.3	1.0	0.7	1.0
ABT 205	1.9	1.6	1.5	1.6
Vernal (ck)	2.1	1.4	1.6	1.7
5262	2.6	2.1	2.2	2.3
Defiant	2.6	2.1	2.2	2.3
5454	2.5	2.3	2.2	2.3
Innovator+Z	2.5	2.2	2.3	2.3
Avalanche+Z	2.9	2.0	2.3	2.4
DK 127	2.7	2.2	2.3	2.4
Wintergreen	2.6	2.4	2.5	2.5
620	2.9	2.2	2.4	2.5
Notice	2.9	2.4	2.5	2.6
ABT 405	3.1	2.2	2.6	2.6
MultiMist	2.9	2.4	2.6	2.7
MP 2000	3.0	2.6	2.6	2.7
Rushmore	2.9	2.5	2.8	2.7
Ranger (ck)	3.0	2.5	2.7	2.8
526 (ck)	3.1	2.5	2.6	2.8
Rainier	3.3	2.5	2.6	2.8
645	3.2	2.6	2.7	2.8
5312	3.3	2.8	2.8	3.0
Guardian	3.2	2.8	2.9	3.0
Viking 1	3.3	2.8	2.8	3.0
Columbia 2000	3.6	2.8	2.9	3.1
Ciba 2888	3.7	3.0	3.0	3.2
Dart (ck)	3.6	3.0	3.1	3.2
UltraLeaf 87	3.8	2.9	3.0	3.2
Lightning	3.7	3.0	3.1	3.3
SuperCuts	3.9	3.0	3.2	3.4
Fortress (ck)	4.2	3.6	3.5	3.8
Archer (ck)	4.7	4.0	3.9	4.2
Southern Special (ck)	5.9	4.9	4.9	5.2
Moapa 69 (ck)	6.2	6.0	5.7	6.0
Cuf 101 (ck)	6.3	6.2	5.8	6.1

Table 4. Forage quality and milk per acre of alfalfa varieties, as percent of check entry. Sorted alphabetically.

Note Key:

* Not significantly different from highest variety in trial.

[1] Varieties listed include joint MN-WI quality trials (1995-96), plus varieties from prior MN quality trials that are currently marketed in MN. (MN Seed Year 1994 winterkilled, reseeded in 1995, is included here in MN SY 1995/PY 1996).

[2] RFV=Relative Feed Value index (calculated from NDF and ADF).

[3] Milk per acre uses season average quality and season average yield at Rosemount, MN.

[4] Milk per acre uses season average quality and season average yield at Arlington, WI.

[5] Checks: Vernal used until 1994; Vernal and WL 322 HQ for 1995-96 seed years.

[6] CV=Coefficient of Variation. Smaller number indicates less variation between replicates.

(SY=Seed Yr) (PY=Prod.Yr) [1] Variety	Minnesota SY 1991-92-93 PY 1992-93-94			Minnesota SY 1995 PY 1996		Wisconsin SY 1995 PY 1996		Minnesota SY 1996 PY 1996		Wisconsin SY 1996 PY 1996	
	[2] RFV	[3] Milk	N	[2] RFV	[3] Milk	[2] RFV	[4] Milk	[2] RFV	[3] Milk	[2] RFV	[4] Milk
2833	110	109	1	—	—	—	—	—	—	—	—
5246	104	107	2	—	—	—	—	—	—	—	—
5454	102	105	1	—	—	—	—	—	—	—	—
630	107	109	1	—	—	—	—	—	—	—	—
8498	—	—	—	—	—	—	—	100*	109*	100	107
9326	—	—	—	—	—	—	—	102*	98*	110*	105
ABT 205	—	—	—	—	—	—	—	92	106*	103	102
Ciba 2888	—	—	—	104*	102	101*	117*	—	—	—	—
Dart	106	99	1	—	—	—	—	—	—	—	—
Dawn	102	110	1	—	—	—	—	—	—	—	—
Dividend	108	104	1	—	—	—	—	—	—	—	—
DK 122	107	106	2	97	114*	—	—	—	—	—	—
DK 127	—	—	—	105*	112*	105*	120*	94*	97	104	110
DK 133	107	107	2	98	109*	—	—	100*	104*	94	113*
Dominator	105	98	1	—	—	—	—	—	—	—	—
Exceed	—	—	—	—	—	—	—	94*	112*	97	109
Extend	—	—	—	—	—	—	—	91	101*	103	104
Garst 645	106	105	1	—	—	—	—	—	—	—	—
GH 755	108	102	1	—	—	—	—	—	—	—	—
GH 766	—	—	—	100	106*	—	—	—	—	—	—
GH 767	—	—	—	104*	97	104*	120*	99*	100*	114*	110
GH 787	—	—	—	106*	95	102*	119*	102*	113*	97	113*
Good As Gold	105	102	1	—	—	—	—	—	—	—	—
Imperial	102	109	1	—	—	—	—	—	—	—	—
Innovator +Z	—	—	—	104*	110*	—	—	—	—	—	—

Table 4 continued. Forage quality and milk per acre of alfalfa varieties, as percent of check entry. Sorted alphabetically.

Variety	Minnesota SY'91-92-93 PY'92-93-94			Minnesota SY 1995 PY 1996		Wisconsin SY 1995 PY 1996		Minnesota SY 1996 PY 1996		Wisconsin SY 1996 PY 1996	
	[1]	[2]	[3]	[2]	[3]	[2]	[4]	[2]	[3]	[2]	[4]
	RFV	Milk	N	RFV	Milk	RFV	Milk	RFV	Milk	RFV	Milk
LegenDairy	110	104	1	—	—	—	—	—	—	—	—
Lightning	—	—	—	106*	102	99*	115*	—	—	—	—
Magnum III	102	105	1	—	—	—	—	—	—	—	—
Magnum III-Wet	111	102	1	—	—	—	—	—	—	—	—
Magnum IV	99	102	1	—	—	—	—	—	—	—	—
Max 329	—	—	—	—	—	—	—	97*	102*	100	123*
MultiKing 1	109	102	3	—	—	—	—	—	—	—	—
Oneida	104	106	2	—	—	—	—	—	—	—	—
Profit	109	103	1	—	—	—	—	—	—	—	—
Rainier	—	—	—	—	—	—	—	103*	101*	100	108
Rushmore	—	—	—	96	111*	—	—	—	—	—	—
Saranac AR	108	102	3	—	—	—	—	—	—	—	—
Spirit	—	—	—	—	—	—	—	99*	115*	92	114*
Sierra	103	109	1	—	—	—	—	—	—	—	—
Sterling	—	—	—	100	112*	—	—	—	—	—	—
Thrive	102	103	1	—	—	—	—	—	—	—	—
UltraLeaf 87	—	—	—	106*	98	101*	112*	—	—	—	—
Vernal	100	100	3	95	95	102	98	98*	108*	100	100
Viking 1	106	103	1	—	—	—	—	—	—	—	—
WL 252 HQ	108	105	1	107*	101	99*	115*	—	—	—	—
WL 322 HQ	110	105	2	105*	105	97	103	102*	92	—	—
Vernal/Chk[5]	124	13754	3	164	8667	190	12096	193	2643	206	5532
Test Mean	132	14251	3	171	9064	—	—	189	2740	—	—
LSD .05				6	9	7	11	10	17	9	13
CV [6]				4.4	6.6	5.0	6.2	7.1	11.7	6.5	8.3

Table 5. Forage Seed Sources, 1997. Listed alphabetically.

Note Key:

Numbering to left of each seed vendor is keyed to Seed Source column in Table 1.

1. Agassiz Seed & Supply ... 445 7th St. NW ... West Fargo, ND 58078 ... 701-282-8118
2. AgriPro Seeds, Inc. ... PO Box 2962 ... Shawnee Mission, KS 66201 ... 913-384-4940
3. AgServices ... 1395 Roberts Road ... Hutchinson, MN 55350 ... 320-587-8972
4. AgVenture Central ... Box 296 ... Madison Lake, MN 56063 ... 507-243-3232
5. AgVenture East ... Rte 2, Box 58 ... Kasson, MN 55944 ... 800-657-4890

Table 5 continued. Forage Seed Sources, 1997. Listed alphabetically.

6. AgVenture West ... Box 184 ... Jeffers, MN 56145 ... 507-628-4929
 7. AgVenture West Central ... Rte. 2, Box 134 ... Olivia, MN 56277 ... 320-523-2250
 8. Albert Lea Seedhouse ... 1414 West Main ... Albert Lea, MN 56007 ... 507-373-3161
 9. Allied Seed Cooperative ... PO Box 945 ... Angola, IN 46703 ... 800-813-5025
Allied Seed Cooperative ... 12 Hilldale Drive ... Macon, MO 63552 ... 800-624-8904
 10. America's Alfalfa ... PO Box 2962 ... Shawnee Mission, KS 66201 ... 913-384-4940
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11. Andrews Seed Co. ... 580 S Oregon ... Ontario, OR 97914 ... 541-889-9109
 12. Brown Seed Farms ... N 1279 530th St. ... Bay City, WI 54723 ... 715-594-3003
 13. Brunner Seed ... Rte 2, Box 273 ... Durand, WI 54736 ... 715-672-5887
 14. Callahan Seeds ... 1122 E 169th St. ... Westfield, IN 46074 ... 317-896-5551
 15. Cargill Hybrid Seeds ... Rte 1, Box 56 ... Plainview, MN 55964 ... 507-534-2128
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16. CIBA Seeds ... PO Box 6346 ... Rochester, MN 55903 ... 507-280-0747
 17. Croplan Genetics ... PO Box 64089, Cenex/Land O' Lakes ... St. Paul, MN 55164 ... 612-451-5490
 18. Custom Farm Seed ... Box 160 ... Momence, IL 60954 ... 815-472-2433
 19. Dairyland Seed Co. ... PO Box 958 ... West Bend, WI 53095 ... 800-236-0163
 20. DEKALB Genetics Corp. ... 7665 Commerce Way, Suite 101 ... Eden Prairie, MN 55344 ... 612-934-2741
-
21. Discount Farm Center ... PO Box 84, West Hwy 212 ... Watertown, SD 57201 ... 605-886-5888
 22. Elk Mound Seed ... PO Box 187, 308 Railroad Ave. ... Elk Mound, WI 54739 ... 715-879-5556
 23. Fontanelle Hybrids ... 10981 8th St. ... Nickerson, NE 68044 ... 402-721-1410
 24. Fred Gutwein & Sons ... RR 1, Box 40 ... Francesville, IN 47946 ... 219-567-9141
 25. Golden Harvest Seeds ... 27420 137th Ave. N ... Cordova, IL 61242 ... 309-654-2234
Golden Harvest Seeds ... PO Box A, 100 J.C. Robinson Blvd. ... Waterloo, NE 68069 ... 402-779-2531
-
26. Golden Seed Co. LLC ... 251 West Main St. ... Wabasha, MN 55981 ... 612-565-2945
 27. Great Lakes Hybrids ... 19 Lamar Court ... North Mankato, MN 56003 ... 800-257-7333
 28. Greenwald Elevator ... 151 First Ave. S ... Greenwald, MN 56335 ... 612-937-3159
 29. Gutwein/Blaney Seeds ... RR1, Box 175 ... Sleepy Eye, MN 56085 ... 507-794-4203
 30. Harvest States Coop/GTA Feeds ... 17944 82nd Way ... Maple Grove, MN 55311 ... 612-420-7712
-
31. Hoegemeyer Hybrids ... Rte 2, Box 126 ... Hooper, NE 68031 ... 402-654-3399
 32. Hoffman Seeds ... 144 Main St. ... Landisville, PA 17538 ... 717-898-2261
 33. ICI Seeds/Garst Seeds ... PO Box 300 ... Coon Rapids, IA 50058 ... 800-831-1850
 34. Interstate Payco Seed Co. ... PO Box 70 ... Dassel, MN 55325 ... 320-286-5511
 35. Jung Seed Genetics ... 1229 NW 41st St. ... Rochester, MN 55901 ... 507-288-1930
Jung Seed Genetics ... 335 South High St. ... Randolph, WI 53957 ... 800-242-1855
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36. Kaltenberg Seed Farms Inc. ... 20155 Biscayne Ave. W ... Farmington, MN 55024 ... 612-463-8997
Kaltenberg Seed Farms Inc. ... PO Box 278 ... Waunakee, WI 53597 ... 608-849-5021
 37. Kaystar Seed ... Box 947 ... Huron, SD 57350 ... 800-288-8791
 38. Keltgen Seed Co. ... Box 209 ... Olivia, MN 56277 ... 800-535-8436
 39. La Crosse Seed Corp. ... PO Box 187 ... LaCrosse, WI 54601 ... 608-781-4848
 40. Lemke Seeds ... 10220 N Granville Rd. ... Mequon, WI 53092 ... 414-242-2647

Table 5 continued. Forage Seed Sources, 1997. Listed alphabetically.

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41. LG Seeds ... PO Box 216, 925 Dexter ... Prescott, WI 54021 ... 800-637-2887
42. Mallard Seed ... PO Box 637 ... Plainview, MN 55964 ... 507-534-2300
43. MBS Inc. ... 225 West 1st St. ... Story City, IA 50248 ... 515-733-5274
44. Midwest Seed Genetics ... PO Box 518 ... Carroll, IA 51401 ... 712-792-6691
45. Mycogen Plant Sciences ... 720 St. Croix ... Prescott, WI 54021 ... 800-321-2867
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46. NC+ Hybrids ... RR 2, Box 52 ... Sanborn, MN 56083 ... 507-648-3378
47. Norco Feeds ... PO Box 56 ... Norfolk, NE 68702 ... 800-658-4388
48. Northrup King Co. ... PO Box 959 ... Minneapolis, MN 55440 ... 612-593-7261
49. Oasis Seed ... P.O. Box 107 ... Oasis, WI 64650 ... 801-864-3614
50. Olds/Payco Seed Co. ... Box 7790 ... Madison, WI 53707 ... 800-356-7333
-
51. Patriot Seed, Inc. ... PO Box 97, 208 South Warrell ... Bowen, IL 62316 ... 217-842-5612
52. Peterson Seed Co., Inc. ... Box 346 ... Savage, MN 55436 ... 612-445-2606
53. Pioneer Hi-Bred Int'l, Inc. ... 130 Willmar Ave. SE ... Willmar, MN 56201 ... 320-235-7420
54. Premium Seed Co., Inc. ... 7800 E State Hwy 101 ... Shakopee, MN 55379 ... 612-496-1783
55. Producers Hybrids, Inc. ... Box C ... Battle Creek, NE 68715 ... 402-675-2975
-
56. R.J. Hunt Seed Co. ... RR 1, Box 112 ... Wadena, MN 56482 ... 218-631-4190
57. Renk Seed Company ... 6800 Wilburn Rd. ... Sun Prairie, WI 53590 ... 608-837-7351
58. Rosens Inc. ... 700 SW Hwy. 291, Suite 204 ... Liberty, MO 64068 ... 816-781-9191
59. Seed Mart, Inc. ... PO Box 126, 925 Dexter St. ... Prescott, WI 54021 ... 715-262-4430
60. Spangler Seeds ... 803 W. Racine St. ... Jefferson, WI 53549 ... 414-674-4606
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61. Specialty Seeds ... 26787 Hillhaven Drive ... Cold Spring, MN 56320 ... 612-685-4520
62. Top Farm Hybrids ... 17177 60th St. SW ... Cokato, MN 55321 ... 320-286-5516
63. Trelay Inc. ... 11623 Hwy 80 N ... Livingston, WI 53554 ... 800-421-0397
64. Tri-State Seed ... Box 354 ... Sleepy Eye, MN 56085 ... 507-794-3078
65. Twin Cities Seeds ... 7265 Washington Ave. S ... Edina, MN 55439 ... 612-944-7105
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66. W-L Research, Inc. ... 8701 W U.S. Hwy 14 ... Evansville, WI 53536 ... 608-882-4100
67. Wensman Seed Co. ... Box 190, 102 Aldrich Ave. SE ... Wadena, MN 56482 ... 218-631-2954
68. Werner Farm Seeds ... 3104 Millersburg Blvd. ... Dundas, MN 55019 ... 507-645-7995
69. Ziller Seed Co., Inc. ... RR 1, Box 122 ... Bird Island, MN 55310 ... 320-365-3674
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Alfalfa Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
Alone	60	199,000	11	50/square foot	Early spring to August 10
With grass			7	32/square foot	
