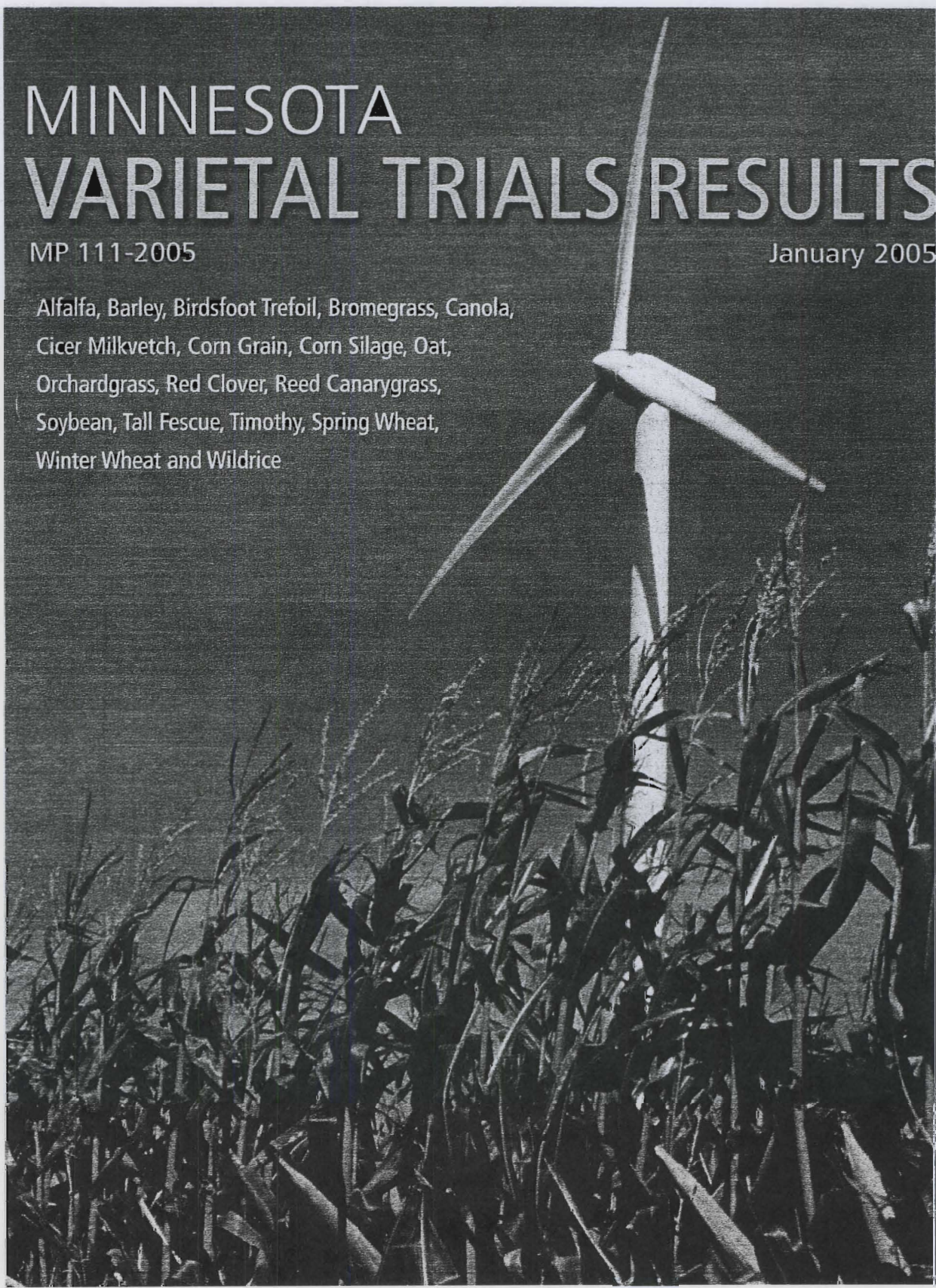


# MINNESOTA VARIETAL TRIALS RESULTS

MP 111-2005

January 2005

Alfalfa, Barley, Birdsfoot Trefoil, Bromegrass, Canola,  
Cicer Milkvetch, Corn Grain, Corn Silage, Oat,  
Orchardgrass, Red Clover, Reed Canarygrass,  
Soybean, Tall Fescue, Timothy, Spring Wheat,  
Winter Wheat and Wildrice



# 2005

## January

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

## February

S	M	T	W	T	F	S
						1
		2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

## March

S	M	T	W	T	F	S
						1
		2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

## April

S	M	T	W	T	F	S
						1
					2	
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## May

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

## June

S	M	T	W	T	F	S
						1
					2	3
					4	
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

## July

S	M	T	W	T	F	S
						1
					2	
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

## August

S	M	T	W	T	F	S
						1
					2	3
					4	5
					6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

## September

S	M	T	W	T	F	S
						1
					2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

## October

S	M	T	W	T	F	S
						1
						2
						3
						4
						5
						6
						7
						8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

## November

S	M	T	W	T	F	S
						1
						2
						3
						4
						5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

## December

S	M	T	W	T	F	S
						1
						2
						3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

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The information in this miscellaneous publication of the Minnesota Agricultural Experiment Station (MAES) is presented under authority granted by the Hatch Act of 1887 to conduct performance trials on farm crops and interpret data to the public.

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Data in this publication are preliminary. A current version of this varietal trials

report is maintained on the MAES web site at [www.maes.umn.edu](http://www.maes.umn.edu) Electronic versions of some reports of past years on these and other crops can also be found there.

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*By Charles C. Muscoplat  
Vice President and Dean,  
College of Agricultural, Food  
and Environmental Sciences,  
and Director, Minnesota  
Agricultural Experiment Station*

## ***The University of Minnesota***

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### ***Developing Untapped Resources***

**I**n 1803, President Thomas Jefferson completed one of the greatest real estate deals in history. He paid France less than three cents an acre for the 828,000 square miles of land stretching from the Mississippi delta to Minnesota.

That land was an untapped resource. Since 1851, one of the University of Minnesota's jobs has been to provide research and education that generate food, jobs and meaningful lives for the persons living on that three-cent-an-acre land.

The booklet you hold in your hand is one example of our ongoing efforts to find the best ways to use the soil, water and solar resources in our region.

The role of a great university is to look over the horizon, see what is coming next and provide the research and education that helps shape the future. Finding ways to increase bushels per acre was once enough to fulfill our mission. Now society asks us to do even more.

Our renewable energy work is a good example of fulfilling our mission by doing more. In the early 1980s, the University of Minnesota's West Central Research and Outreach Center at Morris built Minnesota's first ethanol research facility. Minnesota's ethanol industry has since grown to be a national leader, with 14 plants producing 300 million gallons of ethanol annually.

University of Minnesota research is now looking at developing renewable energy sources that may have even more impact than ethanol. Today at the Research and Outreach Center near Morris a wind turbine is under construction. It looks no different than the other wind turbines producing electricity on the Minnesota prairie.

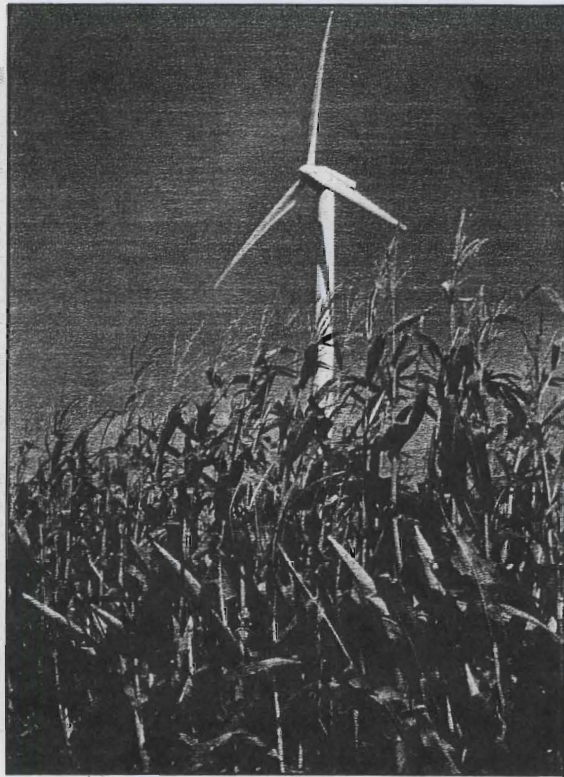
But, there is a big difference. The Morris wind turbine is the only wind research instrument of its type in the Midwest. This research will focus on how to store wind power. Imagine the boost to our economy if we could capture wind blowing across the Minnesota prairie and turn it into hydrogen that powers fuel-cell cars and localized fertilizer production.

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Turning wind into hydrogen is only part of the renewable energy research effort at the University of Minnesota. We're also researching biodiesel, biomass, anaerobic digestion and plastic substitutes. Our goal is to put Minnesota in the driver's seat of the renewable fuel revolution.

Another great issue facing our region is the effect our agricultural practices have on the water quality further downstream. Concern about water quality is shaping a great debate about how our agricultural land is used. The University of Minnesota is a leader in Green Lands, Blue Water, a cooperative effort by land-grant universities to provide solutions. Most of the well-known land-grant colleges in the Upper Midwest are working on this effort to improve water quality while simultaneously increasing rural economic vitality.

These are just a few examples of University research on how to best use Minnesota's natural resources. We are fortunate that previous generations of Minnesotans placed a high value on investing in a great research university. Our society benefits because University research and education help turn untapped resources into food, jobs and meaningful lives.



The College of  
**Agricultural, Food and  
Environmental Sciences**

# Minnesota

## VARIETAL TRIALS RESULTS

Successful crop production depends on selecting varieties best adapted to a specific area. To provide comparative information the Minnesota Agricultural Experiment Station compares varieties in trial plots at St. Paul, Becker, Crookston, Grand Rapids, Lamberton, Morris, Rosemount, St. Paul and Waseca, and on farmers' fields. Crop varieties are grown in replicated plots at each location and factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Some crops and crop varieties included in previous editions of *Minnesota Varietal Trials Results* were not included in the 2004 performance trials. Questions about them can be addressed to the logical individual listed under the "Authors and Researchers" heading on page 7.

### **Variety Classifications**

Barley and oat varieties are classified into groups under "General Purpose Varieties" and "Special-Purpose Varieties" headings.

**General-Purpose Varieties** designates varieties that have been adequately tested three years or more and generally are not grown for a specific special purpose.

**Special-Purpose Varieties** designates adequately tested varieties that have specific attributes that differentiate them from general-purpose varieties or are intended for a specific end use.

Seed of varieties in both groups may be eligible for certification. Use of certified seed is suggested, but certification in itself does not imply recommendation. Registered and certified seed of most varieties described in this report can be purchased from seed dealers or grower-members of Minnesota Crop Improvement Association.

For sources of certified and registered seed go to the Minnesota Crop Improvement Association website: <http://www.mncia.org>

### **Interpreting the Tables**

The LSD (least significant difference) figures beneath yield columns in tables are statistical measures of variability within trials. The LSD is used to determine whether the difference between two yields is due to a genetic difference in the varieties or to other causes, such as environmental variability.

If the yield differences between two varieties equals or exceeds the LSD value for the yield column the higher yielding variety probably was superior in yield. If the difference is less than the LSD the yield difference probably was due to

environmental factors. An "NS" notation in a column indicates no significant difference for that characteristic.

These varietal trials are not designed for crop (species) comparisons; the crops are grown on different fields or with different management. The data should be used only to compare varieties within a table.

The relative maturities of varieties are variously indicated in the tables as date of maturity, date of heading or blooming, days to maturity, heading or blooming; or moisture percentage at harvest.

### **Rate and Date of Planting**

This information is given for each crop; in all cases the planting rate is based on normal seedbeds and normal size, good quality seed. The seeding rate used can vary greatly, depending on seed cost,



desired stand, expected mortality, ability to emerge, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. The bushel weight given is that generally accepted in the United States.

A consolidated chart of planting rates and dates is on page 79.

### **Plant Variety Protection**

**PVP** Barley, oat and wheat varieties covered by the U.S. Plant Variety Protection Act are identified by the PVP symbol in barley and oat variety descriptions and by the letters PVP in wheat tables. When the symbol or letters are followed by (94) seed of that variety may not be sold by a producer, not even to a relative or neighbor, without express permission of the variety's developer / owner. When the symbol or letters are followed by (pending) the variety should be considered as having PVP (94) protection.

### **Abbreviations**

For the sake of economy in variety descriptions and some other listings, the

abbreviation "AES" is generally used for agricultural experiment stations.

### **Authors and Researchers**

Crops section authors are:

**Alfalfa:** C.C. Sheaffer, P.R. Peterson, J. Larson, D. Swanson, J.L. Halgerson, D.L.Holen.

**Alternative Forages:** N.J. Ehlke, D.J. Vellekson.

**Barley:** K.P. Smith, E.L. Schiefelbein.

**Canola:** P.M. Porter, D.G. LeGare.

**Corn Grain:** T.R. Hoverstad, D.R. Hicks, G.A. Nelson, S.R. Quiring.

**Corn Silage:** C.C. Sheaffer, P.R. Peterson, D.R. Swanson, T.R. Hoverstad, J.L. Halgerson, M.D. Bickell, L.M. Behnken, F.R. Breitbart, D.L. Holen, V.W. Crary.

**Oat:** D.D. Stuthman, R.A. Caspers, R.P. Halstead.

**Soybean:** J.H. Orf, L.L. Hardman, S.L. Naeve, P.J. Schaus, A.A. Killam.

**Wheat:** J.A. Anderson, G.L. Linkert, R.G. Fuentes, J.J. Wiersma.

**Wildrice:** R.A. Porter

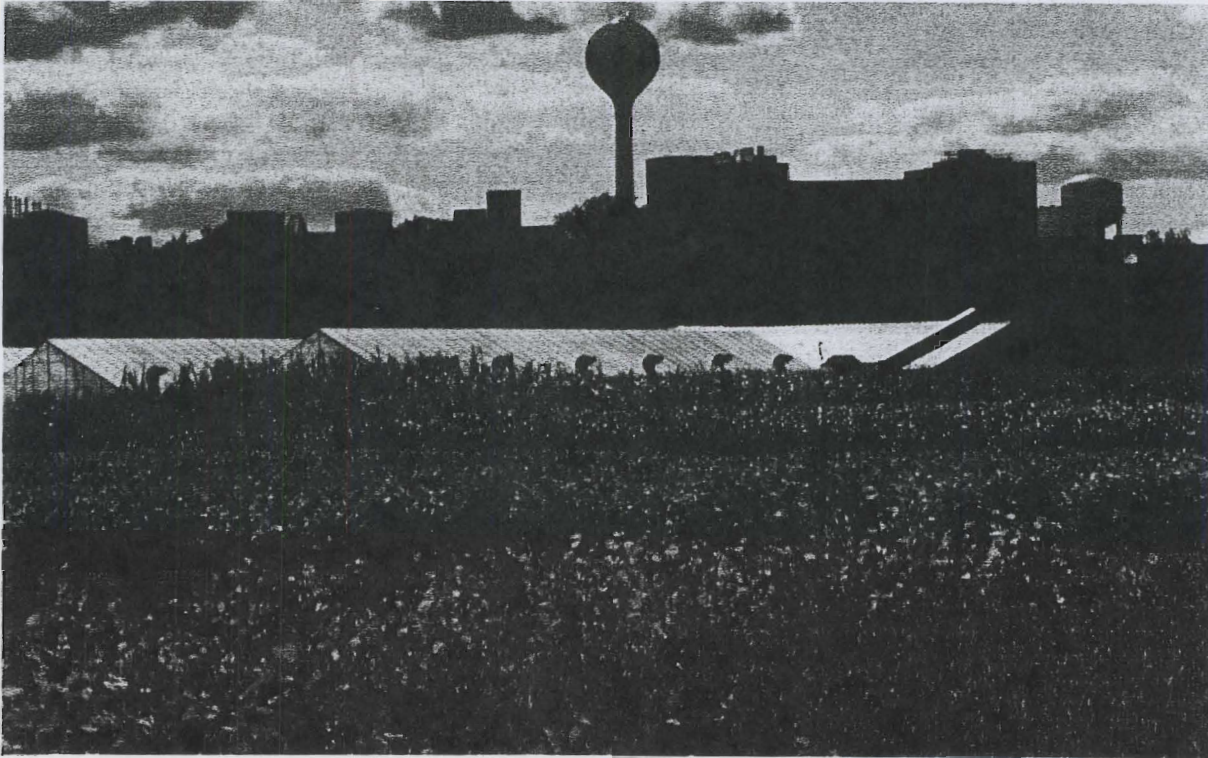
Information on the reaction of crop varieties to specific pathogens was obtained mainly by R. Dill-Macky and B. Steffenson, Department of Plant Pathology; J. Kolmer, USDA-ARS Cereal Disease Laboratory; and F. Kolb, University of Illinois-Urbana. Grain quality data were provided by Gary Hareland, USDA-ARS Wheat Quality Laboratory, Fargo;

**Plotwork supervisors** included T.R. Hoverstad, K.D. Krause, D.G. LeGare, R.D. Mathison, G.A. Nelson, S. Quiring and J.V. Wiersma.

**Publication Supervisor:** Leland L. Hardman.

**Photography:** David L. Hansen.

**Coordination:** Beverly R. Durgan, associate dean and chief financial officer, College of AFES, and the Minnesota Crop Improvement Association.



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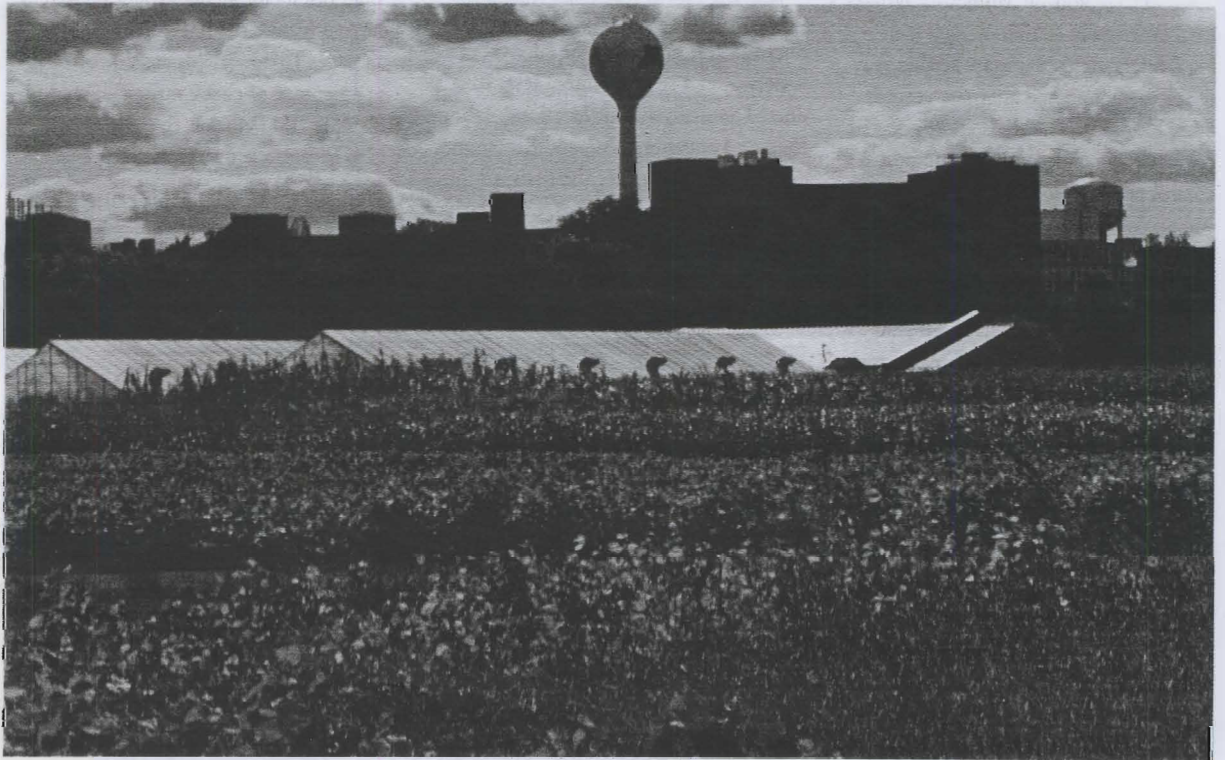
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which they have been tested (2001 to 2004 seedings). Individual tables correspond to test results from different regions of Minnesota.

Greatest confidence should be placed in variety yield information that represents more than five site-years of testing, such as 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 Minnesota yield data have been collected. Varieties in bold type have been tested in six or more site-years.

Varietal differences in yield tend to increase with stand age. Thus, to choose a variety for short-term stands, consider especially yield performance the first and second years after seeding, such as yield performance in 2003 and 2004 for a 2002 seeding. For long-term stands, choose varieties based on their performance through the third year after seeding, such as 2004 yield for a 2001 seeding.

### Forage Quality

While maturity is the greatest determinant of forage quality or feeding value of alfalfa, varieties also differ. An NAAIC Standardized Forage Quality Test has been performed at Arlington, Wis., and Rosemount, Minn., since 1995. Forage quality of alfalfa varieties in tests seeded in 2003 in Minnesota and Wisconsin are shown on page 14. Data are expressed as milk per ton of forage, milk per acre and relative forage quality (RFQ).

Milk per ton is calculated based on MILK2000, which combines crude protein, neutral detergent fiber (NDF) and

NDF digestibility (NDFD) to predict milk production per ton of forage DM. In MILK2000, 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 is 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 Milk2000, see: [www.uwex.edu/ces/forage/pubs/milk2000.htm](http://www.uwex.edu/ces/forage/pubs/milk2000.htm).

Relative forage quality (RFQ) is a new index with similar mean and range as RFV that includes NDFD 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).

Production year evaluation (first year after seeding only) was done by analyzing each of three cuttings taken at late bud to 1/10-bloom stages of maturity.

### 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 varieties have known resistance. Variety resistance ratings for each disease are available on the web at [www.alfalfa.org](http://www.alfalfa.org). Varietal resistance to potato leafhopper and grazing are also available at [www.alfalfa.org](http://www.alfalfa.org). Brown root rot is known to be present in some 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 tempera-

tures 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) WSI 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/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. Since blends may have been derived in various ways, their performance depends on the skill and integrity of the seed company. 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. Using certified seed of adapted, high-yielding varieties best assures trueness to name.

The web version of this report is available on the Minnesota Agricultural Experiment Station website, [www.maes.umn.edu/pubs.html](http://www.maes.umn.edu/pubs.html)

More detailed alfalfa variety performance results are available on the University of Minnesota Agronomy Forages website: <http://forages.coafes.umn.edu>

### Alfalfa Planting Rate and Date

Bushel Weight, Pounds .....	60
Seeds/Pound.....	220,000
Planting Rate, Pounds/Acre	
Alone .....	13
With Grass .....	5-10
Planting Rate, Seeds Sq.Ft.	
Alone .....	65
With grass.....	25-50
Planting Date .....	late April-early May or late July-early August

**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.

	Marketer	WSI	2001 Seeding, Harvest Years			2002 Seeding, Harvest Year	2003 Seeding, Harvest Year	All Site-Years Average
			2002	2003	2-Year Total	2003	2004	
<i>Checks, Tons/Ac 15%mc Hay</i>	—	—	5.7	5.5	11.2	6.3	6.6	6.7
4A421	Mycogen	2.5	—	—	—	—	104	117
PHABULOUS II	Trelay	—	—	—	—	—	106	115
DKA33-16	Monsanto	—	—	—	—	—	107	115
<b>SETTER</b>	Dahlco	—	—	—	—	107	—	113
GOLDLEAF	Albert Lea/ Gold Country	3.1	—	—	—	111	111	113
WL 319 HQ	W-L	1.8	—	—	—	112	—	113
<b>IGNITE</b>	Jung	—	—	—	—	111	101	113
<b>POINTER</b>	Dahlco	—	—	—	—	112	—	112
POWER 4.2	Power	—	—	—	—	—	106	112
FSG 505	Allied	—	—	—	—	—	111	111
WL 357 HQ	W-L	—	—	—	—	—	111	111
MULTIPLIER 3	Mycogen	—	—	—	—	111	—	111
PHIRST	Bio Plant	—	—	—	—	—	105	111
<b>6410</b>	Garst	2.7	111	101	101	115	—	111
NOTICE II	Channel Bio	—	—	—	—	—	106	111
LEGENDAIRY YPQ	Croplan	—	115	103	103	—	—	111
<b>HYBRIFORCE-400</b>	Dairyland	2.8	115	109	110	118	—	110
AV 3420	AgVenture	—	115	107	107	—	—	110
<b>6420</b>	Garst	—	112	110	110	—	110	109
FSG 351	Allied	—	—	—	—	—	112	109
WEBFOOT SUPREME	Great Lakes	—	—	—	—	109	—	109
WL 342	W-L	—	101	106	106	—	—	109
STAMPEDE	Albert Lea	—	—	—	—	110	108	109
GH 711	Golden Harvest	—	—	—	—	—	113	109
STARBUCK	Spangler	—	119	103	103	—	—	108
<b>620</b>	Garst	2.6	—	—	—	109	—	108
54V46	Pioneer	3.1	—	—	—	—	105	108
EVERMORE	Allied	—	—	—	—	—	108	108
6415	Garst	1.5	—	—	—	—	108	108
8599	Mallard	—	106	109	109	—	—	108
BARALFA 42 IQ	Barenbrug	—	—	—	—	108	—	108
DK A42-15	Monsanto	—	103	111	111	—	—	108
PERFECT	Grassland	—	104	103	103	—	106	108
ALLIANT	Monsanto	—	111	106	106	—	—	108
SOMERSET	Syngenta	3.2	—	—	—	—	102	108
PHABULOUS	Trelay	—	105	100	100	—	—	107
54V54	Pioneer	2.7	112	111	111	—	—	107

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

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	2001 Seeding, Harvest Years			2002 Seeding, Harvest Year	2003 Seeding, Harvest Year	All Site-Years Average
			2002	2003	2-Year Total	2003	2004	
<i>Checks, Tons/Ac 15%mc Hay</i>								
			5.7	5.5	11.2	6.3	6.6	6.7
VITRO II	North-Gro	1.8	-	-	-	-	107	107
<b>HYBRIFORCE-420/WET</b>	Dairyland	3.2	-	-	-	-	105	107
EXTREME	Wensman/LG	-	-	-	-	-	106	106
FSG 406	Allied	-	-	-	-	-	106	106
<b>54Q25</b>	Pioneer	-	-	-	-	-	96	106
ABUNDANCE	Ziller	3.4	-	-	-	-	104	105
6400HT	Garst	2.5	-	-	-	-	96	105
<b>FEAST +EV</b>	Garst	2.2	109	101	101	111	-	105
VITRO	North-Gro	-	111	101	101	-	-	104
ABOUND	Monsanto	-	109	101	102	-	-	104
<b>MILK RIVER</b>	R.J. Hunt	-	108	95	96	104	-	103
<b>ROOT 66</b>	Trelay Inc.	2.1	103	102	102	-	-	103
DAKOTA	Great Plains	3.4	-	-	-	-	97	103
PROLIFIC	Bio Plant	-	110	99	99	-	-	103
<b>54H91</b>	Pioneer	3.0	-	-	-	105	94	102
5312	Check	3.0	109	101	101	104	104	102
ALFASTAR II	KayStar	-	-	-	-	-	107	102
53Q60	Pioneer	3.1	99	105	104	-	-	101
ONEIDA VR	Check	-	102	102	102	98	87	100
RUGGED	Target	-	-	-	-	-	99	99
SURPASS	Albert Lea	-	-	-	-	103	94	99
AGATE	Public	-	-	-	-	-	99	99
PLATINUM	Channel Bio	-	107	93	94	-	-	98
VERNAL	Check	2.0	90	97	97	98	109	98
BARALFA 53HR	Barenbrug	-	-	-	-	-	97	97
WRANGLER	Albert Lea	-	-	-	-	96	91	97
4500	Legend	-	-	-	-	-	96	96
DKA50-18	Monsanto	-	-	-	-	-	90	90
LSD 5%	-	-	11	7	9	11	9	-

**Alfalfa variety yield as percentage of check varieties at Potsdam (Olmsted County) and Lambertton (Redwood 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	Potsdam, 2002 Seeding Harvest Years			Lamberton				All Site-Years Average	
			2003	2004	2-Year Total	2001 Seeding Harvest Years			2003 Seeding Harvest Year 2004		
<i>Checks, Tons/Ac 15%mc Hay</i>		–	6.5	7.3	13.8	7.1	7.2	7.3	21.6	7.1	6.7
4A421	Mycogen	2.5	129	117	123	–	–	–	–	–	117
<b>SETTER</b>	Dahlco	–	114	117	116	–	–	–	–	–	113
<b>IGNITE</b>	Jung	–	123	105	113	–	–	–	–	–	113
POINTER	Dahlco	–	119	105	111	–	–	–	–	–	112
<b>6410</b>	Garst	2.7	128	104	115	102	113	105	106	–	111
<b>HYBRIFORCE-400</b>	Dairyland	2.8	110	110	110	108	107	103	106	–	110
<b>6420</b>	Garst	–	–	–	–	106	108	105	106	108	109
JADE III	NC+	–	–	–	–	114	114	101	109	–	109
WL 342	W-L	–	123	110	116	–	–	–	–	–	109
GH 711	Golden Harvest	–	–	–	–	–	–	–	–	101	109
<b>620</b>	Garst	2.6	120	106	113	–	–	–	–	105	108
54V46	Pioneer	3.1	–	–	–	–	–	–	–	96	108
6415	Garst	1.5	–	–	–	–	–	–	–	94	108
DK A42-15	Monsanto	–	–	–	–	99	108	115	107	–	108
54V54	Pioneer	2.7	–	–	–	102	105	102	103	–	107
<b>HYBRIFORCE-420/WET</b>	Dairyland	3.2	110	97	103	–	–	–	–	98	107
9429	LG Seeds	2.8	–	–	–	104	99	96	100	–	106
<b>54Q25</b>	Pioneer	–	–	–	–	–	–	–	–	100	106
<b>AMERISTAND 403T</b>	Am. Alf.	2.1	120	95	107	103	110	106	106	–	106
<b>FEAST +EV</b>	Garst	2.2	–	–	–	101	111	114	109	97	105
<b>MILK RIVER</b>	R.J. Hunt	–	105	86	95	112	108	101	107	–	103
<b>ROOT 66</b>	Trelay Inc.	2.1	118	71	93	–	–	–	–	–	103
DAKOTA	Great Plains	3.4	–	–	–	–	–	–	–	105	103
<b>54H91</b>	Pioneer	3.0	104	90	97	–	–	–	–	98	102
5312	Check	3.0	105	100	102	105	101	92	99	101	102
350	La Crosse	2.8	107	97	102	–	–	–	–	–	102
ALFASTAR II	KayStar	–	–	–	–	–	–	–	–	97	102
4 TRAFFIC	Kaltenberg	2.4	–	–	–	105	100	99	102	–	102
53Q60	Pioneer	3.1	–	–	–	94	102	105	100	–	101
ONEIDA VR	Check	–	97	107	103	96	99	98	97	97	100
VERNAL	Check	2.0	98	93	95	99	100	111	103	101	98
ONEIDA ULTRA	La Crosse	–	103	90	96	–	–	–	–	–	97
RADIANT	Ampac	–	–	–	–	–	–	–	–	96	96
LSD 5%	–	–	13	19	11	9	ns	8	–	12	–

**Alfalfa variety yield as percentage of check varieties at St. Martin (Stearns County), Richmond (Stearns County), Underwood (Otter Tail County) and Grand Rapids (Itasca County).**

Variety, in descending order of average performance over all current Minn. trials. <b>Bold</b> varieties have been in Minn. trials for more than 5 site-years.			St. Martin, 2002 Seeding Harvest Years			Richmond, 2003 Seeding Harvest Year	Underwood, 2004 Seeding Harvest Year	Grand Rapids, 2003 Seeding Harvest Year	All Site-Years Average
Marketer	WSI	2003	2004	2-Year Total	2004	2004	2004		
<i>Checks, Tons/Ac 15%mc Hay</i>		5.4	7.4	12.8	6.5	4.2	5.5	6.7	
WL 348 AP	W-L	-	-	-	120	-	-	120	
WL 327	W-L	-	123	108	114	-	-	116	
PHABULOUS II	Trelay	-	-	-	124	-	-	115	
DKA33-16	Monsanto	-	-	-	123	-	-	115	
REBOUND 5.0	Croplan	-	-	-	-	114	-	114	
VALUE PLUS I	Brown Seed	2.6	-	-	114	-	-	114	
<b>SETTER</b>	Dahlco	-	122	112	116	-	108	113	
GOLDLEAF	Albert Lea/ Gold Country	3.1	-	-	118	-	-	113	
WL 319 HQ	W-L	1.8	124	117	120	-	99	113	
<b>IGNITE</b>	Jung	-	119	114	116	115	-	113	
POINTER	Dahlco	-	119	105	111	-	-	112	
POWER 4.2	Power	-	-	-	118	-	-	112	
LIGHTNING III	Jung	-	-	-	-	111	-	111	
PHIRST	Bio Plant	-	-	-	116	-	-	111	
<b>6410</b>	Garst	2.7	125	115	119	-	-	111	
NOTICE II	Channel	-	-	-	116	-	-	111	
LEGENDAIRY YPQ	Croplan	-	122	116	119	-	104	111	
MAXIMUM I	Johnson	-	119	101	109	-	-	110	
<b>HYBRIFORCE-400</b>	Dairyland	2.8	114	108	111	-	-	110	
<b>6420</b>	Garst	-	-	-	117	-	-	109	
FSG 351	Allied	-	-	-	-	107	-	109	
GH 711	Golden Harvest	-	-	-	112	-	-	109	
<b>620</b>	Garst	2.6	115	100	107	113	99	108	
54V46	Pioneer	3.1	-	-	124	107	109	108	
6415	Garst	1.5	-	-	122	107	-	108	
PERFECT	Grassland	-	123	107	114	-	-	108	
SOMERSET	Syngenta	3.2	-	-	117	-	105	108	
PHABULOUS	Trelay	-	119	112	115	-	-	107	
FSG 408DP	Allied	-	-	-	-	107	-	107	
<b>HYBRIFORCE-420/WET</b>	Dairyland	3.2	118	113	115	111	105	107	
EXTREME	Wensman/LG	-	-	-	115	108	95	106	
9429	LG Seeds	2.8	125	106	114	-	-	106	
<b>54Q25</b>	Pioneer	-	116	106	110	110	112	106	
<b>AMERISTAND 403T</b>	Am. Alf.	2.1	-	-	-	-	99	106	
ABUNDANCE	Ziller	3.4	-	-	-	107	-	105	
6400HT	Garst	2.5	-	-	-	112	107	105	
<b>FEAST +EV</b>	Garst	2.2	120	102	110	107	83	105	
A 30-06	PGI	1.9	-	-	-	110	108	104	
<b>MILK RIVER</b>	R.J. Hunt	-	119	104	111	-	-	103	
<b>ROOT 66</b>	Trelay Inc.	2.1	121	107	113	-	-	103	
DAKOTA	Great Plains	3.4	-	-	-	107	-	103	
<b>54H91</b>	Pioneer	3.0	122	100	110	112	96	102	
5312	Check	3.0	112	106	109	106	94	102	
6200HT	Garst	-	-	-	-	102	-	102	
BOBWHITE	NC+	-	-	-	-	101	-	101	
OWEIDA V3	Check	-	99	97	98	103	108	100	
VERNAL	Check	2.0	89	97	94	91	98	98	
WRANGLER	Albert Lea	-	101	100	100	-	-	97	
LEGENDAIRY 5.0	Croplan	-	-	-	-	95	-	95	
LSD 5%	-	-	10	8	7	8	15	13	

**Alfalfa variety yield, milk production potential and forage quality;  
2004 season totals and weighted averages from trial seeded in 2003 at Rosemount, Minn.**

Variety, listed in descending order of milk/acre.	Yield, Tons DM/Acre	Milk/Ton <sup>a</sup> , 100 lb/T	Milk/Ac <sup>a</sup> , 100 lb/Acre	RFQ <sup>b</sup>	CP, % DM	NDF, % DM	NDFD <sup>c</sup> , % NDF
6415	6.09	31.0	189	169	20	40	51
BARALFA 53 HR	6.07	30.5	185	163	20	40	51
DKA33-16	5.91	31.0	183	172	20	39	51
4A421	5.96	30.7	183	166	21	40	51
EXTREME	5.92	30.6	181	166	20	40	51
VERNAL	5.82	30.4	177	164	21	41	51
54Q25	5.72	30.9	177	167	20	40	52
WL 322 HQ	5.60	31.2	175	175	21	38	52
CIMARRON	5.53	30.7	170	168	21	40	51
Mean	5.85	30.8	180	168	21	40	51
LSD 5%	ns	ns	ns	ns	ns	ns	ns
CV %	7.0	1.7	7.1	4.5	3.0	3.4	1.9

**Alfalfa variety yield, milk production potential and forage quality;  
2004 season totals and weighted averages from trial seeded in 2003 at Arlington, Wis.**

Variety, listed in descending order of milk/acre.	Yield, Tons DM/Acre	Milk/Ton <sup>a</sup> , 100 lb/T	Milk/Ac <sup>a</sup> , 100 lb/Acre	RFQ <sup>b</sup>	CP, % DM	NDF, % DM	NDFD <sup>c</sup> , % NDF
BARALFA 53 HR	7.82	28.7	224	152	23	42	51
EXTREME	7.79	28.4	221	149	23	42	51
54Q25	7.68	28.7	221	150	22	43	52
VERNAL	7.77	28.2	219	146	23	44	52
4A421	7.56	28.5	216	150	23	42	51
6415	7.47	28.6	213	152	23	42	51
DKA33-16	7.52	28.3	213	148	23	43	51
Mean	7.66	28.5	218	149	23	42	51
LSD 5%	ns	0.3	ns	4	ns	1	ns
CV %	7.8	0.7	7.7	1.6	1.8	1.3	0.9

<sup>a</sup>Milk/Ton and Milk/Acre, are based on MILK2000, Univ. of Wisconsin. For a technical discussion of milk production potential see:

<http://www.uwex.edu/ces/forage/pubs/milk2000.htm>

<sup>b</sup>RFQ = Relative Forage Quality. For a technical discussion of RFQ see: <http://www.uwex.edu/ces/crops/ufwforage/RFQvsRFV.htm>

CP = Crude Protein, NDF = Neutral Detergent Fiber

<sup>c</sup>NDFD% = NDF digestibility. For a technical discussion of NDF digestibility see: <http://www.uwex.edu/ces/crops/ufwforage/NDFDig.html>

**2004 Winter Survival Test Results from Minnesota and Wisconsin.**

Variety	Rosemount, Minn.	Morris, Minn.	Arlington, Wis.	Lancaster, Wis.	Mean
ZG 9830	1.3	0.8	1.2	0.8	1.0
ZG 0234	1.6	0.9	1.6	1.2	1.3
ZG 0246	2.1	1.1	1.7	1.2	1.5
5262	1.9	2.2	2.3	2.7	2.3
6400HT	2.3	2.8	2.7	2.6	2.6
4A421	2.5	2.6	3.2	3.2	2.9
WL 325 HQ	3.1	3.1	2.9	3.3	3.1
54V46	2.6	3.1	3.4	3.3	3.1
WL 316	4.2	4.5	3.4	3.6	3.9
ARCHER	4.0	4.6	4.7	4.5	4.4
CUF 101	6.0	5.8	6.0	6.0	6.0

Winter survival index: 1 = superior winter survival. 2 = very good. 3 = good. 4 = adequate. 5 = low. 6 = no winter survival.

**2004 Forage Seed Sources.**

Marketer	Company	City	State	Zip	Phone (main)	Phone (other)	Web URL / Access
AgVenture	AgVenture East	Kasson	MN	55944	800-657-4890		www.agventure.com
Albert Lea	Albert Lea Seed House	Albert Lea	MN	56007	507-373-3161		www.alseed.com
Allied	Allied Seed	Macon	MO	63552	800-880-8127		www.alliedseed.com
Am. Alf.	America's Alfalfa	Princeton	IL	61356-0404	800-873-2532		www.americasalfalfa.com
AMPAC	AMPAC Seed Co.	Winona Lake	IN	46590	866-311-4869		www.ampacseed.com
Barenburg	Barenburg Midwest	Vinton	IA	52349	888-470-5569	800-547-4101	www.barusa.com
Bio Plant	Bio Plant Research	Camp Point	IL	62320	800-593-7708		—
Brown Seed	Brown Seed Farms	Bay City	WI	54723	800-712-7696	715-262-4331	www.browngenetics.com
Channel Bio	Channel Bio Corp	Kentland	IN	47951	800-369-8218		www.channelbio.com
CROPLAN	CROPLAN Genetics	St. Paul	MN	55164-0281	800-851-8810	651-634-8105	www.croplangenetics.com
Dahlico	Dahlico Seed	Cokato	MN	55321	320-286-5982		www.dahlico.com
Dairyland	Dairyland Seed Co.	West Bend	WI	53095	800-236-0163		www.dairylandseed.com
Elk Mound	Elk Mound Feed & Farm Supply	Elk Mound	WI	54739	715-879-5556		www.elkmoundseed.com
Garst	Garst Seed Co.	Dawson	MN	56232	320-769-4445	608-452-3844	www.garstseed.com
Geertson	Geertson Seed Farm	Adrian	OR	97901	800-843-0390		—
Gold Country	Gold Country Seed	Hutchinson	MN	55350	320-587-1050		www.goldcountryseed.com
Grassland	Grassland Central	Jordan	MN	55352	952-492-2990		—
Great Lakes	Great Lakes Hybrids	Ovid	MI	48866	989-834-2251		www.glh-seeds.com
Great Plains	Great Plains Research Co. Inc.	Apex	NC	27539	919-362-1583		www.greatplainsresearch.com
Golden Harvest	JC Robinson Seeds/Golden Harvest	Sherburne	MN	56171	507-764-3640	612-565-2945	www.goldenharvestseeds.com
Johnson	Johnson Seeds	Dassel	MN	55325	320-275-2430		www.seed.ab.ca/grower/Johnson
Jung	Jung Seed Genetics	Eyota	MN	55934	507-545-0151	800-242-1855	www.jungseedgenetics.com
Kaltenberg	Kaltenberg Seed Farms	Waunakee	WI	53597	800-383-3276		www.kaltenburgseeds.com
KayStar	KayStar Seeds	Huron	SD	57350	605-352-8791		www.kaystarseed.com
La Crosse	La Crosse Forage & Turf Seed Co.	LaCrosse	WI	54603	608-783-9560		—
Legend	Legend Seeds	DeSmet	SD	57231	605-854-3346		www.legendseeds.com
LG Seeds	J.G. Seeds	Sauk Rapids	MN	56379	320-248-0042	715-426-7577	www.lgseeds.com
Mallard	Mallard Seed	Plainview	MN	55964	507-534-2300		—
Monsanto	Monsanto Global Seed Group	St Louis	MO	63167	314-694-5701		www.monsanto.com
Mycogen	Mycogen Seeds	Holmen	WI	54636	608-526-2627	317-337-4007	www.mycogen.com
NC+	NC+ Hybrids	Spencer	IA	51301	712-262-9216	402-467-2517	www.nc-plus.com
North-Gro	North-Gro Seeds	Cuba City	WI	53807	608-744-7333		www.northgro.com
Olds Seed	Olds Seed Solutions	Madison	WI	53707	800-356-7333	608-249-9291	seedsolutions.com
PGI Alfalfa	PGI Alfalfa Inc.	Story City	IA	50248	800-247-3967	515-733-5274	—
Pioneer	Pioneer Hi-Bred International Inc.	Johnston	IA	50131-1750	515-334-6426		www.pioneer.com
Power	Power Seeds Inc.	Fraserville	ONT	KOL IV0	705-944-5600		—
Producers	Producers Hybrids, Inc.	Battle Creek	NE	68715	888.675.3190		www.producershybrids.com
R.J. Hunt	R.J. Hunt Seed Co.	Wadena	MN	56482	218-631-4190		—
Ramy	Ramy International	Wankato	MN	56001	800-658-7269		—
Renk	Renk Seed Co.	Sun Prairie	WI	53590	800-289-7365	608-837-7351	www.renkseed.com
Spangler	Spangler Seedtech Inc.	Jefferson	WI	53549	800-284-1080	414-674-4606	www.spanglerseed.com
Specialty	Specialty Seeds	Cold Spring	MN	56307	320-845-7689		www.specialtyseedsalbany.com
Syngenta	Syngenta Seeds Inc.	Golden Valley	MN	55427	763-593-7286		www.syngenta.com
Target	Target Seed, LLC	Homesdale	ID	83628	208-337-6201		www.targetseed.com
Trelay Inc.	Trelay Inc.	Livingston	WI	53554	608-943-6363		www.trelay.com
W-L	W-L Research, Inc.	Madison	WI	53708-8112	800-406-7662	608-240-0530	www.wlresearch.com
Ziller	Ziller Seed Co. Inc.	Bird Island	MN	55310	320-365-3674		www.zillerseed.com
U of MN	University of Minnesota Forages	Saint Paul	MN	55108			http://forages.coafes.umn.edu

# BIRDSFOOT TREFOIL

Birdsfoot trefoil is an excellent non-bloating pasture legume that can also be harvested for hay and silage. It grows under a wide range of soil conditions, and persists longer and performs better than other legumes under poor soil conditions, such as low fertility, acidity and poor drainage. It is also persistent when grown with Kentucky bluegrass, reed canarygrass and timothy.

Performance trials of birdsfoot trefoil were established at Rosemount in 1997, 1998, 2001 and 2003, and at Grand Rapids in 1998 and 2001. The trials generally are harvested twice at Grand Rapids and two or three times at Rosemount. The varieties Roseau and Nueltin have increased natural tolerance to the herbicide Roundup. New releases, Steadfast, a rhizomatous birdsfoot trefoil from Missouri and Pardee, from Cornell, were significantly lower yielding than other varieties in the trial and may not be winterhardy enough to be grown in Minnesota.

Winterhardy varieties, such as Norcen, generally produce the highest consistent

overall yields. Norcen, released in 1983 by the agricultural experiment stations of Minnesota and six other states, has performed exceptionally well in grazing trials.

## Birdsfoot Trefoil Planting Rate and Date

Bushel Weight, Pounds	.....65
Seeds/Pound	.....372,000
Planting Rate, Pounds/Acre	
Alone	.....8
In Mixtures	.....6
Planting Rate, Seeds Sq.Ft.	
Alone	.....70
In Mixtures	.....50
Planting Date	.....Early Spring or Summer

# BROMEGRASS

Bromegrass is generally grown for hay in mixture with alfalfa, or is used as pasture in mixture with other grasses and legumes. Varieties can be classed as southern, intermediate and northern

types. Varieties of the southern type may not be higher yielding, but are generally less susceptible to leaf diseases and earlier in maturity than northern types. All varieties are winterhardy. Some stand losses may occur when bromegrass is managed under three- and four-cut alfalfa harvest systems. Overgrazing also will reduce stands.

Varieties are generally evaluated in pure stands at Minnesota experiment stations with a three-cut harvest system. Nitrogen was applied at all locations in early spring and after the first two harvests at a rate of 50 pounds per acre for each application. Dry matter yields have generally varied little among varieties. At Rosemount in 1999 stand losses occurred after the first harvest in all varieties except York.

## Dry-matter yield, in tons dry matter per acre, of smooth bromegrass seeded at two locations.

Variety	Rosemount	Morris
	1998-2000	1999-2001
Alpha	4.8	4.6
Badger	4.4	4.5
Bounty	4.8	4.7
Lincoln	4.5	-
York	5.2	4.7
LSD 5%	0.3	NS

## Dry-matter yield, in tons dry matter per acre, of birdsfoot trefoil varieties seeded at two locations.

Variety	Seedlot	Winter Injury*	Rosemount				Grand Rapids	
			1998	1999-01	2002	2004	1999-01	2002-04
Bright	3150	-	3.6	3.1	-	-	-	-
Dawn	3142	1.0	4.0	3.8	4.0	5.3	4.8	2.1
Empire	2947	-	4.0	-	-	-	4.4	-
Fergus	3149	-	3.9	-	-	-	-	-
Georgia 1	3143	-	---	3.6	-	-	4.6	1.8
Leo	2951	-	3.9	3.1	-	-	-	-
Norcen	3173	1.0	4.3	3.5	3.9	5.3	4.8	2.1
Nueltin	3370	1.0	3.7	3.1	4.0	4.8	4.2	2.2
Pardee	3422	8.3	-	-	3.5	0.5	-	1.9
Roseau	3435	2.5	4.1	3.4	4.1	4.4	4.6	2.1
Steadfast	3065	-	3.1	2.7	-	-	3.5	-
Trevig	3414	-	4.1	-	4.2	-	-	-
Viking	3395	1.8	3.8	3.6	4.0	4.9	4.4	2.1
WITT	2846	-	4	3.2	4.1	-	-	2.0
LSD 5%		0.9	0.5	0.3	0.4	0.4	0.5	0.2

\* Winter injury, 1 = no injury; 9 = dead

## Bromegrass Planting Rate and Date

Bushel Weight, Pounds	.....14
Seeds/Pound	.....136,000
Planting Rate, Pounds/Acre	
Alone	.....16
In Mixtures	.....5
Planting Rate, Seeds Sq.Ft.	
Alone	.....50
In Mixtures	.....15
Planting Date	.....Early Spring or Late Summer



# CICER MILKVELTCH

Cicer milkvetch is a vigorous, persistent, high-yielding perennial legume that spreads by rhizomes. Stands can persist for many years under heavy grazing and can tolerate stress well once established. It tolerates drought well and is grown extensively for grazing in the western United States. It is also very winterhardy and resistant to insects and disease, but has poor seedling vigor and may take two years to establish. It also has some unknown anti-quality components that can cause photosensitization and hair loss on some grazing ruminants. When animals become acclimated to grazing cicer milkvetch, problems lessen. More evaluation is needed before widespread use of cicer milkvetch is recommended for grazing in Minnesota.

Hi Pal, a variety developed at Minnesota AES, was selected for plant vigor and palatability under grazing. It will be on the market when adequate seedstocks are obtained. Varietal evaluations were seeded in pure stands at three locations in 1998, 1999, 2000 and 2001 to evaluate forage yields. All locations were harvested twice each year except Rosemount was harvested three times in 2000.

### Dry-matter yield, in tons dry matter per acre, of cicer milkvetch varieties seeded at three locations.

Variety	Grand Rapids	Rosemount	Morris
	1999-2001	1999-2001	1999-2001
Hi Pal	3.8	4.5	4.9
Lulana	3.5	4.3	4.8
Monarch	3.4	4.3	4.7
Windsor	3.2	4.2	4.4
LSD 5%	0.5	0.2	0.5

### Cicer Milkvetch Planting Rate and Date

Bushel Weight, Pounds	60
Seeds/Pound	122,000
Planting Rate, Pounds/Acre	
Alone	36
Planting Rate, Seeds Sq.Ft.	
Alone	50
Planting Date	Early Spring or Summer

# KURA CLOVER

Kura clover is a relatively low growing, spreading perennial legume. It is best used as a grazing crop because of its growth habit and plant structure. Kura clover can tolerate frequent grazing and has consistently high forage quality, resulting in high animal performance. Kura clover can induce bloat in grazing ruminants and may be best suited for planting in mixtures with cool-season grasses such as reed canarygrass.

Kura clover is persistent once established, but has poorer seedling vigor than birdsfoot trefoil. Kura clover requires inoculation with the proper rhizobium to insure adequate biological nitrogen fixation. Because of its excellent persistence and spreading growth habit, Kura clover has great potential for soil cover and erosion control in agricultural and nonagricultural areas.

Summary tables include variety trials seeded in 1999 and 2002 at Rosemount and in 2002 at Grand Rapids. Thirty pounds of nitrogen was applied at time of seeding to assist early growth and development. Trials were harvested three times per year at Rosemount and twice per year at Grand Rapids.

### Kura Clover Planting Rate and Date

Bushel Weight, Pounds	65
Seeds/Pound	215,000
Planting Rate, Pounds/Acre	
Alone	10
In Mixtures	6
Planting Rate, Seeds Sq.Ft.	
Alone	50
In Mixtures	30
Planting Date	Early Spring or Summer

### Dry matter yield, in tons per acre, and vigor of kura clover varieties seeded at two locations.

Variety	Seedlot	Vigor*	Rosemount		Grand Rapids
			2001-2002	2003-2004	2003-2004
Cossack	3209	6.0	4.5	4.1	1.1
Endura	3085	3.3	4.3	4.5	1.2
NF-93 C2	3425	5.5	4.6	4.5	1.0
Rfiza	3086	2.8	4.1	3.8	0.8
LSD 5%		1.0	0.5	0.4	0.1

\* Vigor data are from Rosemount only, 1 = least, 9 = best vigor

# ORCHARDGRASS

Orchardgrass is often used in hay and pasture mixes with other grasses and legumes because it establishes rapidly and recovers quickly after grazing or harvesting. Its major limitation is a lack of winterhardiness, but it can persist and remain productive in areas with reliable snow cover.

Orchardgrass varieties were established in pure stands in 1997, 1998 and 2002 at Rosemount, and in 1998 and 2002 at Grand Rapids.

Experimental plots were generally harvested three times per year at Rosemount and two or three times per year at Grand Rapids. Nitrogen was applied in the early spring and after the first and second harvest at rate of 50 pounds per acre for each application. Injury to all varieties was moderate to severe in 2003.

## Orchardgrass Planting Rate and Date

Bushel Weight, Pounds .....	14
Seeds/Pound.....	653,000
Planting Rate, Pounds/Acre	
Alone .....	10
In Mixtures.....	3
Planting Rate, Seeds Sq.Ft.	
Alone .....	150
In Mixtures.....	45
Planting Date	
Alone .....	Early Spring or Late Summer
In Mixtures.....	Use Date for Legume

## Dry matter yield of orchardgrass, in tons dry matter per acre, of orchardgrass varieties seeded at two locations.

Variety	Seedlot	Winter*	Rosemount			Grand Rapids		
		Injury 5/1/03	1998-00	1999-02	2003-4	1990-1994	1999-01	2004
AC Nordic	3222	-	-	3.4	-	-	3.7	-
Albert	3152	-	-	-	-	-	3.9	-
Ambassador	2678	-	4.4	-	-	3.5	3.6	-
Bengal	3247	-	-	3.5	-	-	-	-
Condor	3162	-	4.5	-	-	-	3.8	-
Crown	2635	-	4.5	-	-	3.5	-	-
Dawn	2648	-	-	-	-	3.6	-	-
Duke	3237	2.8	4.8	3.5	3.8	-	3.8	1.6
Elsie	3218	-	-	3.4	-	3.5	3.5	-
Extend	3496	4.5	-	-	3.8	-	-	1.4
Haymate	3147	-	4.5	-	-	-	3.7	-
Hawkeye	3219	4	-	3.8	4	-	3.9	1.6
Justus	3240	4	4.5	3.5	3.7	3.4	3.4	1.4
Megabite	3220	3.5	-	3.8	3.9	-	3.7	1.6
Mammoth	3248	-	-	3.7	-	-	-	-
Napier	3250	-	4.3	-	-	3.6	-	-
Orbit	2669	-	3.6	-	-	3.4	-	-
Orion	2979	3.8	4.7	3.7	3.7	3.7	4.1	1.4
Potomac	3238	2.8	4.4	3.3	4.1	3.5	-	1.3
Shawnee	3221	-	-	-	-	-	3.0	-
Sterling	2680	-	-	-	-	3.4	-	-
Warrior	3241	4.5	-	3.5	3.6	-	-	1.5
LSD 5%		1.5	0.4	0.2	NS	NS	0.4	NS

\*Winter injury, 9 = worst

# RED CLOVER

Red clover can be seeded in pure stands or with grasses for grazing, hay or silage. It is more easily established in pasture renovation than either alfalfa or trefoil.

Historically, winterhardy varieties of red clover have not persisted beyond two crop years in Minnesota because they are susceptible to diseases and winter kill. However, most of the improved varieties currently sold for use in Minnesota can persist for three years if there is good winter snow cover.

Experimental varietal trial plots were established at Grand Rapids in 1998, 1999 and 2001, and at Rosemount in 1996, 1999 and 2002. Harvest frequency is

generally three times per year. Winter injury in 2003-2004 at Rosemount was moderate to severe, with all varieties injured to some degree. Varietal differences were observed; ratings in the table should give some indication as to winterhardiness in the second production year.

Another benefit of red clover is its resistance to potato leaf-hopper injury. In 2003 a severe infestation at Rosemount resulted in injury to some varieties. Scarlett and Marathon had very little injury; Freedom and Arlington had severe chlorosis from the feeding insects.

**Dry matter yield of red clover, in tons dry matter per acre, seeded at two locations in Minnesota.**

Variety	Seedlot	Potato*		Rosemount			Grand Rapids		
		Leathopper Injury	Winter Injury**	1997-98	2000	2003	1999-01	2000-01	2003-04
		7/14/03	5/24/04						
Arlington	3413	3.5	6.5	4.1	5.2	3.6	2.9	3.0	1.2
Astred	2985	-	-	2.8	-	-	-	-	-
Cinnamon	3001	-	-	4.5	-	-	-	-	-
Cinnamon Plus	3454	2.3	7.5	-	-	4.2	-	-	1.3
Freedom	3412	4.8	8.5	-	5.5	3.7	-	3.2	1.2
Juliette(mcc176)	3230	3	6.3	-	5.6	4.0	3.5	3.3	1.3
Marathon	3229	1.5	5	4.0	5.6	4.3	3.4	3.2	1.4
Prima	3223	-	-	-	5.3	-	3.4	3.5	-
Randolph	3002	-	-	4.1	-	-	3.5	-	-
Redland III	3008	-	-	-	-	-	-	-	-
Redlan Grazell	3398	1.3	8	-	-	4.3	-	-	1.5
Redstar	2829	-	-	-	5.9	-	-	3.4	-
Scarlett	3450	1.3	5.3	4.2	-	4.0	3.4	-	1.4
LSD 5%		0.9	1.4	0.6	0.6	0.3	0.2	0.3	0.2

\*Potato leathopper injury are from Rosemount, 5 = worst \*\*Winter Injury, 1 = none, 9 = all dead

**Red Clover  
Planting Rate and Date**

Bushel Weight, Pounds .....	65
Seeds/Pound.....	272,000
Planting Rate, Pounds/Acre	
Alone .....	9
In Mixtures.....	5
Planting Rate, Seeds Sq.Ft.	
Alone .....	50
In Mixtures.....	30
Planting Date	
Alone .....	Early Spring to September 1
In Mixtures.....	Use Date for Legume

**REED CANARYGRASS**

Reed canarygrass is adapted throughout Minnesota for use as hay, pasture and silage. It is one of the best grass species for poorly drained soils and tolerates flooding better than other cool-season grasses. While reed canarygrass utilizes nitrogen efficiently and is adapted to liquid manure application, its seedling vigor is not as good as that of other commonly grown forage grasses.

Each of the available varieties is winter-hardy and persistent in Minnesota.

The most recent developments in reed canarygrass breeding have been the release of varieties low in indole alkaloid concentration. Animal performance and palatability one dramatically improved when these varieties are grazed. Alkaloids are bitter, complex, nitrogen-containing anti-quality compounds.

In grazing trials, lambs and steers performed better on low-alkaloid varieties than on common reed canarygrass. Hay should be harvested between the boot and early-heading stage because quality declines with maturity.

Trials were established in pure stands in 1993 at Grand Rapids and Rosemount. Trials also were established in 1999 and 2002 at Rosemount and Grand Rapids. Trials generally are harvested three times per year at Rosemount and twice at Grand Rapids. Nitrogen was applied early in the spring and after the first two harvests at a rate of 50 pounds per acre per application.

**Dry matter yields, in tons dry matter per acre, of reed canarygrass seeded at two locations in Minnesota.**

Variety	Seedlot	Rosemount			Grand Rapids		
		1994-1996	2000-2002	2003-2004	1994-1996	2000-2002	2003-2004
Chiefton	3301	-	3.7	6.2	-	4.9	1.8
Lara	2920	3.0	-	-	-	-	-
Marathon	3494	-	-	6.1	-	-	1.6
Palaton	3433	3.1	3.8	5.9	3.5	4.8	1.6
Rival	3295	-	3.8	5.8	-	4.6	1.7
Vantage	2325	3.3	3.7	6.2	3.3	5.1	1.8
Venture	3493	3.1	3.1	5.9	3.5	5.1	1.7
LSD 5%		NS	NS	0.3	NS	.4	NS

**Reed Canarygrass  
Planting Rate and Date**

Bushel Weight, Pounds .....	46
Seeds/Pound.....	526,000
Planting Rate, Pounds/Acre	
Alone .....	7
In Mixtures.....	5
Planting Rate, Seeds Sq.Ft.	
Alone .....	85
In Mixtures.....	60
Planting Date	
Alone .....	Early Spring or Late Summer
With Legumes .....	Use Date for Legume

# TALL FESCUE

Tall fescue, a bunchgrass, may be planted in mixtures with other grasses and legumes. It establishes rapidly, withstands trampling, tolerates summer drought and produces fall-season pasture when other grasses become dormant.

Tall fescue is subject to winter injury, but it may remain productive in areas with reliable snow cover.

Animal performance is better when the variety grown is endophyte-free. Endophytes are fungi that invade plant tissues, reducing forage palatability and animal performance.

The wheatgrasses are valuable native forage species that are especially suitable for growing in the U.S. northern Great Plains area.

The variety Newwhy is a wheatgrass x quackgrass hybrid. Wheatgrasses can produce excellent forage yields and sustained productivity under hay and pasture management systems, either in monoculture or in mixtures with alfalfa or other suitable legumes.

Recent releases of improved varieties have prompted interest in these species, especially in the drier western areas of Minnesota. Where rainfall is higher, tall fescue will outyield the wheatgrasses.

Minnesota Agricultural Experiment Station scientists initiated performance trials of tall fescue and the wheatgrasses in 1992, 1997 and 1998.

The trials were harvested three times per year, and nitrogen was applied in the early spring and after each harvest at a rate of 50 pounds per acre.

## Tall Fescue Planting Rate and Date

Bushel Weight, Pounds .....	25
Seeds/Pound.....	229,000
Planting Rate, Pounds/Acre	
Alone .....	10
In Mixtures.....	4
Planting Rate, Seeds Sq.Ft.	
Alone .....	50
In Mixtures.....	20
Planting Date	
Alone.....	Early Spring or Summer
With Legumes .....	Use Date for Legume

### Dry matter yields, in tons dry matter per acre, of tall fescue, wheatgrass and festuca-lolium hybrids seeded at three locations.

Variety	Seedlot	Grand Rapids		Rosemount		Morris
		1994-1996	1999-2001	1993-1995	1998-2000	1993-1996
<b>Tall Fescue</b>						
Barcel	2874	3.0	—	5.3	—	4.5
Cajun	2884	—	4.9	—	5.3	—
Fawin	2873	3.3	—	4.9	—	5.0
Ky 31	2879	3.5	4.6	5.8	—	4.7
Ky 31-endophyte free*	2880	3.3	—	5.6	5.9	4.9
Martin	2885	3.6	4.9	5.3	4.8	4.7
Maximize	3154	—	4.6	—	5.1	—
Mozark	2883	3.5	4.8	5.4	5.5	4.8
Mustang	2872	2.7	4.3	4.7	4.9	—
Seine	3185	—	—	—	5.6	4.8
Stef	2333	3.3	—	5.3	—	—
<b>Festuca-Lolium Hybrids</b>						
Kemal	3166	—	3.8	—	3.3	—
Tandem II	3167	—	3.8	—	3.3	—
Spring Green(WFL-96)	3168	—	—	—	—	—
<b>Wheatgrasses</b>						
Manska	2869	2.9	—	4.0	—	4.8
Newwhy	2878	2.7	—	3.92	4.2	—
Reliant	2870	3	—	4.2	—	5.0
LSD 5%		0.5	0.6	0.6	0.4	NS

\* Endophytes are fungi that invade plant tissues, reducing forage palatability and animal performance.

# TIMOTHY

Timothy is adapted throughout Minnesota for use in hay and pasture mixes and is very winterhardy. When timothy is the major component in hay its stage of maturity affects both yield and quality. Early heading is the preferred time to harvest timothy; most of its forage yield is at the first harvest.

Varieties of timothy differ in maturity, so care should be taken to choose those that fit the management requirements of the crop mixture. Early varieties are best adapted to a three-cut system with alfalfa.

Intermediate- to late-maturing varieties should not be harvested more than twice during the growing season. Appropriately selected timothy varieties are compatible with red clover and birdsfoot trefoil in mixtures for hay production.

Varieties in the experiment station timothy trials were established in pure stands at Rosemount in 1992 and at Grand Rapids in 1999 and 2002.

Trials are harvested two or three times per year. Nitrogen was applied at all locations in the early spring and after the first and second harvest at a rate of 50 pounds per acre.

While early-maturing varieties of timothy had greater forage production than the late-maturing varieties at all locations over all harvest years, quality forage may be maintained later in the season with the later varieties. Timothy normally does not persist well under heavy grazing pressure.

## Dry matter yields, tons per acre, of timothy seeded at two locations.

Variety	Seedlot	Heading, % 6/7/04	Rosemount			Grand Rapids		
			1993-95	2000-02	2003-04	1994-96	2000-02	2003
<b>Early to intermediate maturity:</b>								
Aurora	3299	25.0	—	3.3	3.8	—	3.3	1.9
Climax	3171	1.0	3.8	3.4	3.7	3.6	3.0	—
Colt	3246	3.5	—	3.7	4.1	—	3.3	1.8
Comtal	3245	1.0	3.7	3	3.3	3.4	2.8	1.7
Itasca	3272	2.5	—	—	3.8	—	—	—
Goliath	2758	—	3.4	—	—	3.4	—	—
Promesse	3296	1.0	—	3.1	3.2	—	3.1	1.7
Summit	3463	65.0	—	—	4.1	—	—	1.6
Timfor	2876	1.0	3.8	—	3.8	3.5	—	1.8
Toro	2877	—	3.9	—	—	3.7	—	—
<b>Late maturity:</b>								
Heidemij	2715	—	3.0	—	—	3.5	—	—
Hokusen	2863	—	3.4	—	—	3.3	—	—
Motim	3172	—	—	3.4	—	—	2.8	—
<b>Experimental:</b>								
TM 9501	3404	68	—	—	3.9	—	—	—
LSD 5%		10.0	0.4	0.5	0.4	0.4	0.3	0.2

### Timothy Planting Rate and Date

Bushel Weight, Pounds .....	45
Seeds/Pound.....	1,234,000
Planting Rate, Pounds/Acre	
In Mixtures.....	3
Planting Rate, Seeds Sq.Ft.	
In Mixtures.....	85
Planting Date	
In Mixtures.....	Use Date for Legume

# GRAIN CROPS



## BARLEY

Barley varieties are compared in replicated trials in Crookston, Morris, St. Paul, Stephen and Roseau. The data collected from these trials should be used to make comparisons only among those varieties included in the trials. Descriptions of barley varieties are listed by year of release.

### Variety Selection Criteria

Most barley producers in the region grow barley for malt and therefore select one of the varieties approved by the American Malting Barley Association (AMBA). The most important industry specifications for making malting grade are grain protein, kernel plumpness and

deoxynivalenol (DON), the toxin produced by the Fusarium Head Blight (FHB) pathogen. Currently, among those approved varieties, Robust is preferred by industry. Drummond, Lacey, Tradition and Legacy have recently been approved by AMBA and may be purchased for malting. Industry preference for the newer varieties is uncertain at this time. Please consult the AMBA recommended varieties for the most current information at [www.am-bainc.org](http://www.am-bainc.org). For most

producers the disease FHB and the presence of DON in harvested grain are the two most important factors limiting production of malting barley in the region. Currently the only variety with partial resistance to FHB is MNBrite, however MNBrite is not approved by AMBA as a malting variety. There are no significant differences among the current malting varieties for resistance to FHB.

### General-Purpose Varieties

**Tradition**—High yielding and medium maturity. Medium lodging resistance and kernel plumpness. Six-rowed, semi-smooth awns, long rachilla hairs and colorless aleurone. Classified as a malting variety by AMBA. Resistant to spot blotch and slightly better net blotch resistance compared to Robust. Developed

by Busch-Agricultural Resources Inc. (BARI). Released 2003. **PVP** (94).

**Drummond**—High yield and medium maturity. Very good lodging resistance and good kernel plumpness. Six-rowed, semi-smooth awns, long rachilla hairs, colorless aleurone. Classified as a malting variety by AMBA. Resistant to spot blotch and slightly better net blotch resistance compared to Robust. Developed from crosses involving Azure, Bumper, Hazen and Stander. Released by N.D. AES in 2000. **PVP** (94).

**Legacy**—High yield and medium-late maturity. Medium lodging resistance and kernel plumpness. Six-rowed, semi-smooth awns, long rachilla hairs and colorless aleurone. Classified as a malting variety by AMBA. Resistant to spot blotch; has slightly better net blotch resistance compared to Robust. Developed by Busch-Agricultural Resources Inc. (BARI) from a complex cross involving the parental varieties Bumper, Karl, Manker and Excel. Released 2000. **PVP** (94).

**Lacey**—High yield and medium maturity. Good lodging resistance and kernel plumpness. Six-rowed, semi-smooth awns, short rachilla hairs, colorless aleurone. Classified as a malting variety by AMBA. Resistant to spot blotch. Developed from crosses involving Robust,

### Grain yield as a percent of the mean of the varieties in trials from 2002-2004 and for 2004 alone.

Variety	Crookston		Morris		Stephen		St. Paul		Roseau		Mean	
	2004	3-Year	2004	3-Year	2004	3-Year	2004	2-Year <sup>1</sup>	2004	2-Year <sup>2</sup>	2004	3-Year
Robust	81	86	96	89	88	92	100	96	88	94	91	91
Excel	116	106	108	106	102	100	102	106	113	101	106	105
Stander	97	101	105	103	94	96	93	95	98	113	101	101
MNBrite	93	92	96	98	99	100	91	94	91	71	90	95
Lacey	100	99	120	113	102	97	102	106	105	104	106	104
Drummond	91	105	86	93	96	95	108	106	100	95	95	100
Legacy	108	98	91	95	110	100	107	104	96	120	107	100
Tradition	114	113	99	105	109	119	96	93	100	108	105	105
LSD (0.05)	20	11	15	10	15	9	15	12	20	29	10	5
Mean, Bu/Acre	112	95	138	99	104	90	116	85	128	76	109	94

<sup>1</sup> Only two years of data, 2002 and 2004. <sup>2</sup> Only two years of data, 2003 and 2004.

Excel and Stander. Released by Minn. AES in 2000. **PVP** (94).

**Excel**—High yield and medium maturity. Similar to Robust in lodging resistance. Kernel plumpness lower than Robust. Six-rowed, semi-smooth awn, colorless aleurone and long rachilla hairs. Classified as a malting variety by AMBA. Resistant to spot blotch. Developed from crosses involving Robust, Manker and a sister line of Morex. Released by Minn. AES 1990. **PVP**.

**Robust**—Medium yield and medium maturity. Medium lodging resistance and good kernel plumpness. Six-rowed, semi-smooth awn, short rachilla hairs, colorless aleurone. Classified as a malting variety by AMBA. Resistant to spot blotch. Developed from crosses involving Morex and Manker. Released by Minn. AES 1983. **PVP**.

**Special-Purpose Varieties**

**MNBrite**—Medium yield and early maturity. Medium lodging resistance and kernel plumpness. Six-rowed, semi-smooth awns, colorless aleurone. Not classified as a malting variety. Resistant to kernel discoloration and has some resistance to FHB. Resistant to spot blotch and slightly better net blotch resistance compared to Robust. Released by Minn. AES 1998.

**Royal**—Intended for use as a forage-companion crop and feed-grain variety. Not a malting variety. Six-rowed, semi-smooth awn, blue aleurone, semidwarf stature. Superior in forage quality (RFV) compared to taller varieties based on digestibility and intake potential; low in fiber and lignin. Similar to Robust in forage protein and forage yield at the soft dough stage. Compared to taller barley and oat varieties, it competes less with underseeded forage legumes because of its short stature and superior lodging resistance. Resistant to spot blotch. Developed from crosses involving Robust, Azure and semidwarf Minn. M32. Released by the Minn. AES 1994. **PVP** (94).

**Characteristics of barley varieties, 2000-2004.**

Variety	Type	Heading*	Height, In.	Lodging, %	Plump, %	Protein, %
Robust	Malt	58	36	Medium	83	12.9
Excel <sup>1</sup>	Malt	58	34	Medium	77	12.2
Stander	Feed	58	33	Strong	85	12.3
MNBrite <sup>1</sup>	Feed	58	36	Medium	82	13.4
Lacey	Malt	57	33	Strong	83	12.7
Drummond	Malt	57	34	V. strong	80	12.9
Legacy	Malt	59	35	Medium	75	12.5
Tradition <sup>1</sup>	Malt	58	34	Medium	-	-
No. of Trials		15	15	9	14	11

<sup>1</sup>Only three years of plump and protein data, 2000-2002.

**Stander**—High yield and late maturity. Very good lodging resistance and good kernel plumpness. Six-rowed, semi-smooth awn, short rachilla hairs, colorless aleurone and short stature. Not classified as a malting variety. Resistant to spot blotch. Developed by Minnesota Agricultural Experiment Station from crosses involving Excel, Robust and Bumper. Released 1993. **PVP**.

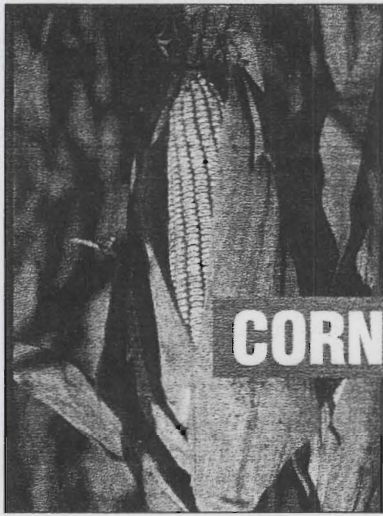
**Barley Planting Rate and Date**

Bushel Weight, Pounds .....	48
Seeds/Pound .....	14,300
Planting Rate, Pounds/Acre .....	85
Planting Rate, Seeds/Sq.Ft. ....	28
Planting Date .....	Early Spring

**Disease reactions<sup>1</sup> of barley varieties, 2001-2004.**

Variety	Fusarium		Septoria		
	Head Blight	Net Blotch	Speckled Leaf Blotch	Spot Blotch	Stem Rust
Robust	8	8	9	2	1
Excel	8	8	9	2	1
Stander	9	8	9	2	1
MNBrite	6	6	9	1	1
Lacey	8	8	9	2	1
Drummond	8	7	9	2	1
Legacy	7	5	9	2	1
Tradition	8	7	9	2	1

<sup>1</sup>Most Resistant = 1, Most Susceptible = 9.



## CORN GRAIN

financed in part by entry fees from private seed companies that chose to enter their hybrids for testing.

Test zones, locations and maturities are:

**Southern Zone:** Lambertson, Waseca and Plainview.

*Early Maturity Trial* – 103 Relative Maturity (RM) and earlier hybrids.

*Late Maturity Trial* – 104 RM and later hybrids.

**Central Zone:** Morris and Rosemount.

*Early Maturity Trial* – 95 RM and earlier hybrids.

*Late Maturity Trial* – 96 RM and later hybrids.

**Northern Zone:** Staples and Rothsay.

### Testing Procedure: Entries

Each seed corn company could enter up to six hybrids per zone. Entries in each

trial were based on the Relative Maturity (RM) provided by the company. The University of Minnesota Corn Testing Committee could also choose and enter hybrids in each test. For this reason, there may be more than six hybrids for a company in a test.

### Presentation of Data

Yields are given for individual locations along with yields and harvest moisture contents averaged across locations for 2004. Reported yields are adjusted to 15.5% grain moisture. Hybrids are ranked within a maturity group by moisture content averaged across locations for 2004.

### Least Significant Difference

We show LSD values with a 0.2 alpha level, which means that when two hybrids differ in yield by the LSD value or more one can be 80% confident that the

The Minnesota Corn Hybrid Evaluation Program is conducted by the University of Minnesota Agricultural Experiment Station to provide unbiased information for use by corn growers when they choose hybrids to buy and grow. The program is

### Companies participating in the 2004 hybrid corn grain trials.

Access Seed, 980 Fox Ridge Road, Dike, IA 50624	<a href="http://www.krugerseed.com">www.krugerseed.com</a>
Ag Source Seeds, Inc., 1800 L. Ave, Nevada IA, 50201	<a href="http://www.agsourceseeds.com">www.agsourceseeds.com</a>
Albert Lea Seed House (Viking Hybrids), Box 127, 1414 W. Main, Albert Lea, MN 56007	<a href="http://www.alseed.com">www.alseed.com</a>
Anderson Seeds, 37825 County Rd. 63, St. Peter, MN 56082	<a href="mailto:njandrsn@hickorytech.net">njandrsn@hickorytech.net</a>
Brown Seed Farms Inc., P.O. Box 7, Bay City, WI 54723	<a href="http://www.browngenetics.com">www.browngenetics.com</a>
Crows Hybrid Corn Co., Box 306, Milford, IL 60953	<a href="http://www.crowshybrid.com">www.crowshybrid.com</a>
Dahlman Seed Co., 73504-200th St., Dassel, MN 55325	<a href="http://www.dahlmanseed.com">www.dahlmanseed.com</a>
Dairyland Seed Co., Inc. (Stealth), Box 958, West Bend, WI 53095	<a href="http://www.dairylandseed.com">www.dairylandseed.com</a>
DynaGro, 221 W Lake Lansing Rd 102 East, East Lansing, MI 48823	<a href="http://www.growers.net">www.growers.net</a>
Epley Bros. Hybrids, Inc., P.O. Box 310, Shell Rock, IA 50670	<a href="http://www.epleyseed.com">www.epleyseed.com</a>
Farm Advantage, 1275 Hwy 69, Belmond IA 50421	<a href="http://www.farmadvatage.com">www.farmadvatage.com</a>
Garst Seed Co & Agripro Seeds, 2369 330th St., Box 500, Slater, IA	<a href="http://www.garstseed.com">www.garstseed.com</a>
Gold Country Seed Inc., 16506 Hwy 15 North, P.O. Box 0604, Hutchinson, MN 55350-0604	<a href="http://www.goldcountryseed.com">www.goldcountryseed.com</a>
Golden Harvest / Golden Seeds Co., 27525 135th Ave N, Cordova IL 61242	<a href="http://www.goldenharvestseeds.com">www.goldenharvestseeds.com</a>
Hyland Seeds, 2 Hyland Drive, Blenheim, Ontario, Canada NOP 1A0	<a href="http://www.hylandseeds.com">www.hylandseeds.com</a>
Jung Farms Inc., 341 So. High St., Randolph, WI 53956	<a href="http://www.jungseedgenetics.com">www.jungseedgenetics.com</a>
Kaltenberg Seeds, P.O. Box 278, Waunakee, WI 53597	<a href="http://www.kaltenbergseeds.com">www.kaltenbergseeds.com</a>
Kruger Seed Co., 33938 160th St., Dike, IA 50624	<a href="http://www.krugerseed.com">www.krugerseed.com</a>
L.G. Seeds Inc., 22827 Shissler Rd., Elwood IL 61529	<a href="http://www.lgseeds.com">www.lgseeds.com</a>
Mallard Seed Co., Inc., Plainview, MN 55964	<a href="http://www.mallardseed.com">www.mallardseed.com</a>
Monsanto Co. (Dekalb), 3100 Sycamore Rd., DeKalb, IL 60115	<a href="http://www.monsanto.com">www.monsanto.com</a>
Mycogen Seeds, 9330 Zionsville Road, Indianapolis, IN 46268	<a href="http://www.dowagro.com/mycogen/index.htm">www.dowagro.com/mycogen/index.htm</a>
Nutech/Thompson Seeds, 6131 North Fork Rd., Ames, IA 50010	<a href="http://www.nutechseed.com">www.nutechseed.com</a>
Pfister Hybrid Corn Co., 187 N Fayette St., El Paso, IL 61738	<a href="http://www.pfisterhybrid.com">www.pfisterhybrid.com</a>
Pioneer Hi-Bred Int'l., Inc., 99 Navaho Ave Suite 101A, Mankato, MN 56001	<a href="http://www.pioneer.com/usa/">www.pioneer.com/usa/</a>
RAGT Semences, Rue Emile Single - Site de Bourran, FR 12033 Rodez cedex 9	<a href="http://www.ragt.de/index.cfm">www.ragt.de/index.cfm</a>
Renk Seed Co., 6800 Wilburn Rd., Sun Prairie, WI 53590	<a href="http://www.renkseed.com">www.renkseed.com</a>
Sand Seed Service, Box 648, 4765 Hwy 143, Marcus, IA 51035	<a href="http://www.sandsofiowa.com">www.sandsofiowa.com</a>
Seeds 2000, Box 200, Breckenridge, MN 56520	<a href="http://www.seeds2000.net">www.seeds2000.net</a>
Top Farm Hybrids, P.O. Box 850, Cokato, MN 55321	<a href="http://www.top-farm.com">www.top-farm.com</a>
Trelay, Inc. (High Cycle by Trelay), 11623 Hwy 80, Livingston, WI 53554	<a href="http://www.trelay.com">www.trelay.com</a>
Trisler Seed Farms, Inc., 3274 E 800 North Rd., Fairmount, IL 61841	<a href="http://www.trisler.com">www.trisler.com</a>
Wensman Seed Co., Box 190, Wadena, MN 56482	<a href="http://www.wensmanseed.com">www.wensmanseed.com</a>



two hybrids differ in yield potential. The higher yielding one is the better hybrid from the yield standpoint. If the yield difference between two hybrids is less than the LSD, the two hybrids probably do not differ significantly in yield potential.

**Individual hybrid corn trial information, 2004.**

Location	Cooperators	Previous Crop	Planting Date	Harvest Dates
Lamberton	Steve Quiring	Soybean	April 27	October 16
Waseca	Tom Hoverstad	Soybean	April 28	October 28
Plainview	Fritz Brietenbach Bruce Ihrke	Soybean	May 4	November 4-5
Morris	George Nelson	Wheat	May 4	October 19, early hybrid October 26-27, late hybrids
Rosemount	Jerry Holz	Soybean	May 5	October 26
Staples	Norman Krause	Dark Red Kidney Beans	May 14	November 2
Rothsay	George Nelson Troy Larson	Wheat	May 3	October 25

**Corn Planting Rate and Date**

Bushel Weight, Pounds .....56  
 Planting Rate, Seeds/Acre .....33,000  
 Planting Date .....April 15 - May 5

**Early-maturity hybrids, southern locations, 2004.**

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
<b>97 and earlier RM hybrids</b>							
Kruger	9392RR	92	188	234	173	198	18.9
Anderson	94YR	94	179	214	167	187	19.0
Access	A-5293YGCB	93	160	213	155	176	19.1
NuTech	EX 592 RRYGCB	91	175	207	172	184	19.2
Crows	1703 B	95	197	233	197	209	19.2
NuTech	5592 YGCB	91	181	202	164	182	19.4
NuTech	3595 RR	93	189	233	202	208	19.5
NuTech	6595 YGRW	96	178	231	184	198	19.5
Renk	RK488YGCB	96	192	232	196	207	19.6
Kruger	9496 YGCB	94	176	240	200	205	19.7
Epley	E1150YGCB	95	210	243	178	210	19.7
Dahlman	D48-01	96	183	228	183	198	19.7
Access	A-1597RR	97	179	237	215	211	19.7
NuTech	4595+ YGCB	93	190	229	195	205	19.7
Golden Harvest	H-7007Bt	96	201	229	202	211	19.7
Dekalb	DKC47-10	97	187	228	193	203	19.7
Gold Country	94-01CB	94	214	222	200	212	19.8
Dahlman	R48-15	95	178	231	204	204	19.8
Anderson	797Y	96	185	239	203	209	19.9
Kaltenberg	K4688Bt	96	207	245	199	217	19.9
Dahlman	D47-47	94	196	228	201	208	20.0
NuTech	4393 YGCB	93	208	207	183	199	20.0
Kruger	5594YGCB	96	196	208	201	202	20.0
Viking	Bi 7293	96	197	231	192	207	20.1
Garst	8880YG1	95	204	236	184	208	20.2
Dahlman	D48-15	95	196	227	183	202	20.5
Pioneer	37A91	97	221	241	190	217	21.4
<b>97 and earlier RM averages:</b>			<b>191</b>	<b>228</b>	<b>190</b>	<b>203</b>	<b>19.7</b>
<b>98 to 101 RM Hybrids</b>							
Access	A-1500RR	100	193	247	197	212	18.9
Dairyland	Stealth-5497	98	183	240	202	208	19.4
Dekalb	DKC50-20	100	203	247	216	222	20.0
NuTech	4999 YGCB	98	212	228	218	219	20.2

**Early-maturity hybrids, southern locations, 2004 (continued).**

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
<b>98 to 101 RM Hybrids, continued</b>							
High Cycle by Trelay	HC7454YGCB	98	213	217	220	217	20.2
Dekalb	DKC50-18	100	215	241	192	216	20.3
Top Farm	2301	100	185	210	211	202	20.4
Viking	B6573	100	204	230	204	212	20.6
LG Seeds	LG2489Bt	100	214	224	190	209	20.6
Anderson	100YR	100	196	218	223	212	20.7
Viking	HL 6592	101	223	221	199	214	20.8
Pioneer	38H67	98	181	233	193	203	20.9
Renk	RK632YGCB	99	232	235	205	224	21.0
LG Seeds	LG2494	100	184	222	199	202	21.1
NuTech	EX 305 RR	99	210	256	220	229	21.2
Sands	SOI 9013	101	197	216	213	209	21.3
High Cycle by Trelay	HC5B353	100	235	239	222	232	21.4
Garst	8787YG1	101	229	245	241	238	21.4
NuTech	3003 RR	99	212	226	216	218	21.6
NuTech	Ex. 200RR	99	190	207	198	199	21.9
Pfister	1688Bt	99	225	229	209	221	22.0
High Cycle by Trelay	HC7560YGCB	100	217	233	207	219	22.0
Pfister	2060Bt	99	194	223	240	219	22.1
NuTech	2202 HX	101	237	241	184	221	22.1
Trisler	T-2744CB	101	216	208	232	219	22.2
NuTech	4202 YGCB	101	217	240	211	223	22.2
Wensman	W 6315BtRR	101	233	221	236	230	22.5
Wensman	W 7309RWRR	101	186	208	195	196	22.7
NuTech	5101+ RR/YGCB	101	213	211	219	215	22.8
Pfister	1680Bt	99	202	219	238	220	22.9
NuTech	4303 YGCB	101	236	215	223	225	23.3
Trisler	T-2475CB	100	214	229	207	217	23.9
<b>98 to 101 RM averages:</b>			<b>209</b>	<b>228</b>	<b>212</b>	<b>216</b>	<b>21.4</b>
<b>102 to 103 RM Hybrids</b>							
Kruger	9002 YGCB	102	228	259	231	239	19.7
Dekalb	DKC52-47	102	202	244	220	222	20.0
Renk	RK652LLYGCB	103	213	244	206	221	20.7
NuTech	4403 YGCB	103	199	243	232	225	21.2
Kaltenberg	K5215Bt	102	225	229	232	229	21.2
Sands	SOI 103YGCB	103	200	226	198	208	21.2
Access	A-2103RR/YGCB	103	202	222	211	212	21.2
Dekalb	DKC52-21	102	211	236	230	226	21.5
Viking	Bt 5370	103	227	221	200	216	21.7
Kruger	9306 YGCB	103	220	234	203	219	21.7
Garst	8745YG1/RR	102	203	236	231	223	21.8
NuTech	5702 RR/YGCB	102	208	239	190	212	21.8
Anderson	6005	102	206	220	179	202	21.9
Access	A-5504YGCB	102	250	221	248	240	22.2
Access	A-8503HX	103	201	237	211	216	22.5
Top Farm	2300	103	198	209	192	199	22.5
Garst	NE634IT	103	242	242	202	229	22.6
Kruger	9203 RR/YGCB	103	210	237	230	226	22.6
Renk	RK636RRYGCB	102	208	234	210	217	22.8
Trisler	T-2757CB	103	194	189	228	204	22.9
Anderson	C102R	102	200	209	167	192	23.0

**Early-maturity hybrids, southern locations, 2004 (continued).**

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
<b>102 to 103 RM Hybrids continued</b>							
Farm Advantage	1023 HX	102	196	205	245	215	23.0
Epley	E1442	102	195	213	230	213	23.4
High Cycle by Trelay	HC7601YGCB	103	215	205	188	203	23.6
Access	A-5503YGCB	103	232	204	209	215	23.7
Crows	2780 B	103	223	207	206	212	23.9
Sands	SOI 9033	103	194	211	191	199	23.9
Gold Country	103-02CB	103	193	191	208	197	24.4
Epley	E1430YGCB	103	220	215	198	211	24.8
<b>102 to 103 RM averages:</b>			<b>211</b>	<b>224</b>	<b>211</b>	<b>215</b>	<b>22.3</b>
<b>Southern locations, early maturity averages:</b>			<b>204</b>	<b>226</b>	<b>205</b>	<b>212</b>	<b>21.2</b>
<b>LSD (0.20)</b>			<b>20</b>	<b>13</b>	<b>25</b>	<b>12</b>	<b>0.7</b>

**Late-maturity hybrids, southern locations, 2004.**

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
<b>104 RM and later hybrids</b>							
Renk	RK772YGCB	104	215	244	192	217	20.2
Access	A-5705YGCB	105	208	229	202	213	20.5
Anderson	4033	106	183	222	210	205	20.6
Access	A-5405YGCB	105	204	226	234	221	20.7
Dairyland	Stealth-5503	105	203	219	226	216	20.8
Jung	6580YGCB	104	211	252	217	226	20.9
Golden Harvest	H-7990Bt	104	210	217	202	210	21.1
NuTech	Ex. 104A YGCB	104	194	219	189	201	21.1
NuTech	Ex. 205 YGCB	104	229	234	249	237	21.3
Golden Harvest	Ex48338Bt	106	198	229	179	202	21.3
Anderson	106Yr	106	191	221	202	204	21.4
Anderson	105Y	105	216	221	190	209	21.5
Gold Country	1016RRBt	104	177	222	181	193	21.6
Access	A-1006RR	105	209	206	219	211	21.7
Kruger	9505	105	209	203	228	213	21.7
High Cycle by Trelay	HC5B739	104	208	234	191	211	21.7
Viking	BR6316	104	198	226	215	213	21.7
Renk	RK700YGCB	105	212	213	243	223	21.8
NuTech	3006 RR	106	207	217	225	217	21.8
Anderson	4320	107	195	222	173	197	21.9
NuTech	4607 YGCB	106	198	231	234	221	22.0
Dekalb	DKC54-51	104	230	217	198	215	22.0
Viking	B 5303	104	213	212	207	211	22.1
Viking	4520	107	168	201	212	194	22.1
Dairyland	Stealth-5104	104	197	203	221	207	22.2
Jung	6545YGCB	105	227	216	205	216	22.4
Epley	E2410YGCB	107	184	217	148	183	22.5
Kruger	9508	108	213	200	194	202	22.6
Dairyland	Stealth-1606RR	107	193	234	185	204	22.6
Dekalb	DKC58-80	108	240	216	234	230	22.6
Garst	8578IT	108	178	230	186	198	23.0

**Late-maturity hybrids, southern locations, 2004 (continued).**

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
<b>104 RM and later hybrids, continued</b>							
Garst	NE 685IT	106	221	213	209	215	23.1
Epley	E2412	106	204	205	206	205	23.2
Pioneer	34N44	110	210	218	217	215	23.2
Wensman	W 6318Bt	104	217	233	195	215	23.2
LG Seeds	LG2533	105	174	228	217	206	23.3
Top Farm	9305RY	104	188	209	154	184	23.3
Kruger	5110YGCB	107	198	185	200	194	23.5
Access	A-2506RR/YGCB	106	217	209	196	207	23.7
Pioneer	35Y67	106	231	240	241	237	23.7
High Cycle by Trelay	HC7698RR/YGCB	107	211	209	208	209	23.7
Viking	B5313	105	228	212	216	219	23.7
NuTech	4407 YGCB	107	209	205	191	202	23.9
Access	A-8407HX	107	179	191	185	185	24.3
NuTech	Ex. 539 YGCB	108	224	196	192	204	24.5
NuTech	EX 308 YGCB	107	219	217	189	208	24.5
Wensman	W 5417Bt	107	196	228	177	200	24.6
Wensman	W 6422BtRR	107	228	207	201	212	24.7
NuTech	313	108	236	204	181	207	24.7
Wensman	W 5437Bt	110	212	195	219	209	24.8
Kruger	9510	108	202	167	198	189	25.3
NuTech	110	108	209	172	171	184	25.5
NuTech	608	108	200	181	220	200	26.2
RAGT	MX337	108	167	200	134	167	26.5
Access	A-1506RR	106	176	173	192	180	30.0
<b>Southern locations, late maturity averages:</b>			<b>205</b>	<b>214</b>	<b>202</b>	<b>207</b>	<b>22.9</b>
<b>LSD (0.20)</b>			<b>20</b>	<b>17</b>	<b>30</b>	<b>13</b>	<b>0.7</b>

**Early-maturity hybrids, central locations, 2004.**

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations		
			Morris	Rosemount	Bu/Acre	% Moisture	
<b>92 and earlier RM hybrids</b>							
Dekalb	DKC40-05	90	199	164	181	19.6	
NuTech	1888 LL/BT	87	209	166	187	19.8	
NuTech	EX 592 RRYGCB	91	185	161	173	20.2	
NuTech	EX 990 RRYGCB	90	179	168	173	20.6	
Dairyland	Stealth-7191	91	176	176	176	20.6	
Kruger	2291RR/YGCB	91	152	169	161	20.8	
NuTech	5990 RR/YGCB	90	158	167	163	20.9	
NuTech	4191 YGCB	90	195	174	185	21.1	
Dairyland	Stealth-1592	91	169	173	171	21.2	
Wensman	W 7111RWRR	92	179	176	177	21.4	
NuTech	5592 YGCB	91	157	165	161	21.5	
Kruger	9392 RR/YGCB	90	207	187	197	21.5	
Kruger	9392 YGCB	90	195	180	187	21.5	
Dyna-Gro	53F49	92	192	188	190	21.6	
Wensman	W 6116RR	91	200	173	186	21.6	
Wensman	W 6117BtRR	92	199	182	191	22.1	

**Early-maturity hybrids, central locations, 2004 (continued).**

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Bu/Acre	% Moisture
<b>92 RM and earlier hybrids continued</b>						
High Cycle by Trelay	HC7242YGCB	90	202	187	194	22.1
Wensman	W 5117Bt	92	193	177	185	22.1
Garst	8921YG1/RR	92	204	178	191	22.1
Kruger	9392RR	92	195	185	190	22.3
Renk	RK438YGCB	92	185	181	183	22.6
NuTech	5292 RR/YGCB	90	169	156	163	22.7
Mallard	3411CB	92	175	167	171	22.7
Dekalb	DKC42-95	92	209	178	194	22.8
NuTech	1992 LL/BT	90	205	178	192	23.3
Hyland Seeds	HL2368	92	189	174	181	23.8
Hyland Seeds	HLR234	92	187	171	179	24.4
<b>92 RM and earlier averages:</b>			<b>187</b>	<b>174</b>	<b>181</b>	<b>21.7</b>
<b>93 to 95 RM hybrids</b>						
Access	A-2193RR/YGCB	93	180	178	179	20.4
Anderson	94YR	94	180	163	172	20.8
Seeds 2000	2944RRBt	94	158	169	163	20.8
Access	A-5293YGCB	93	158	163	160	21.6
Dairyland	Stealth-5194	94	178	175	177	22.4
Top Farm	8395RR	95	204	186	195	22.6
Renk	RK452LLYGCB	94	202	178	190	22.8
Wensman	W 6212RR	95	188	195	192	23.4
NuTech	4595 YGCB	93	207	179	193	23.8
Seeds 2000	2933Bt	93	185	165	175	23.9
NuTech	4595+ YGCB	93	188	185	186	24.1
Dairyland	Stealth-5692	93	192	169	180	24.1
NuTech	4393 YGCB	93	183	176	180	24.2
Dekalb	DKC44-46	94	178	177	178	24.2
NuTech	3595 RR	93	189	199	194	24.2
Dyna-Gro	53F09	95	200	186	193	24.3
Wensman	W 7212RW	95	192	183	188	24.3
Kruger	9496 YGCB	94	191	173	182	24.4
Garst	8880YG1	95	200	183	191	24.6
Seeds 2000	2953	95	171	176	174	24.7
Dahlman	R48-15	95	171	192	181	24.8
Gold Country	94-01CB	94	190	179	185	24.8
Dahlman	D48-15	95	183	185	184	25.0
Hyland Seeds	HLB282	93	175	175	175	25.5
Jung	6432YGCB	95	185	177	181	25.6
Dahlman	D47-47	94	176	173	175	25.8
<b>93 to 97 RM averages:</b>			<b>185</b>	<b>178</b>	<b>182</b>	<b>23.7</b>
<b>Central locations, early maturity averages:</b>			<b>186</b>	<b>176</b>	<b>181</b>	<b>22.7</b>
<b>LSD(0.20)</b>						

**Late-maturity hybrids, central locations, 2004.**

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Bu/Acre	% Moisture
<b>100 and earlier RM hybrids</b>						
Anderson	7902	96	180	172	176	23.2
Kruger	5594YGCB	96	190	173	182	22.2
Dekalb	DKC47-10	97	171	176	174	22.4
Wensman	W5212Bt	96	191	172	182	22.5
Dekalb	DKC48-52	98	180	187	183	22.6
High Cycle by Trelay	HC7454YGCB	98	187	200	193	22.6
Seeds 2000	2953Bt	96	179	175	177	22.6
Dahlman	D48-01	96	186	158	172	22.9
Renk	RK488YGCB	96	159	164	162	22.9
Access	A-1597RR	97	188	165	176	23.1
LG Seeds	LG2463Bt	96	191	182	187	23.3
Mallard	Bt-2430	96	174	158	166	23.3
Anderson	797Y	96	178	164	171	23.3
Pioneer	37A91	97	208	167	188	23.4
Access	A-1500RR	100	179	174	176	23.4
Kaltenberg	K4666RR	96	173	182	178	23.5
Dairyland	Stealth-6497	97	180	185	182	23.5
Pfister	1499Bt	98	154	155	155	23.6
Mycogen	2R426	96	166	169	167	23.6
Anderson	C795	96	175	170	172	23.7
NuTech	6595 YGRW	96	174	170	172	23.9
AgSource	3933	100	188	179	183	24.1
High Cycle by Trelay	HC7560YGCB	100	188	190	189	24.1
Garst	NE769YG1	99	169	148	158	24.2
Renk	RK632YGCB	99	195	190	193	24.2
Dekalb	DKC50-20	100	173	173	173	24.3
Dairyland	Stealth-5497	98	171	171	171	24.6
Top Farm	2301	100	147	152	149	24.8
Pioneer	38H67	98	193	172	183	24.9
Anderson	100YR	100	164	168	166	24.9
NuTech	4999 YGCB	98	179	161	170	24.9
High Cycle by Trelay	HC5B578	100	171	164	167	25.4
Wensman	W 6274RR	98	141	173	157	25.6
LG Seeds	LG2494	100	148	162	155	25.7
NuTech	EX 305 RR	99	175	179	177	25.8
NuTech	3003 RR	99	169	178	173	26.1
LG Seeds	LG2489Bt	100	160	167	163	26.4
NuTech	5101 RR/YGCB	99	193	181	187	26.9
High Cycle by Trelay	HC5B353	100	182	173	177	27.4
NuTech	Ex. 200RR	99	168	157	163	27.6
Pfister	1680Bt	99	177	175	176	28.8
RAGT	MX444	96	188	175	181	28.9
Pfister	1688Bt	99	156	190	173	29.5
Pfister	2060Bt	99	136	173	155	31.2
<b>100 RM and earlier averages:</b>			<b>175</b>	<b>172</b>	<b>173</b>	<b>24.7</b>

**Late-maturity hybrids, central locations, 2004 continued.**

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Bu/Acre	% Moisture
<b>Later than 100 RM hybrids</b>						
Kruger	9002 YGCB	102	195	146	170	21.6
Renk	RK772YGCB	104	175	159	167	24.5
NuTech	4403 YGCB	103	188	178	183	24.9
Kaltenberg	K5244RRBt	102	213	165	189	25.0
Mallard	EXP 05-01	101	197	185	191	26.0
NuTech	5702 RR/YGCB	102	173	175	174	26.1
Jung	6573YGCB	102	159	150	155	26.1
Renk	RK652LLYGCB	103	166	189	178	26.2
Kaltenberg	K5717RRBt	105	157	171	164	26.3
NuTech	4202 YGCB	101	189	161	175	26.4
Access	A-2103RR/YGCB	103	168	173	171	26.6
Kruger	9203 YGCB	103	160	155	157	26.6
High Cycle by Trelay	HC7694RR/YGCB	101	164	156	160	26.9
Wensman	W 5314Bt	101	166	148	157	27.2
Wensman	W 6315BtRR	101	163	155	159	27.2
Kruger	9203 RR/YGCB	103	157	153	155	27.3
AgSource	4556	105	175	179	177	27.4
NuTech	5101+ RR/YGCB	101	175	150	163	27.4
Mycogen	2K541	103	175	147	161	27.5
Access	A-5504YGCB	102	177	185	181	27.5
Garst	8745YG1/RR	102	179	163	171	27.6
Wensman	W 7309RWRR	101	158	187	172	28.0
Renk	RK636RRYGCB	102	151	158	155	28.1
Garst	8787YG1	101	152	167	160	28.2
Access	A-1006RR	105	176	162	169	28.5
Access	A-5705YGCB	105	164	194	179	28.7
Access	A-5405YGCB	105	165	187	176	29.0
AgSource	Exp. 41053HX	105	174	156	165	29.1
Access	A-8503HX	103	173	173	173	29.1
NuTech	2202 HX	101	165	172	169	29.4
Access	A-5503YGCB	103	176	170	173	29.6
NuTech	4303 YGCB	101	175	175	175	29.6
Dairyland	Stealth-5104	104	177	169	173	29.7
Mycogen	2R570	104	157	171	164	30.2
High Cycle by Trelay	HC7601YGCB	103	170	172	171	30.3
Mallard	EXP 05-02	105	144	163	153	31.4
Kruger	9505	105	152	173	162	31.6
Wensman	W 5417Bt	107	175	179	177	31.9
NuTech	4607 YGCB	104	165	158	161	32.1
Wensman	W 6422BtRR	107	169	165	167	32.2
Wensman	W 6318Bt	104	178	173	176	32.3
NuTech	313	108	149	155	152	33.0
<b>Later than 100 RM averages:</b>			<b>170</b>	<b>167</b>	<b>169</b>	<b>28.2</b>
<b>Central locations, late maturity averages:</b>			<b>172</b>	<b>170</b>	<b>171</b>	<b>26.4</b>
<b>LSD(0.20)</b>			<b>14</b>	<b>15</b>	<b>10</b>	<b>0.9</b>

RAGT	MX227	80	139	145	142	27.0
NuTech	5884 RR/YGCB	82	138	134	136	27.1
Hyland Seeds	HL2232	79	114	140	127	27.2
Wensman	W 5081Bt	82	129	144	136	27.4
Wensman	W 6082BtRR	82	137	134	136	27.5
Kaltenberg	K2404	81	134	138	136	27.8
NuTech	4383 YGCB	82	143	145	144	28.2
Dairyland	Stealth-1476	76	121	117	119	29.5
NuTech	5383 RR/YGCB	82	133	121	127	29.6
<b>82 and earlier RM averages:</b>			<b>130</b>	<b>135</b>	<b>133</b>	<b>27.1</b>
<b>83 to 87 RM hybrids</b>						
Dairyland	Stealth-6685	85	159	152	155	25.3
Renk	RK232	85	123	120	122	25.8
Dekalb	DKC35-02	85	128	142	135	26.0
Dahlman	R42-15	85	131	148	140	26.2
Wensman	W 5085Bt	85	168	151	159	26.4
Seeds 2000	2842RRBt	84	157	136	147	26.5
Wensman	W 4085	84	154	134	144	26.5
LG Seeds	LG2355	84	140	147	143	26.8
Wensman	W 6085RR	84	146	151	148	26.9
Hyland Seeds	HLR288	85	136	143	140	27.3
Hyland Seeds	HL2288	85	140	138	139	27.4
Renk	RK224RR	84	137	141	139	27.6
Mycogen	2R194	85	153	138	145	27.7
Dekalb	DKC37-14	87	143	134	138	27.7
AgSource	Exp. 40843	85	139	128	133	27.8
Mallard	EXP 05-03	84	153	139	146	27.8
Top Farm	8385RY	83	126	138	132	27.9
Seeds 2000	2821Bt	83	142	142	142	28.0
NuTech	3585 RR	84	134	134	134	28.0
AgSource	2663	85	148	146	147	28.2
Wensman	W 6089BtRR	84	143	137	140	28.3
Renk	RK288YGCB	86	139	153	146	28.3
Hyland Seeds	HLB264	86	143	148	146	28.4
Brown's	2733	85	123	114	118	28.6
Pioneer	39D82	87	138	144	141	28.7
NuTech	1888 LL/BT	87	130	145	138	29.0
Dyna-Gro	51F23	84	140	140	140	29.0
Renk	RK282	84	115	95	105	31.4
Kaltenberg	K2717RRBt	85	113	110	112	32.9
RAGT	MX152-Bt	87	129	126	128	33.4
<b>83 to 87 RM averages:</b>			<b>139</b>	<b>137</b>	<b>138</b>	<b>28.0</b>



**Northern locations, 2004 (continued).**

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Rothsay	Staples	Bu/Acre	% Moisture
<b>88 to 92 RM hybrids</b>						
Dekalb	DKC40-05	90	151	148	149	27.5
Wensman	W 7111RWRR	92	129	130	130	27.9
Mycogen	2H243	88	131	134	133	28.0
Dahlman	D44-11	88	144	149	147	28.1
NuTech	5592 YGCB	91	134	129	131	28.5
Dyna-Gro	53P76	92	131	130	130	29.1
NuTech	EX 990 RRYGCB	90	146	132	139	29.4
Dairyland	Stealth-7191	91	149	144	146	29.4
NuTech	5990 RR/YGCB	90	123	136	129	29.6
Kruger	2291RR/YGCB	91	135	124	130	30.0
NuTech	3191 RR	90	142	135	138	30.0
Dekalb	DKC39-48	89	139	126	133	30.1
NuTech	EX 592 RRYGCB	91	127	110	119	30.3
Pioneer	39F28	89	144	135	139	30.6
Top Farm	9391RY	92	141	119	130	30.6
Dekalb	DKC42-95	92	139	137	138	30.7
Wensman	W 6117BtRR	92	147	137	142	30.7
Kruger	9392RR	92	144	140	142	31.1
Wensman	W 6116RR	91	152	155	153	31.2
Pioneer	38W22	92	138	146	142	31.8
Dahlman	R45-15	90	144	148	146	31.8
RAGT	MX156	91	149	132	141	31.8
NuTech	4191 YGCB	90	116	132	124	31.9
Kaltenberg	K3919RRBt	92	124	138	131	32.1
Kruger	9392 YGCB	90	142	143	142	32.2
Kruger	9392 RR/YGCB	90	128	161	145	32.3
RAGT	MX155-Bt	89	127	128	127	32.5
Renk	RK438YGCB	92	141	131	136	32.5
LG Seeds	LG2407Bt	92	133	128	131	32.8
Dahlman	D45-15	92	147	139	143	33.1
Brown's	3000YGCB	90	143	128	136	33.1
Mallard	RRBt 5810	90	104	101	103	33.1
Pioneer	38R92	92	143	127	135	33.2
Dairyland	Stealth-1690	90	135	122	129	33.5
Jung	6418RR/YGCB	92	124	121	122	33.7
NuTech	5292 RR/YGCB	90	115	121	118	33.7
Wensman	W 5117Bt	92	145	133	139	34.2
NuTech	1992 LL/BT	90	140	125	132	35.4
Dahlman	D45-47	88	131	113	122	35.4
Top Farm	2490	91	108	128	118	36.3
RAGT	MX334	92	135	132	133	37.0
<b>88 to 92 RM averages:</b>			<b>136</b>	<b>132</b>	<b>134</b>	<b>31.6</b>

**Northern locations, 2004 (continued).**

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Rothsay	Staples	Bu/Acre	% Moisture
<b>93 and later RM hybrids</b>						
Access	A-2193RR/YGCB	93	136	111	124	29.8
Mycogen	2T336	93	136	135	135	29.9
Access	A-5293YGCB	93	108	110	109	31.3
NuTech	3595 RR	93	136	137	136	31.8
Seeds 2000	2953Bt	96	146	146	146	32.7
Mycogen	2K350	93	136	137	136	32.9
Top Farm	2395	95	150	128	139	33.0
Wensman	W 6212RR	95	142	136	139	33.2
NuTech	4393 YGCB	93	135	124	130	33.5
AgSource	3563	95	136	138	137	33.5
Dairyland	Stealth-5194	94	122	134	128	33.5
Wensman	W5212Bt	96	145	136	141	33.5
Wensman	W 4212	95	144	138	141	33.8
NuTech	4595+ YGCB	93	143	134	139	33.8
Kruger	9496 YGCB	94	149	132	140	33.9
Renk	RK488YGCB	96	143	126	135	34.0
Wensman	W 7212RW	95	153	128	140	34.1
NuTech	6595 YGRW	96	121	127	124	34.2
Jung	6432YGCB	95	137	130	134	34.2
NuTech	4595 YGCB	93	137	138	138	34.3
Mycogen	2R426	96	135	151	143	34.3
Kruger	5594YGCB	96	144	141	143	34.4
Dekalb	DKC44-46	94	137	112	124	35.2
Renk	RK452LLYGCB	94	135	134	135	35.9
AgSource	Exp. 41923	95	141	117	129	36.0
Dairyland	Stealth-5692	93	127	103	115	39.3
<b>93 and later RM averages:</b>			<b>137</b>	<b>130</b>	<b>134</b>	<b>33.7</b>
<b>Northern locations averages:</b>			<b>136</b>	<b>134</b>	<b>135</b>	<b>30.5</b>
<b>LSD(0.20)</b>			<b>14</b>	<b>12</b>	<b>9</b>	<b>1.1</b>



The Minnesota Hybrid Corn Silage Evaluation Program evaluates the silage potential of corn hybrids in Minnesota. The goal of the program is to provide unbiased forage yield and quality information for educational and marketing programs.

The program is financed in part by entry fees from private seed companies that chose to enter hybrids for testing; they are listed in this publication. Results presented are from 2004 corn silage performance trials in regions of extensive corn silage use: southeastern, central and west-central Minnesota. The locations are in Minnesota's primary dairy regions.

#### Test Sites

Silage hybrids entered in the southeast or central region trials were tested at two sites within each region. Hybrids entered in the west-central region were tested at one site. Sites within regions were as follows:

##### Southeast Dairy Region:

- Harmony (Fillmore County)
- Potsdam (Olmsted County)

##### Central Dairy Region:

- Paynesville (Stearns County)
- Melrose (Stearns County)

##### West-Central Dairy Region:

- Ottertail (Otter Tail County)

#### Test Procedure

##### Southeast and Central

**Design:** Small plots were established at Harmony, Potsdam, Paynesville and Melrose in randomized complete block designs with four replications. Hybrids were planted at 33,000 seeds per acre with 30-inch row spacing. The Southeast sites were planted May 4. Central sites were planted May 10. Plant nutrients as manure or inorganic fertilizer were applied to maximize plant yield. Cultivation and herbicides were used to control weeds.

**Harvesting:** Plots were harvested and whole-plant herbage sampled for yield and forage quality at each site. Harvest was targeted for when average whole-plant moisture across entries at the site averaged 65%. Harvest dates at Harmony, Potsdam, Paynesville and Melrose were September 23, September 21, September 27 and September 30, respectively.

##### West-Central

**Design:** Large plots were established April 28 near Ottertail under center-pivot irrigation in a randomized complete block design with three replications. Hybrids were planted at 34,000 seeds per acre with 30-inch row spacing. Inorganic fertilizer was applied pre-plant

and via irrigation to maximize plant yield. Cultivation and herbicides were used to control weeds.

**Harvesting:** Plots were harvested and whole-plant herbage sampled for yield and forage quality on October 2.

#### Results Provided

Tables summarize hybrid yield and forage quality results from Harmony, Potsdam, Paynesville, Melrose and Ottertail, respectively. Relative maturity (RM), moisture content, whole-plant dry matter (DM) yield and silage yield are listed, and hybrids are ranked, in descending order of milk yield per acre (Milk Yield /Acre).

Whole-plant forage quality traits listed include crude protein (CP), neutral detergent fiber (NDF), 48-hour *in vitro* digestibility (IVD), 48-hour neutral detergent fiber digestibility (NDFD) and starch concentrations. With the exception of NDFD, all forage quality traits are expressed as a percent of dry matter. NDFD is expressed as a percent of NDF.

Milk production potentials per ton (lb milk/ton forage) and per acre (lb milk/acre forage) of forage were calculated using the MILK2000 spreadsheet developed by the University of Wisconsin. MILK2000 approximates animal perfor-

#### Companies participating in the 2004 hybrid corn silage performance trials.

Ag Venture, P.O. Box 29, Kentland, IN 47951

Crew's Hybrid Corn Co., 612 E Dunlop St, P.O. Box 157, Kentland, IN 47951

Dairyland Seed Company, Inc., P.O. Box 958, West Bend, WI 53095

Dow AgroSciences- Mycogen Seeds, 9330 Zionsville Rd, Indianapolis, IN 46268

Dyna-Gro Seed, 7259 West 4th St, Greeley, CO 80634

Garst Seed Company, 2369 330th St, Slater, IA 50244

Golden Seed Company, Inc. - Golden Harvest, 27525 135th Ave N, Cordova, IL 61242

Hyland Seeds, 2 Hyland Dr, Box 130, Blenheim, Ontario, Canada N0P 1A0

Monsanto Seed Group, DeLalb Genetics, 3160 Sycamore Road, De Kalb, IL 60115

Mycogen Seeds, 9330 Zionsville Rd, Indianapolis, IN 46268

Pioneer Hi-Bred, International, 7000 NW 62nd Ave, Johnston, IA 50131

Producers Hybrids, P.O. Box C, Battle Creek, NE 68715

Renk Seed Company, 6800 Wilburn Rd, Sun Prairie, WI 53590

Trelay Seeds, 11623 State Road 80 North, Livingston, WI 53554

mance based on a standard cow weight and milk production level (1,350-lb. body weight and 90 lb. milk/day at 3.8% fat). Values based on field calculations for hybrid moisture and DM yield; laboratory values for CP, NDF, NDFD, starch and ash concentration; and book values for NDFCP (1.3%) and ether extract (3.2%) concentration were used for spreadsheet calculations. For MILK2000 predictions, we assumed that kernel processing occurred.

### How To Use Results

NDF is a negative indicator of forage intake potential; higher NDF concentration generally implies lower animal performance potential. IVD provides an estimate of forage dry matter digestibility, and NDFD estimates digestibility of the fiber fraction. Starch concentration is positively associated with digestibility because it is assumed to be 100% digestible. Relatively higher IVD, NDFD and/or starch concentrations generally imply greater animal performance potential. Milk per acre represents the combined effects of yield and quality.

Corn hybrids differed in yield, forage quality and milk production potential at all sites. Means and least significant difference (LSD) values at the 10% probability level are shown for each parameter at each site. Where the difference between two selected hybrids for a particular trait and site is greater than the LSD value, there is a 90% probability that there is a real difference between the two hybrids for that parameter (i.e. moisture, yield, quality concentration or milk production).

### Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Harmony (Fillmore County) in 2004.

Brand / Hybrid	RM,		Yield, Ton/Acre <sup>1</sup>		Quality (Concentration) <sup>2</sup> %					Milk Yield <sup>3</sup>	
	Rating	Moisture, %	DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Dekalb DKC 57-84	107	65.0	103	29.3	7.6	38	81	49	40	3,510	36,200
Pioneer 34N42	108	66.1	10.2	30.1	7.9	41	80	50	33	3,420	34,800
Dairyland Stealth 1611	108	67.8	10.0	31.1	8.2	40	80	50	35	3,430	34,400
Pioneer 33J57	114	69.6	10.4	34.0	8.0	42	79	49	31	3,290	34,100
Garst 8590IT	100	67.7	9.4	29.2	7.3	41	80	50	33	3,410	32,100
High Cycle 7698RRYGCB	107	64.4	9.5	26.6	7.8	41	79	49	35	3,350	31,700
High Cycle 7601YGCB	103	64.7	9.1	25.9	7.2	39	80	49	35	3,460	31,600
Garst 8579RR	101	67.4	9.3	28.4	7.2	43	79	51	31	3,340	30,900
Ag Venture 6501CB	103	68.1	9.7	30.3	7.8	44	77	48	30	3,180	30,800
Crows 438B	108	68.5	9.2	29.2	8.2	43	79	50	32	3,330	30,600
Golden Harvest H-8673Bt	108	65.0	9.2	26.2	8.0	42	79	49	32	3,330	30,600
Ag Venture X4413CB	105	68.0	9.4	29.7	7.3	43	78	49	31	3,270	30,600
Golden Harvest H-9006Bt	112	68.1	9.4	29.5	7.4	43	77	47	31	3,190	30,000
Producers Hybrids SS110	116	68.7	9.7	30.9	8.1	46	76	49	28	3,080	29,800
High Cycle 7748YGCB	109	70.0	9.7	32.0	7.6	45	76	47	29	3,070	29,900
Dekalb DKC 61-45	111	71.3	9.2	32.0	7.9	44	78	50	29	3,210	29,500
Dairyland Stealth 1507BT	106	66.6	8.9	26.7	7.9	42	78	49	32	3,320	29,500
Renk RK870YGCB	112	68.1	9.0	28.1	8.0	42	78	49	33	3,270	29,400
Renk RK775	104	65.5	8.8	25.6	8.2	42	79	49	33	3,300	29,100
Pioneer 35Y67	106	67.6	9.2	28.3	7.5	44	77	49	30	3,170	29,100
Renk RK789YGCB	111	66.2	9.1	27.1	7.7	43	77	48	31	3,180	29,000
Pioneer 34M93	108	67.6	9.0	27.8	8.1	46	77	51	28	3,210	29,000
Trelay 7012	105	63.3	8.3	22.8	7.5	41	79	49	34	3,310	27,600
Dekalb DKC 54-51	104	67.9	8.3	25.8	7.8	42	79	48	33	3,260	27,100
Producers Hybrids SS104RR	104	69.6	8.6	28.2	7.7	46	77	50	27	3,090	26,600
Mycogen F697	112	72.4	7.9	28.6	8.5	45	79	53	28	3,230	25,400
<b>Mean</b>		<b>67.5</b>	<b>9.3</b>	<b>28.6</b>	<b>7.8</b>	<b>43</b>	<b>78</b>	<b>49</b>	<b>32</b>	<b>3,280</b>	<b>30,400</b>
<b>LSD (0.10)</b>		<b>2.4</b>	<b>1.0</b>	<b>2.1</b>	<b>0.6</b>	<b>3</b>	<b>ns</b>	<b>2</b>	<b>3</b>	<b>ns</b>	<b>4,700</b>

<sup>1</sup>DM yield is whole-plant corn yield at 100% dry matter; Silage yield is whole-plant corn yield at harvest moisture.

<sup>2</sup>Quality concentration description expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to Results Provided text for additional information.

<sup>3</sup>Milk production was estimated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to Results Provided text for additional information.

**Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Potsdam (Olmsted County) in 2004.**

Brand / Hybrid	RM, Rating	Moisture, %	Yield, Ton/Acre <sup>1</sup>		Quality (Concentration) <sup>2</sup> %					Milk Yield <sup>3</sup>	
			DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Pioneer 35Y67	106	68.4	12.2	38.7	7.5	42	79	50	32	3,410	41,700
Garst 8579RR	101	67.6	11.9	36.7	7.5	40	80	51	33	3,490	41,600
Ag Venture X4413CB	105	67.1	12.8	38.7	7.6	45	77	49	27	3,240	41,400
Dekalb DKC 57-84	107	66.5	12.0	35.9	8.1	40	79	48	32	3,380	40,500
Pioneer 33J57	114	72.6	12.6	45.9	8.0	45	77	49	28	3,180	40,100
Golden Harvest H-9006Bt	112	69.9	12.1	39.9	8.0	43	77	47	33	3,190	38,400
Pioneer 34N42	108	68.2	11.3	35.5	7.9	42	79	50	33	3,360	37,900
Golden Harvest H-8673Bt	108	67.9	11.3	35.2	8.2	45	78	51	28	3,250	36,700
Crows 438B	108	69.9	11.4	37.6	8.4	45	77	49	30	3,180	36,300
Dairyland Stealth 1611	108	69.1	11.2	36.4	7.7	44	77	47	32	3,150	35,400
Mycogen F697	112	74.4	10.3	40.0	8.2	44	79	53	29	3,350	34,300
Producers Hybrids SS110	116	69.9	11.5	38.2	8.1	48	74	47	26	2,940	33,900
Renk RK870YGCB	112	69.6	11.3	37.0	7.6	47	75	47	28	3,000	33,800
High Cycle 7698RRYGCB	107	69.9	11.2	37.1	8.0	47	76	49	27	3,030	33,900
Pioneer 34M93	108	69.5	11.0	36.0	8.1	48	76	49	26	3,030	33,300
Producers Hybrids SS104RR	104	70.5	10.8	36.4	7.8	46	76	48	28	3,080	33,200
Dekalb DKC 61-45	111	72.1	10.9	39.1	8.1	47	76	48	28	3,030	33,100
Trelay 7012	105	67.5	10.4	31.9	7.5	44	77	48	32	3,190	33,100
Garst 8590IT	100	70.5	10.5	35.5	7.3	46	76	47	30	3,120	32,600
Renk RK775	104	67.5	10.6	32.5	7.8	47	75	47	30	3,010	32,000
Dairyland Stealth 1507BT	106	70.5	10.7	36.2	8.1	48	75	47	28	2,970	31,800
High Cycle 7601YGCB	103	70.2	9.7	32.4	7.9	43	78	50	31	3,250	31,400
Renk RK789YGCB	111	69.3	10.2	33.2	7.4	46	75	45	29	3,040	31,000
High Cycle 7748YGCB	109	72.5	10.8	39.3	7.6	49	74	46	26	2,860	30,900
Dekalb DKC 54-51	104	69.5	9.8	32.2	7.5	44	77	46	31	3,140	30,900
Ag Venture 6501CB	103	70.3	9.9	33.6	7.8	46	76	48	29	3,050	30,300
Mean		69.7	11.1	36.6	7.8	45	77	48	29	3,150	35,000
LSD (0.10)		2.0	1.2	2.6	0.5	3	2	1	3	200	5,300

<sup>1</sup>DM yield is whole-plant corn yield at 100% dry matter; Silage yield is whole-plant corn yield at harvest moisture.

<sup>2</sup>Quality concentration description expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to Results Provided text for additional information.

<sup>3</sup>Milk production was estimated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to Results Provided text for additional information.

**Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Paynesville (Stearns County) in 2004.**

Brand / Hybrid	RM, Rating	Moisture, %	Yield, Ton/Acre <sup>1</sup>		Quality (Concentration) Percent <sup>2</sup>					Milk Yield <sup>3</sup>	
			DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Pioneer 37F16	98	64.9	8.7	24.8	7.1	41	80	50	24	3,570	31,100
DeKalb DKC 54-51	104	71.5	8.7	30.4	7.4	45	79	52	27	3,410	29,500
Pioneer 34N44	108	64.3	8.9	25.2	6.8	45	77	50	26	3,290	29,100
Dairyland Stealth 1602	98	70.6	7.8	26.6	9.2	42	81	54	30	3,630	28,300
Pioneer 37A91	97	65.1	7.6	21.8	6.8	40	81	51	33	3,660	27,800
Pioneer 35Y67	106	71.3	8.0	27.8	6.4	45	78	52	25	3,360	26,900
Renk RK556	97	68.7	7.7	24.4	8.1	44	78	51	31	3,450	26,400
High Cycle 7560YGCB	100	69.3	7.7	25.1	7.6	43	78	48	21	3,360	25,900
Renk RK488YGCB	96	70.7	7.7	26.0	7.6	44	78	50	27	3,380	25,900
Producers Hybrids 5152RR	91	67.5	7.4	22.6	7.5	40	80	49	32	3,440	25,300
Producers Hybrids 577	100	69.0	7.8	25.1	7.5	47	77	50	25	3,210	24,900
DeKalb DKC 48-52	98	68.2	7.4	23.0	7.0	43	77	47	30	3,370	24,800
Pioneer 36K67	102	71.0	6.8	23.5	7.3	45	78	51	29	3,420	23,300
Dairyland Stealth 1606	104	70.8	7.0	23.8	7.4	46	76	48	26	3,290	23,000
Dyna-Gro 5227RR	100	73.0	7.2	26.6	7.2	49	76	50	21	2,970	21,400
Dairyland HIDF 4200	101	73.7	6.6	25.2	7.7	47	76	50	25	3,200	21,100
Garst 8787YG1	96	71.0	6.2	21.2	7.5	45	78	52	26	3,420	21,000
High Cycle 7698RRYGCB	107	73.5	6.9	26.0	7.6	50	75	50	20	3,010	20,800
Dairyland Stealth 1503	100	72.2	6.8	24.4	7.3	48	75	48	25	3,050	20,700
Hyland Seeds HL S041	95	71.4	6.3	21.9	7.4	46	77	54	27	3,310	20,700
DeKalb DKC 47-10	97	69.9	5.8	19.2	7.8	42	80	52	30	3,510	20,400
Garst 8865	90	71.0	6.1	20.8	7.6	45	77	50	29	3,310	20,200
Hyland Seeds HL S058	102	73.7	5.9	22.5	7.3	46	79	54	21	3,260	19,200
Hyland Seeds HL S067	104	73.7	6.3	23.7	6.6	51	73	48	17	2,880	18,000
Mean		70.4	7.1	24.1	7.4	45	78	51	26	3,320	23,800
LSD (0.10)		3.8	1.5	4.6	ns	3	2	2	5	260	5,700

<sup>1</sup> DM yield is whole-plant corn yield at 100% dry matter; Silage yield is whole-plant corn yield at harvest moisture.

<sup>2</sup> Quality concentration description expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to Results Provided text for additional information.

<sup>3</sup> Milk production was estimated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to Results Provided text for additional information.

**Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Melrose (Stearns County) in 2004.**

Brand	Hybrid	RM		Yield, Ton/Acre <sup>1</sup>		Quality (Concentration) <sup>2</sup>					Milk Yield <sup>3</sup>	
		Rating	Moisture, %	DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
High Cycle	7560YGCB	100	71.0	9.9	34.6	8.6	42	80	53	31	3,380	33,400
DeKalb	DKC 48-52	98	68.9	9.2	29.9	8.4	38	83	54	34	3,630	33,300
Garst	8865	90	70.7	9.8	33.7	8.9	43	80	54	29	3,360	32,800
DeKalb	DKC 47-10	97	70.9	8.8	30.3	8.7	42	81	54	31	3,390	29,800
Dairyland Stealth	1602	98	72.4	8.8	32.1	9.5	46	79	55	25	3,290	29,000
Pioneer	37A91	97	72.2	8.8	32.0	9.2	43	79	52	29	3,260	28,600
Pioneer	34N44	108	72.1	9.0	32.6	8.8	44	80	54	26	3,160	28,400
Dairyland Stealth	1503	100	71.9	9.0	32.2	8.6	46	78	52	25	3,130	28,200
High Cycle	7698RRYGCB	107	69.9	8.9	29.6	9.6	46	80	55	23	3,150	28,000
DeKalb	DKC 54-51	104	69.2	8.8	28.4	8.5	44	80	54	26	3,190	27,900
Producers Hybrids	5152RR	91	72.4	8.1	29.6	8.4	41	81	53	32	3,420	27,800
Dairyland Stealth	1606	104	72.0	8.5	30.2	9.2	44	81	56	25	3,250	27,500
Pioneer	35Y67	106	69.6	8.6	28.3	8.3	45	81	57	25	3,180	27,300
Renk	RK488YGCB	96	69.7	8.4	27.8	8.7	42	80	52	29	3,260	27,200
Pioneer	36K67	102	70.8	8.4	28.5	9.0	42	80	52	28	3,240	27,100
Hyland Seeds	HL S058	102	72.4	8.8	32.0	8.8	46	79	55	23	3,060	26,900
Garst	8787YG1	96	72.4	8.4	30.7	8.8	44	79	52	26	3,190	26,800
Hyland Seeds	HL S067	104	72.4	8.9	32.3	9.2	49	77	53	20	2,980	26,400
Producers Hybrids	577	100	70.7	8.1	27.9	9.0	43	81	55	27	3,230	26,000
Dyna-Gro	5227RR	100	72.0	8.1	29.0	9.0	45	79	54	26	3,180	25,700
Renk	RK556	97	70.7	8.3	28.8	9.3	45	78	51	27	3,070	25,600
Pioneer	37F16	98	72.2	7.7	27.9	8.5	42	79	51	29	3,230	25,000
Dairyland	HIDF 4200	101	68.0	7.7	24.3	9.1	46	78	52	25	3,100	23,900
Hyland Seeds	HL S041	95	71.2	7.3	25.4	8.6	46	77	51	27	3,120	22,800
Means			71.0	8.5	29.7	8.9	44	80	54	27	3,230	27,500
LSD (0.10)			ns	1.1	5.1	0.5	3	2	2	4	230	4,300

**Relative maturity (RM), whole-plant moisture, silage yield and quality traits for irrigated corn hybrids planted at Ottertail (Otter Tail County) in 2004.**

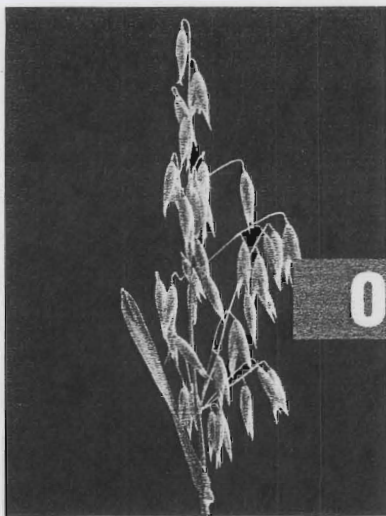
Brand	Hybrid	RM		Yield, Ton/Acre <sup>1</sup>		Quality (Concentration) <sup>2</sup>					Milk Yield <sup>3</sup>	
		Rating	Moisture, %	DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Pioneer	38W21	91	58.0	6.8	16.2	7.3	48	75	48	26	2,900	19,800
Monsanto	DKC 42-95	92	67.7	6.2	19.1	8.1	46	78	52	27	3,180	19,600
Mycogen	2M405	97	71.1	6.8	23.6	8.3	52	75	51	18	2,830	19,200
Pioneer	37R71	97	68.1	6.7	20.9	7.9	49	76	51	21	2,880	19,200
Garst	8865	90	64.6	6.2	17.5	7.6	48	76	50	25	3,060	19,000
Pioneer	37D02	97	68.1	6.8	21.2	7.8	52	74	50	20	2,760	18,700
Monsanto	DKC 37-14	87	62.7	6.0	16.1	8.1	46	77	50	27	3,090	18,500
Dyna Gro	5227	100	69.9	6.8	22.6	7.7	52	73	49	19	2,690	18,300
Hyland Seeds	HL S067	102	74.0	7.1	27.4	8.8	57	73	52	14	2,550	18,200
Monsanto	DKC 40-05	90	62.8	6.2	16.7	7.7	50	74	49	22	2,850	17,800
Hyland	HL S058	99	74.4	6.4	25.0	7.8	54	73	50	15	2,550	16,300
Pioneer	37A91	97	64.5	5.7	16.1	7.7	51	74	49	21	2,760	15,800
Mycogen	2D421	95	68.6	6.2	19.6	7.2	57	72	51	15	2,550	15,700
Hyland Seeds	HL SR59	99	75.1	6.2	24.9	7.4	54	74	52	13	2,360	14,600
Mean			67.8	6.4	20.5	7.8	51	75	50	20	2,790	17,900
LSD (0.10)			1.7	ns	2.6	0.6	3	2	2	3	230	3,100

<sup>1</sup> DM yield is whole-plant corn yield at 100% dry matter; Silage yield is whole-plant corn yield at harvest moisture.

<sup>2</sup> Quality concentration description expressed as a % of DM, except NDFD which is expressed as a % of NDF.

Refer to Results Provided text for additional information.

<sup>3</sup> Milk production was estimated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to Results Provided text for additional information.



## OAT

BYDV (red leaf) susceptibility (score of 7 or higher) should be chosen carefully.

Groat percent is an important consideration for grain production, perhaps equal to grain yield, whether for food or feed. Lodging can be site-specific; varieties with lodging scores above 2.6 should be chosen cautiously if soil is highly fertile. Taller varieties may generally produce more forage and/or straw. Earlier

varieties tend to perform relatively better in more southerly parts of the state while later varieties usually have an advantage in the north.

### General-Purpose Varieties

**Dane**—Early maturity, lower yield, short, good lodging resistance, fair test weight, high groat percentage. Yellow seed. Moderately resistant to crown rust and smut, susceptible to red leaf. Selected at the Wis. AES. Released in 1990. Foundation seed available to certified seed producers only under a license/fee collection agreement. Because of smut susceptibility, planting only treated seed is recommended. **PVP**

**Drumlin**—Late maturity, very high yield, fair lodging resistance, medium test weight and groat percentage, yellow

Proper selection of oat varieties requires consideration of the anticipated growing conditions, the pests that might be encountered in a specific production situation and the purpose for growing the crop. Specific growing situations will dictate the priority and emphasis given to each trait included in the tables.

Generally, crown rust is the most important disease and detailed interpretation of our data follows. We divided the rust reading into two columns beneath "Crown Rust" headed "Amount Infected" and "Reaction Type." The value in the Crown Rust Amount Infected column predicts the relative proportion of rust spores that will achieve a successful infection. The Reaction Type value gives the size of the pustule, which indicates how much the pustule is restricted by the host reaction. A small and/or restricted pustule produces fewer spores for reinfection.

Depending upon the plant growth stage at initial infection, there can be one to three cycles of reinfection during an oat-growing season. Each infection cycle is 8 to 10 days long. The final amount of rust infection depends upon both the number and size of spore-producing pustules present to cause subsequent infections. It is these later infections that really damage the plant.

Treated seed should be used for smut-susceptible varieties, and those with

### Oat traits, 2003-2004

Variety	Days After Planting To Heading	Height, Inches	Lodging, 1 = Erect 5 = Flat	Test Weight, Lb/Bu	Groat %
Reeves	63	41	3.2	41.6	72.2
Moraine	65	39	2.3	40.1	72.9
Richard	65	44	2.3	40.2	70.1
Wabasha	66	40	1.9	39.7	73.0
Gem	67	41	2.7	39.5	71.1
Vista	67	42	2.9	40.1	71.5
Sesqui	68	40	2.6	39.5	67.8
Morton	69	46	1.5	41.3	71.2
HiFi	69	44	1.9	41.1	71.1
Leonard	69	41	2.8	37.1	70.1
Drumlin	69	40	2.5	39.7	71.9
Mean	67	42	2.4	40.0	71.2

### Oat yield, (Percent of mean) off-station locations, 2004 only.

Variety	Madison <sup>1</sup>	Winona <sup>1</sup>
Dane	89	95
Reeves	95	63
Moraine	78	149
Richard	100	102
Wabasha	102	85
Gem	120	124
Vista	99	94
Sesqui	104	83
Morton	99	114
HiFi	111	96
Leonard	106	76
Drumlin	97	119
Location Mean (Bu/Acre)	95	58
LSD 0.05 (% of Mean)	23.5	34.4

<sup>1</sup> Organic reduced pesticide locations.



**Oat yield, percent of mean, by location, 2002-2004.**

Variety	Rosemount	Waseca	Lamberton	Morris	Average of 4 locations	Crookston <sup>1</sup>	Grand Rapids <sup>1</sup>	Average of 6 locations
Reeves	98	92	100	72	90	88	54	84
Moraine	95	93	90	109	97	100	103	98
Richard	96	98	94	89	94	100	109	98
Wabasha	100	107	96	98	100	103	88	99
Gem	98	97	96	98	97	92	103	97
Vista	100	91	96	109	100	104	107	101
Sesqui	102	95	108	105	103	106	104	103
Morton	109	110	114	105	110	99	100	106
HiFi	107	108	114	101	107	103	98	105
Leonard	99	94	98	101	98	101	113	101
Drumlin	105	104	109	118	109	111	114	110
Location Mean (Bu/Acre)	86	84	88	96	89	142	126	100
LSD 0.05 (% of Mean)	8.2	8.3	9.7	8.8	4.4	8.6	14.6	4.5

<sup>1</sup> Data from 2003 and 2004 only.

seed. Resistant to crown rust and smut, some tolerance to red leaf. Selected at Wis. AES. Released in 2003. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP** (pending)

**Gem**—Medium maturity, high yield, medium height, fair lodging resistance, fair test weight and groat percentage. Yellow seed. Resistant to crown rust and smut, susceptible to red leaf. Selected at Wis. AES. Released in 1995. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP** (94)

**HiFi**—Late maturity, high yield, tall, good lodging resistance, high test weight, medium groat percentage. White seed. Modest resistance to crown rust and smut, some tolerance to red leaf. Selected at N.D. AES. Released in 2001. **PVP** (94)

**Jerry**—Medium maturity, medium yield, tall, good lodging resistance, very high test weight, high groat percentage. Ivory seed. Susceptible to crown rust and to smut, some tolerance to red leaf. Selected at N.D. AES. Released in 1994. Because of smut susceptibility, planting

only treated seed is recommended. **PVP** (94)

**Leonard**—Late maturity, high yield, medium height, fair lodging resistance, fair test weight and groat percentage. Yellow seed. Resistant to crown rust and smut. High tolerance to red leaf. Selected at Minn. AES. Released in 2002.

**Moraine**—Early maturity, medium yield, short, good lodging resistance, high test weight and groat percentage. Yellow seed. Resistant to crown rust and smut, some tolerance to red leaf. Selected at Wis. AES. Released in 2001. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP** (pending)

**Disease data in single year (2004), except crown rust (2003).**

Variety	Crown Rust <sup>1</sup>		Smut Score <sup>3</sup>	BYDV Score <sup>4</sup>
	Amount Infected	Reaction, Type <sup>2</sup>		
Reeves	10	MR-MS	S	6
Moraine	5	R-MR	R	6
Richard	15	MR-MS	R	4
Wabasha	5	MR-MS	MR	6
Gem	1	R-MR	MR	7
Vista	1	R-MR	R	8
Sesqui	10	MS	R	4
Morton	5	R-MR	R	6
HiFi	10	S-MS	MS	6
Leonard	5	MR-MS	R	3
Drumlin	1	R	R	6

<sup>1</sup> Data from inoculated nursery in 2003.

<sup>2</sup> R = resistant, MR = moderately resistant, MS = moderately susceptible and S = susceptible.

<sup>3</sup> Artificially inoculated, R = resistant, MR = moderately resistant, MS = moderately susceptible and S = susceptible.

<sup>4</sup> Barley Yellow Dwarf Virus score from Urbana, Ill, with 1 = no symptoms and 9 = dead.



Oat trial locations.

**Morton**—Late maturity, very high yield, tall, very good lodging resistance, very high test weight, medium groat percentage. Ivory seed. Very good resistance to crown rust and smut, some tolerance to red leaf. Selected at N.D. AES. Released in 2001. **PVP** (pending)

**Reeves**—Early maturity, fair yield, medium height, poor lodging resistance, medium test weight and high groat percentage. Ivory seed. Resistance to crown rust, moderately susceptible to smut, some tolerance to red leaf. Selected at S.D. AES. Released in 2002.

**Richard**—Early maturity, high yield, tall, good lodging resistance, high test weight and medium groat percentage. Yellow seed. Some resistance to crown rust, resistant to smut and good tolerance to red leaf. Selected at Minn. AES. Released in 2000. **PVP** (94)

**Riser**—Early maturity, lower yield, short, fair lodging resistance, high test weight and groat percentage. Yellow seed. Resis-

tant to crown rust and smut, susceptible to red leaf. Selected at S.D. AES. Released in 1998.

**Sesqui**—Late maturity, high yield, medium height, good lodging resistance, fair test weight, lower groat percentage. Yellow seed. Moderately resistant to crown rust, resistant to smut and good tolerance to red leaf. Selected at Minn. AES. Released in 2001.

**Vista**—Medium maturity, high yield, medium height, poor lodging resistance, high test weight and groat percentage. Yellow seed. Resistant to crown rust and smut, very susceptible to red leaf. Selected at Wis. AES. Released in 1999. **PVP** (94)

**Wabasha**—Medium maturity, high yield, medium height, very good lodging resistance, fair test weight, high groat percentage. White seed. Some resistance to crown rust, resistant to smut, some tolerance to red leaf. Selected at Minn. AES. Released in 2001.

**Troy**—Medium maturity, medium yield, tall, poor lodging resistance, low test weight, medium groat percentage. White seed. Moderately susceptible to crown rust, resistant to smut, good tolerance to red leaf. Selected at S.D. AES. Released in 1991.

**Special-Purpose Variety**

**Paul**—Hulless. Medium-late maturity, high yield for hulless cultivar, tall, very good lodging resistance; hulless, so very high test weight. Moderately susceptible to crown rust, resistant to smut, moderately susceptible to red leaf. Selected at N.D. AES. Released in 1994. **PVP** (94)

**Oat Planting Rate and Date**

Bushel Weight, Pounds .....	32
Seeds/Pound.....	16,200
Planting Rate, Pounds/Acre .....	80
Planting Rate, Seeds/Sq.Ft.....	28
Planting Date .....	Early Spring



# HARD RED SPRING WHEAT

Spring wheat varieties are compared in trial plots at Waseca, Lamberton, Morris, Crookston, Stephen, Roseau and St. Paul. Wheat varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as possible. These hard red spring wheat trials are not designed for crop (species) comparisons, because the various crops are grown on different

fields or with different management. The data should only be used to compare varieties within a table.

Tested hard red spring wheat varieties are listed in the order of their flowering date in the tables. Only new varieties or varieties with better than susceptible reaction to scab are being tested.

## Variety Selection Criteria

While grain yield is an important economic trait, return per acre also is affect-

**Origin, characteristics and disease reactions of hard red spring wheat varieties.**

Variety	Origin <sup>1</sup>	PVP Status	Days to Heading <sup>2</sup>	Height Inches <sup>2</sup>	Straw Strength <sup>3</sup>	Leaf Rust <sup>4</sup>	Stripe Rust <sup>4</sup>	Other Leaf Diseases <sup>4</sup>	Scab	
									Disease Severity <sup>4</sup>	Grain Soundness <sup>5</sup>
Ingot	1998 SDSU	PVP (94)	65	40	Medium	S	R	MS	MR-MS	2.0
Briggs	2002 SDSU	PVP (94)	65	36	Medium	R	R	MR	MR-MS	2.5
Walworth	2001 SDSU	PVP (94)	65	38	Medium	MS	MS	MS	MR-MS	2.5
Oklee	2003 MN	PVP (pending)	66	35	Medium	MR-MS	R	MR	MR-MS	2.5
Trooper	2004 Westbred	PVP (pending)	66	32	V. Strong	MR	MS-S	-	MR-MS	2.5
Banton	2004 Trigen	PVP (pending)	66	36	V. Strong	R	R	-	MR-MS	2.5
2375	1990 NDSU	PVP (94)	66	36	Medium	MS	R	S	MR-MS	2.5
Granger	2004 SDSU	PVP (pending)	66	40	Medium	MR	R	MR	MR-MS	2.5
Oxen	1995 SDSU	PVP (94)	67	37	M. Strong	MS-S	R	MS	MS-S	3.0
Dapps	2003 NDSU	PVP (pending)	67	42	Medium	MR	MR	MR-R	MS	3.0
Mercury	1999 N. Star G.	PVP (94)	67	33	Strong	MR	R	MR	S	5.0
Alsen	2000 NDSU	PVP (94)	67	36	Strong	MR	R	MR-R	MR	2.0
Freyr	2004 AgriPro	PVP (94)	67	37	Medium	MR-MS	R	-	MR	2.0
Steele-ND	2004 NDSU	PVP (94)	67	39	Medium	R	R	MR	MS	2.5
Parshall	1999 NDSU	PVP (94)	68	42	Strong	MS-S	R	MR-R	MR-MS	2.0
Reeder	1999 NDSU	PVP (94)	68	39	Strong	MS	R	MR-R	MS	3.5
Knudson	2001 AgriPro	PVP (94)	68	37	M. Strong	R	MR	MR-R	MR-MS	2.5
Hanna	2002 AgriPro	PVP (94)	68	41	M. Strong	MS	R	MR	MR	2.0
HJ98	1998 MN	PVP (94)	68	36	Medium	MS	R	MS	MS	3.0
Norpro	1999 AgriPro	PVP (94)	70	35	Strong	MR	MR	MR-R	MS	3.5
Verde	1995 MN	PVP (94)	70	36	M. Strong	MR	R	MR-R	MS	3.5
Granite	2002 Westbred	PVP (94)	71	35	V. Strong	MR-MS	MR	MR	MR-MS	2.5
Marshall	1982 MN	-	71	36	Strong	MS	R	MS	MS	3.5
Saturn	2004 N. Star G.	PVP (pending)	73	39	V. Strong	MR-MS	R	-	MS	3.5
Polaris	2004 N. Star G.	PVP (pending)	74	39	V. Strong	MS	R	-	MS	3.5
Mean			68	37						

<sup>1</sup>. Abbreviations: MN = Minnesota Agricultural Experiment Station and USDA-ARS; N. Star G. = North Star Genetics; NDSU = North Dakota State University Research Foundation; SDSU = South Dakota Agricultural Experiment Station; Trigen = Trigen Seed Services LLC.

<sup>2</sup>. 2004 data. <sup>3</sup>. 2000-2004 data. <sup>4</sup>. R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

<sup>5</sup>. Ability to maintain plump, sound kernels under scab epidemics. 1=good, 5=poor.

ed by grain quality. Because Fusarium Head Blight (FHB), or scab, can reduce grain quality and yield dramatically, it is an important consideration.

The foliar disease rating, which represents the total complex of leaf diseases other than leaf rust, includes the Septoria complex and tan spot. Although varieties may differ for their response to each of those diseases, the rating does not differentiate among them. Consequently, the rating should be used as a general indication and only for varietal selection in areas where these diseases have been a problem or if the previous crop was wheat or barley.

Control of leaf diseases with fungicides may be warranted, even for varieties with an above-average rating.

The varietal response to FHB is presented as a severity rating, similar to the rating for leaf and stem rust. Resistance to spread in the head, the basis for this severity rating, is one of the resistance mechanisms to the disease. A second rating is provided to characterize ability to maintain sound, plump kernels despite visual disease symptoms on the head.

This ability to maintain sound kernels and thus, test weight is another component to resistance.

**Grain yield (percent of the mean) of hard red spring wheat varieties in Minnesota, northern locations.**

Variety	Crookston			Roseau <sup>1</sup>		Stephen		
	2004	2-Year	3-Year	2004	2-Year	2004	2-Year	3-Year
Ingot	94	93	94	97	100	99	99	93
Briggs	98	95	100	110	110	102	104	102
Walworth	101	98	100	98	101	100	98	100
Oklee	97	97	103	103	99	103	100	98
Trooper	104	-	-	79	-	111	-	-
Banton	104	-	-	97	-	102	-	-
2375	98	102	98	102	101	109	99	98
Granger	80	84	-	99	97	104	101	-
Oxen	85	89	91	106	103	93	95	96
Dapps	95	96	-	106	100	88	93	-
Mercury	99	100	104	113	109	110	102	108
Alsen	103	97	100	100	96	93	96	100
Freyr	101	-	-	94	-	83	-	-
Steele-ND	90	95	-	100	99	103	107	-
Parshall	83	91	95	100	98	90	87	85
Reeder	87	90	94	105	102	100	102	101
Knudson	115	109	107	89	98	99	103	102
Hanna	101	99	99	94	94	98	101	100
HJ98	116	115	110	102	106	111	113	111
Norpro	101	97	95	94	96	100	103	102
Verde	111	108	105	95	95	97	95	100
Granite	111	102	97	110	98	92	97	94
Marshall	87	93	86	76	88	95	101	98
Saturn	96	-	-	103	-	105	-	-
Polaris	107	-	-	100	-	103	-	-
Mean (Bu/Acre)	86.6	83.5	77.5	89.5	91.9	71.4	71.5	53.8
LSD	12.2	14.8	13.5	10.9	14.7	15.7	13.5	11.7

<sup>1</sup> There are no 3-year Roseau data because 2002 was flooded.

Variety selection for 2005 continues to be a balance between yield potential, disease responses and grain quality. Leading varieties in Minnesota, based on

acres planted, include Oxen, Knudson, Alsen, Reeder, Walworth and Briggs. New releases for 2005 are Banton, Freyr, Granger, Polaris, Saturn, Steele-ND and Trooper. Four of these new varieties - Banton, Polaris, Saturn and Trooper - have very strong straw, comparable to Granite.

Leaf rust continues to be a yearly problem on varieties with ratings of MS or worse. Varieties with ratings of MR or better should not experience economic levels of damage to this fungus in most years.

Stripe rust was a serious problem on susceptible varieties in some locations in 2004. This disease is not as widespread and does not occur as regularly as leaf rust, but can be very damaging when temperatures remain unseasonably cool into early July. A column comparing the variety responses to this disease has been added to the disease-reactions table. Most varieties are resistant or moderate-

(Continued on page 46)

**Hard Red Spring Wheat Planting Rate and Date.**

Calculating and seeding the appropriate amount of seed is an important first step towards maximizing yield. The seeding rate is a function of the number of kernels per pound of seed, the percent germination of the lot, the expected stand loss as a function of the quality of seedbed, and the desired stand. In Minnesota, an average optimum stand for hard red spring wheat when planted early is between 28 to 30 plants per square foot or approximately 1.25 million plants per acre. This number should increase by 1 to 2 plants per square foot for every week planting is delayed past the early, optimum seeding date. Expected stand loss even under good seedbed conditions is between 10 to 20% and will increase with a poor seedbed or improper seed placement due to poor depth control.

The general formula for calculating a seeding rate is:

$$\text{Seeding Rate (Pounds/Acre)} = \frac{\text{Desired stand (Plants/Acre)} \times (1 + \text{Expected Stand Loss})}{(\text{Seeds/Pound} \times \text{Percentage Germination})}$$

Calculate the seeding rate for every single seed lot and calibrate the drill accordingly.

**Example: Early variety.**

Desired Stand, (Plants/Acre)	Expected Stand Loss	Seeds per Pound	Percentage Germination	Seeding Rate, (Lb/Acre)
1.25 million	0.20	14,000	0.95	113

**Grain yield (percent of the mean) of hard red spring wheat varieties in Minnesota, southern locations.**

Variety	Lamberton			Morris			St. Paul			Waseca		
	2004	2-Year	3-Year	2004	2-Year	3-Year	2004	2-Year	3-Year	2004	2-Year	3-Year
Ingot	88	90	90	80	88	94	94	96	99	84	90	89
Briggs	98	96	98	109	98	101	96	96	96	101	99	98
Walworth	102	99	99	80	94	95	103	106	106	108	102	108
Oklee	95	96	104	106	96	98	104	94	100	102	102	107
Trooper	91	-	-	83	-	-	129	-	-	88	-	-
Banton	89	-	-	105	-	-	107	-	-	85	-	-
2375	93	95	90	110	103	101	88	84	85	90	86	84
Granger	109	105	-	110	100	-	97	98	-	92	100	-
Oxen	85	98	99	94	105	104	109	110	113	97	102	110
Dapps	107	97	-	105	94	-	99	98	-	108	101	-
Mercury	115	109	110	113	114	108	135	121	118	124	115	110
Alsen	94	94	92	97	93	90	87	91	91	90	88	85
Freyr	109	-	-	107	-	-	104	-	-	100	-	-
Steele-ND	100	101	-	99	100	-	120	107	-	111	105	-
Parshall	65	70	73	84	87	88	116	112	106	74	86	92
Reeder	90	98	97	105	107	107	114	112	111	98	98	101
Knudson	116	114	114	117	110	110	104	107	104	122	117	114
Hanna	110	95	88	89	91	88	77	87	86	75	83	80
HJ98	93	102	105	94	101	99	76	95	97	95	99	97
Norpro	108	111	110	93	97	101	75	90	96	105	103	101
Verde	107	107	103	112	107	102	98	101	99	108	104	102
Granite	112	116	113	97	104	104	97	98	103	99	100	92
Marshall	79	85	79	70	86	90	45	67	79	64	76	73
Saturn	93	-	-	101	-	-	130	-	-	105	-	-
Polaris	97	-	-	109	-	-	105	-	-	91	-	-
Mean (Bu/Acre)	54.9	53	46.8	83.1	79.9	69.4	66.9	75.6	73.4	66.0	77.3	62.3
LSD	13.2	19.8	16	14.2	22.7	16.5	10.8	25.7	18.6	15.9	15.7	13.2

**Grain yield (percent of the mean) of hard red spring wheat varieties in Minnesota.**

Variety	State			North <sup>1</sup>			South <sup>2</sup>		
	2004	2-Year	3-Year	2004	2-Year	3-Year	2004	2-Year	3-Year
Ingot	91	94	94	96	97	95	87	91	93
Briggs	102	100	100	103	103	103	101	97	98
Walworth	99	100	101	100	99	100	98	100	102
Oklee	101	98	101	101	99	100	102	97	102
Trooper	98	-	-	98	-	-	98	-	-
Banton	98	-	-	101	-	-	97	-	-
2375	99	96	94	103	101	99	95	92	90
Granger	99	98	-	94	94	-	102	101	-
Oxen	96	100	102	95	96	96	96	104	107
Dapps	101	97	-	96	96	-	105	97	-
Mercury	116	110	109	107	104	107	122	115	111
Alsen	95	94	93	99	97	99	92	91	90
Freyr	100	-	-	92	-	-	105	-	-
Steele-ND	103	102	-	98	101	-	108	103	-
Parshall	87	90	91	91	92	92	84	89	90
Reeder	100	101	102	97	98	98	102	104	104
Knudson	109	108	108	101	103	103	115	112	111
Hanna	92	93	91	98	98	98	88	89	86
HJ98	98	104	103	109	111	109	89	99	99
Norpro	97	99	101	98	99	98	95	100	102
Verde	104	103	101	101	99	100	106	105	102
Granite	103	102	100	104	99	96	101	105	103
Marshall	74	85	85	66	94	91	64	79	80
Saturn	105	-	-	102	-	-	107	-	-
Polaris	102	-	-	103	-	-	101	-	-
Mean (Bu/Acre)	74.1	76.1	66.7	82.5	82.2	72.2	67.7	71.4	63.0
LSD	9.9	6.6	5.9	12.2	8.2	6.5	14.9	9.6	8.2
No. Environments	7	14	20	3	6	8	4	8	12

<sup>1</sup> 2-year data are from 2003 and 2004 Crookston, Roseau and Stephen; 3-year data add 2002 Crookston and Stephen.

<sup>2</sup> Data from Lamberton, Morris, St. Paul and Waseca.

ly resistant. Trooper and Walworth are more susceptible, and sustained economic levels of damage in 2004.

Falling number data, an important end-use quality trait that can be determined at most local elevators, has been added to the grain-quality table. Falling number is measured in seconds, and values of 300 or higher are required for milling quality wheat. Falling number is related to pre-harvest sprouting, in that sprouted grain will always have low falling numbers. In the absence of visual sprouting, falling numbers are generally greater than 400, except in certain varieties. The variety Dandy, which we no longer test, had on average, falling numbers 100 seconds less than other varieties. Granite tends to average about 70 seconds less than other varieties.

*Variety descriptions published in previous editions have been discontinued because all of the information they contained is now included in the tables.*

**Grain quality of hard red spring wheat varieties.**

Variety	Test Weight (Lb/Bu)		Protein (%) <sup>1</sup>		Baking Quality <sup>2</sup>	Falling Number <sup>3</sup>	Pre-Harvest Sprouting
	2004	2-Year	2004	2-Year			
Ingot	61.9	63.0	14.2	14.7	med.-high	404	Susceptible
Briggs	60.7	61.7	14.6	14.6	med.	493	Resistant
Walworth	58.8	60.2	14.4	14.7	med.-high	387	Resistant
Oklee	61.0	62.2	14.9	15.1	low-med.	398	Resistant
Trooper	59.9	—	13.7	—	—	—	—
Banton	61.0	—	14.5	—	—	—	—
2375	60.4	61.3	14.4	14.7	med.	—	Resistant
Granger	60.1	61.2	14.6	14.8	—	—	Mod. Resistant
Oxen	57.7	59.8	14.4	14.5	high-med.	386	Resistant
Dapps	60.1	61.0	15.7	16.1	high	—	Resistant
Mercury	59.7	60.8	13.8	14.0	med.	—	Mod. Susceptible
Alsen	60.5	61.6	14.9	15.1	high	403	Resistant
Freyr	59.2	—	14.5	—	—	—	Resistant
Steele-ND	61.4	62.5	15.2	15.3	—	—	Resistant
Parshall	61.3	62.4	14.4	14.8	high-med.	395	Resistant
Reeder	59.8	61.1	14.4	14.6	med.-high	398	Resistant
Knudson	59.9	61.1	14.0	14.0	med.-high	404	Resistant
Hanna	60.3	61.1	14.5	14.6	high	449	Resistant
HJ98	57.9	59.8	14.0	14.1	med.-low	400	Mod. Resistant
Norpro	58.1	59.8	14.2	14.3	med.	396	Resistant
Verde	59.5	60.5	13.8	13.9	low-med.	—	Resistant
Granite	61.8	62.7	15.4	15.3	med.-low	329	Resistant
Marshall	57.1	59.4	13.6	13.5	low	400	Resistant
Saturn	57.0	—	15.0	—	—	—	—
Polaris	58.8	—	13.4	—	—	—	—
Mean	59.8	61.2	14.4	14.6	—	—	—

<sup>1</sup> 12% moisture basis. <sup>2</sup> 2001-2003. <sup>3</sup> Based on 7 environments from 2002 and 2003; data from USDA-ARS Wheat Quality Laboratory, Fargo.

# WINTER WHEAT

Winter wheat varieties are compared in trial plots at Crookston, Lamberton, Morris, Roseau and St. Paul. Wheat varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible. These winter wheat trials are not designed for crop (species) comparisons, because the various crops are grown on different fields or with different management. The data should be used only to compare varieties within a table.

Varieties are listed in order of heading. The varieties tested differ in their winterhardiness, and this characteristic should receive attention when choosing varieties. Cultural practices have a major

effect on winter survival of all winter wheat varieties. Planting into a firm seedbed with at least some stubble remaining to retain snow cover can reduce winterkill.

Only 25,000 acres of winter wheat were harvested in Minnesota in 2004. Average yield was 40 bushels/acre down 2 bushels/acre from 2003. There continues to be interest in Minnesota in planting winter wheat after either canola or soybeans.

**Variety Selection Criteria**

The success of a winter wheat variety depends largely on its ability to survive Minnesota winters. Research on the Canadian plains has shown that planting winter wheat in standing canola stubble using no-till methods can decrease win-

terkill considerably. Trapped snow provides additional protection that increases the odds that the young seedlings will survive.

While all winter wheat varieties should be considered susceptible to very susceptible to FHB, they head earlier than spring wheat varieties and have a better chance of escaping damage to FHB.

**Winter Wheat Planting Rate and Date**

Bushel Weight (Pounds).....	60
Seeds/Pound.....	14,500
Pounds Rate/Acre.....	75+
Seeds / Square Foot.....	25
Planting Date.....	Aug. 20 – Sept. 20

Most winter wheat varieties are also susceptible to very susceptible to the leaf diseases other than the rusts. Use of fungicides to control these diseases and/or suppress FHB may be warranted.

CDC Buteo, developed at the Crop Development Centre at the University of

Saskatchewan and released in 2001, was added to the trials in 2004. Like CDC Falcon and CDC Raptor, CDC Buteo, sold by SeCan, is a semi-dwarf hard red winter wheat. It did well in its first year.

Expedition, a 2002 SDSU release, was tested under its experimental designation

in 2003; its data are reported for the first time this year.

*Variety descriptions published in previous editions have been discontinued because all of the information they contained is now included in the tables.*

### Growth characteristics of winter wheat varieties.

Variety	Origin <sup>1</sup>	PVP Status	Heading, Days from Jan. 1	Height, Inches	Winter- hardiness <sup>2</sup>	Lodging Rating	Test Weight, Pounds/Bushel		Protein % at 12% Moisture		Rust Resistance <sup>3</sup>	
							2004	2-Year	2004	2-Year	Leaf	Stem
Nekota	1994 NE/SDSU	—	171	30.8	M	Medium	57.3	59.5	12.8	12.7	S	—
Expedition	2002 SDSU	PVP (pending)	172	31.4	M	Medium	57.5	59.2	13.0	13.0	S	R
Arapahoe	1988 NE	PVP (94)	173	34.1	M	M. strong	56.7	58.5	13.4	13.2	MR	MR
Millenium	1999 NE	PVP (94)	174	34.9	M	Strong	59.2	60.3	13.2	13.2	MR	R
Seward	1987 NDSU	—	175	40.3	MH	Medium	59.1	60.1	11.9	12.0	S	MR
CDC Buteo	2001 CAN	—	176	36.8	MH	Strong	60.5	—	12.5	—	MS	—
Ransom	1998 NDSU	PVP (94)	176	39.3	MH	Medium	58.9	59.5	12.9	12.9	MR	MR
Windstar	1997 NE	PVP (94)	176	34.4	M	Strong	57.3	59.0	12.7	12.6	MR-MS	MR
CDC Falcon	1998 CAN	PVP (94)	176	31.0	MH	Strong	58.9	60.2	12.5	12.6	MS	R
Roughrider	1975 NDSU	—	176	44.0	VH	Medium	58.8	59.8	13.2	13.5	S	R
Jerry	2001 NDSU	—	177	38.9	MH	M. strong	58.4	59.4	13.2	13.2	MR	R
CDC Raptor	1999 CAN	—	177	34.8	MH	Strong	55.5	57.6	12.3	12.3	MS	—
Mean			175	35.9			58.2	58.8	12.8	12.8		

<sup>1</sup> Abbreviations: CAN = Crop Development Centre, Saskatoon, Canada; NDSU = North Dakota State University; NE = Nebraska Agricultural Experiment Station; SDSU = South Dakota Agricultural Experiment Station.

<sup>2</sup> Winterhardiness rating is a relative ranking that includes data from Minnesota, North Dakota, Nebraska and South Dakota. <sup>3</sup> S = Susceptible, MS = Moderately Susceptible, MR = Moderately Resistant, R = Resistant.

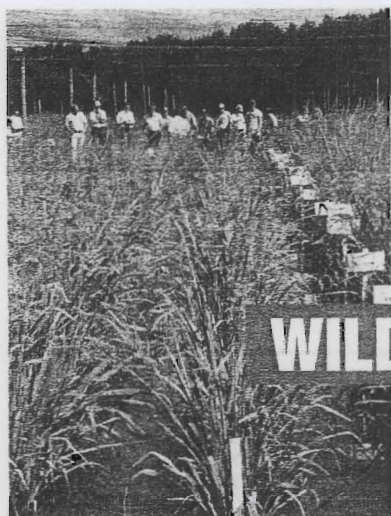
### Yield (percent of the mean) of winter wheat varieties.

Variety	Crookston		St Paul <sup>1</sup>		Lamberton			Morris			Roseau		State		
	2004	2004	2004	2-Year	2004	2-Year	3-Year	2004	2-Year	3-Year	2004	2004	2-Year	3-Year	
Nekota	84	—	—	—	46	71	—	—	—	—	86	—	—	—	
Expedition	97	—	—	—	49	61	—	—	—	—	82	—	—	—	
Arapahoe	116	—	108	—	74	91	97	90	100	101	81	90	100	101	
Millenium	104	—	111	—	108	111	112	104	110	109	113	108	111	110	
Seward	108	—	99	—	115	111	108	90	78	86	119	108	99	101	
CDC Buteo	115	—	—	—	116	—	—	110	—	—	114	114	—	—	
Ransom	99	—	96	—	122	116	120	115	97	106	110	112	103	108	
Windstar	110	—	130	—	124	118	118	117	124	117	76	107	113	115	
CDC Falcon	103	—	—	—	122	129	—	82	96	—	123	108	112	—	
Roughrider	87	—	80	—	99	88	84	110	85	87	92	97	85	85	
Jerry	116	—	123	—	117	121	119	87	97	108	110	108	110	115	
CDC Raptor	96	—	—	—	105	105	—	97	105	—	97	99	103	—	
Mean (bu/A)	115.1	—	58.9	—	53.6	55.7	53.8	52.4	52.9	56.1	93.3	78.6	67.9	65.6	
LSD	17.2	—	20.3	—	20.8	22.5	15.0	37.5	34.4	24.7	38.8	19.4	17.7	13.2	

<sup>1</sup> 2 yr. data is 2002 and 2003. 2004 was abandoned due to winterkill.

<sup>2</sup> Nekota and Expedition headed 5 to 7 days earlier than other varieties at Morris in 2004, suffered severe damage from leaf rust and broken straw. Yield was less than 15% of the mean and those data are not included in these tables.

**Due to an unfavorable season no wildrice plots were harvested in 2004. The information given here is the most recent available.**



# WILDRICE

**GIB-C9**—High yielding, tall, medium-late maturing variety. Average shattering resistance. Seed is short, similar in length to Itasca and Petrowske

Bottlebrush. Panicle type is mixed, including a noticeable percentage of bottlebrush panicles, depending on continuing selection intensity for the trait. Proprietary variety owned by Gunvalson Brothers and Pine Lake Wild Rice.

**Itasca**—High yielding, tall, medium-late maturing variety with superior resistance to seed shattering and fungal brown spot (FBS) disease. Very lodging resistant. Yield is about 50% higher than Petrowske Purple and Franklin. Shattering loss is about 1/3 less than Franklin or Petrowske Purple. Significantly more FBS resistant than Franklin. Taller than Franklin by 3 inches and Petrowske Purple by 4 inches. Slightly later maturing than Petrowske Purple. Flowers 2-3 days after Petrowske Purple or Franklin. Average seed length is somewhat short—similar to Petrowske Purple and GIB-C9 but shorter than Franklin by 1/64 inch. Panicle type is mixed, including a noticeable percentage of bottlebrush panicles, but declining

from 50% frequency without continued selection for the trait. Released 2002 exclusively to Minnesota growers by the Minnesota Cultivated Wild Rice Council.

**Petrowske Purple**—Moderately high fungal brown spot disease resistance and yield. High shattering resistance and lodging resistance. Consists of heterogeneous panicle types, most of which have some degree of purple at full flowering. Medium plant height. Medium-late maturity, flowering several days to a week after K2 and Franklin. Seeds shorter in length than most older varieties, but similar in length to Itasca and GIB-C9. Released 2000 by Minn. AES under a licensing agreement.

Cultivated wildrice is grown on about 20,000 acres in Minnesota. Though some wildrice paddies are grown with shattering types, most grower use varieties with nonshattering tendencies.

For flexibility in harvesting, plant varieties resistant to shattering, disease and lodging. Where early killing frost is common, growers should favor varieties of early to medium maturity.

### Varieties

**Franklin**—Medium height, medium to early maturity. More resistant to shattering than older varieties, such as K2, especially retaining more seed when harvest is delayed. Long seeds, resulting in higher percentage of long-grain seeds in A-grade width. Released 1992 by Minn. AES.

### Wildrice Planting Rate and Date

Bushel Weight, Pounds .....	25
Seeds/Pound .....	7,900
Planting Rate, Pounds/Acre .....	50
Planting Rate, Seeds Sq. Ft. ....	9
Planting Date .....	Late Fall

### Yield, shattering, lodging and fungal brown spot (FBS) ratings for wildrice varieties.

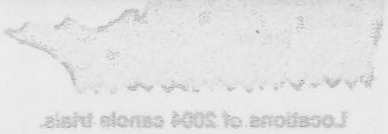
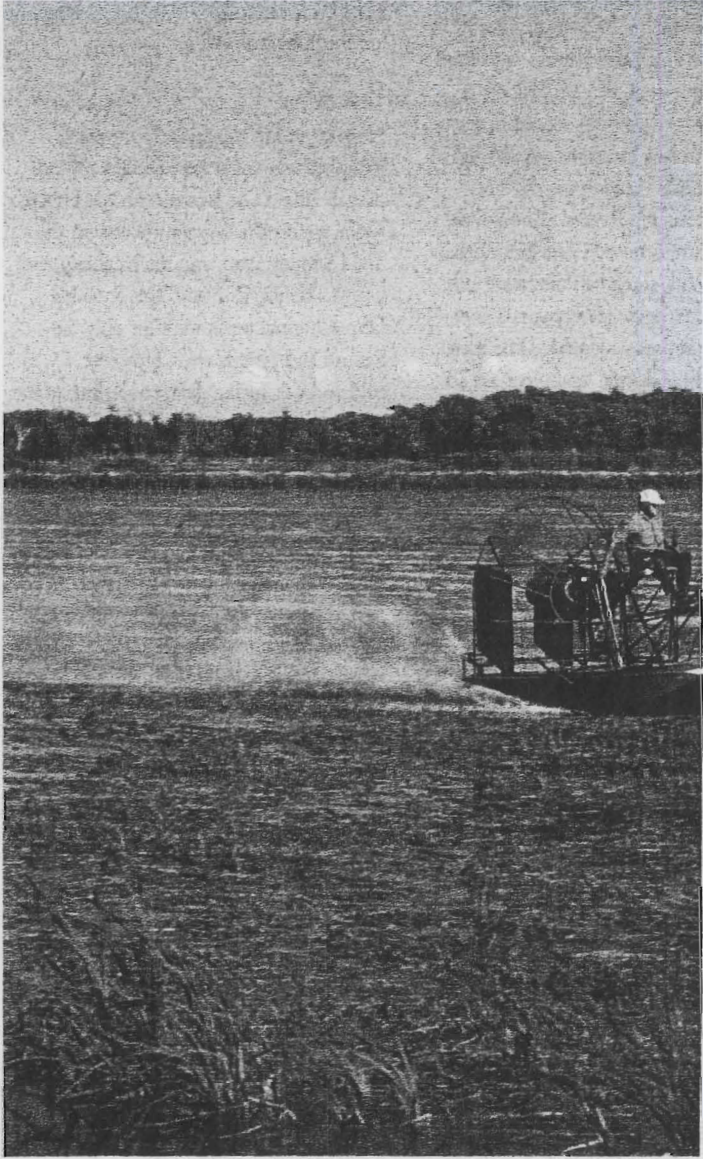
Variety	Kelliher / Waskish				Clearbrook / Gully			Altkin				1998-2002 Average				
	Yield, Lb/Acre <sup>1</sup>	Shattering, Percent <sup>2</sup>	Lodging, Score <sup>3</sup>	FBS, Score <sup>4</sup>	Yield, Lb/Acre <sup>1</sup>	Lodging, Score <sup>3</sup>	FBS, Score <sup>4</sup>	Yield, Lb/Acre	Shattering, Percent <sup>2</sup>	Lodging, Score <sup>3</sup>	FBS, Score <sup>4</sup>	Yield, Lb/Acre <sup>1</sup>	Shattering, Percent <sup>2</sup>	Lodging, Score <sup>3</sup>	FBS, Score <sup>4</sup>	
Franklin	1,255	23	2.7	4.8	1,439	2.4	4.0	1,096	20	2.1	4.7	1,244	22	2.4	4.6	
GIB-C9	1,703	25	2.1	4.1	2,064	2.8	4.6	1,214	38	2.0	4.4	1,629	28	2.2	4.3	
Itasca	1,793	17	1.3	3.2	2,429	2.0	3.5	1,774	12	1.1	4.0	1,915	16	1.3	3.6	
Petrowske Purple	1,378	22	1.7	3.7	1,458	1.9	4.0	1,033	26	1.5	4.2	1,290	23	1.7	3.9	
LSD 5%	197	4	0.4	0.6	374	0.6	0.8	217	7	0.3	0.7	139	3	0.2	0.4	
Years	98-99-00-01-02	98-99-01-02	99-99-01-02	98-99-00-01-02	00	98	98-00	00-01-02	02	02	01-02	01-02	99-00-01-02	99-00-01-02		

<sup>1</sup> Adjusted to 40% moisture. <sup>2</sup> Expressed as a percentage of shattered seed plus grain yield per unit area. <sup>3</sup> Using a 1-5 scale where 1=stems completely erect, 3=stems averaging 45° angle, 5=stems prostrate. <sup>4</sup> Fungal Brown Spot rating using a 1-9 scale where 1=no significant disease lesions and 9=completely susceptible (dead).



LSD 5%	0.4	0.08	5	0.6	0.11	5	0
Years	00-01-02	00-01-02	00-01-02	00-03	00-03	00-03	00-0

<sup>1</sup> Dried, hulled, intact seeds. <sup>2</sup> Percentage of A-grade seeds (width >3.75/64 in.) that are in the lot



Locations of 2004 canal trials. Average canals in the state with four local trials. Average canals in the state with four local trials. Average canals in the state with four local trials.

# OILSEED CROPS



Canola (*Brassica napus* and *B. rapa*) is a crop developed from oilseed rape by Canadian plant breeders; the first canola variety was licensed in 1974. Canola is used for edible oil extraction and protein feed meal. Canola oil is considered one of the highest quality edible oils available. Considerable acreage of spring canola is grown in Canada. Minnesota acreage increased from about 8,000 acres in 1990 to more than 200,000 acres in 1998. Acreage in recent years has dropped back to less than 65,000 acres.

The oil in canola seed contains less than 2% erucic acid, compared with 20% to 40% found in oilseed rape. The canola meal remaining after oil extraction contains less than 0.1% glucosinolates (sulfur-containing compounds) compared with about 1% in rapeseed meal. Consequently, canola is also referred to as "double low" or "00" rapeseed. High levels of erucic acid in oilseed rape are hazardous to human health, and high levels of glucosinolates are detrimental in livestock feeds.

## Canola Planting Rate and Date

Bushel Weight (Pounds).....	50
Seeds/Pound.....	80,000 to 160,000
Planting Rate, Pounds/Acre.....	3 to 5
Planting Rate, Seeds/Square Foot...	6 to 9
Planting Date .....	Early Spring

The canola varieties described here are all spring-sown *Brassica napus* types. Fall-planted winter-type canola varieties were evaluated by University of Minnesota researchers over 10 years ago with limited success. A trial with winter-type canola varieties seeded at multiple seeding dates in the fall of 2002 near St. Hilaire yielded up to 2,400 pounds/acre. This trial was repeated in 2003-04 at Thief

River Falls, Morris and Waseca with limited survivability at all three locations. A large variety trial also was seeded in the fall of 2003 at two locations with a total of 38 winter canola varieties tested, 8 of which are Roundup Ready. Although the very hard winter caused extensive mortality in both trials, some varieties were still able to yield close to 3,000 pounds/acre where the stand was adequate. The variety trial is being conducted again in 2004-05 near Thief River Falls, with 30 varieties being tested in barley stubble and on plowed soil.

## Information Sources

The Minnesota Canola Council is a good source for information on canola. The Council can be contacted by mail (4630 Churchill St., Suite 1, St. Paul, MN 55126), phone (651-638-9883) or fax (651-638-0756).

A complete and newly revised Canola Growers Manual on canola production is available from the Canola Council of Canada, 400-167 Lombard Ave, Winnipeg, Manitoba, Canada, R3B 0T6 (phone 204-982-2100, internet [www.canola-council.org](http://www.canola-council.org)). The manual contains detailed information on canola production practices and costs \$59.95 (U.S.). The Canola Grower's Manual is also available for viewing online at [www.canola-council.org](http://www.canola-council.org). Please keep in mind when using this manual that not all pesticides used in Canada are legal in the United States. Always confirm the clearance of a pesticide with your local dealer or county extension educator. Another

## Canola Variety Name Changes

Old Name or Experimental Number	New Variety Name
PHS 02-563	InVigor 5630
SW G5235 RR	SW Titan RR

management tool is a CD-ROM called the "Canola Growers Decision Support System" available from the Canola Council of Canada for \$28.00 (U.S.). These items can be ordered on line.

## Test Sites

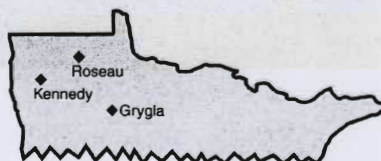
Non-Roundup Ready and Roundup Ready variety trials were seeded at three sites in 2004. The Roseau site was on the Kvien farms, the Grygla site was on the Todd Stanley farm, and the Kennedy test site was on the Rob and Tim Rynning farm. Original plans were for only the Roseau and Grygla sites. However, a very cold and wet spring delayed seeding of the Roseau site and prompted the project to add the Kennedy site in mid June to ensure at least two sites. The non-Roundup Ready trial at Kennedy was destroyed because of extensive volunteer canola, and the Grygla Roundup Ready trial is not reported because excessive drowned-out areas caused unreliable data.

## Local Support

CHS of Kennedy provided sponsorship for the Kennedy site. Farmer's Union Oil of Grygla provided support for the Grygla site.

## Field Day Assistance

Extension educators Nathan L. Johnson, Hans J. Kandel and Bill Craig provided field day assistance.



Locations of 2004 canola trials.

**Developers**

- D<sup>1</sup> Advanta Seeds, Unit 3, 75 Scurfield Blvd., Winnipeg, MB, Canada R3Y 1P6
- D<sup>2</sup> Agriprogress, P.O. Box 2499, Morden, MB, Canada R6M 1C2
- D<sup>3</sup> Bayer Crop Science, 203-407 Downey Rd., Saskatoon, SK, Canada S7N 4L8, 701-775-2700
- D<sup>4</sup> Monsanto Canada Seeds, 2915 A Faithful Ave., Sask., SK Canada S7K 8E8, 306-657-4675
- D<sup>5</sup> Pioneer Hi-Bred International, Inc., 7200 NW 62nd Ave., Johnston, IA 50131
- D<sup>6</sup> Svalof Weibull Ltd., 2-411 Downey Rd., Saskatoon, SK, Canada S7N 4L8
- D<sup>7</sup> Not Available

**Marketers**

- M<sup>1</sup> Bayer Crop Science, 203-407 Downey Rd., Saskatoon, SK, Canada S7N 4L8, 701-775-2700
- M<sup>2</sup> Croplan Genetics, P.O. Box 1291, Minot, ND 59702, 701-852-3556
- M<sup>3</sup> Interstate Seed Company, 1215 Parkway, West Fargo, ND 58078, 800-437-4120
- M<sup>4</sup> Monsanto, 3100 Sycamore Rd., De Kalb, IL 60115, 815-754-4809
- M<sup>5</sup> Pioneer Hi-Bred International, Inc., 7200 NW 62nd Ave., Johnston, IA 50131, 701-298-6894  
Pioneer Hi-Bred International, Inc., Minnesota contact: Zach Fore, 218-280-0926
- M<sup>6</sup> Proseed, 705 E. Brewster, Harvey, ND 58341, 701-324-4177

**Seed yield of Roundup Ready canola (*Brassica napus*) varieties (lb/acre at 8% moisture) at Roseau and Kennedy in 2004.**

**Variety information** includes Source Codes: (D#=Developer; M#=Marketer) keyed to listing above, and these supplemental codes: H=Hybrid, Op=Open Pollinated, Syn=Synthetic, SP=Specialty Oil.

\* 2002 average yields were analyzed using three replicates from each site (Kennedy and Grygla).

\*\* Hyola 357 Magnum was used as a check between the Non-Roundup Ready trial and the Roundup Ready trial.

**Blackleg Resistance** rating provided by seed companies: CR = Canker Resistant, R = Resistant, MR = Moderately Resistant, MS = Moderately Susceptible, S = Susceptible.

Variety	Variety Information	Blackleg Resistance	Roseau	Kennedy	Average, Ros & Ken	2003 Aver. R, K,G	2002* Aver. K,G	3-year Average
Crosby	D7,M2,Op	MR	1,844	1,366	1,605	2,379	1,677	1,957
Dekalb DKL223	D1,M4,H	MS	2,104	1,722	1,913	2,297	1,766	2,036
Dekalb DKL34-55	D4,M4,Op	MR	1,868	1,694	1,781	2,297	1,402	1,894
Dekalb DKL35-85	D4,M4,Op	R	2,025	1,530	1,777	-	-	-
HyCLASS 2061	D7,M2,H	MR	1,889	1,637	1,763	2,248	1,766	1,972
HyCLASS 767 SW	D6,M2,Syn	MR	1,916	1,473	1,695	2,368	1,756	2,001
HyCLASS 905	D7,M2,H	R	2,077	1,686	1,881	2,448	1,892	2,127
HyCLASS 910	D7,M2,H	R	2,059	1,655	1,857	2,611	-	-
HyLite 225 RR	D1,M3,OP	MR	2,008	1,639	1,824	-	-	-
Hyola 357 Magnum**	D1,M3,H	MR	2,155	1,925	2,040	2,398	1,764	2,115
Hyola 505 RR	D1,M3,H	R	1,729	1,325	1,527	2,365	-	-
Pioneer 45H21	D5,M5,H	R	2,222	1,976	2,099	2,559	1,876	2,232
RR Hyb 2013	D2,M6,H	R	1,962	1,661	1,811	2,252	1,845	2,010
RR Hyb 2066	D2,M6,H	MR	2,115	1,948	2,032	2,243	1,693	2,026
SW G5246 RR	D6,M3,OP	R	1,892	1,624	1,758	-	-	-
SW Marksman RR	D6,M3,H	MR	2,004	1,719	1,861	2,506	-	-
SW Patriot RR	D6,M3,Syn	MR	2,107	1,660	1,884	2,484	-	-
SW Titan RR	D6,M3,H	R	1,928	1,675	1,801	-	-	-
SWPL98-7835 RR	D6,M3,Syn	R	1,703	1,469	1,586	-	-	-
Z2409 RR	D1,M3,H	R	2,037	1,854	1,946	-	-	-
Mean			1,982	1,662	1822	2,303	1,585	2,037
LSD (0.05)			177.0	207.2	137.02	187.1	216	-
C.V.			6.4	8.9	7.6	10.1	11.9	-

**Growth characteristics and oil content of Roundup Ready canola varieties grown near Roseau, seeded June 17, 2004.**

Total available fertilizer was 149-100-464-68 (N-P-K-S) down to 24 inches.

Variety	Yield, Lb/Acre at 8% Moisture	Oil, % of Seed Weight at 0% Moisture	Days After Planting to			Height, Inches	Lodging, 1 = Erect 9 = Flat
			95% Canopy Closure	Beginning Bloom	Maturity: 30% Seed Color Change on Main Raceme		
Crosby	1,844	49.0	31	41	101	46	2.3
DEKALB DKL223	2,104	44.9	30	37	92	39	2.8
DEKALB DKL34-55	1,868	47.1	30	40	99	47	1.5
DEKALB DKL35-85	2,025	46.1	28	40	100	49	3.0
HyCLASS 2061	1,889	45.6	30	39	99	46	2.0
HyCLASS 767 SW	1,916	47.7	29	39	99	46	2.0
HyCLASS 905	2,077	47.6	28	41	100	50	1.3
HyCLASS 910	2,059	48.6	29	42	99	48	1.8
HyLite 225 RR	2,008	50.4	29	37	95	43	3.0
Hyola 357 Magnum**	2,155	46.6	28	36	94	38	2.8
Hyola 505 RR	1,729	47.7	27	42	101	52	2.0
Pioneer 45H21	2,222	47.4	27	40	96	45	2.3
RR Hyb 2013	1,962	47.1	31	40	100	49	1.8
RR Hyb 2066	2,115	48.2	28	39	95	47	2.3
SW G5246 RR	1,892	46.7	28	40	99	48	2.5
SW Marksman RR	2,004	47.4	27	38	97	46	2.3
SW Patriot RR	2,107	47.6	26	38	94	42	2.8
SW Titan RR	1,928	47.5	28	38	95	44	1.8
SWPL98-7835 RR	1,703	45.2	30	41	99	51	1.8
Z2409 RR	2,037	48.0	31	40	97	44	2.8
Mean	1,982	47.3	29	39	97	46	2.2
LSD (0.05)	177.0	1.55	1.3	0.9	2.6	3.6	0.72
C.V.	6.4	2.0	3.3	1.6	1.9	5.6	23.5

**Growth characteristics and oil content of Roundup Ready canola varieties grown near Kennedy, seeded June 14, 2004.**

Total available fertilizer was 133-55-0-20 (N-P-K-S).

Variety	Yield, Lb/Acre at 8% Moisture	Oil, % of Seed Weight at 0% Moisture	Days After Planting to			Height, Inches	Lodging, 1 = Erect 9 = Flat
			Beginning Bloom	Maturity: 30% Seed Color Change on Main Raceme			
Crosby	1,366	46.3	48	109	37	4.3	
DEKALB DKL223	1,722	44.6	43	100	32	6.5	
DEKALB DKL34-55	1,694	46.5	46	103	39	4.3	
DEKALB DKL35-85	1,530	46.4	46	103	38	4.8	
HyCLASS 2061	1,637	45.7	47	105	38	3.5	
HyCLASS 767 SW	1,473	47.2	47	107	39	3.3	
HyCLASS 905	1,686	48.3	47	103	45	3.5	
HyCLASS 910	1,655	47.5	48	108	47	2.5	
HyLite 225 RR	1,639	48.0	44	100	35	5.5	
Hyola 357 Magnum**	1,925	46.1	43	99	33	5.3	
Hyola 505 RR	1,325	49.1	48	108	43	3.5	
Pioneer 45H21	1,976	47.6	44	101	42	5.0	
RR Hyb 2013	1,661	46.0	47	106	42	3.0	
RR Hyb 2066	1,948	47.7	45	101	40	4.8	
SW G5246 RR	1,624	46.0	46	104	43	4.5	
SW Marksman RR	1,719	46.1	46	105	39	3.5	
SW Patriot RR	1,660	47.3	46	102	41	4.3	
SW Titan RR	1,675	43.6	45	102	42	3.5	
SWPL98-7835 RR	1,469	47.0	47	107	39	3.0	
Z2409 RR	1,854	48.0	47	105	40	4.0	
Mean	1,662	46.8	46	104	40	4.1	
LSD (0.05)	207.2	3.03	1.1	2.4	3.7	1.07	
C.V.	8.9	3.9	1.6	1.64	6.7	18.6	

**Seed yield of Non-Roundup Ready canola (*Brassica napus*) varieties (lb/acre at 8% moisture) at Roseau and Grygla for 2004.**

**Variety information** includes Source Codes: (D# = Developer; M# = Marketer) keyed to listing, page 51, and these supplemental codes: H = Hybrid, RR = Roundup Ready, OP = Open Pollinated, Syn = Synthetic, LL= Liberty Link, C = Clearfield.

\*2002 and 2004 average yields were analyzed using three replicates from each site.

\*\* Hyola 357 Magnum was used as a check between the Non-Roundup Ready trial and the Roundup Ready trial.

**Blackleg Resistance** rating provided by seed companies: CR = Canker Resistant, R = Resistant, MR = Moderately Resistant, MS = Moderately Susceptible, S = Susceptible.

Variety	Variety Information	Blackleg Resistance	Average*		Average*, Ros & Gry	2003 Average Roseau, Kennedy	2002*Average Kennedy, Grygla	3-Year Average
			Roseau	Grygla				
99CH01	D2,M6,H	MR	1,613	1,964	1,803	2,181	1,321	1,768
HyLite 618 CL	D1,M3,H,C	R	1,904	2,782	2,332	-	-	-
Hyola 357 Magnum**	D1,M3,H,RR	MR	2,073	2,647	2,374	2,439	-	-
Hyola 420	D1,M3,H	MR	1,993	2,471	2,255	-	-	-
Hyola 440	D1,M3,H	CR	1,918	2,240	2,087	-	-	-
InVigor 2573	D3,M1,H,LL	R	1,964	3,184	2,586	2,565	1,590	2,247
InVigor 2663	D3,M1,H,LL	R	2,101	3,077	2,574	2,612	1,549	2,245
InVigor 4870	D3,M1,H,LL	R	2,110	2,929	2,533	2,616	-	-
InVigor 5630	D3,M1,H,LL	R	2,131	3,188	2,657	-	-	-
PHS 401	D3,M1,H,LL	R	2,061	3,322	2,704	2,735	-	-
PHS02-562	D3,M1,H,LL	R	2,050	3,173	2,618	-	-	-
Mean			1,993	2,816	2,411	2,425	1,317	2,087
LSD (0.05)			165.7	454.7	244.5	119.1	175	-
C.V.			5.8	9.5	8.7	4.9	11.5	-

**Growth characteristics and oil content of non-Roundup Ready canola varieties grown near Roseau, seeded June 17, 2004.**

Total available fertilizer was 149-100-464-68 (N-P-K-S) down to 24 inches.

Variety	Yield, Lb/Acre at 8% Moisture	Oil, % of Seed Weight at 0% Moisture	Days After Planting to			Height, Inches	Lodging, 1 = Erect 9 = Flat
			95% Canopy Closure	Beginning Bloom	Maturity: 30% Seed Color Change on Main Raceme		
99CH01	1,613	46.0	30	39	101	49	2.0
HyLite 618 CL	1,904	47.0	28	39	95	48	1.8
Hyola 357 Magnum**	2,073	46.6	27	35	93	38	2.5
Hyola 420	1,993	47.0	29	38	96	42	1.8
Hyola 440	1,918	49.2	29	41	99	52	1.8
InVigor 2573	1,964	46.8	27	40	97	52	1.5
InVigor 2663	2,101	46.7	25	40	97	52	1.3
InVigor 4870	2,110	48.2	27	40	100	51	1.8
InVigor 5630	2,131	49.6	25	38	94	45	1.3
PHS01-401	2,061	47.4	26	40	96	51	1.5
PHS02-562	2,050	49.4	26	40	99	53	1.0
Mean	1,993	47.6	27	39	97	48	1.6
LSD (0.05)	165.7	1.63	1.3	0.8	2.3	3.7	0.88
C.V.	5.8	2.0	3.2	1.3	1.7	5.3	37.2

**Growth characteristics and oil content of non-Roundup Ready canola varieties grown near Grygla, seeded May 1, 2004.**

Total available fertilizer was 174-85-260-490 (N-P-K-S) down to 24 inches.

Variety	Yield, Lb/Acre at 8% Moisture	Oil, % of Seed Weight at 0% Moisture	Days After Planting to		Height, Inches	Lodging, 1 = Erect 9 = Flat
			Beginning Bloom	Maturity: 30% Seed Color Change on Main Raceme		
99CH01	1,964	43.3	66	126	46	2.3
HyLite 618 CL	2,782	45.5	64	118	40	3.3
Hyola 357 Magnum	2,647	43.8	59	116	38	4.0
Hyola 420	2,471	43.2	62	119	41	2.7
Hyola 440	2,240	44.8	64	118	42	3.7
InVigor 2573	3,184	44.7	64	117	44	2.7
InVigor 2663	3,077	45.9	63	116	41	2.7
InVigor 4870	2,929	47.2	65	121	44	2.3
InVigor 5630	3,188	45.5	62	117	40	2.7
PHS01-401	3,322	45.9	64	117	46	2.0
PHS02-562	3,173	46.2	64	119	45	2.0
Mean	2,816	45.1	63	119	43	2.8
LSD (0.05)	454.7	2.91	2.0	5.5	5.4	0.73
C.V.	9.5	3.8	1.9	2.7	7.4	15.5

**Growth characteristics and oil content of the variety and systems comparison trial grown near Roseau, seeded June 19, 2004.**

Total available fertilizer was 149-100-464-68 (N-P-K-S) down to 24 inches. Large plots (400 feet x 30 feet) replicated 4 times.

Each system was sprayed with the respective herbicides and the trial was threshed on October 12, 2004.

Variety	Yield, Lb/Acre at 9% Moisture	Oil, % of Seed Wt. at 0% Moisture	Percent Green Seed	Days After Planting to		Height, Inches	Lodging, 1 = Erect 9 = Flat	Swath Score, 1 = easy 5 = difficult
				Beginning Bloom	Maturity: 30% Seed Color Change On Main Raceme			
<b>Conventional system</b>								
Hyola 401	1,920	42.7	3.8	36	114	38	2.3	1.3
<b>Liberty Link System</b>								
InVigor 4870	2,106	43.4	3.0	39	118	55	4.0	3.3
InVigor 5630	2,160	43.5	2.7	37	114	48	2.8	2.0
<b>Clearfield System</b>								
Pioneer 46A76	2,032	43.1	5.1	40	119	48	3.8	2.6
<b>Roundup Ready System</b>								
Dekalb DKL 223	2,120	40.8	3.1	36	114	41	3.8	2.8
Dekalb DKL 3585	1,967	42.6	5.2	39	117	47	3.8	2.6
Hyola 357 Magnum	2,105	41.4	3.8	35	114	38	3.0	2.3
Pioneer 45H21	2,048	43.5	3.2	39	114	43	2.8	2.3
SW Marksman	2,017	43.1	4.5	38	116	45	3.3	2.1
Mean	2,053	42.7	3.8	38	115	45	3.3	2.3
LSD (0.05)	124.8	1.36	1.80	0.7	0.8	3.2	0.87	0.66
C.V.	4.2	2.2	32.3	1.3	0.5	4.9	18.3	19.3



# SOYBEAN

Each year Minnesota Agricultural Experiment Station scientists conduct tests of adapted public and private soybean varieties. Companies are charged a fee for each variety they enter; these fees partially cover the costs of conducting the tests. A stipulation of the testing program is that the company is marketing or intends to begin marketing the variety in the next growing season.

Because the 2004 growing season was significantly cooler than normal the maturity dates are somewhat later than other years. Locations in the northern zone were affected to a greater degree than locations in the southern zone. No varieties were mature at Roseau when a season-ending freeze occurred; consequently, that location was not harvested in 2004.

Pages 59 and 60 present data from the regular public and private variety tests conducted annually at various locations within the northern, central and southern production zones. The map shows test locations and zone boundaries. All of these tests were planted between May 4 and June 14 at planting rates of 160,000 plants/acre. Herbicides were used as necessary for good weed control. Row spacings were 30 inches at Becker and Jackson, 10 inches at other locations. Plot combines were used to harvest the plots. Shelly and Moorhead data from 2004 were not included due to unfavorable weather.

Page 60 shows results of the very early (northern Minnesota) and page 75 the special southeastern Minnesota variety

tests. These locations were added to provide data for environments not represented by the other location tests. The Roseau location was not harvested in 2004 due to unfavorable weather.

Pages 61-68 provide results from specific tests of available Roundup Ready® varieties adapted to the northern, central and southern production zones. Data in 2004 from Shelly and Moorhead were not included due to unfavorable weather.

Pages 69 and 70 show results from the special performance tests of soybean-cyst-nematode-resistant varieties in "infested" field sites near Lamberton, Waseca and Madelia in the southern zone and Danube, Danvers and Holloway in the central zone. "Non-infested" field sites were located near Lamberton, Jackson and Becker, Morris and Rosemount in the central zones. Planting techniques were the same as for the regular performance tests.

Pages 71-75 provide performance and characteristics data from special-use soybean variety tests. These tests were conducted to provide reliable data for growers interested in producing these types of soybeans, which are typically grown under contract.

Page 76 provides important variety characteristics of publicly developed varieties entered in the 2004 tests.

**To better understand and use the data provided in these tables, please read the following additional information very carefully:**

### Relative Maturity and Calendar Dates of Maturity

Soybeans respond to changing day length, so the actual calendar date of maturity achievement is affected by latitude. Each variety has a narrow range of north-south adaptation. Soybean yield and quality are assured if a variety arrives at physiological maturity before a season ending freeze occurs. This date is determined visually by noting the actual date when 95% of the pods show their geneti-

cally programmed mature color. These dates for 2004 are provided in the table. Harvest dates are typically 7 to 14 days later, depending upon drying conditions.

Relative maturity ratings are also provided for each variety. These ratings consist of a number for the maturity group designation (000, 00, 0, 1, 2) followed by a decimal and another number, ranging from 0 to 9, which indicates a ranking within each maturity group. For example the variety MN0302 is indicated as 0.3, making it an early group 0 variety, while MN0901, with a 0.9 rating, is the latest. These values for public varieties are developed after observing them for several years in many locations. Relative maturity ratings for private varieties in these tables were provided by their owners, and were developed in a similar manner.

### Yield

Because maturity is a very important attribute, varieties are arranged in the tables in order of their actual 2004 calendar date of maturity and not yield performance.

Later-maturing varieties can usually be expected to have higher yields than earlier-maturing types. If you wish to correctly compare yields, do so only between varieties with similar calendar dates of maturity, usually within 3 to 5 days. More reliable comparisons can be made using variety yields from several consecutive years. All yield determinations were made from replicated tests harvested with a plot combine.



In 2004 the yield information is presented as a percent of the mean of the test. The actual mean value is given at the bottom of each table. Values over 100 indicate the variety had a yield greater than the mean while those less than 100 have a yield less than the mean.

LSD values associated with data in these tables are measures of variability within the trials. The LSD values are given on the percent of mean data, not the actual yields. If a yield difference between two varieties within a single column exceeds this LSD value you can assume that the higher-yielding variety was truly better yielding. A 20% level of significance is used in all these tables. This means that yield differences exceeding the stated LSD value are real 80% of the time.

### Chlorosis

These ratings are based on how much of the leaf area was yellowing in tests conducted on high lime (high pH) soils near Foxhome in 2004. Comparing chlorosis scores of varieties permits you to estimate how well they perform relative to each other. Actual chlorosis ratings can vary depending on the specific site and year of test. Specific scores and evaluation dates from the 2004 tests are provided at the following web site [www.soybeans.umn.edu/home.htm](http://www.soybeans.umn.edu/home.htm)

Some universities and companies use numerical scores rather than word descriptors to describe chlorosis tolerance. A comparison of these systems follows:

Numerical Score		Word Description
1-5 scale	1-9 scale	Rating
1 to 2	1 to 2.5	Tolerant (T)
2.1 to 3	2.6 to 5	Moderately Tolerant (MT)
3.1 to 4	5.1 to 7.5	Moderately Susceptible (MS)
4.1 to 5	7.5 to 9	Susceptible (S)

### Protein and Oil

Protein and oil values were determined from mature seed using near infrared reflectance analysis equipment. **The table values are for the 2004 season only. Protein and oil information is**

**presented on a percent of the mean of the test. The actual mean values are given at the bottom of each table.** Values over 100 indicate the protein and/or oil contents of the variety were greater than the mean value, while those less than 100 have protein and/or oil contents less than the mean. **Absolute values of protein and oil can vary from year to year.** The mean protein and oil values are expressed on a 13% moisture basis. This formula converts the protein and oil values to another moisture basis:

$$\frac{100 - \text{desired moisture}}{87} \times \frac{\text{protein or oil value given in the table}}{\text{protein or oil value given in the table}}$$

The value of a bushel of soybeans (APV) based on its oil and protein content can be calculated by:

$$APV = 60 [Po(X) + \frac{Pm(Y)}{.44}]$$

*Where:*  
APV = Approximate value of a bushel of soybeans  
Po = soybean oil price (in \$ per pound)  
Pm = price of 44% meal (in \$ per pound)\*  
X = oil content at 13% moisture (in decimals)  
Y = protein content at 13% moisture (in decimals)

*And:*  
\* price of meal \$/ton = \$/pound  
2,000

The value of an acre of soybeans can be calculated by multiplying the APV by the yield in bushels per acre.

### Phytophthora

Phytophthora root rot can cause significant yield reductions if susceptible varieties are planted in poorly drained, infested fields. There are several known races of this fungus, so it is important to

### Genes for resistance to various races of Phytophthora root rot.

#### Gene Races

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Rps1,1a																												
Rps1b																												
Rps1c																												
Rps1k																												
Rps3																												
Rps4																												
Rps6																												

know which are present in your field. Genes can be incorporated into varieties to provide resistance to specific races of this disease.

Some published information refers to Phytophthora "tolerance" or "field resistance," which is not race-specific and should not be confused with race-specific resistance. Reliable tests for tolerance have not yet been developed.

The data tables in this report indicate the Phytophthora gene or genes present in each variety. The "Genes for resistance" chart shows which genes provide resistance to the various races.

### Soybean Cyst Nematode

Soybean Cyst Nematode (SCN), first identified in Minnesota in 1978, is now known to occur in many Minnesota counties where the soybean is grown. Both the area of infestation and numbers of nematodes per unit of soil appear to be increasing. Several races of this pest are known to occur in Minnesota. When SCN numbers are high, significant yield losses can occur. Rotations to non-host crops and planting of resistant varieties can assist in reducing nematode populations as well as reducing their impact on yield.

Yield performance results of susceptible (S), moderately susceptible (MS), moderately resistant (MR) and resistant (R) varieties planted in infested and non-infested fields in southern Minnesota are provided on pages 69 and 70. The ratings for SCN resistance were determined using nematode counts from naturally infested field sites and molecular markers.

For proper management of fields with SCN it is recommended that varieties with an R rating be planted. If the SCN



population numbers are relatively low – less than 3,000 – a variety with an MR rating might be considered. Although SCN reproduction is less on MS-rated varieties than on S-rated varieties, for practical purposes these varieties should not be considered for planting in fields where SCN is present and being managed.

Management information is available from web site [www.soybeans.umn.edu](http://www.soybeans.umn.edu) or from the Minnesota Soybean Research and Promotion Council, 360 Pierce Avenue, Suite 110, North Mankato, MN 56003, 1-888-896-9678, web site [www.mnssoybean.org](http://www.mnssoybean.org)

#### White Mold

White mold, also known as Sclerotinia stem rot, develops in infested fields when high relative humidity and moderate temperatures occur during soybean flowering. Planting less-susceptible varieties in wider row spacings or at lower populations is the most effective method of reducing white mold severity. Accurate

ratings for soybean variety resistance to white mold are difficult to obtain because both infection and disease development are dependent on weather conditions. Because of this variability, a variety's performance can change significantly among locations and years depending on the interaction of plant development, precipitation, relative humidity and temperature. White mold severity also tends to be greater if lodging occurs. Growers concerned about variety performance in the presence of white mold should select varieties that show consistently less white mold during several years of testing.

#### Brown Stem Rot

Brown stem rot (BSR) is a fungal disease that can cause yield losses in certain situations. The disease occurs most frequently when soybeans follow soybeans but can occur where soybeans are planted every other year. Resistant varieties, or longer rotations, assist in the management of this disease. MN0304, MN 0902CN, MN 1302, Freeborn, IA1006,

and IA2008R are available public varieties with resistance to BSR. Latham L1840 Brand, Latham E1936R, Latham L2331 Brand and Viking 0.2199 are privately developed varieties reported to be resistant to BSR.

Some information refers to "tolerance" or "field resistance." Reliable tests for tolerance or field resistance have not yet been developed.

#### Special-Use Varieties

There is growing interest in producing soybeans with special characteristics important to manufacturers of specialty food products. Soybean scientists previously developed some of these special-use varieties, which were general releases, but more recently varieties have been released under exclusive or nonexclusive licenses to specific companies who then contract with growers for production. For further information contact MCIA at web site [www.mncia@tc.umn.edu](mailto:www.mncia@tc.umn.edu) or telephone number 612-625-7766.

#### Brand names, addresses, phone and web URL or e-mail information for companies entered in 2004 tests.

<b>Advantage Brand Soybean Seed (Advantage)</b> , 17303 Highway 22, Good Thunder, MN 56037	507-278-4087	KSC@mnic.net
<b>Garst Seed Company (Garst/Agripro)</b> , 2369 330th St. Box 500, Slater, IA 50244	888-GOGARST	<a href="http://www.garstseed.com">www.garstseed.com</a>
<b>Albert Lea Seed House (Viking)</b> , P.O. Box, 127, 1414 W. Main, Albert Lea, MN 56007	507-373-3161	<a href="http://www.alseed.com">www.alseed.com</a>
<b>Anderson Seeds (Anderson)</b> , 37825 County Road 63, St. Peter, MN 56082	507-246-5032	<a href="mailto:njandrsn@hickorytech.net">njandrsn@hickorytech.net</a>
<b>Circle C Seeds (Northern Soypro)</b> , 2493 380th Street, Gary, MN 56545	218-356-8214	<a href="mailto:ccseeds8214@arvig.net">ccseeds8214@arvig.net</a>
<b>Dairyland Seed Co., Inc. (Dairyland)</b> , PO Box 958 3570 Hwy H, West Bend, WI 53095	515-233-9610	<a href="http://www.dairylandseed.com">www.dairylandseed.com</a>
<b>Dyna-Gro (Dyna-Gro)</b> , P.O. Box 10 Wall Lake, IA 51466	712-852-2908	<a href="mailto:al.schmitz@uap.com">al.schmitz@uap.com</a>
<b>Dyna-Gro Seed (Dyna-Gro)</b> , Northern Plains	218-731-6792	<a href="mailto:stan.rund@uap.com">stan.rund@uap.com</a>
<b>Excel Brand (Excel Brand)</b> , 116 E. State, Camp Point, IL 62320	515-233-9610	<a href="mailto:rsecrist@dairylandseed.com">rsecrist@dairylandseed.com</a>
<b>Earthwise Processors, Inc. (Earthwise)</b> , Moorhead, MN 56560	218-287-5510	<a href="mailto:ryan@earthwisepro.com">ryan@earthwisepro.com</a>
<b>Farm Advantage</b> , 1275 Hwy 69, Belmond, IA 50421	641-444-3344	<a href="mailto:jmeints@kalnet.com">jmeints@kalnet.com</a>
<b>Galena Genetics (Galena)</b> , 501 Main St Box 548, Ormsby, MN 56162	507-736-2004	<a href="mailto:nes@rconnect.com">nes@rconnect.com</a>
<b>Gold Country Seed, Inc. (GCS)</b> , 16506 Hwy. 15 N, P.O. Box 604, Hutchinson, MN 55350	320-587-1050	<a href="mailto:jleatblad@goldcountryseed.com">jleatblad@goldcountryseed.com</a>
<b>Helena Chemical Company (Helena)</b> , 7137 Vista Drive, West Des Moines, IA 50266	515-309-3468	<a href="mailto:ravelings@helenachemical.com">ravelings@helenachemical.com</a>
<b>Hyland Seeds (Hyland)</b> , 2 Hyland Drive, Blenheim, Ontario, Canada NOP1A0	800-265-7403	<a href="mailto:jolmsted@hylandseeds.com">jolmsted@hylandseeds.com</a>
<b>Kaltenberg Seeds (Kaltenberg)</b> , 5506 State Rd. 19, Waunakee, WI 53597	608-849-5021	<a href="mailto:kstseeds@chorus.net">kstseeds@chorus.net</a>
<b>Kruger Seed Company (Kruger)</b> , Highway 20 East, Box A, Dike, IA 50624	800-772-2721	<a href="mailto:info@kruegerseed.com">info@kruegerseed.com</a>
<b>KSC/Challenger (KSC/Challenger)</b> , Highway 20 East, Box A, Dike, IA 50624	800-772-2721	<a href="mailto:info@kruegerseed.com">info@kruegerseed.com</a>
<b>Latham Farms (Latham)</b> , 131 180th St., Alexander, IA 50420	641-692-3258	<a href="mailto:markg@lathamseeds.com">markg@lathamseeds.com</a>
<b>Latham Seed Company (Latham)</b> , 131 180th St., Alexander, IA 50420	641-692-3258	<a href="mailto:markg@lathamseeds.com">markg@lathamseeds.com</a>

<b>LG Seeds (LG Seeds)</b> , 22827 Shissler Rd, Elmwood IL 61529	715-821-7788	www.lgseeds.com
<b>Mallard Seed Co. (Mallard)</b> , P.O. Box 637, Plainview, MN 55964	507-534-2300	mallardinc@aol.com
<b>Midwest Seed Genetics (Midwest)</b> , 23751 Highway 30 East, Carroll, IA 51401	800-369-8218	www.midwestseed.com
<b>Monsanto (Asgrow/Dekalb)</b> , 800 N. Lindberg Blvd, St. Louis, MO 63167	815-758-9323	www.monsanto.com
<b>Mustang Seeds (Mustang)</b> , Madison, SD 57042	605-480-1047	info@mustangseeds.com
<b>Northland Seed &amp; Grain Corp (Northland Organics)</b> , 462 Holly Ave, St Paul, MN 55102	651-221-4402	Soybean@northlandorganic.com
<b>Nutech Seed (Nutech Seed)</b> , 6131 North Fork Rd, Ames, IA 50010	877-561-9067	—
<b>Pattison Bros (Pattison Bros Brand)</b> , 701 King St, Box 670, Fayette, IA 52142	800-632-5952	dillont@pattisonbros.com
<b>Peterson Farm Seed (PFS)</b> , 3104 164th Ave SE, Harwood, ND 58042	701-282-7476	jerad@greatsoybeans.com
<b>Pioneer Hi-Bred International, Inc. (Pioneer)</b> , 99 Navaho Ave. Suite 101A, Mankato MN 56001	507-625-3045	www.pioneer.com
<b>Proseed (Proseed)</b> , 705 E Brawster, Harvey, ND 58341	701-324-4177	proseed@ndak.net
<b>Prairie Brand Research (PBR)</b> , 15 X Ave., Story City, IA 50248	515-733-2101	mike@prairiebrandseed.com
<b>Prairie Brand Seed Company (Prairie Brand)</b> , 15 X Ave., Story City, IA 50248	515-733-2101	mike@prairiebrandseed.com
<b>Renk Seed Co. (Renk)</b> , 6800 Wilburn Rd., Sun Prairie, WI 53590	608-837-7351	www.renkseed.com
<b>Richland Organics (Richland Organics)</b> , 100N 10th St, Breckenridge, MN 56520	218-643-1797	andy@richlandorganics.com
<b>Sand Seed Service, Inc. (Sands)</b> , PO Box 648, Marcus, IA 51035	712-376-4135	soi@midlands.net
<b>Sansgaard Seed Farms, Inc. (Sansgaard)</b> , 15 X Avenue, Story City, IA 50248	515-733-2101	mike@prairiebrandseed.com
<b>Seeds 2000 (Seeds 2000)</b> , P.O. Box 200, Breckenridge, MN 56520	888-786-7333	seeds2000@seeds2000.net
<b>Sodak Genetics (Sodak Genetics)</b> , Box 2207A, SDSU, Brookings, SD 57007	605-688-5418	jackiemansen@sdstate.edu
<b>Star Brand Research (Star)</b> , P.O. Box 648 Marcus IA 51035	712-376-4135	soi@midlands.net
<b>Stine Seed Co.</b> , 2225 Laredo Trail, Adel, IA 50003	800-362-2510	www.stinseed.com
<b>Syngenta Seeds (NK Brand)</b> , 26241 Anna Lake Rd, Underwood, MN 56586	218-826-6380	jay.stroh@syngenta.com
<b>Syngenta Seeds (NK Brand)</b> , Golden Valley, MN 55427	800-445-0956	gary.prescher@syngenta.com
<b>Tech Brand (Tech Brand)</b> , 40321 130th Ave., Leland, IA 50453	641-567-3350	—
<b>Thompson Seeds (Thompson Seeds)</b> , 40321 130th Ave., Leland, IA 50453	641-567-3350	—
<b>Thunder Seed (Thunder)</b> , 3008 210th St. N, Hawley, MN 54549	888-684-8633	Peterman@fargocity.com
<b>Top Farm Hybrids (Top Farm)</b> , P.O. Box 850, Cokato, MN 55321	320-286-5516	ron@topfarm.com
<b>Trelay Seeds (High Cycle)</b> , 11623 State Road 80, Livingston, WI 53544	608-943-6363	jasonb@trelay.com
<b>Wensman Seed Company (Wensman)</b> , P.O. Box 190, Wadena, MN 56482	218-631-2954	wensman@wensmanseed.com
<b>Ziller Seed Co., Inc. (Ziller)</b> , 76374 380th St, Bird Island, MN 55310	320-365-3674	zscsales@zillerseed.com

### **Soybean Planting Rate and Date**

Bushel Weight, Pounds .....	60
Seeds/Pound.....	2,800
Planting Rate, Pounds/Acre .....	56
Planting Rate, Seeds/Ft. of Row	
7-inch rows.....	2
10-inch rows.....	3
20-inch rows.....	6
22-inch rows.....	7
30-inch rows.....	9
Planting Date.....	May 10 to June 10

**Performance and characteristics of public and private soybean varieties, northern zone;  
Crookston, Moorhead and Shelly, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
Jim	N.D. AES	9-23	103	107	145	98	99	00.8	S	3.6
MN0071	Minn.AES	9-26	94	97	82	101	103	00.7	Rps1	3.9
90B43	Pioneer	9-27	106	109	108	100	102	0.4	Rps1c	3.4
Traill	N.D. AES	9-30	110	116	145	98	98	0.0	S	3.5
O.702	Northern Soypro	10-2	—	—	126	102	97	00.8	S	3.7
MN0302	Minn.AES	10-3	101	101	94	98	103	0.3	Rps1k	3.8
Walsh	N.D. AES	10-3	96	93	74	97	102	0.2	Rps6	3.5
Glacier	Minn.AES	10-5	94	89	74	105	94	00.8	Rps6	4.2
MN0201	Minn.AES	10-6	96	100	102	107	95	0.2	Rps1	3.3
Barnes	N.D. AES	10-6	105	102	96	97	102	0.2	Rps6	3.8
MN0304	Minn.AES	10-6	98	89	90	98	106	0.3	Rps1k	3.5
Lambert	Minn.AES	10-7	105	102	83	101	101	0.7	Rps1	3.8
Mean		10-2	33.6 bu/a	28.6 bu/a	21.2 bu/a	38.2%	15.6%			
LSQ 20%			5%	8%	15%					

**Performance and characteristics of public and private soybean varieties, central zone;  
Becker, Morris and Rosemount, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
MN0302	Minn. AES	9-17	95	95	88	99	106	0.3	Rps1k	3.7
Lambert	Minn. AES	9-18	106	105	100	100	104	0.7	Rps1	4.5
MN0902CN	Minn. AES	9-18	100	100	90	102	98	0.9	S	3.7
Barnes	N.D. AES	9-18	88	85	72	98	106	0.2	Rps6	4.1
MN1005	Minn. AES	9-21	107	110	111	97	106	1.0	Rps1k	4.3
Surge	Minn. & S.D. AES	9-22	100	101	94	103	102	0.9	Rps1	4.0
8003	Northern Soypro	9-22	—	—	85	102	101	1.1	Rps1k	4.3
91M10	Pioneer	9-23	—	114	111	102	102	1.1	S	4.3
MN1302	Minn. AES	9-23	107	107	100	97	102	1.3	Rps1k	4.0
PB-183	Prairie Brand	9-25	—	—	124	100	101	1.8	Rps1	3.8
Kato	Minn. AES	9-25	98	99	100	108	97	1.4	Rps1	3.9
MN1006CN	Minn. AES	9-25	100	101	81	99	103	1.0	Rps1	4.3
FA1545	Farm Advantage	9-26	119	118	119	104	101	1.4	S	4.3
Parker	Minn. AES	9-26	99	101	102	103	101	1.5	Rps1	4.2
91B53	Pioneer	9-27	113	113	105	105	99	1.6	S	4.2
Freeborn	Minn. AES	9-27	99	97	89	105	102	1.6	Rps1	3.9
PB-178	Prairie Brand	9-28	122	120	118	104	101	1.7	S	4.2
1919	Kruger	9-28	—	123	116	105	101	1.5	S	4.1
Mean		9-23	47.6 bu/a	42.4 bu/a	40.9 bu/a	35.0%	17.6%			
LSQ 20%			4%	6%	7%					

**Performance and characteristics of public and private soybean varieties, southern zone;  
Jackson, Lamberton and Waseca, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2003	2003-2004	2004	Protein	Oil			
MN1302	Minn. AES	9-19	99	99	90	107	97	1.3	Rps1k	4.3
SO1187	Sands	9-23	112	110	104	105	99	1.8	Rps1	4.3
Parker	Minn. AES	9-23	104	104	97	103	97	1.5	Rps1	4.4
MN1801	Minn. AES	9-24	97	94	89	96	102	1.8	Rps1c	4.3
L1840 Brand	Latham	9-25	—	—	112	99	101	1.8	S	4.0
1884	Viking	9-25	—	120	111	99	98	1.8	S	3.9
280 Brand	Latham	9-25	—	112	106	99	100	1.7	S	3.5
1919	Kruger	9-25	—	v	105	99	99	1.5	S	4.2
FA1846	Farm Advantage	9-25	113	108	96	100	98	1.8	S	4.1
PB-183	Prairie Brand	9-26	—	120	103	104	100	1.8	Rps1	3.8
PB-178	Prairie Brand	9-26	105	106	100	99	99	1.7	S	3.9
IA1006	Iowa AES	9-26	99	99	97	102	100	1.6	S	4.1
Freeborn	Minn. AES	9-27	93	97	92	99	98	1.6	Rps1	3.7
IA1008	Iowa AES	9-27	—	93	80	97	104	2.0	S	4.3
NT-222	Nutech	9-28	—	—	107	99	102	2.2	S	4.2
PB-210N	Prairie Brand	9-28	—	—	104	98	100	2.1	Rps1	4.3
92B12	Pioneer	9-29	—	—	105	101	98	2.1	Rps1k	4.0
92M10	Pioneer	9-29	—	109	101	100	100	2.1	Rps1c	3.8
IA2050	Iowa AES	9-29	108	104	101	99	100	2.1	S	4.3
FA2244	Farm Advantage	9-30	111	108	100	101	101	2.2	Rps1	4.3
2525+	Kruger	10-2	—	—	105	100	99	2.4	S	4.4
Sturdy	Minn. AES	10-2	97	100	93	97	104	2.0	Rps1	4.1
IA2008R	Iowa AES	10-3	102	101	97	100	104	2.1	Rps1k	4.1
2320SCN	Kruger	10-4	—	—	107	99	99	2.3	S	4.3
Mean		9-27	44.7 bu/a	41.1 bu/a	48.8 bu/a	36.5%	18.0%			
LSD 20%			5%	6%	7%					

**Performance and characteristics of very early maturing soybean varieties;  
Grand Rapids, Kennedy, Roseau and Thief River Falls, 2002-2004.**

Variety	Maturity Rating	Yield, Percent of Mean			Percent of Mean		Phytophthora Gene	Chlorosis Score
		2002-2004	2003-2004	2004	Protein	Oil		
MN0071	00.7	100	102	136	96	108	Rps1	3.5
Jim	00.7	104	102	111	97	100	S	3.6
90A07	00.7	99	97	92	100	97	S	3.6
TrailH	0.0	96	98	89	102	98	S	3.1
RG200RR	0.0	—	—	87	101	98	S	3.1
Mean		26.8 bu/a	24.4 bu/a	9.1 bu/a	36.6%	14.9%		
LSD 20%		4%	7%	24%				

**Performance and characteristics of conventional and Roundup Ready public and private soybean varieties, far northern zone; Roseau, Thief River Falls, Crookston and Kennedy, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
MN0071	Minn. AES	10-1	—	106	140	99	100	00.7	Rps1	3.6
04009RR	PFS	10-1	—	98	101	98	103	00.9	Rps1k	3.9
S0076-4	Stine	10-2	—	—	143	98	102	00.4	Rps1k	3.7
PB-0094RR	Prairie Brand	10-2	—	—	141	99	104	00.9	Rps1k	3.3
30D09	Dyna-Gro	10-2	—	107	132	96	105	00.9	Rps1k	3.9
W20077RR	Wensman	10-2	—	—	130	98	104	00.7	Rps1k	3.8
0082RR	Star	10-2	—	—	123	99	100	00.5	Rps1k	3.3
NT-0089RR	Nutech Seed	10-2	—	—	116	99	102	00.8	Rps1k	4.0
0051RR	Seeds 2000	10-15	—	—	161	102	96	00.5	S	3.7
W20091RR	Wensman	10-15	—	—	146	99	101	00.9	Rps1k	3.4
Emerson	Hyland Seeds	10-15	—	—	138	95	109	00.6	S	3.6
T-0121RR	Thompson Seeds	10-15	—	—	133	95	105	0.1	S	3.4
DKB009-51	DeKalb	10-15	—	—	123	95	105	00.9	—	3.8
90A07	Pioneer	10-15	—	102	122	105	99	00.7	S	3.5
PB-0052RR	Prairie Brand	10-15	—	—	120	99	102	00.6	S	3.6
AG00802	Asgrow	10-15	—	—	118	101	93	00.8	—	3.9
Jim	N.D. AES	10-15	—	101	105	95	99	00.8	S	3.6
PB-00943RR	Prairie Brand	10-15	—	—	105	99	106	0.1	Rps1k	3.6
NT-0101A	Nutech Seed	10-15	—	—	101	97	103	0.1	Rps1	3.7
DST0604/RR	Dairyland	10-15	—	—	98	95	103	00.8	S	4.1
Trail	N.D. AES	10-15	—	97	96	101	95	0.0	S	3.1
8008RR	Excel Brand	10-15	—	—	92	96	106	00.8	S	3.9
03005RR	PFS	10-15	—	103	88	101	97	00.5	S	3.6
DSR-007/RR	Dairyland	10-15	—	—	82	104	98	00.7	S	3.6
DSR-C900/RR	Dairyland	10-15	—	—	78	100	99	00.9	S	3.8
RG200RR	RoughRider Genetics	10-15	—	—	77	101	92	0.0	S	3.1
SX04200	Dyna-Gro	10-15	—	—	72	103	101	00.6	S	3.5
04007RR	PFS	10-15	—	96	60	99	105	00.7	S	3.7
PB-0072RR	Prairie Brand	10-15	—	—	57	104	101	0.1	S	3.3
0071RR	Seeds 2000	10-15	—	—	56	102	102	00.7	S	3.7
DKB005-51	DeKalb	10-15	—	85	47	101	101	00.5	—	3.8
Mean		10-11	—	30.6 bu/a	9.4 bu/a	37.0%	15.1%			
LSD 20%			—	6%	1.6%					

**Performance and characteristics of Roundup Ready soybean varieties, northern zone; Crookston, Moorhead and Shelly, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
E34094RR	Top Farm	9-27	—	—	118	101	106	00.8	S	3.5
W20091RR	Wensman	9-28	—	103	123	107	101	0.9	Rps1k	3.8
PB-0094RR	Prairie Brand	9-29	96	109	129	101	108	00.9	Rps1k	3.5
M-025RR	Mustang	9-30	—	—	152	99	106	0.2	S	3.0
RR20-11	Proseed	9-30	—	92	123	101	106	0.1	S	4.2
RG200	Rough Rider Genetics	10-1	—	104	128	108	91	0.0	Rps1	3.5
PB-0052RR	Prairie Brand	10-1	—	102	123	100	106	00.6	S	3.5
PB-0234RR	PBR	10-2	—	—	145	101	102	0.2	S	3.6
PB-0134RR	Sansgaard	10-2	—	—	133	101	102	0.1	S	4.0
NT-0121+RR	Nutech Seed	10-2	—	—	133	100	103	0.1	S	3.9
90B11	Pioneer	10-2	—	—	123	103	101	0.1	S	3.3
033RR	KSC/Challenger	10-2	—	—	114	104	101	0.3	S	3.1
RR00	Proseed	10-2	—	92	113	104	107	00.0	S	4.3
RR Ramsey	Hyland Seeds	10-2	—	103	102	108	101	00.5	S	3.7
PB-0232RR	Sansgaard	10-3	96	98	113	104	102	0.2	S	3.6
M-023RR	Mustang	10-3	102	105	111	99	109	0.2	Rps1k	3.8
M-033RR	Mustang	10-4	—	105	126	102	101	0.3	Rps1k	3.8
RR Royal	Hyland Seeds	10-4	—	—	124	104	99	00.9	S	3.5
RR20-05	Proseed	10-4	—	—	109	101	103	00.5	S	3.9
RR Reliant	Hyland Seeds	10-4	—	—	105	107	101	0.3	S	3.7
AG0301	Asgrow	10-5	—	108	125	97	106	0.3	—	3.7
90M20	Pioneer	10-5	—	—	123	99	103	0.2	Rps1k	3.6
055RR	Kruger	10-5	—	102	114	99	107	0.3	S	3.8
PB-0799RR	Prairie Brand	10-5	100	100	112	103	102	0.5	Rps1k	3.3
90B51	Pioneer	10-5	111	105	111	97	109	0.5	Rps1c	2.9
NT-0414RR	Nutech Seed	10-5	—	—	105	106	101	0.3	S	3.3
36R01	Dyna-Gro	10-6	—	—	120	100	106	0.1	S	3.8
05061RR	PFS	10-6	—	—	120	102	104	0.6	Rps6	3.6
PB-00943RR	PBR	10-6	—	—	114	102	101	0.1	Rps1k	3.3
066RR	Kruger	10-6	—	—	112	100	109	0.3	S	3.7
S0536-4	Stine	10-6	—	100	110	105	100	0.5	Rps1k	3.6
PB-0643RR	PBR	10-6	—	95	109	102	104	0.5	Rps1k	3.0
022RR	KSC/Challenger	10-6	—	—	79	104	103	0.2	S	3.6
2021RR	Seeds 2000	10-6	93	98	77	99	109	0.2	Rps1c	3.6
PB-0614RR	Sansgaard	10-7	—	—	115	104	105	0.5	Rps6	3.4
RR Rugged	Hyland Seeds	10-7	—	—	111	103	102	0.3	S	4.2
066RR	KSC/Challenger	10-7	—	98	105	102	106	0.6	S	3.3
0661RR	Star	10-7	—	—	78	99	106	0.6	S	3.6

**Performance and characteristics of Roundup Ready soybean varieties, central zone;  
Becker, Rosemount and Morris, 2002-2004. (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
PB-0812RR	Sansgaard	9-22	104	101	109	107	96	0.8	S	3.8
KB094RR	Kaltenberg	9-22	—	—	101	100	100	0.9	Rps1	3.7
SD1081RR	Sodak Genetics	9-22	95	98	100	102	99	0.8	Rps1	4.0
RR20-80	Proseed	9-22	—	—	98	99	102	0.8	Rps1k	4.0
2209RR	Thunder	9-22	—	—	94	99	103	0.9	Rps1k	3.8
RS101RR	Renk Seed	9-22	102	100	94	101	97	1.0	Rps1c	4.3
0410RR	PFS	9-22	—	—	91	101	97	1.0	Rps1k	4.4
91M11	Pioneer	9-22	—	—	86	104	97	1.1	Rps1k	3.6
RREXP 0.9P	Proseed	9-23	—	—	109	98	99	0.9	S	4.2
RS093RR	Renk Seed	9-23	—	100	104	104	97	0.9	S	4.2
32F12	Dyna-Gro	9-23	—	—	100	103	98	1.2	S	3.6
EXP44310R	Ziller	9-23	—	—	99	106	95	1.0	S	3.8
S0943-4	Stine	9-23	—	104	99	104	96	1.0	Rps1k	4.8
PB-1063RR	Prairie Brand	9-23	—	96	98	103	98	1.0	S	4.1
101RR	Kruger	9-23	—	—	84	103	98	1.1	S	4.5
AG1401	Asgrow	9-24	106	107	112	98	102	1.4	—	3.9
PB-0954RR	Sansgaard	9-24	—	—	110	101	100	0.9	S	4.3
RRX0914	Mallard	9-24	—	—	109	98	99	0.9	Rps1k	3.8
37A10	Dyna-Gro	9-24	—	—	108	103	97	1.0	Rps1k	4.3
C0990RR	LG Seeds	9-24	—	108	108	101	99	0.9	S	4.0
PB-0923RR	Prairie Brand	9-24	—	99	108	103	99	0.9	Rps1k	4.2
T-1444RR	Tech Brand	9-24	—	—	105	103	97	1.4	Rps1c	4.1
X315R	NK Brand	9-24	—	—	97	101	99	1.5	Rps1c	3.8
M-095RR	Mustang	9-25	—	—	115	98	103	0.9	S	4.2
W2121RR	Wensman	9-25	—	—	107	96	101	1.2	Rps1c	3.8
1499RR	Garst/Agripro	9-25	—	102	104	99	103	1.4	S	3.8
PB-1294RR	Prairie Brand	9-25	—	—	104	91	104	1.2	Rps1c	3.9
S011441RR	Sands	9-25	—	101	101	103	98	1.4	S	4.3
C1410RR	LG Seeds	9-25	105	103	99	99	103	1.4	S	4.2
C1212RR	LG Seeds	9-25	—	—	98	95	102	1.2	S	4.2
T-1212RR/SCN	Tech Brand	9-25	—	—	98	96	98	1.2	Rps1c	3.4
2142RR	High Cycle	9-25	—	99	97	102	98	1.4	S	4.1
M-115RR	Mustang	9-25	—	—	95	95	101	1.1	Rps1c	3.9
E1230R	Latham	9-25	—	—	93	99	102	1.2	S	4.2
0511RR	PFS	9-25	—	—	90	95	99	1.1	Rps1c	4.4
PB-1354RR	Sansgaard	9-25	—	—	88	104	98	1.3	S	3.7
SD1091RR	Sodak Genetics	9-25	91	89	81	107	97	0.9	Rps1	4.1
S1300-4	Stine	9-26	—	—	111	99	101	1.3	S	4.2
NT-1313RR/SCN	Nutech Seed	9-26	—	—	109	100	98	1.3	Rps1k	3.8
33M14	Dyna-Gro	9-26	—	—	107	101	100	1.4	S	4.0
RR1313	Mallard	9-26	—	—	106	98	103	1.3	S	3.7
AG1603	Asgrow	9-26	—	—	105	101	101	1.6	—	4.2
151CNR	Anderson Seeds	9-26	—	—	104	99	104	1.5	Rps1k	4.3
91M51	Pioneer	9-26	—	—	104	101	102	1.5	Rps1k	4.2
FA7123	Farm Advantage	9-26	—	—	104	98	104	1.2	Rps1k	4.1
PB-1254RR	Sansgaard	9-26	—	—	104	100	101	1.2	Rps1k	4.3
152RR	Kruger	9-26	—	—	102	103	101	1.5	S	4.3
3512RR	Gold Country	9-26	—	—	102	92	104	1.2	Rps1k	3.8
BT7145R	Ziller	9-26	—	—	102	102	101	1.4	S	4.1
141RR/SCN	Kruger	9-26	—	104	101	103	100	1.5	Rps1k	4.3

**Performance and characteristics of Roundup Ready soybean varieties, northern zone;  
Crookston, Moorhead and Shelly, 2002-2004 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
RREXP 0.2E	Proseed	10-7	--	--	77	101	105	0.2	S	4.1
S0206-4	Stine	10-7	--	--	61	100	104	0.2	S	3.8
8040RR	Excel Brand	10-8	--	--	114	107	99	0.4	S	3.8
PB-0532RR	PBR	10-8	108	101	110	104	102	0.5	S	3.7
0305RR	PFS	10-8	--	108	107	102	102	0.5	S	4.3
T-0626RR	Thompson Seeds	10-8	--	--	101	105	99	0.3	S	3.8
PB-0554RR	Prairie Brand	10-8	--	--	100	99	107	0.5	S	3.7
PB-0754RR	Sansgaard	10-8	--	--	91	105	100	0.7	Rps1	3.8
T-0525RR	Thompson Seeds	10-8	--	--	77	102	111	0.3	S	4.2
W2074RR	Wensman	10-8	--	--	77	104	106	0.6	S	3.6
033RR	Kruger	10-8	--	--	72	105	99	0.3	S	3.9
T-0252RR	Thompson Seeds	10-8	--	--	66	101	104	0.1	S	4.2
M-055RR	Mustang	10-9	--	--	107	104	101	0.5	S	3.4
NT-0606RR	Nutech Seed	10-9	--	--	99	105	103	0.3	S	3.6
DST08-000/RR	Dairyland	10-9	--	--	97	99	107	0.8	S	3.9
DSR-040/RR	Dairyland	10-9	100	96	89	98	107	0.5	S	3.6
0505RR	Star	10-9	--	98	83	101	102	0.5	S	3.3
W2062RR	Wensman	10-9	--	98	81	105	99	0.5	S	3.5
RG405	Rough Rider Genetics	10-9	--	--	70	102	104	0.5	Rps6	4.3
W2036RR	Wensman	10-9	--	--	58	107	102	0.3	S	4
S0606-4	Stine	10-9	--	--	42	100	99	0.5	S	4.0
DSR-050/RR	Dairyland	10-12	--	93	46	101	105	0.6	S	4.1
S0504-4	Stine	10-12	--	--	29	98	104	0.5	Rps1	4.3
E3M030RR	Top Farm	--	--	--	0	0	0	0.3	S	4.7
Mean		10-6	41.4 bu/a	33.0 bu/a	24.3 bu/a	35.1%	16.4%			
LSD 20%			5%	7%	12%					

**Performance and characteristics of Roundup Ready soybean varieties, central zone;  
Becker, Rosemount and Morris, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
AG0602	Asgrow	9-15	--	--	89	99	99	0.6	--	4.3
90M60	Pioneer	9-16	--	--	94	100	97	0.6	Rps1c	3.9
RR0069	Proseed	9-16	--	--	88	96	103	0.6	Rps1k	4.4
RR REGAL	Hyland Seeds	9-16	--	85	79	97	101	0.5	S	3.7
PB-0554RR	Prairie Brand	9-17	--	--	98	96	106	0.5	S	4.4
PB-0532RR	PBR	9-17	--	99	93	100	99	0.5	S	3.9
E34623RR	Top Farm	9-17	--	--	83	98	104	0.6	S	3.4
DSR-075/RR	Dairyland	9-18	--	95	90	101	102	0.8	Rps1k	4.2
AG0801	Asgrow	9-19	99	100	107	95	103	0.8	--	4.1
RR30-50	Proseed	9-19	--	--	96	100	101	0.5	S	4.3
M-075RR	Mustang	9-19	--	--	95	97	103	0.7	Rps1	4.5
PB-0834RR	PBR	9-19	--	--	93	100	102	0.8	Rps1k	4.1
T-0676+RR	Thompson Seeds	9-19	--	--	83	101	98	0.3	Rps1	4.5
RR RALLY	Hyland Seeds	9-19	--	--	82	103	99	0.5	S	3.8
2092RR	High Cycle	9-20	--	--	108	100	96	0.9	Rps1k	4.0
FA7075	Farm Advantage	9-20	--	--	101	98	102	0.7	Rps1	4.8
6052RR	Top Farm	9-20	--	--	98	101	101	0.5	S	4.2
AG1102	Asgrow	9-21	--	--	112	95	102	1.1	--	3.9
E34944RR	Top Farm	9-21	--	--	112	99	98	0.9	Rps1k	4.1
AG1001	Asgrow	9-22	--	--	109	100	99	1.0	--	4.1



**Performance and characteristics of Roundup Ready soybean varieties, southern zone;  
Jackson, Lamberton and Waseca, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
AG1401	Asgrow	9-19	--	--	88	94	103	1.4	--	4.2
151CNR	Anderson Seeds	9-20	--	--	97	100	101	1.5	Rps1k	4.0
1524	Helena	9-21	--	--	98	99	102	1.4	S	3.3
1508RR	Anderson Seeds	9-21	--	99	96	101	99	1.5	S	4.2
ADV1284NR	Advantage	9-22	--	--	113	92	101	1.3	S	3.6
RR2012	Mallard	9-22	--	--	107	98	102	2.0	S	4.1
C1664RR	LG Seeds	9-22	--	--	101	102	98	1.6	Rps1k	3.3
SD1151RR	Sodak Genetics	9-22	87	93	94	101	100	1.5	Rps1k	3.5
DKB15-51	Dekalb	9-22	95	92	90	97	101	1.5	--	3.9
AG1603	Asgrow	9-22	--	--	89	102	98	1.6	--	3.8
PB-1754RR	Sansgaard	9-23	--	--	108	103	98	1.7	S	4.2
KB161RR	Kaltenberg	9-23	--	--	107	94	101	1.6	Rps1c	3.8
FA7184N	Farm Advantage	9-23	--	--	102	107	96	1.8	Rps1	3.7
X319R	NK Brand	9-23	--	--	95	102	97	1.9	Rps1	4.4
X317R	NK Brand	9-23	--	--	93	96	100	1.7	Rps1c	4.4
PB-1634RR	PBR	9-23	--	--	92	100	98	1.5	Rps1k	3.9
2014RR	Thunder	9-23	--	--	83	98	102	1.4	S	4.0
6174RR	Top Farm	9-24	--	--	103	98	102	1.7	S	3.3
M-201RR	Mustang	9-24	101	105	101	97	102	2.0	Rps1k	3.8
K-200RR	Kruger	9-24	--	--	101	100	102	2.0	S	3.9
KB203RR	Kaltenberg	9-24	--	--	101	98	103	2.0	S	3.4
S1918-4	Stine	9-24	--	--	99	99	102	1.8	S	3.3
2175RR	High Cycle	9-24	--	--	97	98	103	1.7	S	3.8
192RR	KSC/Challenger	9-24	--	--	96	97	103	1.5	S	3.8
PB-1954RR	PBR	9-24	--	--	96	100	101	1.9	S	3.8
PB-2112RR	Prairie Brand	9-24	100	96	93	97	102	2.1	S	3.4
T-1818RR/SCN	Thompson Seeds	9-24	--	--	92	105	98	1.8	Rps1	4.2
211+RR	Kruger	9-25	--	96	106	98	103	2.0	S	3.8
223RR	Kruger	9-25	--	--	104	98	101	2.3	Rps1k	4.1
2222RR	High Cycle	9-25	--	--	103	99	102	2.2	S	3.8
PB-1943RR	Sansgaard	9-25	--	102	103	98	102	2.1	Rps1k	4.0
PB-2141RR	Prairie Brand	9-25	104	99	101	98	102	2.1	Rps1k	4.1
33B17	Dyna-Gro	9-25	--	--	100	101	98	1.7	Rps1k	4.1
PB-2243RR	Prairie Brand	9-25	--	97	100	98	102	2.2	S	4.0
SOI2143RR	Sands	9-25	101	102	100	98	102	2.1	Rps1k	4.1
NT-1909RR	Nutech Seed	9-25	--	--	98	98	103	1.9	S	4.2
NT-2002+RR	Nutech Seed	9-25	--	--	97	97	101	2.0	Rps1k	4.1
S2116-4	Stine	9-25	--	102	96	96	103	2.1	S	4.0
RS199RR	Renk Seed	9-25	96	91	95	98	104	1.9	Rps1k	4.4
GR2037	Midwest	9-25	99	95	94	98	103	2.0	S	4.2
191CNR	Anderson Seeds	9-26	--	104	111	98	105	1.9	Rps1k	4.2
W2163RR	Wensman	9-26	--	97	109	104	97	1.5	Rps1	4.3
2074	Helena	9-26	--	--	108	99	104	2.0	Rps1k	4.0
RR2214	Mallard	9-26	--	--	107	100	100	2.2	Rps1k	3.8
XR20P03	Garst/Agripro	9-26	--	--	104	99	102	2.0	S	3.8
C2121RR	LG Seeds	9-26	--	102	104	99	102	2.1	S	4.0
FA7192	Farm Advantage	9-26	--	100	103	98	102	1.9	S	3.6
T-7205RR	Thompson Seeds	9-26	108	106	102	97	102	2.0	Rps1k	4.1
2133	Helena	9-26	--	--	101	98	102	2.1	Rps1k	4.1
T-2202RR	Thompson Seeds	9-26	--	--	100	98	102	2.1	S	3.7

**Performance and characteristics of Roundup Ready soybean varieties, central zone;  
Becker, Rosemount and Morris, 2002-2004 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
RS159RR	Renk Seed	9-26	100	96	100	96	100	1.5	Rps1c	4.1
155RR	Kruger	9-26	—	—	99	102	99	1.5	Rps1k	3.8
W2090RR	Wensman	9-26	—	—	94	101	99	0.9	S	4.6
SD1151RR	Sodak Genetics	9-26	—	—	93	105	97	1.5	Rps1k	3.5
SO11261RR	Sands	9-26	—	—	93	96	98	1.2	Rps1c	3.5
KB104RR	Kaltenberg	9-26	—	—	92	99	99	1.0	Rps1c	4.3
125RR	KSC/Challenger	9-26	—	—	75	99	102	1.5	S	4.0
ADV1541	Advantage	9-27	—	—	115	99	103	1.5	Rps1k	4.4
6144RR	Top Farm	9-27	—	103	111	100	103	1.4	S	3.7
1508RR	Anderson Seeds	9-27	106	104	107	103	99	1.5	S	4.3
E1635	Latham	9-27	—	—	103	101	98	1.2	Rps1k	3.9
2133RR	High Cycle	9-27	—	—	101	103	99	1.3	S	4.8
RRX1314	Mallard	9-27	—	—	101	92	104	1.3	Rps1c	3.8
T-1601	Thompson Seeds	9-27	—	—	101	98	99	1.6	S	3.9
1524	Helena	9-27	—	—	100	100	104	1.4	S	4.5
1703RR	Garst/Agripro	9-27	—	103	100	97	102	1.5	Rps1c	4.2
DKB15-51	Dekalb	9-27	—	101	100	103	95	1.5	—	4.5
DSR-130/RR	Dairyland	9-27	103	101	99	101	96	1.3	S	4.6
EXP.33513R	Ziller	9-27	—	—	93	95	99	1.1	S	4.3
154RR	KSC/Challenger	9-27	—	—	90	97	100	1.5	Rps1c	4.7
DST13-000/RR	Dairyland	9-27	—	—	84	101	102	1.3	S	4.3
RRX1512	Mallard	9-28	—	—	121	99	102	1.5	Rps1k	3.8
FA7162	Farm Advantage	9-28	—	—	114	100	103	1.5	S	4.3
31C15	Dyna-Gro	9-28	—	107	113	100	100	1.5	S	4.6
W2163RR	Wensman	9-28	—	—	107	106	96	1.5	Rps1	4.5
W2144RR	Wensman	9-28	—	—	104	101	100	1.4	Rps1k	4.1
149+RR	KSC/Challenger	9-28	—	—	103	102	99	1.5	Rps1k	3.8
PB-1552RR	PBR	9-28	102	102	102	101	98	1.5	S	4.4
T-1577RR	Tech Brand	9-28	—	—	101	102	99	1.5	S	4.1
KB153RR	Kaltenberg	9-28	—	—	98	101	98	1.5	S	4.7
DST15-000/RR	Dairyland	9-28	—	—	96	103	99	1.5	S	4.0
BT17150R	Ziller	9-28	90	91	85	96	100	1.5	Rps1c	4.2
XR18C21	Garst/Agripro	9-29	—	—	107	101	102	1.7	Rps1c	4.3
S1436-4	Stine	9-29	—	—	104	101	101	1.4	Rps1k	3.8
M-155RR	Mustang	9-29	—	—	103	99	103	1.5	Rps1k	4.0
SO11540RR	Sands	9-29	—	103	102	101	98	1.5	S	4.1
S1586-4	Stine	9-29	103	101	99	103	97	1.4	S	4.3
PB-1634RR	PBR	9-29	—	—	94	102	101	1.5	Rps1k	3.8
2133	Helena	9-30	—	—	116	100	102	2.1	S	4.3
2154RR	High Cycle	9-30	—	—	114	102	101	1.5	Rps1k	4.1
2074	Helena	9-30	—	—	112	99	106	2.0	Rps1k	4.4
8160RR	Excel Brand	9-30	—	—	109	102	99	1.6	S	4.4
T-1717RR/SCN	Thompson Seeds	9-30	—	—	78	103	98	—	S	4.4
Mean		9-25	48.4 bu/a	41.9 bu/a	37.1 bu/a	34.9%	16.0%			
LSD 20%			8%	9%	10%					

**Performance and characteristics of Roundup Ready soybean varieties, southern zone;  
Jackson, Lamberton and Waseca, 2002-2004 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2002-2004	2003-2004	2004	Protein	Oil			
T-2121RR/SCN	Tech Brand	9-29	—	—	92	100	101	2.1	Rps1c	4.8
SO11940RR	Sands	9-30	100	101	107	103	98	1.9	Rps1k	3.7
DST20-000/RR	Dairyland	9-30	—	—	105	103	97	2.0	S	4.1
233+RR	KSC/Challenger	9-30	—	101	101	103	98	2.1	S	3.8
DSR-199/RR	Dairyland	9-30	98	101	100	104	97	1.9	Rps1k	4.0
8192RR	Excel Brand	10-1	—	—	100	103	95	1.9	S	3.9
3190RR	Dyna-Gro	10-1	—	—	99	98	101	1.9	Rps1k	4.0
RRX2411	Mallard	10-1	—	—	98	103	97	2.4	S	4.1
2194RR	High Cycle	10-1	—	—	95	104	95	1.9	S	3.7
M-255RR	Mustang	10-1	—	—	93	101	97	2.5	S	3.8
W2400RR	Wensman	10-1	—	—	93	105	93	2.4	Rps1k	4.8
2157RR	Viking	10-2	105	108	110	97	102	2.1	Rps1k	4.1
AG2403	Asgrow	10-2	—	104	109	100	102	2.4	—	4.1
FA7243	Farm Advantage	10-2	—	—	109	105	96	2.4	S	4.1
DSR-234/RR	Dairyland	10-2	—	—	105	101	100	2.3	S	4.7
L2336R BRAND	Latham	10-2	—	104	105	103	98	2.3	S	3.8
92M30	Pioneer	10-2	—	—	104	101	101	2.3	S	4.0
T-2402RR/SCN	Tech Brand	10-2	—	—	103	101	101	1.9	Rps1k	4.6
36N23	Dyna-Gro	10-3	—	—	108	103	97	2.3	S	4.3
3218RR	Dyna-Gro	10-3	—	—	101	103	98	2.1	S	4.3
8237RR	Excel Brand	10-4	—	104	107	101	99	2.3	S	4.2
T-2404RR	Nutech Seed	10-4	—	—	81	101	98	—	S	4.5
Mean		9-27	50 bu/a	45.2 bu/a	46.9 bu/a	35.6%	18.6%			
LSD 20%			5%	7%	8%					

**Performance and characteristics of Roundup Ready soybean varieties, southern zone; Jackson, Lambertson and Waseca, 2002-2004 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chloros Score
			2002-2004	2003-2004	2004	Protein	Oil			
DKB22-52	Dekalb	9-26	—	—	100	98	103	2.2	—	3.7
DSR-184/RR	Dairyland	9-26	—	97	99	97	104	1.8	Rps1k	4.4
PB-1914RR	Sansgaard	9-26	—	—	99	100	101	1.9	S	3.8
181RR/SCN	KSC/Challenger	9-26	—	—	97	105	99	1.9	Rps1	4.3
E1936R	Latham	9-26	—	—	97	99	102	1.9	S	3.8
2162RR	High Cycle	9-26	—	94	95	98	104	1.6	Rps1k	4.3
SOI2141ARR	Sands	9-26	—	99	94	99	101	2.1	S	4.0
M-203RR	Mustang	9-26	97	93	93	98	103	2.1	S	3.6
M-223RR	Mustang	9-26	—	—	93	103	97	2.2	S	3.5
2101RR	Anderson Seeds	9-27	—	—	106	97	101	2.1	Rps1k	4.0
497RR BRAND	Latham	9-27	107	108	106	97	102	2.2	Rps1k	3.7
RS204NRR	Renk Seed	9-27	—	—	105	98	104	2.0	Rps1k	3.9
RS234RR	Renk Seed	9-27	—	—	105	98	102	2.3	S	3.8
W2211RR	Wensman	9-27	—	102	103	98	102	2.1	S	4.0
SOI2169RR	Sands	9-27	—	—	103	99	101	2.1	Rps1	4.3
NT-1919+RR/SCN	Nutech Seed	9-27	—	—	103	97	105	2.0	Rps1k	3.4
6221RR	Gold Country	9-27	—	101	102	98	101	2.1	S	3.6
RS223RR	Renk Seed	9-27	—	100	101	98	103	2.2	Rps1k	3.8
W2144RR	Wensman	9-27	—	—	99	100	100	1.4	Rps1k	3.4
1717RR	Viking	9-27	—	—	97	101	97	1.7	S	4.2
T-2323RR/SCN	Tech Brand	9-27	—	—	96	105	97	2.3	Rps1k	3.9
XR18C21	Garst/Agripro	9-27	—	—	95	101	99	1.6	Rps1c	4.1
AG2107	Asgrow	9-28	—	107	112	101	104	2.1	—	4.1
ADV2135R	Advantage	9-28	105	104	109	96	102	2.1	Rps1k	4.1
ADV1773R	Advantage	9-28	—	103	108	102	100	1.7	S	3.6
BT7215R	Ziller	9-28	—	—	108	98	101	2.1	Rps1k	3.7
E34104RR	Top Farm	9-28	—	—	107	99	102	2.2	S	4.1
T-7193RR/SCN	Thompson Seeds	9-28	—	—	106	98	105	2.0	Rps1k	3.9
BT7193R	Ziller	9-28	102	104	105	103	98	1.9	S	4.2
191RR	KSC/Challenger	9-28	—	99	103	99	101	—	S	4.2
92B38	Pioneer	9-28	100	99	101	101	100	2.3	S	4.2
S2103-4	Stine	9-28	102	101	100	97	102	2.2	Rps1k	4.0
AG1903	Asgrow	9-28	—	—	99	100	98	1.9	—	4.3
PB-2023RR	Sansgaard	9-28	—	94	98	101	98	2.0	Rps1k	3.9
PB-1981RR	PBR	9-28	101	96	98	104	97	2.1	Rps1k	3.9
E3M321RR	Top Farm	9-28	—	—	97	98	101	2.1	Rps1k	4.2
AG2203	Asgrow	9-28	—	—	97	105	96	2.2	—	4.6
X320R	NK Brand	9-28	—	—	94	101	98	2.0	Rps1	4.3
S2403-4	Stine	9-28	—	—	90	103	98	2.4	Rps1k	4.0
FA7212	Farm Advantage	9-29	—	100	107	98	100	2.1	Rps1k	4.1
92M32	Pioneer	9-29	—	—	106	100	100	2.3	Rps1k	4.1
KB223RR	Kaltenberg	9-29	—	—	105	98	101	2.2	Rps1k	3.9
195+RR/SCN	Kruger	9-29	—	106	105	98	105	1.8	Rps1k	4.0
EXP.23717R	Ziller	9-29	—	—	104	103	97	1.7	S	4.3
PB-1921RR	Prairie Brand	9-29	101	101	104	97	102	1.9	Rps1k	3.7
EXP.23921R	Ziller	9-29	—	—	102	105	97	2.1	S	3.9
ADV2353R	Advantage	9-29	—	—	101	102	100	2.3	S	4.3
F1901RR	Tech Brand	9-29	—	—	101	100	100	2.1	S	4.7
E34904RR	Top Farm	9-29	—	—	101	99	102	1.9	S	3.8
PB-1934RR	PBR	9-29	—	—	96	103	97	1.9	S	4.3

**Performance and characteristics of soybean varieties, southern zone; at soybean-cyst-nematode-infested (Lamberton, Madelia and Waseca) and non-infested (Jackson, Lamberton and Waseca) sites, 2002-2004. (Continued)**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean						Percent of Mean Protein	Oil	Maturity Rating	Phytophthora Gene	Chlorosis Score	SCN Rating
			Infested Sites			Non-Infested Sites								
			02-04	03-04	2004	02-04	03-04	2004						
NF1919RR/SCN	Nutech	10-8	—	—	111	—	—	107	97	104	1.5	Rps1k	3.8	R
191CNR	Anderson Seeds	10-8	—	103	109	—	102	108	96	105	1.9	Rps1k	4.3	R
GR2031	Midwest	10-8	—	107	107	—	106	111	97	103	2.0	Rps1k	4.4	R
171RR/SCN	Kruger	10-8	—	—	103	—	—	96	100	98	1.5	S	4.0	S
SO12151NRR	Sands	10-8	—	101	103	—	108	109	97	103	2.1	Rps1k	4.3	R
T-193RR/SCN	Thompson Seeds	10-8	—	—	103	—	—	111	97	104	2.0	Rps1k	4.3	R
PB-1994NRR	Prairie Brand	10-8	—	—	102	—	—	95	104	96	1.9	Rps1	4.4	R
IA1008	Iowa AES	10-8	—	98	91	—	97	98	102	95	2.0	S	3.9	R
T-1818RR/SCN	Thompson Seeds	10-8	—	—	90	—	—	92	103	96	1.8	Rps1	3.8	R
T-1717RR/SCN	Thompson Seeds	10-8	—	—	87	—	—	82	99	97	1.5	S	4.3	S
M-194NRR	Mustang	10-9	—	115	117	—	109	111	97	103	1.9	Rps1k	3.9	R
195RR/SCN	Kruger	10-9	—	—	115	—	—	115	97	103	1.8	Rps1k	4.3	R
PB-1984NRR	Prairie Brand	10-9	—	—	110	—	—	107	98	103	1.9	S	4.1	R
2420NRR	Gold Country	10-9	—	—	107	—	—	110	96	104	2.0	Rps1k	4.0	R
PB-2183NRR	Prairie Brand	10-9	—	106	107	—	105	111	97	104	2.1	Rps1k	4.5	R
1908CNRR	Viking	10-9	—	101	107	—	107	110	96	104	1.9	Rps1k	4.1	R
Turner	S.D. AES	10-9	—	—	103	—	—	102	99	99	2.3	S	4.0	R
W2195NRR	Wensman	10-9	—	—	95	—	—	106	97	104	1.9	Rps1k	4.2	R
169RR/SCN	KSC/Challenger	10-9	—	—	72	—	—	94	98	100	1.5	S	4.3	MS
92B12	Pioneer	10-10	—	—	120	—	—	106	99	102	2.1	Rps1k	4.2	R
AG2203	Asgrow	10-10	—	—	111	—	—	98	101	97	2.2	—	4.3	R
NF-3223CN	Nutech	10-10	—	—	109	—	—	107	98	100	—	S	4.3	R
E2380	Latham	10-11	—	—	109	—	—	102	99	98	2.3	S	3.9	R
SO12341NRR	Sands	10-11	—	—	106	—	—	106	99	99	2.3	Rps1k	4.4	MS
92M30	Pioneer	10-11	—	104	105	—	101	97	100	99	2.3	S	4.4	R
T-2100RR/SCN	Thompson Seeds	10-11	—	—	100	—	—	102	101	99	2.1	S	4.5	R
33124	Dyna-Gro	10-11	—	—	99	—	—	91	101	96	2.4	S	4.2	R
SO12461NRR	Sands	10-11	—	—	92	—	—	95	99	97	2.4	Rps1k	4.5	R
T-2512RR/SCN	Tech Brand	10-11	—	—	90	—	—	95	100	98	2.1	S	4.1	R
2320SCN	KSC/Challenger	10-12	—	—	106	—	—	105	99	99	2.3	S	4.3	R
241RR/SCN	Kruger	10-12	—	—	100	—	—	99	100	97	2.4	Rps1k	3.8	R
XR23N51	Garst/Agripro	10-13	—	—	112	—	—	102	101	101	2.2	S	3.9	R
T-2323RR/SCN	Tech Brand	10-13	—	—	97	—	—	96	100	97	2.3	Rps1k	4.5	R
225RR/SCN	KSC/Challenger	10-13	—	—	87	—	—	99	101	99	2.3	Rps1c	4.5	R
T-2112RR/SCN	Tech Brand	10-13	—	—	77	—	—	95	100	98	2.1	S	4.7	MS
T-2402	Tech Brand	10-14	—	—	87	—	—	103	101	97	2.4	S	4.4	MS
T-2121RR/SCN	Tech Brand	10-14	—	—	80	—	—	91	100	97	2.1	Rps1c	4.7	MS
Mean		109	30.1 bu/a	38.6 bu/a	41.0 bu/a		44.7 bu/a	44.5 bu/a	46.7 bu/a	35.7%	18.6%			
LSD 20%				7%	14%			5%	7%					

**Performance and characteristics of soybean varieties, central zone; soybean-cyst-nematode-infested (Danvers, Holloway and Danube) and non-infested (Becker, Morris and Rosemount) sites, 2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean					Maturity Rating	Phytophthora Gene	Chlorosis Score	SC Rating		
			Infested Sites			Non-Infested Sites						Percent of Mean	
			2004	2004	2004	2004	2004					Protein	Oil
MNO902CN	Minn. AES	9-18	85	88	108	89	0.9	S	3.7	MI			
Lambert	Minn. AES	9-19	91	98	104	97	0.7	Rps1	3.8	S			
092RR/SCN	Kruger	9-23	71	93	101	102	0.9	S	4.4	S			
151CNR	Anderson Seeds	9-24	127	111	99	103	1.5	Rps1k	4.4	R			
DKB15-52	Dekalb	9-24	120	109	100	100	1.5	—	4.2	R			
X413R	NK Brand	9-24	115	106	100	97	1.3	Rps1c	3.8	MI			
1490N	Garst/Agripro	9-24	102	97	101	97	1.4	S	4.3	MI			
141RR/SCN	Kruger	9-25	126	105	101	99	1.5	Rps1k	3.8	MI			
SO11343NRR	Sands	9-25	116	96	99	101	1.3	S	3.8	MI			
PB-1594NRR	Prairie Brand	9-25	114	104	100	101	1.5	Rps1k	4.2	MS			
AG1501	Asgrow	9-25	110	107	100	102	1.5	—	4.3	R			
PB-1392NRR	PBR	9-25	97	97	97	105	1.3	S	3.8	MR			
MN1006CN	Minn. AES	9-25	92	105	103	96	1.0	Rps1	4.3	MR			
91M50	Pioneer	9-25	84	88	102	97	1.5	S	4.2	R			
1212RR/N	Garst/Agripro	9-26	96	102	100	100	1.2	S	4.0	MR			
T-1737RR/SCN	Thompson Seeds	9-26	78	107	96	105	1.7	S	4.1	R			
PB-1694NRR	Prairie Brand	9-27	100	105	100	97	1.7	Rps1c	4.1	R			
PB-1794NRR	Prairie Brand	9-27	100	99	98	99	1.7	Rps1k	3.8	MR			
171RR/SCN	Kruger	9-28	103	96	101	97	1.5	S	4.1	S			
NF-1919+RR/SCN	Nutech	9-28	97	123	96	106	-	Rps1k	4.2	R			
169RR/SCN	Kruger	9-28	77	90	97	102	1.5	S	4.3	MS			
T-1717RR/SCN	Thompson Seeds	9-29	110	97	96	104	1.5	S	3.9	MR			
1812RR/N	Garst/Agripro	9-29	93	91	102	97	1.7	Rps1k	4.2	R			
Mean		9-25	29.4 bu/a	42.9 bu/a	38.1%	17.4%							
LSD 20%			10%	7%									

**Performance and characteristics of soybean varieties, southern zone; at soybean-cyst-nematode-infested (Lamberton, Madelia and Waseca) and non-infested (Jackson, Lamberton and Waseca) sites, 2002-2004.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean						Maturity Rating	Phytophthora Gene	Chlorosis Score	SCN Rating		
			Infested Sites			Non-Infested Sites							Percent of Mean	
			02-04	03-04	2004	02-04	03-04	2004					Protein	Oil
MN1006CN	Minn. AES	10-2	—	87	90	—	92	90	98	100	1.0	Rps1	3.7	R
Parker	Minn. AES	10-3	100	82	78	100	91	89	99	100	1.5	Rps1	3.8	S
NT-1616RR/SCN	Nutech	10-5	—	—	109	—	—	99	101	99	1.5	Rps1k	3.7	MR
91M90	Pioneer	10-5	—	97	102	—	95	97	99	100	1.9	Rps1k	3.5	R
GR1531	Midwest	10-5	—	—	101	—	—	99	103	98	1.5	Rps1k	4.1	MR
151CNR	Anderson Seeds	10-5	—	—	100	—	—	98	102	99	1.5	Rps1k	4.0	MS
2174RR/SCN	High Cycle	10-5	—	—	99	—	—	100	99	101	1.7	Rps1c	4.1	R
Freeborn	Minn. AES	10-5	—	92	81	—	86	83	102	99	1.6	Rps1	3.8	R
141RR/SCN	KSC/Challenger	10-6	—	—	107	—	—	100	102	97	1.5	Rps1k	4.2	MS
181RR/SCN	Kruger	10-6	—	—	99	—	—	100	105	95	1.9	Rps1	3.8	R
X418R	NK Brand	10-6	—	—	89	—	—	92	98	102	1.8	S	4.1	R
DKB20-52	DeKalb	10-7	—	93	110	—	97	105	97	104	2.0	—	3.9	R
34N19	Dyna-Gro	10-7	—	—	106	—	—	97	105	96	1.9	S	4.1	R
NT-3183CN	Nutech	10-7	—	—	100	—	—	102	104	99	—	S	3.8	R
PB-1694NRR	Prairie Brand	10-7	—	—	97	—	—	94	99	99	1.7	Rps1c	3.7	R
X417R	NK Brand	10-7	—	—	91	—	—	98	100	101	1.7	Rps1	4.0	MR
E1798R	Latham	10-7	—	—	84	—	—	91	98	99	1.7	S	4.6	R
AG2107	Asgrow	10-8	—	116	120	—	104	107	99	104	2.1	—	4.3	R
33X19	Dyna-Gro	10-8	—	110	114	—	108	115	98	103	1.9	Rps1k	4.0	R
IA2068	Iowa AES	10-8	—	—	114	—	—	105	96	99	2.1	S	4.4	R

**Performance of special-use soybean varieties, southern zone; Jackson, Lambertson and Waseca, 2002-2004.**

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2002-2004	2003-2004	2004	Protein	Oil
MN1004SP	Minn. AES	9-16	82	89	89	99	97
MN1001SP	Minn. AES	9-16	72	75	79	98	95
Surge	Minn. & S.D. AES	9-18	--	--	108	96	107
MN1302	Minn. AES	9-20	115	116	109	94	105
MN1408SP	Minn. AES	9-20	75	75	79	104	88
MN1604SP	Minn. AES	9-20	82	81	78	98	92
MN1406SP	Minn. AES	9-21	100	100	97	99	101
MN1404SP	Minn. AES	9-21	86	88	87	99	102
MN1306SP	Minn. AES	9-21	85	85	77	97	99
MN1103SP	Minn. AES	9-22	103	102	106	99	102
MN1101SP	Minn. AES	9-23	97	101	99	99	98
O.X1452	Viking	9-23	--	--	98	103	97
IA1011	Iowa AES	9-23	--	--	91	94	106
Parker	Minn. AES	9-24	89	122	115	97	103
MN1503SP	Minn. AES	9-24	107	110	104	100	103
MN1502SP	Minn. AES	9-24	97	97	93	99	102
21G01	Galena	9-25	--	--	115	102	101
92M10	Pioneer	9-25	--	110	101	95	104
MN1305SP	Minn. AES	9-25	93	92	88	98	103
MN1607SP	Minn. AES	9-26	116	119	115	102	102
O.1832	Viking	9-26	--	--	114	91	108
MN1407SP	Minn. AES	9-26	108	106	100	99	99
O.2022	Viking	9-26	--	--	95	92	108
MN1605SP	Minn. AES	9-26	85	85	78	98	90
MN1606SP	Minn. AES	9-27	113	114	114	101	102
MN1403SP	Minn. AES	9-27	111	113	110	95	103
IA2041	Iowa AES	9-27	106	99	102	106	96
HP204	Iowa AES	9-27	97	90	97	103	97
IA1007	Iowa AES	9-27	93	94	95	100	98
MN1603SP	Minn. AES	9-27	92	91	83	100	102
MN1501SP	Minn. AES	9-27	80	78	73	102	87
O.2199	Viking	9-28	--	--	115	97	102
IA2012	Iowa AES	9-28	101	103	101	102	97
Royalpro	Northland Organics	9-28	--	100	98	103	98
IA1010	Iowa AES	9-29	--	--	114	98	97
IA2053	Iowa AES	9-29	--	--	113	104	97
IA1008	Iowa AES	9-29	113	111	110	98	99
IA2042	Iowa AES	9-29	108	99	102	102	95
IA2016	Iowa AES	9-29	97	89	94	103	97
Soyapro	Northland Organics	9-30	--	103	103	104	98
2400	Star	9-30	--	--	102	97	102
IA2017	Iowa AES	9-30	104	102	99	100	99
IA2025	Iowa AES	9-30	95	94	93	104	99
IA2065	Iowa AES	10-1	--	--	128	94	111
IA2050	Iowa AES	10-1	129	128	118	96	104
Soyapro	Northland Organics	10-1	--	--	114	105	98
IA2067	Iowa AES	10-1	--	--	102	104	97
IA1013	Iowa AES	10-1	--	--	101	105	100
MN2001SP	Minn. AES	10-2	110	111	109	105	97
IA1014	Iowa AES	10-2	--	--	106	104	98

**Performance of special-use soybean varieties, northern zone; Crookston, Moorhead and Shelly, 2002-2004.**

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2002-2004	2003-2004	2004	Protein	Oil
Jim	N.D. AES	9-28	106	102	107	96	100
Danatto	N.D. AES	9-30	99	104	101	96	101
MNO202SP	Minn. AES	9-30	96	95	101	94	98
Trail	N.D. AES	9-30	—	111	96	100	103
UM3	Minn. AES	10-1	90	92	109	98	101
MNO201	Minn. AES	10-2	114	115	149	104	99
EXO205	Richland Organics	10-3	—	—	105	101	104
Nomatto	N.D. AES	10-3	—	103	85	100	100
90B43	Pioneer	10-4	—	—	99	96	106
Nannonatto	N.D. AES	10-4	—	95	98	95	100
MNO203SP	Minn. AES	10-4	89	90	84	104	92
MNO205SP	Minn. AES	10-5	101	102	105	101	102
Norpro	N.D. AES	10-6	107	106	113	104	99
MNO303SP	Minn. AES	10-6	98	95	87	99	96
MK0649	Richland Organics	10-6	—	99	84	101	99
EWP PA-07	Earthwise	10-6	—	—	81	106	100
MK0953	Richland Organics	10-6	—	89	61	105	97
Mean		10-3	27.0 bu/a	24.2 bu/a	16.0 bu/a	37%	16%
LSD 20%			8%	9%	15%		

**Performance of special-use soybean varieties, central zone; Becker, Morris and Rosemount, 2002-2004.**

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2002-2004	2003-2004	2004	Protein	Oil
MNO201	Minn. AES	9-15	—	94	93	99	102
EWP PA-07	Earthwise	9-15	—	—	80	101	101
Lambert	Minn. AES	9-17	125	110	108	93	109
MNO302	Minn. AES	9-17	107	108	108	90	112
Proto	Minn. AES	9-17	93	87	84	103	94
Evans	Minn. AES	9-18	—	108	100	93	109
MNO601SP	Minn. AES	9-18	89	90	94	109	91
MN1004SP	Minn. AES	9-18	90	88	86	97	99
Danatto	N.D. AES	9-18	66	64	68	91	107
MN1003SP	Minn. AES	9-20	115	116	116	100	104
Minnatto	Minn. AES	9-20	85	80	83	101	96
MNO803SP	Minn. AES	9-20	84	79	77	106	92
Surge	Minn. & S.D. AES	9-21	113	116	113	98	105
MN1103SP	Minn. AES	9-21	112	112	106	98	106
Toyopro	Minn. AES	9-21	101	98	98	109	91
91M10	Pioneer	9-22	—	123	127	96	107
MNO903SP	Minn. AES	9-22	110	113	115	104	97
MN1201SP	Minn. AES	9-22	103	108	108	98	104
MN1302	Minn. AES	9-22	—	113	108	91	109
Minnpro	Northland Organics	9-22	—	95	96	107	92
Alhpro	Northland Organics	9-22	—	89	90	116	78
MN1102SP	Minn. AES	9-23	114	116	116	98	106
MN1306SP	Minn. AES	9-23	87	86	93	96	98
MN1007SP	Minn. AES	9-23	86	78	83	109	82
Kato	Minn. AES	9-24	103	102	104	102	102
MN1101SP	Minn. AES	9-26	110	114	111	102	101
Parker	Minn. AES	9-26	107	106	103	95	107
MN1503SP	Minn. AES	9-27	—	—	120	100	107
MN1305SP	Minn. AES	9-27	106	107	111	98	104
Mean		9-21	39.5 bu/a	36.6 bu/a	37.2 bu/a	38.2%	16.5%
LSD 20%			5%	8%	10%		



**Characteristics of special-use soybean varieties, central zone; Becker, Morris and Rosemount, 2004.  
(continued).**

Altapro	Northland Organics	1.0	Higher Protein	Yellow	S	3.6	3,492
MN1102SP	Minn. AES	1.1	Large Seed, Higher Protein	Yellow	Rps1	3.5	2,671
MN1306SP	Minn. AES	1.3	Small Seed	Yellow	Rps1	3.4	7,567
MN1007SP	Minn. AES	1.0	Small Seed	Yellow	Rps1	3.8	6,053
Kato	Minn. AES	1.3	General Purpose	Black	Rps1	3.6	2,248
MN1101SP	Minn. AES	1.1	Large Seed, Higher Protein	Yellow	Rps1	4.2	2,481
Parker	Minn. AES	1.5	General Purpose	Buff	Rps1	4.4	3,088
MN1503SP	Minn. AES	1.5	Large Seed, Higher Protein	Yellow	Rps1	3.8	2,270
MN1305SP	Minn. AES	1.3	Large Seed, Higher Protein	Yellow	Rps1	3.8	2,305

**Characteristics of special-use soybean varieties, southern zone; Jackson, Lamberton and Waseca, 2004.**

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum Color	Phytophthora Gene	Chlorosis Score	Seeds/Lb
MN1004SP	Minn. AES	1.0	Large Seed, Higher Protein	Black	Rps1	3.9	2,719
MN1001SP	Minn. AES	1.0	Small Seed	Yellow	Rps1	3.4	5,821
Surge	Minn. & S.D. AES	0.9	Higher Protein	Imperfect Black	Rps1	3.4	2,270
MN1302	Minn. AES	1.3	General Purpose	Buff	Rps1k	3.6	2,402
MN1408SP	Minn. AES	1.4	Small Seed	Yellow	Rps1	3.5	5,675
MN1604SP	Minn. AES	1.3	Small Seed	Yellow	Rps1	3.2	6,776
MN1406SP	Minn. AES	1.4	Large Seed, Higher Protein	Yellow	Rps1	3.5	2,102
MN1404SP	Minn. AES	1.4	Large Seed, Higher Protein	Yellow	Rps1	4.0	1,868
MN1306SP	Minn. AES	1.3	Small Seed	Yellow	Rps1	3.8	6,486
MN1103SP	Minn. AES	1.1	Low Linolenic Acid	Black	Rps1	4.0	2,508
MN1101SP	Minn. AES	1.1	Large Seed	Yellow	Rps1	3.8	2,018
O.X1452	Viking	1.4	Large Seed, Higher Protein	Yellow	S	3.8	2,036
IA1011	Iowa AES	1.8	Large Seed	Yellow	S	4.3	2,802
Parker	Minn. AES	1.5	General Purpose	Buff	Rps1	4.1	2,454
MN1503SP	Minn. AES	1.5	Large Seed, Higher Protein	Yellow	Rps1	3.6	2,152
MN1502SP	Minn. AES	1.2	Large Seed, Higher Protein	Yellow	Rps1	3.8	2,064
21G01	Galena	2.1	Large Seed, Higher Protein	Yellow	S	3.9	2,036
92M10	Pioneer	2.1	Yellow Hilum	Yellow	S	3.6	2,752
MN1305SP	Minn. AES	1.3	Large Seed, Higher Protein	Yellow	Rps1	3.8	1,991
MN1607SP	Minn. AES	1.6	Large Seed, Higher Protein	Yellow	Rps1	3.4	2,009
O.1832	Viking	1.8	Feed	Buff	Rps1	4.3	2,686
MN1407SP	Minn. AES	1.4	Large Seed, Higher Protein	Brown	Rps1	3.8	1,707
O.2022	Viking	2.0	Large Seed	Yellow	Rps1c	4.0	2,402
MN1605SP	Minn. AES	2.0	Small Seed	Yellow	Rps1	3.3	6,580
MN1606SP	Minn. AES	1.6	Large Seed, Higher Protein	Yellow	Rps1	3.4	2,121
MN1403SP	Minn. AES	1.4	Large Seed	Yellow	Rps1	3.7	2,073
IA2041	Iowa AES	2.1	Large Seed, Higher Protein	Yellow	S	4.2	2,215
HP204	Iowa AES	2.0	Large Seed, Higher Protein	Yellow	S	4.8	1,948
IA1007	Iowa AES	1.8	Large Seed, Higher Protein	Yellow	S	4.0	1,726
MN1603SP	Minn. AES	1.6	Large Seed, Higher Protein	Yellow	S	3.9	1,616
MN1501SP	Minn. AES	1.8	Small Seed	Yellow	S	4.5	5,974
O.2199	Viking	2.1	Higher Protein	Brown	S	3.9	2,495
IA2012	Iowa AES	2.2	Large Seed	Yellow	S	3.5	1,726
Royalpro	Northland Organics	1.6	Large Seed, Higher Protein	Yellow	S	3.6	1,831
IA1010	Iowa AES	1.9	Large Seed	Yellow	S	4.0	1,549
IA2053	Iowa AES	2.5	Large Seed, Higher Protein	Yellow	S	4.3	1,940
IA1008	Iowa AES	2.0	Yellow Hilum	Yellow	S	4.0	2,162
IA2042	Iowa AES	2.1	Large Seed, Higher Protein	Yellow	S	4.7	1,932
IA2016	Iowa AES	2.2	Large Seed, Higher Protein	Yellow	S	4.3	1,991
Soyapro	Northland Organics	1.6	Large Seed, Higher Protein	Yellow	S	3.9	1,802

**Performance of special-use soybean varieties, southern zone; Jackson, Lamberton and Waseca, 2002-2004 (continued).**

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2002-2004	2003-2004	2004	Protein	Oil
IA2020	Iowa AES	10-2	95	90	100	102	99
7321	Pattison Bros.	10-2	—	—	99	105	98
MN2101SP	Minn. AES	10-2	110	106	96	100	95
323 Brand	Latham	10-3	—	—	96	101	98
Vinton 81	Iowa AES	10-3	90	89	86	100	100
7322	Pattison Bros.	10-4	—	—	103	100	98
Mean		9-26	37.5 bu/a	35.8 bu/a	39.7 bu/a	38.6%	17.3%
LSD 20%			4%	5%	8%		

**Characteristics of special-use soybean varieties, northern zone; Crookston, Moorhead and Shelly, 2004.**

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum Color	Phytophthora Gene	Chlorosis Score	Seeds/Lb
Jim	N.D. AES	00.8	General Purpose	Yellow	S	3.8	3,175
Donatto	N.D. AES	0.4	Small Seed	Yellow	S	3.6	5,470
MN0202SP	Minn. AES	0.2	Small Seed	Yellow	Rps1	3.6	5,675
Trail	N.D. AES	0.0	General Purpose	Yellow	S	3.6	3,197
UM3	Minn. AES	00.9	Small Seed	Yellow	Rps1	3.8	6,580
MN0201	Minn. AES	0.2	General Purpose	Yellow	Rps1	3.1	3,691
EX0205	Richland Organics	0.2	Small Seed	Yellow	S	3.3	5,896
Nornatto	N.D. AES	0.2	Small Seed	Yellow	S	3.6	5,044
90B43	Pioneer	0.4	Large Seed, Higher Protein	Yellow	Rps1c	3.4	3,519
Nannonatto	N.D. AES	0.3	Small Seed	Yellow	S	3.8	4,830
MN0203SP	Minn. AES	0.2	Small Seed	Yellow	Rps1	3.3	6,219
MN0205SP	Minn. AES	0.2	Small Seed	Yellow	Rps1	3.6	6,486
Norpro	N.D. AES	0.4	Higher Protein	Yellow	S	3.9	3,110
MN0303SP	Minn. AES	0.3	Small Seed	Yellow	Rps1	3.6	6,135
MK0649	Richland Organics	0.3	Small Seed	Yellow	S	3.7	3,027
EWP PA-07	Earthwise	0.7	Large Seed, Higher Protein	Yellow	S	3.8	2,142
MK0953	Richland Organics	0.3	Large Seed, Higher Protein	Yellow	S	3.6	3,661

**Characteristics of special-use soybean varieties, central zone; Becker, Morris and Rosemount, 2004.**

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum Color	Phytophthora Gene	Chlorosis Score	Seeds/Lb
MN0201	Minn. AES	0.2	General Purpose	Yellow	Rps1	3.3	3,575
EWP PA-07	Earthwise	0.7	Large Seed, Higher Protein	Yellow	S	3.6	2,064
Lambert	Minn. AES	0.7	General Purpose	Buff	Rps1	3.8	3,088
MN0302	Minn. AES	0.3	General Purpose	Buff	Rps1k	3.2	3,847
Proto	Minn. AES	0.5	Higher Protein	Buff	S	3.6	2,967
Evans	Minn. AES	0.5	Yellow Hilum	Yellow	Rps1	3.4	3,131
MN0601SP	Minn. AES	0.6	Higher Protein	Yellow	Rps1c	4.0	4,633
MN1004SP	Minn. AES	1.0	Low Sat., Low Linolenic Acid	Black	Rps1	3.5	3,290
Donatto	N.D. AES	0.4	Small Seed	Yellow	S	3.5	4,729
MN1003SP	Minn. AES	1.0	Higher Protein	Brown	S	3.4	3,027
Minnatto	Minn. AES	0.9	Small Seed	Yellow	Rps1	4.1	5,044
MN0803SP	Minn. AES	0.8	Smaller Seed Higher Protein	Yellow	Rps1	3.5	5,044
Surge	Minn. & S.D. AES	0.9	General Purpose	Imperfect Black	Rps1	3.8	2,820
MN1103SP	Minn. AES	1.1	Low Linolenic Acid	Black	Rps1	3.8	3,007
Toyopro	Minn. AES	0.8	Higher Protein	Yellow	S	4.3	3,752
91M10	Pioneer	1.1	Yellow Hilum	Yellow	S	4.3	2,702
MN0903SP	Minn. AES	0.9	Higher Protein	Yellow	Rps1	4.1	2,987
MN1201SP	Minn. AES	1.2	Large Seed, Higher Protein	Yellow	Rps1	3.8	2,389
MN1302	Minn. AES	1.3	General Purpose	Buff	Rps1k	3.8	2,892
Minnpro	Northland Organics	0.8	Higher Protein	Yellow	S	3.8	2,640

**Characteristics of publicly developed soybean varieties entered in 2004 tests.**

Variety	Releasing Institution	Maturity Rating	Phytophthora Gene	BSR Reaction	SCN Reaction	Chlorosis Score
MN0071	Minn. AES	00.7	Rps1	S	S	3.6
Glacier	Minn. AES	00.8	Rps6	S	S	4.2
Jim	N.D. AES	00.8	S	S	S	3.6
Traill	N.D. AES	0.0	Rs1	S	S	3.1
Barnes	N.D. AES	0.2	Rps6	S	S	4.1
MN0201	Minn. AES	0.2	Rps1	R	S	3.3
Walsh	N.D. AES	0.2	Rps6	S	S	3.5
MN0302	Minn. AES	0.3	Rps1k	S	S	3.7
MN0304	Minn. AES	0.3	Rps1k+Rps6	R	S	3.5
Lambert	Minn. AES	0.7	Rps1	S	S	3.8
MN0902CN	Minn. AES	0.9	Rps1	R	R	3.7
Surge	Minn. & S.D. AES	0.9	Rps1	S	S	4.0
MN1005	Minn. AES	1.0	Rps1k	S	S	4.3
MN1006CN	Minn. AES	1.0	Rps1	S	R	3.7
Kato	Minn. AES	1.3	Rps1	S	S	3.9
MN1302	Minn. AES	1.3	Rps1k	R	S	4.0
Parker	Minn. AES	1.5	Rps1	S	S	3.8
Freeborn	Minn. AES	1.6	Rps1	R	R	3.8
IA1006	Iowa AES	1.6	S	R	S	4.1
MN1801	Minn. AES	1.8	Rps1c	S	S	4.3
IA1008	Iowa AES	2.0	S	S	R	3.9
Sturdy	Minn. AES	2.0	Rps1	S	S	4.1
IA2068	Iowa AES	2.1	S	S	R	4.4
IA2008R	Iowa AES	2.1	Rps1k	R	S	4.1
IA2050	Iowa AES	2.1	S	S	S	4.3
Turner	S.D. AES	2.3	S	S	R	4.0



**Characteristics of special-use soybean varieties, southern zone; Jackson, Lambertson and Waseca, 2004  
(continued).**

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum Color	Phytophthora Gene	Chlorosis Score	Seeds/Lb
2400	Star	2.4	Yellow Hilum	Yellow	Rps1	4.0	2,000
IA2017	Iowa AES	2.2	Large Seed, Higher Protein	Yellow	S	4.0	2,054
IA2025	Iowa AES	2.2	Lipoxygenase Free	Yellow	S	4.0	2,009
IA2065	Iowa AES	2.3	Low Linolenic Acid	Black	S	4.2	2,655
IA2050	Iowa AES	1.7	General Purpose	Black	S	4.6	2,481
Surepro	Northland Organics	2.0	Large Seed, Higher Protein	Yellow	S	3.7	1,838
IA2067	Iowa AES	2.4	Large Seed, Higher Protein	Yellow	S	4.1	1,853
IA1013	Iowa AES	2.1	Large Seed, Higher Protein	Yellow	S	4.2	1,700
MN2001SP	Minn. AES	2.0	Large Seed, Higher Protein	Yellow	Rps1	3.5	2,092
IA1014	Iowa AES	2.1	Large Seed, Higher Protein	Yellow	S	4.1	1,823
IA2020	Iowa AES	2.3	Large Seed, Higher Protein	Yellow	S	4.1	1,780
7321	Pattison Bros.	2.0	Yellow Hilum	Yellow	S	3.7	1,787
MN2101SP	Minn. AES	2.1	Large Seed, Higher Protein	Brown	Rps1	3.8	1,831
323 Brand	Latham	2.3	Large Seed	Yellow	S	4.1	1,900
Vinton 81	Iowa AES	2.0	Large Seed, Higher Protein	Yellow	Rps1c	4.2	1,868
7322	Pattison Bros.	2.0	Yellow Hilum	Yellow	S	4.2	1,663

**Performance and characteristics of soybean varieties, southeastern Minn., 2000-2004.**

Variety	Maturity Rating	Yield, Percent of Mean			Percent of Mean		Phytophthora Gene	Chlorosis Score
		2000-2004	2002-2004	2004	Protein	Oil		
MN1005	1.0	—	—	114	95	103	Rps1k	4.0
MN1006CN	1.0	—	—	89	97	101	Rps1	4.1
Kato	1.3	—	—	109	108	96	Rps1	3.8
MN1302	1.3	—	102	98	95	100	Rps1k	3.9
Parker	1.5	95	98	101	100	99	Rps1	4.1
91B53	1.5	—	94	76	102	100	S	4.0
IA1006	1.6	103	107	128	99	99	S	4.1
Freeborn	1.6	91	89	96	104	101	Rps1	3.8
MN1801	1.8	95	94	79	102	100	Rps1c	4.3
IA1008	2.0	89	105	103	101	97	S	4.1
Sturdy	2.0	120	104	83	101	99	Rps1	4.1
IA2050	2.1	105	108	114	98	103	S	4.4
IA2065	2.1	—	—	110	96	110	S	4.2
IA2008R	2.1	—	—	96	101	95	Rps1k	4.1
IA2068	2.1	—	—	92	96	101	S	4.2
Mean		42.1 bu/a	40.8 bu/a	36.9 bu/a	36.9%	17.9%		
LSD 20%		3%	5%	7%				





## Planting Rate and Date

Rates are based on seed of normal size and good quality and normal seedbed. Actual rates used will vary widely, depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment.

Crop	Bushel Weight (Pounds) <sup>1</sup>	Seeds/Pound (Number)	Rate/Acre (Pounds)	Rate (Seeds)	Planting Date
Barley	48	14,300	85	28/sq. ft.	Early spring
Corn	56	-	-	33,000/acre	April 15/May 5
<b>Fieldbean</b>					
Black turtle soup	60	2,300	45	105,000/acre	May 20/June 15
Great northern	60	1,000	100	90,000/acre	May 20/June 15
Kidney	60	900	90-115	90,000/acre	May 20/June 15
Navy	60	2,500	42	105,000/acre	May 20/June 15
Navy, rows 6 to 14 in.	60	-	60	150,000/acre	May 20/June 15
Pinto	60	1,300	80	90,000/acre	May 20/June 15
Small red	60	1,400	75	100,000/acre	May 20/June 15
Small white	60	3,000	35	105,000/acre	May 20/June 15
Flax	56	88,000	42	85/sq. ft.	April 15/May 15
<b>Forage grasses, perennial</b>					
Bromegrass alone	14	136,000	16	50/sq. ft.	Early spring or late summer
Bromegrass in mixtures	-	-	5	15/sq. ft.	Use date for legumes
Orchardgrass, alone	14	653,000	10	150/sq. ft.	Early spring or late summer
Orchardgrass, in mixtures	-	-	3	45/sq. ft.	Use date for legumes
Reed canarygrass alone	46	526,000	7	85/sq. ft.	Early spring or late summer
Reed canarygrass, in mixtures	-	-	5	60/sq. ft.	Use date for legumes
Tall fescue, alone	25	229,000	10	50/sq. ft.	Early spring or summer
Tall fescue, in mixtures	-	-	4	20/sq. ft.	Use date for legumes
Timothy in mixtures	45	1,234,000	3	85/sq. ft.	Use date for legumes
<b>Forage legumes, perennial</b>					
Alfalfa alone	60	220,000	13	55/sq. ft.	Late April-early May / Late June-early August
Alfalfa with grass	-	-	5 to 10	35/sq. ft.	Late April-early May / Late June-early August
Alsike clover in mixtures	60	653,000	2	30/sq. ft.	Early spring to August 10
Birdsfoot trefoil alone	60	372,000	8	70/sq. ft.	Early spring or summer
Birdsfoot trefoil in mixtures	-	-	6	50/sq. ft.	Early spring or summer
Cicer milkvetch	60	122,000	16	50/sq. ft.	Early spring or summer
Ladino clover in mixtures	60	784,000	1	18/sq. ft.	Early spring to August 10
Red clover alone	65	272,000	9	50/sq. ft.	Early spring to September 1
Red clover with grass	-	-	5	30/sq. ft.	Use date for legumes
Oat	32	16,200	80	28/sq. ft.	Early spring
Rye	56	18,200	60	25/sq. ft.	September 1
Sorghum, rows 18 to 40 in.	56	15,000	10	150,000/acre	May 20 to June 5 for grain
Sorghum, rows 6 to 14 in.	-	-	15	5/sq. ft.	-
Soybean, 7-in. rows	60	2,800	56	2/ft. of row	May 1 to May 10
10-in. rows	-	-	-	3/ft. of row	-
20-in. rows	-	-	-	6/ft. of row	-
22-in. rows	-	-	-	7/ft. of row	-
30-in. rows	-	-	-	9/ft. of row	-
Sunflower, nonoilseed	24	4,300	4	17,000/acre	May 1-June 15
Sunflower, oilseed	27	7,700	3	23,000/acre	May 1-June 15
Wheat, durum	60	12,100	90	25/sq. ft.	Early spring
Wheat, hard red spring <sup>2</sup>	-	14,000	113	28/sq. ft.	Early spring
Wheat, hard red winter	-	14,500	75+	25/sq. ft.	August 20/September 20
<b>Other Crops</b>					
Annual canarygrass	50	58,000	30	40/sq. ft.	Early spring
Buckwheat	48	14,900	50	17/sq. ft.	June 15/July 20
Canola, <i>B napus</i>	50	80,000 to 160,000	3 to 5	6 to 9	Early spring
Crambe	22	65,000	15	23/sq. ft.	Late April/early May
Fieldpea	60	2,300	180	9/sq. ft.	Early spring
Fieldpea with 1 1/2 to 2 bu. oat	-	-	70	4/sq. ft.	Early spring
Fababean, medium size	60	1,300	180	5/sq. ft.	Early spring
Fababean, with 2 bu. oat	-	-	60	2/sq. ft.	Early spring
Lentil, small	60	15,600	55	20/sq. ft.	Early spring
Millet, foxtail	48	218,000	15	75/sq. ft.	June 15/July 15
Millet, proso	56	65,000	20	30/sq. ft.	June 15/July 15
Sudangrass, rows 6 to 14 in.	40	44,000	10	25/sq. ft.	May 20/June 10
Sudangrass, rows 18 to 40 in.	-	-	20	20/sq. ft.	May 20/June 10

A black and white photograph of a sheep's head, looking down. A small, light-colored flower is held in its mouth. The background is dark, making the sheep's face and the flower stand out.

MINNESOTA  
VARIETAL TRIALS  
RESULTS

