



## Alfalfa

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Yield is the single largest determinant of economic return per acre for alfalfa production. Selecting alfalfa varieties with high yield potential is fundamental to obtaining high yields. The yield advantage realized with good alfalfa varieties quickly trivializes their greater seed cost.

Yield potential of alfalfa varieties is evaluated in research trials at University of Minnesota Research and Outreach Centers and on cooperating farmers' fields. The trials are conducted using recommended fertility and pest control practices to optimize alfalfa yield and persistence.

Yield performance of tested varieties is presented as a percentage of check variety yields (average for Vernal, Oneida VR, and 5312). Test locations are in alfalfa production regions with different winter injury risk. They include Rosemount (Dakota Co.), Zumbro Falls



Locations of alfalfa trials.

(Wabasha Co.), Lamberton (Redwood Co.), St. Martin and Richmond (Stearns Co.), Underwood (Otter Tail Co.) and Grand Rapids (Itasca Co.). In addition, some alfalfa varieties are tested for forage quality at Rosemount.

Yield results for alfalfa varieties tested in current Minnesota yield trials (2006 to 2009 seeding years) are listed in Tables 1 through 5. Varieties in the current forage quality trial are listed in Table 6. Alfalfa variety seed marketers and matching web sites are provided in Table 7. Disease resistance information for alfalfa varieties is available on the web at [www.alfalfa.org](http://www.alfalfa.org).

### Winterhardiness and Winter Survival Index

Severe winters make winter hardiness a primary consideration in variety selection for most areas of Minnesota. Winterhardiness of varieties is difficult to determine because winter injury can occur as a result of weather events that cause varied responses in alfalfa plants of differing ages.

The best indicator of winter survival potential is the yield performance in the third production year after seeding. Fall dormancy rating, sometimes an indicator of winter survival potential, is available at [www.alfalfa.org](http://www.alfalfa.org).

When selecting alfalfa varieties for your farm, greatest winterhardiness is needed in west central and northwestern Minnesota (see winter injury potential map). East central and southeastern Minnesota also experience severe winters frequently. Southwestern Minnesota seldom experiences severe winter injury because of dry soils, high soil potassium levels and neutral soil pH. Because of dependable snow cover, Northeastern Minnesota seldom experiences severe winter injury.



### Forage Yield

Yield results for alfalfa varieties tested in current Minnesota trials are presented in Tables 1 to 5. Yields for many entries in 2009 were reduced because of a summer drought. Yields are expressed as a percentage of check variety yields; for example, '113' means the variety had 13% greater yield than the average of the check varieties. Within each table, varieties are ranked according to their average performance across ALL current trials in which they have been tested (2006 to 2008 seedings). Individual tables correspond to test results from different regions of Minnesota.

Greatest confidence should be placed in variety yield information that represents six or more site-years of testing (e.g. two years of yield data at each of three test sites). Each variety in the yield result tables has been formatted to reveal how many site-years of MN yield data have been collected. Varieties appearing in **bold** type have been tested in six or more site-years.

Varietal yield difference tends to increase with stand age. Thus, to choose a variety for short-term stands, consider yield performance the first and second years after seeding (e.g. yield performance in 2007 and 2008 for a 2006 seeding). For long-term stands, choose varieties based on their performance through the third year after seeding (e.g. 2009 yield for 2006 seeding).

## Forage Quality

While maturity is the greatest determinant of forage quality or feeding value of alfalfa, varieties also genetically differ in forage quality potential. Forage quality of alfalfa varieties in tests seeded in 2008 (four harvests) and 2009 (two harvests) in Minnesota are shown in Table 6a and 6b respectively. Production year evaluation (first year after seeding) was done by analyzing each of four cuttings taken at late bud to 1/10-bloom stages of maturity. Data are expressed as milk per ton of forage, milk per acre and relative forage quality (RFQ).

Milk per ton is calculated based on MILK2006 and combines crude protein, neutral detergent fiber (NDF), and NDF digestibility to predict milk production per ton of forage DM. In MILK2006, the intake of energy from forage for a 1,350-pound milking cow consuming a 30% NDF diet is calculated, and the cow's maintenance energy requirement then subtracted from energy intake to provide an estimate of energy available from forage for conversion to milk. Forage DM

yield multiplied by milk per ton of forage DM provides an estimate of milk produced per acre and combines yield and quality into a single term. For a technical discussion of NDFD and Milk2006, see: <http://www.uwex.edu/ces/forage/articles.htm#milk2000>.

Relative forage quality (RFQ) is an index with similar average and range as RFV but it includes NDF digestibility in estimates of DMI and TDN to calculate RFQ. For a technical discussion of RFQ, see: [www.uwex.edu/ces/crops/uwforage/RFQvsRFV.htm](http://www.uwex.edu/ces/crops/uwforage/RFQvsRFV.htm).

## Potato Leafhopper Tolerance

Potato leafhoppers (PLH) are usually the most damaging insect pest of alfalfa in Minnesota. Some alfalfa varieties have tolerance via inhibited PLH population growth and higher economic thresholds. Alfalfa varieties with greater than 50% resistance to PLH have an economic threshold three times higher than conventional varieties. Variety resistance to potato leaf hopper is available at [www.alfalfa.org](http://www.alfalfa.org).

Despite their potential for significant damage, PLH are not a problem in every harvest, year and region of Minnesota. PLH pressure is more consistent south and east of Minnesota.

## Disease Resistance

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 (races 1 and 2). Plant resistance for all six diseases is widely available, except for Aphanomyces race 2 for which only a few, but a growing number of, varieties have known resistance. Variety resistance ratings for each disease are available on the web at [www.alfalfa.org](http://www.alfalfa.org). Brown root rot is known to be present in Minnesota soils, but varietal resistance is currently unknown. While moderate resistance (MR) to a disease will provide protection to a variety under most conditions, either resistance (R) or high resistance (HR) is 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. While all varieties can benefit from improved disease resistance, it is especially important that varieties with less than Very Good (2.0) WSI have at least (R) levels of disease resistance to produce more than two years after the seeding year under intensive management (four cuts/season) in the east central and southeastern areas of Minnesota.

## Blends

Many companies sell blends, a mixture of two or more varieties, at a reduced price from named varieties. Blends may perform as well as the best varieties or may do very poorly. Disease resistance, yield, winter survival, and other characteristics may change within a blend from lot to lot or year to year as blend composition changes. Planting *certified* seed of adapted, high-yielding varieties best assures trueness to name.

**Table 1. Alfalfa variety yield as percentage of check varieties at Rosemount (Dakota County).**

Variety <sup>1</sup>	Marketer	Rosemount			
		2007 Seeding			2008 seeding
		2009	2008	2-Year Total	1-Year Total
4S417	Mycogen	—	—	—	118
HYBRIFORCE-2400	DairyLand	—	—	—	113
FSG 406	La Crosse	118	108	113	—
DKA43-13	Dekalb	—	—	—	108
FOREMOST II	Prairie	111	112	111	—
PHABULOUS III	Trelay Inc.	116	111	113	—
LIGHTNING IV	Jung	—	—	—	107
<b>AMERISTAND 407TQ</b>	<b>Am.Alf</b>	<b>101</b>	<b>109</b>	<b>106</b>	<b>106</b>
6431	Garst	—	—	—	104
<b>VELOCITY</b>	<b>NuTech</b>	—	—	—	<b>114</b>
SPRINGGOLD	Renk	111	108	109	—
<b>6417</b>	<b>Garst</b>	<b>112</b>	<b>106</b>	<b>109</b>	<b>106</b>
<b>55V48</b>	<b>Pioneer</b>	<b>117</b>	<b>110</b>	<b>113</b>	<b>108</b>
6415	Garst	—	—	—	103
LEGEND EXTRA	Legend	—	—	—	102
6426	Garst	110	106	108	—
CIMARRON	Great Plains	111	104	107	103
WL 322HQ	W-L	110	104	106	98
5312(check)	Pioneer	103	105	104	102
VERNAL(check)	Public	98	100	99	100
ONEIDA VR(check)	Public	99	94	96	99
<i>Checks, tons/acre as hay</i>		<i>4.7</i>	<i>6.1</i>	<i>10.8</i>	<i>6.0</i>
LSD (5%)		15	9	10	8

<sup>1</sup> Varieties are ranked according to their performance across all current trials. Bold varieties have been in Minnesota trials for more than 5 site-years.



**Table 3. Alfalfa variety yield as percentage of check varieties at Richmond (Stearns County) and Underwood ( Otter Tail County).**

Variety <sup>1</sup>	Marketer	Richmond			Underwood				2008 seeding 1-Year Total
		2007 Seeding			2006 Seeding				
		2009	2008	2-Year Total	2009	2008	2007	3-Year Total	
PROFUSE BR	Deer Creek	117	113	115	—	—	—	—	—
54V46	Pioneer	—	—	—	115	110	104	109	—
DKA43-13	Dekalb	—	—	—	—	—	—	—	113
MAGNUM VI	Dairyland	—	—	—	115	110	107	110	—
SUMMERGOLD	Renk	112	111	111	—	—	—	—	—
L333HD	Legacy	108	113	111	—	—	—	—	—
PERFORM	Dairyland	—	—	—	122	112	105	112	—
PHABULOUS III	Trelay Inc.	117	106	112	103	99	96	99	—
LIGHTNING IV	Jung	—	—	—	—	—	—	—	113
GENOA	NK Brand	—	—	—	112	104	104	106	—
PGI 459	Producer	—	—	—	—	—	—	—	110
<b>AMERISTAND 407TQ</b>	<b>Am.Alf</b>	<b>112</b>	<b>110</b>	<b>111</b>	<b>113</b>	<b>116</b>	<b>109</b>	<b>113</b>	—
6431	Garst	—	—	—	—	—	—	—	111
<b>VELOCITY</b>	<b>NuTech</b>	—	—	—	—	—	—	—	<b>108</b>
SPRINGGOLD	Renk	116	116	116	—	—	—	—	—
<b>6417</b>	<b>Garst</b>	<b>122</b>	<b>114</b>	<b>118</b>	—	—	—	—	<b>99</b>
WL 363 HQ	W-L	—	—	—	—	—	—	—	110
WL 343HQ	W-L	116	111	113	107	104	100	103	94
<b>55V48</b>	<b>Pioneer</b>	<b>115</b>	<b>109</b>	<b>112</b>	—	—	—	—	<b>110</b>
6443 RR	Garst	—	—	—	105	101	98	101	—
6400 HT	Garst	105	109	107	104	99	102	101	—
6415	Garst	—	—	—	103	103	98	101	—
53Q30	Pioneer	—	—	—	97	89	95	93	—
420 PLUS	Mustang	—	—	—	—	—	—	—	98
6200 HT	Garst	—	—	—	98	95	99	97	—
5312(check)	Pioneer	104	105	104	102	104	106	104	105
VERNAL(check)	Public	100	100	100	96	99	99	98	92
ONEIDA VR(check)	Public	97	95	96	101	97	96	98	103
<i>Checks, tons/acre as hay</i>		<i>7.6</i>	<i>7.9</i>	<i>15.4</i>	<i>3.5</i>	<i>5.2</i>	<i>6.0</i>	<i>14.7</i>	<i>3.3</i>
LSD 5%		8	10	7	15	14	11	11	20

<sup>1</sup>Varieties are ranked according to their performance across all current trials. Bold varieties have been in Minnesota trials for more than 5 site-years.

**Table 4. Alfalfa variety yield as percentage of check varieties at Grand Rapids (Itasca County).**

Variety <sup>1</sup>	Marketer	Grand Rapids		
		2007 Seeding		
		2009	2008	2-Year Total
<b>AMERISTAND 407TQ</b>	<b>Am.Alf</b>	<b>105</b>	<b>96</b>	<b>100</b>
<b>6417</b>	<b>Garst</b>	<b>97</b>	<b>98</b>	<b>97</b>
<b>55V48</b>	<b>Pioneer</b>	<b>99</b>	<b>96</b>	<b>98</b>
5312(check)	Pioneer	107	101	104
VERNAL(check)	Public	96	100	98
ONEIDA VR(check)	Public	97	99	98
<i>Checks, tons/acre as hay</i>		<i>5.5</i>	<i>5.5</i>	<i>10.9</i>
LSD 5%		6	ns	2

<sup>1</sup>Varieties are ranked according to their performance across all current trials. Bold varieties have been in Minnesota trials for more than 5 site-years.

**Table 5. Seeding year alfalfa variety yields as a percentage of check varieties at Rosemount (Dakota County), Lamberton (Redwood County) and St. Martin (Stearns County)**

Variety <sup>1</sup>	Marketer	Rosemount	Lamberton	St. Martin
FSG 329	Farm Science	—	—	112
DKA43-13	Dekalb	—	103	111
4S417	Mycogen	104	103	107
HYBRIFORCE 807	DairyLand Research	100	105	—
KINGFISHER 243	Byron Seed	—	—	101
REBOUND 5.0	Croplan	101	—	—
FSG 420LH	Farm Science	101	—	—
<b>AMERISTAND 407TQ</b>	<b>Am.Alf</b>	<b>100</b>	<b>100</b>	<b>101</b>
HYBRIFORCE-2400	DairyLand	106	95	—
CHESAPEAKE	Dahlco	98	105	97
WL 363 HQ	W-L	100	—	—
AMERISTAND 403T PLUS	Am. Alf.	98	102	98
LEGENDAIRY 5.0	CROPLAN	—	—	98
<b>55V48</b>	<b>Pioneer</b>	<b>99</b>	<b>99</b>	<b>95</b>
<b>VELOCITY</b>	<b>NuTech</b>	<b>90</b>	<b>100</b>	<b>97</b>
64Q22	Garst	99	101	84
CIMARRON	Great Plains	106	—	—
5312(check)	Pioneer	101	102	101
VERNAL(check)	Public	101	100	101
ONEIDA VR(check)	Public	98	98	98
WL 322HQ	W-L	94	—	—
Checks, tons/acre as hay		3.8	2.5	3.8
LSD 5%		12	14	16

<sup>1</sup> Varieties are ranked according to their performance across all current seeding year trials.

Bold varieties have been in Minnesota trials for more than 5 site-years.

**Table 6a. Alfalfa variety dry matter yield, milk production (expressed as percent of Vernal), RFQ index, CP and NDF (% dry matter), and NDFD (% NDF); 2009 season totals and weighted averages from a trial seeded in 2008 at Rosemount.**

Variety, listed in descending order of milk production	DM Yield <sup>1</sup> Ton/ Acre	Milk, (% of Vernal) <sup>2</sup>		RFQ <sup>3</sup> , Index	CP <sup>3</sup> , % dm	NDF <sup>3</sup> , % dm	NDFD <sup>4</sup> , % NDF
		Lb/ Acre	Lb/ Ton				
VELOCITY	5.9	121	107	175	20.8	35.5	42.5
DKA 43-13	5.6	114	105	167	20.5	36.3	42.3
6417	5.5	112	105	169	21.0	35.8	41.5
6431	5.4	110	106	172	21.3	35.8	43.3
6415	5.3	109	105	173	21.0	35.5	42.3
WL 322 HQ	5.1	104	107	175	21.5	35.0	42.8
CIMARRON	5.3	104	101	154	19.8	38.3	40.3
VERNAL	5.2	100	100	147	19.3	39.0	40.0
Vernal, actual values	5.2	14,580	2,817	147	19.3	39.0	40.0
Mean	5.4	109	104	167	20.6	36.4	41.8
LSD ( 5%)	0.4	8	4	15	1.1	1.7	3.1
CV (%)	5.0	5.3	4.2	6.1	3.5	3.2	5.1

<sup>1</sup> A seasonal 4-harvest total taken 2009.

<sup>2</sup> Milk production (pounds milk per acre and ton) are predicted using the MILK2006 spreadsheet, version milk2006alfalfagrass, developed at the University of Wisconsin.

<sup>3</sup> RFQ = relative forage quality index; CP = % crude protein; and NDF = % neutral detergent fiber. Variables expressed as average concentration for the season.

<sup>4</sup> NDFD = neutral detergent fiber digestibility, expressed as % NDF concentration.

**Table 6b. Alfalfa variety dry matter yield, milk production (expressed as percent of Vernal), RFQ index, CP and NDF (% dry matter), and NDFD (% NDF); 2009 season totals and weighted averages from a trial seeded in 2009 at Rosemount.**

Variety, listed in descending order of milk production	DM Yield <sup>1</sup> Ton/ Acre	Milk, (% of Vernal) <sup>2</sup>		RFQ <sup>3</sup> , Index	CP <sup>3</sup> , % dm	NDF <sup>3</sup> , % dm	NDFD <sup>4</sup> , % NDF
		Lb/ Acre	Lb/ Ton				
CIMARRON	3.5	104	99	169	19.9	38.4	49.2
VERNAL	3.3	100	100	170	19.6	38.6	50.3
WL 322HQ	3.1	96	102	179	21.2	36.4	48.9
exp. 2302	3.1	95	103	186	21.0	35.9	50.5
VELOCITY	2.9	90	101	181	20.1	37.3	52.2
exp. 2314	2.7	85	104	191	20.9	36.2	54.1
Vernal, actual values	3.3	10,023	3,029	170	19.6	38.6	50.3
Mean	3.1	95	102	179	20.4	37.1	50.8
LSD ( 5%)	0.3	19	5	21	1.4	2.7/ns	5.8/ns
CV (%)	9.3	12.9	2.9	7.7	4.7	4.8	7.6

<sup>1</sup> A seasonal 2-harvest total taken 2009.

<sup>2</sup> Milk production (pounds milk per acre and ton) are predicted using the MILK2006 spreadsheet, version milk2006alfalfagrass, developed at the University of Wisconsin.

<sup>3</sup> RFQ = relative forage quality index; CP = % crude protein; and NDF = % neutral detergent fiber. Variables expressed as average concentration for the season.

<sup>4</sup> NDFD = neutral detergent fiber digestibility, expressed as % NDF concentration.

**Table 7. 2009 forage seed sources.**

Marketer	Company	Web URL
Albert Lea	Albert Lea Seed House	<a href="http://www.alseed.com">www.alseed.com</a>
Allied	Allied Seed	<a href="http://www.alliedseed.com">www.alliedseed.com</a>
Am. Alf.	America's Alfalfa	<a href="http://www.americasalfalfa.com">www.americasalfalfa.com</a>
Barenburg	Barenburg Midwest	<a href="http://www.barusa.com">www.barusa.com</a>
BioPlant	BioPlant Research	P.O. Box 320, Camp Point, IL 62320, 800-593-7708
Byron Seed	Byron Seed	<a href="http://www.bestforage.com/">www.bestforage.com/</a>
Croplan	Croplan Genetics	<a href="http://www.croplangenetics.com">www.croplangenetics.com</a>
Dahlco	Dahlco Seed	<a href="http://www.dahlco.com">www.dahlco.com</a>
Dairyland	Dairyland Seed Co.	<a href="http://www.dairylandseed.com">www.dairylandseed.com</a>
Deer Creek	Deer Creek Seed	<a href="http://www.deercreekseed.com/index.html">www.deercreekseed.com/index.html</a>
Dekalb	AsgrowDekalb	<a href="http://www.asgrowanddekalb.com/web">www.asgrowanddekalb.com/web</a>
Farm Science	Farm Science Genetics	<a href="http://www.farmsciencegenetics.com/">www.farmsciencegenetics.com/</a>
FFR	FFR Cooperative	<a href="http://www.ffrcoop.org">www.ffrcoop.org</a>
Garst	Garst Seed Co.	<a href="http://www.garstseed.com">www.garstseed.com</a>
Golden Harv.	JC Robinson Seeds/Golden Harvest	<a href="http://www.goldenharvestseeds.com">www.goldenharvestseeds.com</a>
Jung	Jung Seed Genetics	<a href="http://www.jungseedgenetics.com">www.jungseedgenetics.com</a>
La Crosse	LaCrosse Forage and Turf	<a href="http://www.lftseed.com">www.lftseed.com</a>
Legacy	Legacy Seeds, Inc.	<a href="http://www.legacyseeds.com">www.legacyseeds.com</a>
Legend	Legend Seeds	<a href="http://www.legendseeds.com">www.legendseeds.com</a>
LG Seeds	LG Seeds	<a href="http://www.lgseeds.com">www.lgseeds.com</a>
Mallard	Mallard Seed	<a href="http://www.mallardseed.com">www.mallardseed.com</a>
Mustang	Mustang Seeds	<a href="http://www.mustangseeds.com">www.mustangseeds.com</a>
Mycogen	Mycogen Seeds	<a href="http://www.mycogen.com">www.mycogen.com</a>
NC+	NC+ Hybrids	<a href="http://www.nc-plus.com">www.nc-plus.com</a>
NK Brand	NK Brand	<a href="http://www.nk-us.com">www.nk-us.com</a>
NuTech	NuTech Seed	<a href="http://www.nutechseed.com">www.nutechseed.com</a>
Pioneer	Pioneer Hi-Bred International	<a href="http://www.pioneer.com">www.pioneer.com</a>
Prairie	Prairie Brand	<a href="http://www.prairiebrandseed.com/index.html">www.prairiebrandseed.com/index.html</a>
Producer	Producer's Choice	<a href="http://www.producerschoiceseed.com">www.producerschoiceseed.com</a>
Renk	Renk Seed Co.	<a href="http://www.renkseed.com">www.renkseed.com</a>
Trelay Inc.	Trelay Inc.	<a href="http://www.trelay.com">www.trelay.com</a>
W-L	W-L Research, Inc.	<a href="http://www.wlresearch.com">www.wlresearch.com</a>
Ziller	Ziller Seed Co. Inc.	<a href="http://www.zillerseed.com">www.zillerseed.com</a>
U of MN	University of Minnesota Forages	<a href="http://www.extension.umn.edu/forages/">http://www.extension.umn.edu/forages/</a>