

Alfalfa

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Yield is the single largest determinant of 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 trial plots at University of Minnesota Research and Outreach Centers and on cooperating farmers' fields. 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 representative of the



Locations of alfalfa trials.

variable winter injury risk in different regions of Minnesota. Test locations include Rosemount (Dakota Co.), Zumbro Falls (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 (2004 to 2007 seeding years) are listed in Tables 1 through 4.

Varieties in current forage quality and potato leafhopper trials are listed in Tables 5 and 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.

Winterhardiness and Winter Survival Index

Severe winters make winterhardiness 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 many different weather events that cause varied responses in alfalfa plants of differing ages. A standardized test, the North American Alfalfa Improvement Conference (NAAIC) Winter Survival Test, measures the survival of a variety after a severe winter.

The WSI for each tested variety was averaged over all test locations and years to provide a robust estimate of winterhardiness and is presented beside the yield data in Tables 1 through 4. Varieties are rated from Superior (WSI=1) to No Survival (WSI=6) for winter survival ability. Vernal, a traditional winterhardy variety, is rated Very Good (WSI=2). After a severe winter, injury is expected for varieties rated Adequate (WSI=4).



All varieties tested to date have rated above Adequate. If a variety does not have a WSI, the company has not entered the variety in the Winter Survival Trial. If a WSI number is not available, yield performance in the third production year after seeding may be the next best indicator of winter survival potential. Fall dormancy rating used to be a good indicator of winter survival potential, but this is no longer the case with modern varieties.

When selecting alfalfa varieties for your farm, greatest winterhardiness is needed in west central and northwestern Minnesota (see winter injury potential map). Because of the high frequency of severe winters only varieties with at least Very Good (WSI~2) winter survival should be selected in these areas. East central and southeastern Minnesota also frequently experience severe winters. Southwestern Minnesota seldom experiences severe winter injury because of dry soils, high soil potassium levels and neutral soil pH. Northeastern Minnesota seldom experiences severe winter injury because of dependable snow cover.

Forage Yield

Yield results for alfalfa varieties tested in current Minnesota trials are presented in Tables 1 to 4. Yields are expressed as a percentage of check variety yields; for example,

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

Variety, in descending order of average performance over all current Minn. trials. **Bold** varieties have been in Minn. trials for more than 5 site-years.

Variety	Marketer	WSI	2004 Seeding, Harvest Years				2005 Seeding, Harvest Years			2006 Seeding, Harvest Year	Total Years, Average
			2007	2006	2005	3-Year Total	2007	2006	2-Year Total	1-Year Total	
<i>Checks, Tons/Ac as Hay</i>			<i>6.4</i>	<i>7.2</i>	<i>6.9</i>	<i>20.5</i>	<i>7.2</i>	<i>6.6</i>	<i>13.8</i>	<i>6.7</i>	<i>6.5</i>
45419	DairyLand	-	-	-	-	-	120	112	116	-	113
L-311	Legacy	-	-	-	-	-	115	112	113	-	113
LIGHTNING III	Jung	2.5	108	119	105	111	-	-	-	-	112
REBOUND 5.0	CropLan	2.5	108	110	103	107	-	-	-	-	112
WL 348 AP	W-L	2.0	-	-	-	-	108	114	111	-	111
MARVEL	Albert Lea	-	-	-	-	-	112	110	111	-	111
ESCALADE	Allied	-	-	-	-	-	111	110	111	-	111
MARINER III	Allied	-	-	-	-	-	-	-	-	110	110
6415	Garst	2.0	112	117	106	112	111	104	108	98	110
MILESTONE	FFR	-	-	-	-	-	111	111	111	-	110
MAGNUM VI	DairyLand	-	-	-	-	-	-	-	-	113	109
GENOA	NK Brand	2.0	100	111	100	104	-	-	-	109	109
SUMMERGOLD	Renk	-	110	113	102	109	-	-	-	-	109
PERFORM	DairyLand	-	-	-	-	-	-	-	-	106	109
6420	Garst	-	-	-	-	-	104	106	105	-	108
ENFORCER	FFR	-	-	-	-	-	109	105	107	-	107
54V46	Pioneer	3.0	104	110	102	105	116	115	115	102	107
INTEGRITY	PGI	-	-	-	-	-	112	109	110	-	107
GOLDLEAF	Albert Lea	3.0	-	-	-	-	106	106	106	-	106
DKA42-15	DeKalb	2.5	107	107	102	106	-	-	-	-	106
5312	Check	-	105	106	102	105	105	103	104	107	105
PHABULOUS II	Trelay	-	104	104	106	105	-	-	-	-	105
54Q25	Pioneer	-	103	110	99	104	-	-	-	-	105
53Q30	Pioneer	-	-	-	-	-	108	111	109	107	105
LEGENDAIRY 5.0	CropLan	3.0	97	103	97	100	-	-	-	-	105
8630	Mallard	-	-	-	-	-	103	103	103	-	104
JADE III	NC+	2.0	104	107	102	104	-	-	-	-	104
DKA41-18RR	DeKalb	-	-	-	-	-	-	-	-	102	104
ABUNDANCE	Ziller	3.5	102	108	100	104	-	-	-	-	104
MACON	Allied	-	104	105	101	104	-	-	-	-	103
6400 HT	Garst	2.5	109	107	101	106	108	105	106	-	103
DKA34-17RR	DeKalb	-	-	-	-	-	-	-	-	103	103
VIKING 357	Allied	-	-	-	-	-	102	101	102	-	102
6443 RR	Garst	-	-	-	-	-	-	-	-	102	102
Wyo. BRR - Resistant	Public	-	101	101	107	103	-	-	-	-	101
6200 HT	Garst	2.0	96	100	99	99	-	-	-	-	101
4R429	Mycogen	4.0	93	105	91	97	-	-	-	-	100
STAMPEDE	Allied	-	-	-	-	-	100	101	100	-	100
WL 343 HQ	W-L	-	-	-	-	-	-	-	-	98	100
HYBRIFORCE-420/WET	DairyLand	3.0	92	98	96	95	-	-	-	-	99
VERNAL	Check	2.0	107	101	104	104	99	100	99	99	99
BARALFA 42 IQ	Barenbrug	2.0	-	-	-	-	99	95	97	-	97
VIKING 357	Albert Lea	-	94	105	91	97	-	-	-	-	97
SHAW	Albert Lea	-	93	97	98	96	-	-	-	-	96
ONEIDA VR	Check	-	88	92	94	92	97	97	97	94	96
LSD 5%		-	20	10	7	10	14	9	10	11	

Table 2. Alfalfa variety yield as percentage of check varieties at Zumbro Falls (Wabasha County), Lamberton (Redwood County) and St. Martin (Stearns County).

Variety, in descending order of average performance over all current Minn. trials. Bold varieties have been in Minn. trials for more than 5 site-years.			Zumbro Falls		Lamberton			St. Martin			Total Years, Average
Marketer	WSI		2006 Seeding		2005 Seeding		2005 Seeding				
			1-Year Total		2007	2006	2-Year Total	2007	2006	2-Year Total	
<i>Checks, Tons/Ac as Hay</i>			5.7		6.6	8.3	14.9	6.7	6.8	13.6	6.5
LABRADOR	Dahlco	-	-	-	-	-	-	114	114	114	114
4S419	DairyLand	-	-	-	119	102	110	115	112	114	113
DKA33-16	DeKalb	-	-	-	-	-	-	114	109	112	112
L447HD	Legacy	-	112	-	-	-	-	-	-	-	112
SOMERSET	NK Brand	2.5	-	-	-	-	-	115	108	112	112
REBOUND 5.0	CropLan	2.5	-	-	120	100	109	-	-	-	112
6415	Garst	2.0	108	-	119	105	111	117	113	115	110
MILESTONE	FFR	-	-	-	114	105	109	-	-	-	110
MAGNUM VI	DairyLand	-	107	-	-	-	-	-	-	-	109
GENOA	NK Brand	2.0	108	-	127	103	113	113	112	113	109
PERFORM	DairyLand	-	105	-	118	109	113	-	-	-	109
6420	Garst	-	-	-	111	105	108	110	111	110	108
GH727	Golden Harv.	-	108	-	-	-	-	-	-	-	108
WL 357 HQ	W-L	2.0	-	-	113	97	104	112	108	110	108
AMERISTAND 407TQ	Am. Alf.	-	106	-	-	-	-	-	-	-	108
54V46	Pioneer	3.0	106	-	115	104	109	110	114	112	107
INTEGRITY	ABI	-	-	-	109	96	102	-	-	-	107
5312	Check	-	105	-	101	103	102	108	106	107	105
4A421	Mycogen	2.5	103	-	-	-	-	-	-	-	105
53Q30	Pioneer	-	105	-	113	96	104	112	107	110	105
LEGENDAIRY 5.0	CropLan	3.0	-	-	-	-	-	115	109	112	105
8630	Mallard	-	-	-	105	100	102	109	108	108	104
DKA41-18RR	DeKalb	-	106	-	-	-	-	-	-	-	104
6400 HT	Garst	2.5	-	-	107	95	100	98	103	101	103
6443 RR	Garst	-	104	-	-	-	-	-	-	-	102
4G418RR	Mycogen	-	101	-	-	-	-	-	-	-	101
6200 HT	Garst	2.0	-	-	-	-	-	101	103	102	101
PHABULOUS III	Trelay	-	105	-	-	-	-	-	-	-	100
4R429	Mycogen	4.0	-	-	-	-	-	104	109	106	100
WL 343 HQ	W-L	-	101	-	-	-	-	-	-	-	100
VERNAL	Check	2.0	98	-	99	96	97	96	97	97	99
ONEIDA VR	Check	-	97	-	100	100	100	95	97	96	96
LSD 5%		-	8	-	10	7	6	8	8	7	

Table 3. Alfalfa variety yield as percentage of check varieties at Underwood (Otter Tail County) and Grand Rapids (Itasca County).

Variety, in descending order of average performance over all current Minn. trials. Bold varieties have been in Minn. trials for more than 5 site-years.			Underwood					Grand Rapids			Total Years, Average
Marketer	WSI		2004 Seeding		2006 Seeding	3-Year Total	2005 Seeding				
			2007	2006	2005		1-Year Total	2007	2006	2-Year Total	
<i>Checks, Tons/Ac as Hay</i>			7.3	8.9	7.6	23.8	6.0	2.2	3.4	5.5	6.5
LIGHTNING III	Jung	2.5	123	112	107	114	-	-	-	-	112
REBOUND 5.0	CropLan	2.5	123	119	111	118	-	-	-	-	112
EXTREME	LG Seeds	-	112	110	110	111	-	-	-	-	111
6415	Garst	2.0	120	119	108	116	98	-	-	-	110
BOBWHITE	NC+	-	109	113	104	109	-	-	-	-	109
MAGNUM VI	DairyLand	-	-	-	-	-	107	-	-	-	109
GENOA	NK Brand	2.0	-	-	-	-	104	-	-	-	109
FSG 351	La Crosse	-	112	106	108	108	-	-	-	-	109

Table 3 (continued). Alfalfa variety yield as percentage of check varieties at Underwood (Otter Tail County) and Grand Rapids (Itasca County).

Variety, in descending order of average performance over all current Minn. trials. Bold varieties have been in Minn. trials for more than 5 site-years.		Marketer	WSI	Underwood				Grand Rapids			Total Years, Average
				2004 Seeding		2006 Seeding		2005 Seeding			
				2007	2006	2005	3-Year Total	1-Year Total	2007	2006	
<i>Checks, Tons/Ac as Hay</i>			7.3	8.9	7.6	23.8	6.0	2.2	3.4	5.5	6.5
PERFORM	DairyLand	-	-	-	-	-	105	-	-	-	109
FSG 408DP	La Crosse	-	111	106	108	108	-	-	-	-	108
AMERISTAND 407TQ	Am. Alf.	-	-	-	-	-	109	-	-	-	108
WL 319 HQ	W-L	1.5	109	110	102	107	-	-	-	-	107
54V46	Pioneer	3.0	118	109	102	110	104	84	97	92	107
5312	Check	-	105	104	104	104	106	110	110	110	105
4A421	Mycogen	2.5	-	-	-	-	-	100	112	107	105
54Q25	Pioneer	-	105	105	106	106	-	-	-	-	105
53Q30	Pioneer	-	-	-	-	-	95	89	111	102	105
LEGENDAIRY 5.0	CropLan	3.0	119	111	96	108	-	97	101	99	105
6400 HT	Garst	2.5	105	106	107	106	102	86	101	96	103
6443 RR	Garst	-	-	-	-	-	98	-	-	-	102
Wyo. BRR - Resistant	Public	-	99	99	99	99	-	-	-	-	101
6200 HT	Garst	2.0	105	94	101	100	99	107	103	105	101
PHABULOUS III	Trelay	-	-	-	-	-	96	-	-	-	100
A 30-06	Producer	2.0	104	94	101	99	-	-	-	-	100
WL 343 HQ	W-L	-	-	-	-	-	100	-	-	-	100
HYBRIFORCE-420/WET	DairyLand	3.0	103	105	102	103	-	-	-	-	99
VERNAL	Check	2.0	100	97	98	98	99	101	95	97	99
ONEIDA VR	Check	-	95	100	97	97	96	89	95	93	96
LSD 5%		-	9	13	11	8	11	22	12	13	

Table 4. Seeding year alfalfa variety yields as a percentage of check varieties at Rosemount, Lamberton, St. Martin and Underwood.

Variety, in descending order of average performance over all current Minn. trials. Bold varieties have been in Minn. trials for more than 5 site-years.		Marketer	WSI	Rosemount	Lamberton	St. Martin	Total Years, Average
				2007 Seeding	2007 Seeding	& Underwood	
				Seed Year Total	Seed Year Total	2007 Seeding	
<i>Checks, Tons/Ac as Hay</i>			3.1	3.3	3.2	3.2	
L333HD	Legacy	-	-	-	110	110	
SUMMERGOLD	Renk	-	-	-	108	108	
6417	Garst	-	100	102	121	108	
PHABULOUS III	Trelay	-	103	-	110	107	
FSG 406	La Crosse	2.0	104	-	-	104	
SPRINGGOLD	Renk	-	100	100	110	103	
5312	Check	-	104	103	98	102	
FOREMOST II	Sansgaard	-	101	-	-	101	
VERNAL	Check	2.0	97	100	104	101	
6426	Garst	-	108	89	-	98	
ONEIDA VR	Check	-	98	96	97	97	
AMERISTAND 407TQ	Am. Alf.	-	-	-	95	95	
6415	Garst	2.0	-	94	-	94	
6400 HT	Garst	2.5	-	-	94	94	
WL 343HQ	W-L	-	-	-	92	92	
55V48	Pioneer	-	93	87	96	92	
LSD 5%		-	9	ns	26		

Table 5a. Alfalfa variety dry matter yield, milk production (expressed as percent of Vernal), RFQ index, CP and NDF (% dry matter), NDFD (% NDF); 2007 season totals¹ and weighted averages from a trial seeded in 2006 at Rosemount, Minn.

Variety, listed in descending order of milk production	DM Yield Ton/Acre	Milk, (% vernal) ²		RFQ ³ Index	CP ³ , % DM	NDF ³ , % DM	NDFD ⁴ , % NDF
		Lb/Acre	Lb/Ton				
53Q30	6.1	107	103	156	21.9	40.6	49.2
Experimental 1 ⁵	5.9	104	102	151	21.6	42.1	49.8
6415	5.9	101	100	147	20.7	42.4	48.7
VERNAL	5.9	100	100	145	20.8	42.9	49.4
CIMARRON	5.7	97	99	142	20.9	43.5	48.8
WL 322 HQ	5.4	96	103	156	22.0	40.1	48.5
Vernal, actual values	5.9	16,700	2,830	145	20.8	42.9	49.4
Mean	5.8	101	101	150	21.3	41.9	49.1
LSD (0.05)	ns	ns	2	6	0.5	1.6	ns
CV (%)	7	6	1	3	2	3	2

¹ Three-harvest total taken on 31 May, 9 July and 21 August in 2007.

² Milk production (pounds milk per acre and ton) are predicted using spreadsheet MILK2000 version 7.54, University of Wisconsin, expressed as % Vernal.

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

⁴ NDFD=neutral detergent fiber digestibility, expressed as % NDF concentration.

⁵ Entered as experimental germplasm by alfalfa breeder.

Table 5b. Alfalfa variety dry matter yield, milk production (expressed as percent of Vernal), RFQ index, CP and NDF (% dry matter), NDFD (% NDF); 2007 season totals¹ and weighted averages from a trial seeded in 2007 at Rosemount, Minn.

Variety, listed in descending order of milk production	DM Yield Ton/Acre	Milk, (% vernal) ²		RFQ ³ Index	CP ³ , % DM	NDF ³ , % DM	NDFD ⁴ , % NDF
		Lb/Acre	Lb/Ton				
Experimental 2 ⁵	2.9	117	106	172	22.9	37.7	51.0
CIMARRON	2.8	107	100	151	21.5	41.1	49.6
WL 322 HQ	2.6	107	105	173	23.4	37.2	50.2
Experimental 3 ⁵	2.7	106	106	175	23.3	37.2	51.3
SPRINGGOLD	2.7	106	108	182	23.7	36.2	51.7
6417	2.7	105	105	174	22.6	37.0	50.2
VERNAL	2.5	100	100	155	22.3	40.5	49.8
Vernal, actual values	2.5	7,100	2,850	155	22.3	40.5	49.8
Mean	2.7	107	104	169	22.8	38.1	50.5
LSD (0.05)	0.2	11	3	14	1.2	2.3	1.5
CV (%)	4	7	2	6	4	4	2

¹ Two-harvest total taken on 9 July and 27 August in 2007.

² Milk production (pounds milk per acre and ton) are predicted using spreadsheet MILK2000 version 7.54, University of Wisconsin.

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

⁴ NDFD=neutral detergent fiber digestibility, expressed as % NDF concentration.

⁵ Entered as experimental germplasm by alfalfa breeder.

Table 6. 2006-2007 regional alfalfa yield trial for potato-leafhopper-resistant varieties.

Conducted at S. Charleston, Ohio, and Ames, Iowa, seeded spring 2006.

Variety	Marketer	Yield ¹ Tons/acre	PLH Yield Index ² %
<i>Resistant</i>			
53H92	Pioneer	1.20*	45
4P424	Mycogen Seeds	1.15*	38
6426PLH	Garst Seed	1.14*	37
EVERGREEN ³	NK Brand Seed	1.09*	30
54H91	Pioneer	1.06*	28
GH773LH	Goldern Harvest Seeds	1.04*	25
<i>Susceptible Checks³</i>		0.83	
LSD (0.05)		0.10	

* Yield is significantly greater than yield of the susceptible check varieties.

¹ Average yield at 10 harvests across both locations in 2006 and 2007 when potato-leafhoppers caused significant injury to alfalfa.

² The % yield improvement over the yield of susceptible check varieties.

³ Average yield of two susceptible varieties (5454, DK140).

Table 7. 2007 forage seed sources.

Marketer	Company	Web URL
Albert Lea	Albert Lea Seed House	www.alseed.com
Allied	Allied Seed	www.alliedseed.com
Am. Alf.	America's Alfalfa	www.americasalfalfa.com
Barenburg	Barenburg Midwest	www.barusa.com
Croplan	CROPLAN Genetics	www.croplangenetics.com
Dahlco	Dahlco Seed	www.dahlco.com
Dairyland	Dairyland Seed Co.	www.dairylandseed.com
Dekalb	AsgrowDekalb	www.asgrowanddekalb.com/web
FFR	FFR Cooperative	www.ffrcoop.org
Garst	Garst Seed Co.	www.garstseed.com
Golden Harvest	JC Robinson Seeds/Golden Harvest	www.goldenharvestseeds.com
Jung	Jung Seed Genetics	www.jungseedgenetics.com
La Crosse	La Crosse Forage & Turf Seed Corp.	www.lftseed.com
Legacy	Legacy Seeds, Inc.	www.legacyseeds.com
LG Seeds	LG Seeds	www.lgseeds.com
Mallard	Mallard Seed	www.mallardseed.com
Mycogen	Mycogen Seeds	www.mycogen.com
NC+	NC+ Hybrids	www.nc-plus.com
NK Brand	NK Brand	www.nk-us.com
Producer	Producer's Choice	www.producerschoiceseed.com
Pioneer	Pioneer Hi-Bred International, Inc.	www.pioneer.com
Renk	Renk Seed Co.	www.renkseed.com
Prairie	Prairie Brand	www.prairiebrandseed.com/index.html
Trelay Inc.	Trelay Inc.	www.trelay.com
W-L	W-L Research, Inc.	www.wlresearch.com
Ziller	Ziller Seed Co. Inc.	www.zillerseed.com
U of MN	University of Minnesota Forages	http://www.extension.umn.edu/forages/