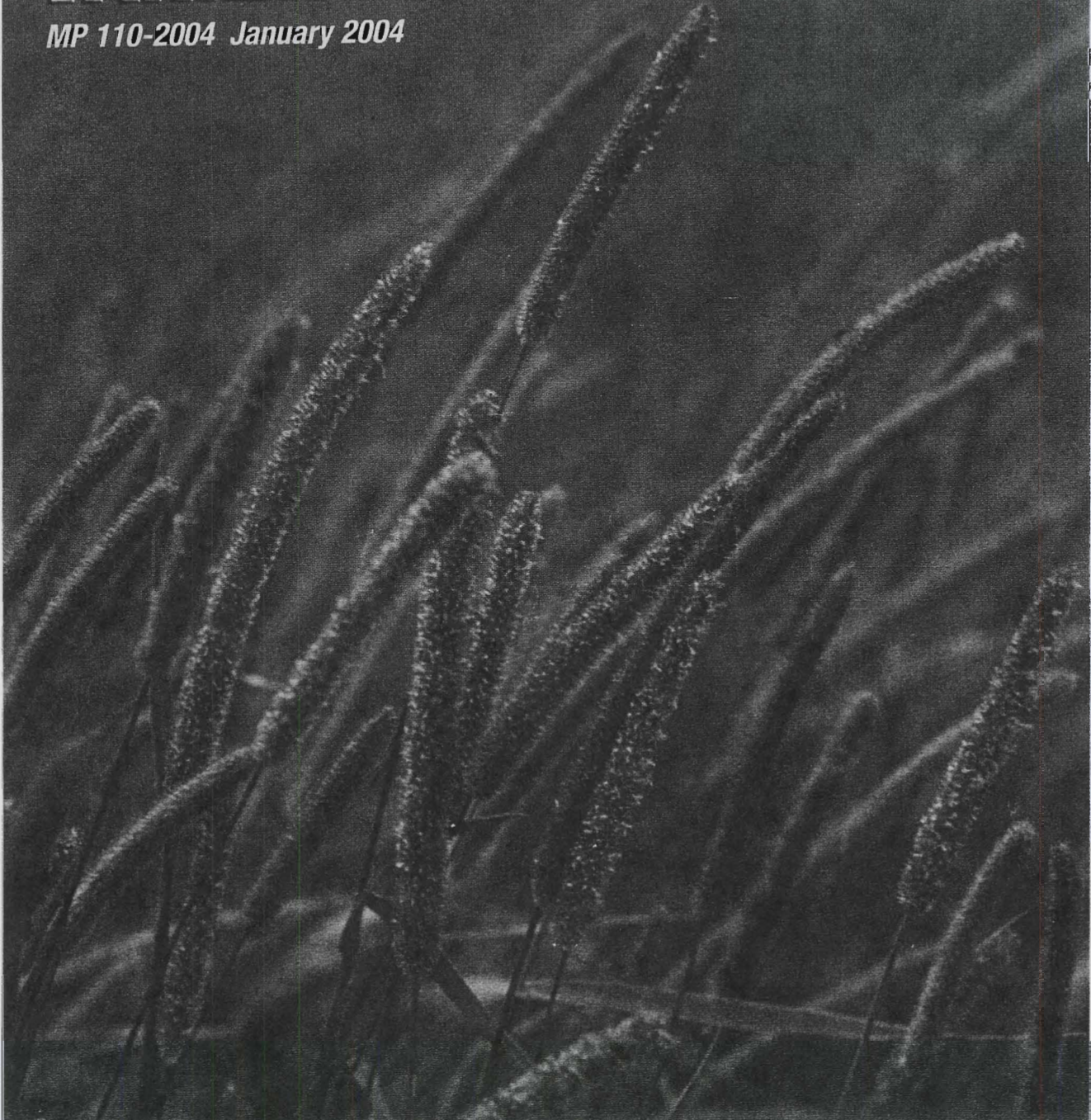


Minnesota

VARIETAL TRIALS RESULTS

MP 110-2004 January 2004



Minnesota
Agricultural
Experiment
Station

UNIVERSITY OF MINNESOTA

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

2004

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

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29						

March

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28	29	30	31			

April

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May

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23	24	25	26	27	28	29
30	31					

June

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27	28	29	30			

July

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25	26	27	28	29	30	31

August

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29	30	31				

September

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October

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24	25	26	27	28	29	30
31						

November

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21	22	23	24	25	26	27
28	29	30				

December

S	M	T	W	T	F	S
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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.

Permission is granted to reproduce tables only in their entirety, without rearrangement, manipulation or reinterpretation. Permission is also granted to reproduce a maturity group sub-table provided that complete table headings and table notes are included. Reproductions of any material from this publication should credit the MAES as its source.

Data in this publication are preliminary. An up-to-date version of this report is

maintained on the MAES web site at www.maes.umn.edu Electronic versions of some reports of past years on these and other crops can also be found there.

In accordance with the Americans with Disabilities Act, this material is available in alternative formats upon request. Please contact your University of Minnesota county extension office. Outside of Minnesota, contact the Distribution Center at (612) 625-8173.

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

The University of Minnesota

Enhancing Agricultural Systems

The College of Agricultural, Food and Environmental Sciences and the Minnesota Agricultural Experiment Station hosted eight Listening Sessions during the summer of 2003. More than 700 persons attended these Listening Sessions and provided insights and input into the College's and the Experiment Station's vision and priorities. People shared what was important to them, their families and communities. It was a wonderful chance to hear what people like about what we do and what we must improve.

These Listening Sessions confirmed the importance of our efforts to enhance agricultural systems. The University of Minnesota is committed to providing research, education and outreach activities that strengthen Minnesota agriculture. Keeping all three of these areas strong is key to our efforts to deliver value to Minnesota.

Research is the lifeblood that flows through the arteries of our education and outreach efforts. If we don't have the research, then we can't provide our students with the latest knowledge they need when they go out in the world. And if we don't have the research, then what we "extend" to farmers through the University of Minnesota Extension Service will be based on yesterday's news.

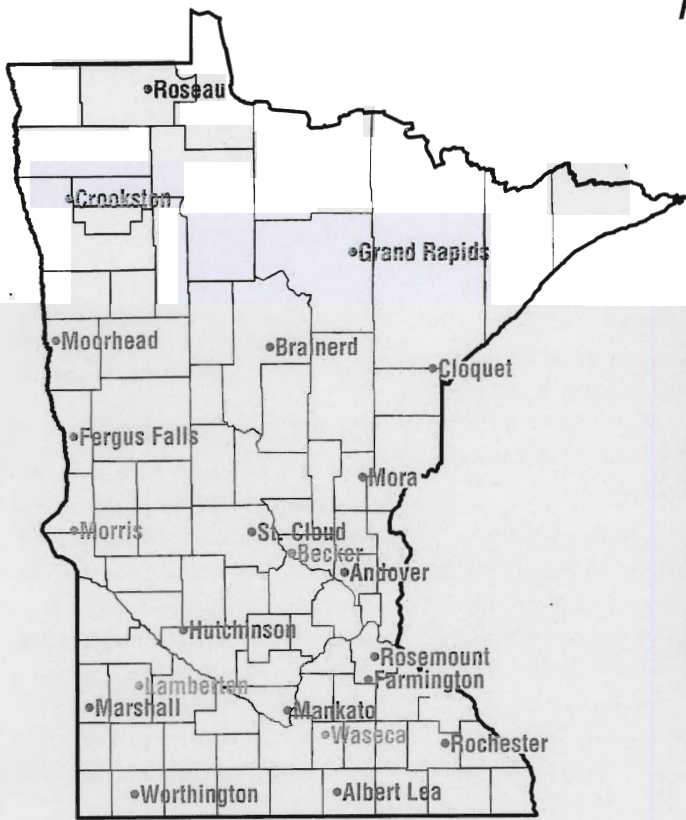
Education includes what takes place in classrooms where students prepare for careers producing food, creating new food products, managing financial resources and improving environmental quality. Education also includes what takes place outside the classroom as we use various communication tools to share the latest research including meetings, the Internet and publications such as this one.






Outreach takes place primarily through the University of Minnesota Extension Service. Recently, the University announced a plan to improve the connection between research and extension. A key part of this plan will place Extension Educators throughout the state. These skilled individuals will work closely with campus researchers to find the latest developments to share with you. They will also work with the county-based Extension personnel to provide ways to connect growers in local areas to the latest research information.

The most important component is listening. We did that in the formal sessions we held last summer. The process doesn't stop there. We are committed to continue to listen to your needs. Feel free to contact us in person, call 612-624-3009 or e-mail (college-info@mail.coafes.umn.edu) or by mail at College of Agricultural, Food and Environmental Sciences, 277 Coffey Hall, 1420 Eckles Ave. St. Paul, MN 55108.

Agriculture is moving at a faster pace. Times change and the details of how we do things change too. What doesn't change is the commitment of the University of Minnesota to providing knowledge for a changing world.

Regional Research and Outreach Locations



-  Regional Extension Centers
-  Regional Extension Centers and Research and Outreach Centers
-  Research and Outreach Centers
-  Outreach, Research and Education Park
-  Sand Plain Research Center

- | | |
|--|---|
| Albert Lea
Regional Extension Center | Mankato
Regional Extension Center |
| Andover
Regional Extension Center | Marshall
Regional Extension Center |
| Becker
Sand Plain Research Center | Mora
Regional Extension Center |
| Brainerd
Regional Extension Center | Moorhead
Regional Extension Center |
| Cloquet
Regional Extension Center | Morris
Regional Extension Center
Research and Outreach Center |
| Crookston
Regional Extension Center
Research and Outreach Center | Rochester
Regional Extension Center |
| Farmington
Regional Extension Center | Roseau
Regional Extension Center |
| Fergus Falls
Regional Extension Center | Rosemount
University of Minnesota
Outreach, Research
and Education Park |
| Grand Rapids
Regional Extension Center
Research and Outreach Center | St. Cloud
Regional Extension Center |
| Hutchinson
Regional Extension Center | Waseca
Research and Outreach Center |
| Lamberton
Research and Outreach Center | Worthington
Regional Extension Center |



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

UNIVERSITY OF MINNESOTA
Extension
SERVICE

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 2003 performance trials. Questions about them can be addressed to the logical individual listed under the "Authors and Researchers" heading on page 7.

Variety Classifications

Varieties of barley, oat, hard red spring wheat and winter wheat are classified into groups under "General Purpose Varieties" "Special-Purpose Varieties" and "Varieties Not Adequately Tested" 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.

Varieties Not Adequately Tested designates varieties that may be new or were previously tested but have not been evaluated over the past three consecutive years.

Seed of varieties in all these 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 growers in the Minnesota Crop Improvement Association listing beginning on page 78.

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 generally accepted in the United States.

Financial Support

The Minnesota Agricultural Experiment Station acknowledges with deep appreciation the continued generous financial support of the Minnesota Approved Seed Conditioners and Marketing Association and the former oat and soybean grower members of the Minnesota Seed Producers and Promotion Association, which for many years marketed public varieties under the MPS Seed brand. Their contributions make possible the free distribution of this report.

Other Assistance

The Experiment Station appreciates the assistance of the following organizations in the distribution of the 2004 edition of *Minnesota Varietal Trials Results*:

Minnesota Barley Growers Association and Minnesota Barley Council

Minnesota Corn Growers Association and Minnesota Corn Research and Promotion Council

Minnesota Grain and Feed Association

Minnesota Soybean Growers Association and Minnesota Soybean Research and Promotion Council

Minnesota Association of Wheat Growers and Minnesota Wheat Council

Northwest Agri-Dealers Association

The Minnesota Crop Improvement Association is especially helpful through its coordination of the organization, publication and distribution of this report.

A consolidated chart of planting rates and dates is on page 91.

Plant Variety Protection

PVP Barley, oat, soybean and wheat varieties covered by the U.S. Plant Variety Protection Act are identified by the PVP symbol. When the symbol is 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 is 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 station.

Authors and Researchers

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

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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



Locations of University of Minnesota Research and Outreach Centers.

Information on the reaction of crop varieties to specific pathogens was obtained mainly by R. Dill-Macky, K. Evans, and B. Steffenson, Department of Plant Pathology; J. Kolmer and Y. Jin, 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.

Overall Coordination: Beverly R. Durgan, associate dean, and the Minnesota Crop Improvement Association.



FORAGE CROPS



ALFALFA

Yield results for alfalfa varieties tested in current Minnesota yield trials (1999 to 2002 seeding years) are listed in tables on pages 10-15. Varieties in current winter-survival or forage-quality trials are listed on pages 15 and 16, respectively. Alfalfa variety seed marketers, telephone numbers, and web sites are provided on page 17. Disease resistance information for alfalfa varieties is available on the web at www.alfalfa.org and <http://forages.coafes.umn.edu/>.

Winterhardiness and Winter Survival Index

Severe winters make winterhardiness a primary consideration in variety selection for most areas of Minnesota.

Winterhardiness of varieties is difficult to determine because winter injury can occur as a result of many different weather events that cause varied responses in alfalfa plants of differing ages. A standardized test, the North American Alfalfa Improvement Conference (NAAIC) Winter Survival Test, measures the survival of a variety after a severe winter. Tests conducted annually at four locations (Arlington and Lancaster, Wis., and Rosemount and Morris, Minn.) are the basis for the winter survival index (WSI) on page 15.

The WSI for each tested variety was averaged over all test locations to provide a robust estimate of winterhardiness and is presented beside yield data in tables on pages 10-15. Varieties are rated from superior (1) to adequate (4) in winter survivability. Vernal, a traditional winterhardy variety, is rated very good. After a severe winter, injury is expected for varieties rated adequate (4). All varieties tested to date have rated above adequate. If a variety does not have a WSI (the company has not entered the variety in the winter survival trial) the fall dormancy index is the next best indicator of winterhardiness. Fall dormancy indices can be found on the National

Alfalfa Alliance website: www.alfalfa.org

When selecting alfalfa varieties, greatest winterhardiness is needed in west central and northwestern Minnesota (see injury potential map, page 9). Because of the high frequency of severe winters in these areas, only varieties with at least very good winter survival should be selected in these regions. East central and south-eastern Minnesota also frequently experience severe winters. Southwestern Minnesota seldom experiences severe winter injury because of dry soils, high soil potassium levels and neutral soil pH. Northeastern Minnesota seldom experiences severe winter injury because of dependable snow cover.

Forage Yield

Yield results for alfalfa varieties tested in current Minnesota trials are shown on pages 10-15. Yields are expressed as a percentage of check-variety yields; for example, 113 means the variety had 13% greater yield than the check varieties. Within each table, varieties are ranked according to their average performance across ALL current trials in which they have been tested (1999 to 2002 seedings). Individual tables correspond to test results from different regions of Minnesota.

Greatest confidence should be placed in variety yield information that represents



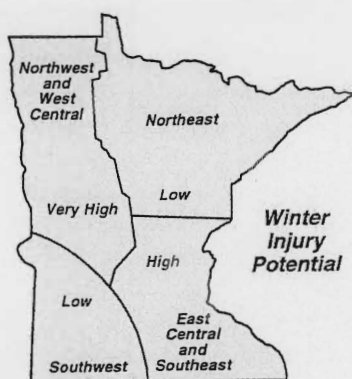
Locations of Alfalfa Trials.

Alfalfa Data Sources, Selection

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

Yield potential of alfalfa varieties is evaluated in trial plots on Minnesota Agricultural Experiment Stations and cooperating farmers' fields, seeded yearly at Rosemount, and alternate years at other locations. The trials are conducted using recommended fertility and pest control practices to optimize alfalfa yield and persistence.

Yield performance of tested varieties is presented as a percent of check variety yields (average for Vernal, Oneida VR and 5312). Test locations are representative of the variable winter-injury risk in different regions of Minnesota. Test locations include Rosemount (Dakota Co.), Potsdam (Olmsted Co.), Lamberton (Redwood Co.), Morris (Stevens Co.), St. Martin (Stearns Co.) and Grand Rapids (Itasca Co.); see the locations map. In addition, some alfalfa varieties are tested for winter survival index (WSI) and forage quality at selected experiment stations of the universities of Minnesota and Wisconsin.



more than 5 site-years of testing (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 printed in bold type indicate that the variety has been tested in more than 5 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 (yield performance in 2001 and 2002 for 2000 seeding). For long-term stands, choose varieties based on their performance through the third year after seeding (2003 yield for 2000 seeding).

Forage Quality

While maturity is the greatest determinant of forage quality or feeding value of alfalfa, varieties also differ. A 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 2002 and 2003 in Minnesota and Wisconsin are shown on page 16. 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 and 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 1350-pound milking cow consuming a 30% NDF diet is calculated, and the cow's maintenance energy requirement is then subtracted from en-

ergy 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.

Relative forage quality (RFQ) is a new index with similar mean and range as RFV that includes NDF digestibility in estimates of DMI and TDN to calculate RFQ. For a technical discussion of RFQ, see www.uwex.edu/ces/forage/pubs/rfq.htm.

In the seeding year, varieties are evaluated at one or two cuts taken in July and/or late August. Production year evaluation (first year after seeding only) is done by analyzing each of three cuttings taken at late bud to one-tenth-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. Plant resistance is available for all six diseases. Variety resistance ratings for each disease are available on the web at www.alfalfa.org or <http://forages.coafes.umn.edu/>. While moderate resistance (MR) to a disease will provide protection to a variety under most conditions, either resistance (R) or high resistance (HR) is required for protection under severe disease conditions.

Winter injury can be the result of a combination of injury from cold temperatures and from root and crown diseases. Under some conditions, disease resistances can compensate for lesser levels of cold tolerance. While all varieties can benefit from improved disease resistance, it is especially important for moderately fall-dormant varieties to have at least (R) levels of disease resistance to stay productive for more than two years after the

seeding year under intensive management (four cuts/season) in the east-central and southeastern areas of Minnesota.

Bacterial Wilt – This disease is prevalent in most areas of the state. Wilt-susceptible varieties are poor risks and should not be grown. They generally show losses in stand by the end of the second year after seeding. In some cases where infection is severe, stand losses are often observed by the end of the first year after seeding. Stand reductions after winter are often due to a combination of wilt damage and winter injury.

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

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

Anthracnose – This fungus disease was first found in Minnesota in 1978 and has become more prevalent each year, but only in the east central and southeast area. It infects stems and crowns and kills susceptible plants. Because anthracnose is favored by hot, moist conditions, it is most often seen in southeast Minnesota.

Verticillium Wilt – This potentially destructive fungus disease was first found in several eastern Minnesota fields in 1981. It has usually been found in 2- or 3-year-old fields, and its spread in the state has been slow. Planting resistant varieties will help provide insurance for long-life stands.

Aphanomyces Root Rot – This disease is associated with very slowly drained soils and is easily confused with Phytophthora root rot. It stunts and kills seedlings as well as causing a chronic

root disease in established plants. Few cases of this disease have been identified in Minnesota. Consider planting a variety with *Aphanomyces* resistance if *Phytophthora*-root-rot-resistant varieties fail to persist.

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 re-

sistance, yield, winter survival and other characteristics may change within a blend from lot to lot or year to year as blend composition changes. Therefore, using *certified* seed of adapted, high-yielding varieties best assures trueness to name.

For the web version of this report, go to the Minnesota Agricultural Experiment Station website, 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 in percent of check varieties at Rosemount, Dakota County.

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

Variety	Marketer	WSI	1999 Seeding Harvest Year				2001 Seeding Harvest Year			2002 Seeding Harvest Year	All Site-Years Average
			2000	2001	2002	3-yr Total	2002	2003	2-yr Total	2003	
Checks, Tons/Ac 15%mc Hay	-	-	6.73	6.86	6.39	19.98	5.67	5.54	11.21	6.33	-
WL 319HQ	W-L	1.8	-	-	-	-	-	-	-	112	118
IGNITE	Jung	-	-	-	-	-	-	-	-	111	118
PHABULOUS	Trelay Inc.	-	-	-	-	-	105	100	103	-	116
LEGENDAIRY YPQ	CROPLAN	-	-	-	-	-	115	103	109	-	115
SETTER	Dahlco	-	-	-	-	-	-	-	-	107	114
MULTIPLIER 3	Mycogen	2.8	-	-	-	-	-	-	-	111	114
ROOT 66	Trelay Inc.	2.1	-	-	-	-	103	102	102	-	114
WL 342	W-L	-	-	-	-	-	101	106	104	-	114
POINTER	Dahlco	-	112	109	104	116	-	-	-	112	113
WL 327	W-L	-	109	111	101	115	-	-	-	-	113
PERFECT	Grassland	-	-	-	-	-	104	103	103	-	113
ALLIANT	Monsanto	3.0	-	-	-	-	111	106	108	-	113
WINTERGOLD	Renk	2.5	106	109	99	112	-	-	-	-	113
HYBRIFORCE-400	Dairyland	2.8	-	-	-	-	115	109	112	118	112
GOLDLEAF	Gold C/ALSH	3.1	-	-	-	-	-	-	-	111	112
620	Garst	2.6	-	-	-	-	-	-	-	109	112
BARALFA 42 IQ	Barenburg	2.3	-	-	-	-	-	-	-	108	112
STARBUCK	Spangler	-	-	-	-	-	119	103	111	-	111
COLOMBIA 2000	Allied	3.1	105	104	102	111	-	-	-	-	111
AV 3420	AgVenture	-	-	-	-	-	115	107	111	-	111
FORECAST 1001	Dairyland	2.9	109	113	112	119	-	-	-	-	111
54H91	Pioneer	3.0	-	-	-	-	-	-	-	105	110
54V54	Pioneer	2.7	-	-	-	-	112	111	112	-	110
STAMPEDE	Albert Lea	-	-	-	-	-	-	-	-	110	110
9429	LG Seeds	2.8	106	109	97	111	-	-	-	-	110
FORECAST 3001	Dairyland	3.1	103	107	95	109	-	-	-	-	110
WEBFOOT EXTREME	Great Lakes	-	-	-	-	-	-	-	-	109	109
6410	Garst	2.7	103	100	96	107	111	101	106	115	109
FQ 315	Mycogen	-	110	110	97	113	-	-	-	-	109
GENEVA	Syngenta	2.7	108	101	100	110	-	-	-	-	109
6420	Garst	-	-	-	-	-	112	110	111	-	109

Alfalfa variety yield in percent 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.		Marketer	WSI	1999 Seeding Harvest Year				2001 Seeding Harvest Year			2002 Seeding Harvest Year	All Site-Years Average
				2000	2001	2002	3-yr Total	2002	2003	2-yr Total	2003	
Checks, Tons/Ac 15%mc Hay		-	-	6.73	6.86	6.39	19.98	5.67	5.54	11.21	6.33	-
6420	Garst	-	-	-	-	-	-	112	110	111	-	109
FEAST + EV	Garst	2.2	-	-	-	-	-	109	101	105	111	109
SPRINT	Specialty	2.6	108	114	102	115	-	-	-	-	-	109
DK 140	Monsanto	2.8	105	109	104	113	-	-	-	-	-	108
DK 141	Monsanto	3.3	105	101	94	107	-	-	-	-	-	108
WETLAND	Bio Plant	-	102	101	101	108	-	-	-	-	-	108
SAMURAI	Am. Alf.	-	105	103	96	108	-	-	-	-	-	108
ULTRALAC	Elk Mound	-	105	104	94	108	-	-	-	-	-	108
HUNTER	Ramy	-	100	104	99	108	-	-	-	-	-	108
WL 324	W-L	-	102	105	97	108	-	-	-	-	-	108
REBOUND 4.2	CROPLAN	2.4	108	113	100	114	-	-	-	-	-	108
8599	Mallard	-	-	-	-	-	-	106	109	108	-	108
350	La Crosse	2.8	107	110	99	113	-	-	-	-	-	108
IMPERIAL	Am. Alf.	-	100	105	95	107	-	-	-	-	-	107
VITRO	North-Gro	2.6	-	-	-	-	-	111	101	106	-	106
ABOUND	Monsanto	2.5	100	101	95	106	-	109	101	105	-	106
MILK RIVER	R.J. Hunt	-	102	100	99	107	-	108	95	101	104	106
MAGNUM V	Dairyland	3.0	105	109	101	112	-	-	-	-	-	106
DK A42-15	Monsanto	2.7	-	-	-	-	-	103	111	107	-	105
AC VIVA	-	-	104	105	101	110	-	-	-	-	-	105
53Q60	Pioneer	3.1	108	107	100	112	-	99	105	102	-	105
PROLIFIC	Bio Plant	3.1	-	-	-	-	-	110	99	104	-	104
LEGEND GOLD	Legend	-	113	106	101	114	-	-	-	-	-	104
5312	Check	3.0	102	102	101	102	-	109	101	105	104	104
SURPASS	Albert Lea	-	-	-	-	-	-	-	-	-	103	102
DK 124	Monsanto	2.7	104	101	91	106	-	-	-	-	-	102
AWARD	Monsanto	3.3	102	100	100	108	-	-	-	-	-	100
ONEIDA VR	Check	-	101	101	101	101	-	102	102	102	98	99
PLATINUM	Channel Bio	-	-	-	-	-	-	107	93	100	-	99
WRANGLER	Albert Lea	-	-	-	-	-	-	-	-	-	96	98
VERNAL	Check	2.0	97	98	98	98	-	90	97	94	98	98
LSD .05	-	-	7	6	9	6	-	11	7	7	11	-

Alfalfa variety yield in percent of check varieties at Potsdam, Olmsted 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	2000 Seeding Harvest Year			3-Year Total	2002 Seeding	All Site-Year Average
			2001	2002	2003		Harvest Year 2003	
Checks, Tons/Ac 15%mc Hay	—	—	7.52	6.56	5.68	19.76	6.46	—
LIGHTNING II	Jung	—	116	131	140	128	—	128
4200	Olds Seed	—	118	124	143	127	—	127
SOMERSET	Syngenta	—	113	120	126	119	—	119
TROPHY	Geertson	—	110	116	133	118	—	118
IGNITE	Jung	—	—	—	—	—	123	118
DK 134	Monsanto	2.8	119	128	133	126	—	117
PHABULOUS	Trelay Inc.	—	114	122	146	126	—	116
SETTER	Dahlco	—	—	—	—	—	114	114
MULTIPLIER 3	Mycogen	2.8	113	121	131	121	—	114
ROOT 66	Trelay Inc.	2.1	—	—	—	—	118	114
WL 342	W-L	—	—	—	—	—	123	114
AMERISTAND 403T	Am. Alf.	2.1	108	117	114	113	120	113
POINTER	Dahlco	—	113	115	119	116	119	113
WL 327	W-L	—	111	113	120	114	—	113
ALLIANT	Monsanto	3.0	117	121	120	119	—	113
HYBRIFORCE-400	Dairyland	2.8	—	—	—	—	110	112
GOLDLEAF	Gold C/ALSH	3.1	112	118	111	114	—	112
620	Garst	2.6	—	—	—	—	120	112
BARALFA 42 IQ	Barenburg	2.3	112	115	122	116	—	112
MONUMENT II	Geertson	—	115	119	114	116	—	111
54H91	Pioneer	3.0	—	—	—	—	104	110
54V54	Pioneer	2.7	112	116	132	119	—	110
9429	LG Seeds	2.8	115	116	116	116	—	110
MAGNUM V-Wet	Dairyland	3.3	109	111	108	109	—	109
6410	Garst	2.7	112	107	99	107	128	109
FEAST + EV	Garst	2.2	106	105	94	102	—	109
631	Garst	—	112	108	101	108	—	108
350	La Crosse	2.8	—	—	—	—	107	108
ABOUND	Monsanto	2.5	110	114	110	112	—	106
MILK RIVER	R.J. Hunt	—	108	106	94	103	105	106
DK 127	Monsanto	2.9	105	101	115	106	—	105
53Q60	Pioneer	3.1	107	111	119	112	—	105
5312	Check	3.0	—	—	—	—	105	104
ONEIDA ULTRA	La Crosse	—	—	—	—	—	103	103
SURPASS	Albert Lea	—	105	99	96	101	—	102
DK 124	Monsanto	2.7	108	110	105	108	—	102
IROQUOIS	Albert Lea	—	102	99	99	100	—	100
ONEIDA VR	Check	—	99	102	99	100	97	99
WRANGLER	Albert Lea	—	104	92	96	98	—	98
VERNAL	Check	2.0	101	98	101	100	98	98
DEFENSE + EV	Garst	—	109	93	81	96	—	96
LSD .05	—	—	7	9	22	9	13	—

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Alfalfa variety yield in percent of check varieties at Morris, Stevens County and St. Martin, Stearns County.

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

Variety	Marketer	WSI	Morris, 2000 Seeding Harvest Year			3-Year Total	St. Martin, 2002 Seeding	All Site-Years Average
			2000	2001	2002			
Checks, Tons/Ac 15%mc Hay			6.83	5.42	3.75	16.00	5.43	—
MAXIMUM I	Johnson	—	—	—	—	—	119	119
WL 319HQ	W-L	1.8	—	—	—	—	124	118
IGNITE	Jung	—	—	—	—	—	119	118
54Q25	Pioneer	—	—	—	—	—	116	116
PHABULOUS	Trelay Inc.	—	—	—	—	—	119	116
LEGENDAIRY YPQ	CROPLAN	—	—	—	—	—	122	115
SETTER	Dahlco	—	—	—	—	—	122	114
ROOT 66	Trelay Inc.	2.1	—	—	—	—	121	114
POINTER	Dahlco	—	110	110	113	111	119	113
WL 327	W-L	—	97	106	101	101	123	113
PERFECT	Grassland	—	—	—	—	—	123	113
WINTERGOLD	Renk	2.5	112	107	123	113	—	113
HYBRIFORCE-400	Dairyland	2.8	—	—	—	—	114	112
620	Garst	2.6	115	91	102	104	115	112
FORECAST 1001	Dairyland	2.9	105	100	102	102	—	111
54H91	Pioneer	3.0	—	—	—	—	122	110
9429	LG Seeds	2.8	—	—	—	—	125	110
AMERISTAND 201+ Z	Am. Alf.	2.0	109	119	124	116	—	110
FORECAST 3001	Dairyland	3.1	113	106	109	110	—	110
6410	Garst	2.7	98	78	83	88	125	109
FQ 315	Mycogen	—	109	96	111	105	—	109
FEAST + EV	Garst	2.2	—	—	—	—	120	109
SPRINT	Specialty	2.6	100	100	110	102	—	109
DK 140	Monsanto	2.8	110	106	103	107	—	108
DK 141	Monsanto	3.3	111	114	106	111	—	108
WETLAND	Bio Plant	—	108	104	115	108	—	108
FQ 314	W-L	3.0	106	113	104	108	—	108
REBOUND 4.2	CROPLAN	2.4	113	102	113	109	—	108
350	La Crosse	2.8	109	93	106	103	—	108
ABOUND	Monsanto	2.5	104	95	106	101	—	106
MILK RIVER	R.J. Hunt	—	105	93	98	100	119	106
MAGNUM V	Dairyland	3.0	99	107	102	103	—	106
53Q60	Pioneer	3.1	105	96	108	103	—	105
LEGEND GOLD	Legend	—	103	99	102	102	—	104
5312	Check	3.0	97	102	96	99	112	104
DK 124	Monsanto	2.7	104	93	83	96	—	102
WL 232 HQ	W-L	2.8	100	99	106	101	—	101
AWARD	Monsanto	3.3	97	90	88	93	—	100
ONEIDA VR	Check	—	99	98	102	99	99	99
WRANGLER	Albert Lea	—	—	—	—	—	101	98
GH 750	Golden Harvest	—	105	96	99	101	—	98
VERNAL	Check	2.0	103	101	102	102	89	98
GH 766	Golden Harvest	—	95	91	88	92	—	92
AVALANCHE+Z	Am. Alf.	2.4	93	85	82	88	—	88
LSD .05	—	—	ns	ns	ns	ns	10	—

Alfalfa variety yield in percent of check varieties at Lamberton, 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	1999 Seeding Harvest Year			3-yr Total	2001 Seeding Harvest Year		2-yr Total	All Site-Years Average
			2000	2001	2002		2002	2003		
Checks, Tons/Ac 15%mc Hay			7.16	6.43	7.51	21.10	7.13	7.15	14.29	-
JADE II	NC+	-	-	-	-	-	114	114	114	114
AMERISTAND 403T	Am. Alf.	2.1	-	-	-	-	103	110	107	113
POINTER	Dahlco	-	102	98	102	101	-	-	-	113
HYBRIFORCE-400	Dairyland	2.8	-	-	-	-	108	107	108	112
54V54	Pioneer	2.7	-	-	-	-	102	105	104	110
9429	LG Seeds	2.8	91	100	98	96	104	99	102	110
AMERISTAND 201+ Z	Am. Alf.	2.0	97	100	110	103	-	-	-	110
6410	Garst	2.7	100	95	103	100	102	113	107	109
GENEVA	Syngenta	2.7	102	111	110	108	-	-	-	109
6420	Garst	-	-	-	-	-	106	108	107	109
FEAST + EV	Garst	2.2	-	-	-	-	101	111	106	109
DK 140	Monsanto	2.8	99	105	107	104	-	-	-	108
DK 141	Monsanto	3.3	105	108	104	106	-	-	-	108
REBOUND 4.2	CROPLAN	2.4	98	97	104	100	-	-	-	108
ABOUND	Monsanto	2.5	96	104	106	102	-	-	-	106
MILK RIVER	R.J. Hunt	-	96	95	93	95	112	108	110	106
MAGNUM V	Dairyland	3.0	98	96	109	102	-	-	-	106
DK A42-15	Monsanto	2.7	-	-	-	-	99	108	104	105
AC VIVA		-	96	100	104	100	-	-	-	105
53Q60	Pioneer	3.1	99	98	106	101	94	102	98	105
LEGEND GOLD	Legend	-	89	101	101	97	-	-	-	104
5312	Check	3.0	102	102	101	102	105	101	103	104
4 TRAFFIC	Kaltenberg	2.4	-	-	-	-	105	100	103	103
DK 124	Monsanto	2.7	96	91	92	93	-	-	-	102
645-II	Garst	-	100	98	102	100	-	-	-	100
AWARD	Monsanto	3.3	100	99	96	98	-	-	-	100
ONEIDA VR	Check	-	96	100	95	97	96	99	97	99
PLATINUM	Channel Bio	-	98	101	96	98	-	-	-	99
GH 750	Golden Harvest	-	96	90	98	95	-	-	-	98
VERNAL	Check	2.0	102	97	104	101	99	100	100	98
WL 325 HQ	W-L	3.0	92	97	102	97	-	-	-	97
9326	LG Seeds	-	91	96	99	96	-	-	-	96
AMERIGUARD 302 + Z	Am. Alf.	-	93	98	95	95	-	-	-	95
LSD .05	-	-	ns	10	ns	ns	9	ns	10	-

Alfalfa variety yield in percent of check varieties at Grand Rapids, Itasca County.

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

	Marketer	WSI	2000 Seeding Harvest Year			3-yr Total	All Site-Years Average
			2001	2002	2003		
Checks, Tons/Ac 15%mc Hay	—	—	3.78	4.96	3.85	12.59	—
DK 134	Monsanto	2.8	107	105	111	107	117
MULTIPLIER 3	Mycogen	2.8	119	108	105	110	114
ALLIANT	Monsanto	3.0	125	105	101	110	113
620	Garst	2.6	126	109	107	113	112
MONUMENT II	Geertson	—	120	98	100	105	111
54V54	Pioneer	2.7	121	99	100	106	110
ABOUND	Monsanto	2.5	119	108	99	108	106
MILK RIVER	R.J. Hunt	—	118	111	107	112	106
DK 127	Monsanto	2.9	112	103	98	104	105
53Q60	Pioneer	3.1	106	108	101	105	105
DK 124	Monsanto	2.7	111	105	103	106	102
ONEIDA VR	Check	—	109	102	101	104	99
VERNAL	Check	2.0	91	98	99	96	98
LSD .05	—	—	19	ns	8	9	—

2003 Winter Survival Test Results from Wisconsin and Minnesota.

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

Variety	Arlington, Wis.	Lancaster, Wis.	Morris, Minn.	Rosemount, Minn.	Mean
BEAVER	0.9	1.2	1.4	1.8	1.3
6415	1.3	1.1	1.5	2.0	1.5
VERNAL	2.2	1.8	2.4	1.6	2.0
ZG 0141	2.4	1.1	2.5	2.1	2.0
5262	2.3	2.1	1.9	2.4	2.2
AVALANCHE +Z	2.5	2.6	2.6	1.8	2.4
526	2.2	2.2	2.8	2.5	2.4
50M172	2.1	1.9	3.0	3.1	2.5
54H91	2.8	2.5	3.3	3.5	3.0
WL 325 HQ	3.2	3.1	2.8	3.1	3.1
HYBRIFORCE-420/WET	2.8	2.4	3.6	3.8	3.2
53Q60	2.5	2.0	4.1	4.9	3.4
RANGER	3.6	3.2	3.1	3.8	3.4
DART	3.7	3.5	3.6	4.0	3.7
G-2852	3.7	3.8	—	—	3.7
FORTRESS	4.1	4.0	3.9	4.1	4.0
WL 316	—	—	4.0	4.2	4.1
ARCHER	4.4	4.2	4.2	5.0	4.4
SOUTHERN SPECIAL	4.5	4.6	6.0	5.6	5.2
CJF 101	6.0	6.0	6.0	6.0	6.0
MOAPA 69	6.0	6.0	6.0	6.0	6.0

Alfalfa variety milk production expressed as percent of Vernal and forage RFQ, CP%, NDF% and NDFD%; 2003 season totals from trial seeded in 2002 at Rosemount, Minn.

Variety, listed in descending order of milk production	Milk, %		RFQ ^a	CP, %	NDF, %	NDFD ^b , %
	Lb / Acre	Lb / Ton				
6410	123	106	132	20	44	46
GOLDLEAF	116	101	123	19	45	44
620	116	108	136	21	44	48
WL 322 HQ	113	106	132	20	44	46
FEAST +EV	114	102	125	19	45	45
BARALFA 42 IQ	113	106	132	20	44	46
CIMARRON	95	99	120	18	46	44
VERNAL	100	100	122	19	46	45
VERNAL actual values	9,257	2,183	122	19	46	45
LSD 5%	1	5	13	ns	1	ns

Alfalfa variety milk production expressed as percent of Vernal and forage RFQ, CP%, NDF% and NDFD%; 2003 season totals from trial seeded in 2003 at Rosemount, Minn.

Variety, listed in descending order of milk production	Milk, %		RFQ ^a	CP, %	NDF, %	NDFD ^b , %
	Lb / Acre	Lb / Ton				
6415	116	101	185	24	35	49
DKA33-16	114	102	187	24	35	50
EXTREME	105	99	176	23	36	48
CIMARRON	103	89	147	23	40	45
VERNAL	100	100	177	23	37	51
BARALFA 53 HR	99	93	157	22	39	47
WL 322 HQ	98	101	181	23	36	50
VERNAL actual values	2,803	2,748	177	23	37	51
LSD 5%	ns	ns	ns	1	3	ns

Alfalfa variety milk production expressed as percent of Vernal and forage RFQ, CP%, NDF% and NDFD%; 2003 season totals from trial seeded in 2003 at Arlington, Wis.

Variety, listed in descending order of milk production	Milk, %		RFQ ^a	CP, %	NDF, %	NDFD ^b , %
	Lb / Acre	Lb / Ton				
FEAST +EV	106	106	172	22	38	51
VERNAL	100	100	155	20	40	48
6410	95	99	153	20	40	47
VERNAL actual values	13,635	2,558	155	20	40	48
LSD 5%	ns	1	4	1	1	2

Alfalfa variety milk production expressed as percent of Vernal and forage RFQ, CP%, NDF% and NDFD%; 2003 season totals from trial seeded in 2003 at Arlington, Wis.

Variety, listed in descending order of milk production	Milk, %		RFQ ^a	CP, %	NDF, %	NDFD ^b , %
	Lb / Acre	Lb / Ton				
BARALFA 53 HR	121	102	195	23	35	53
6415	112	103	198	24	35	54
DKA33-16	111	101	192	24	35	52
VERNAL	100	100	185	24	37	54
EXTREME	99	97	179	23	37	51
VERNAL actual values	7,695	2,840	185	24	37	54
LSD 5%	ns	4	16	ns	ns	2

RFQ^a = Relative Forage Quality. For a technical discussion of RFQ see: <http://www.uwex.edu/ces/forage/pubs/rfq.htm>

NDFD^b = NDF digestibility. For a technical discussion of NDF digestibility see: <http://www.uwex.edu/ces/forage/pubs/milk2000.htm>

CP = Crude Protein. NDF = Neutral Detergent Fiber

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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
Dahlco	Dahlco Seed	Cokato	MN	55321	320-286-5982		www.dahlco.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	55534	507-545-0151	800-242-1855	www.jungseedgenetics.com
Kaltenberg	Kaltenberg Seed Farms	Waunakee	WI	53597	800-383-3276		www.kaltenbergseeds.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	LG 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 Int'l Inc.	Johnston	IA	50131-1150	515-334-6426		www.pioneer.com
Power	Power Seeds Inc.	Fraserville	ONT	K0L 1V0	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	Mankato	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	763-593-7285		www.syngenta.com
Target	Target Seed, LLC	Honmesdale	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	608-240-0630	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.usafes.umn.edu

CICER MILKVETCH

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
Lutana	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	16
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 also 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. Thirty pounds of nitrogen was applied at time of seeding to assist early growth and development. The 1999 and 2002 Rosemount trials were harvested three times per year. The Grand Rapids trial was harvested two times per year.

Dry-matter yield, in tons per acre, and vigor of kura clover varieties seeded at Rosemount.

Variety	Vigor*	Yield, Tons / Acre		
		Rosemount		Grand Rapids
		2001-02	2003	2003
Cossack	6.0	4.5	4.0	1.0
Endura	3.3	4.3	4.8	1.0
NF-93	5.5	4.6	4.3	0.8
Rhizo	2.8	4.1	3.5	0.6
LSD 5%	1.0	0.5	0.4	0.2

* Vigor, Rosemount, 1=least, 9=best vigor.

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

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 1999 at Rosemount and Grand Rapids and in 1997 at Morris.

Experimental plots were generally harvested three times per year. The Morris location was harvested only twice in 1999. Nitrogen was applied in the early

spring and after the first and second harvest at rate of 50 pounds per acre for each application.

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, in tons dry matter per acre, of orchardgrass varieties seeded at three locations.

Variety	Winter Injury 5/1/03	Rosemount			Grand Rapids		Morris
		1998-2000	1999-2002	2003	1990-1994	1999-2001	1999-2001
AC Nordic	-	-	3.4	-	-	3.7	-
Albert	-	-	-	-	-	3.9	-
Ambassador	-	4.4	-	-	3.5	3.6	2.6
Bengal	-	-	3.5	-	-	-	-
Condor	-	4.5	-	-	-	3.8	2.6
Crown	-	4.5	-	-	3.5	-	2.6
Dawn	-	-	-	-	3.6	-	-
Duke	2.8	4.8	3.5	4.1	-	3.8	3.1
Elsie	-	-	3.4	-	3.5	3.5	-
Extend	4.5	-	-	4.2	-	-	-
Haymate	-	4.5	-	-	-	3.7	2.7
Hawkeye	4.0	-	3.8	4.1	-	3.9	-
Justus	4.0	4.5	3.5	4.3	3.4	3.4	2.7
Megabite	3.5	-	3.8	4.2	-	3.7	-
Mammoth	-	-	3.7	-	-	-	-
Napier	-	4.3	-	-	3.6	-	2.1
Orbit	-	3.6	-	-	3.4	-	2.8
Orion	3.8	4.7	3.7	4.3	3.7	4.1	3.2
Potomac	2.8	4.4	3.3	4.6	3.5	-	2.6
Sterling	-	-	-	-	3.4	-	-
Warrior	4.5	-	3.5	4.4	-	-	-
LSD 5%	1.5	0.4	0.2	0.6	NS	0.4	0.8

* Winter Injury, Rosemount, 9 = worst.

**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

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 birds-foot trefoil.

Historically, 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 2002, at Morris in 1996 and 1997; and at Rosemount in 1996, 1999 and 2002. Harvest frequency is generally three times per year.

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

Variety	Potato Leathopper* Injury, 7/14/03	Vigor,** 5/1/03	Rosemount			Grand Rapids		
			1997-98	2000	2003	1999-01	2000-01	2003
Arlington	3.5	5	4.1	5.2	3.6	2.9	3.0	1.2
Astred	-	-	2.8	-	-	-	-	-
Cinnamon	-	-	4.5	-	-	-	-	-
Cinnamon Plus	2.3	6	-	-	4.2	-	-	1.3
Freedom	4.8	4	-	5.5	3.7	-	3.2	1.2
Juliette (mcc176)	3	5.8	-	5.6	4.0	3.5	3.3	1.3
Marathon	1.5	6.3	4.0	5.6	4.3	3.4	3.2	1.4
Prima	-	-	-	5.3	-	3.4	3.5	-
Randolph	-	-	4.1	-	-	3.5	-	-
Redland III	-	-	-	-	-	-	-	-
Redland Graze II	1.3	5.5	-	-	4.3	-	-	1.5
Redstar	-	-	-	5.9	-	-	3.4	-
Scarlett	1.3	5.8	4.2	-	4.0	3.4	-	1.4
LSD 5%	0.9	0.8	0.6	0.6	0.3	0.2	0.3	0.2

* Potato leathopper injury-Rosemount, 5=worst. ** Vigor-Rosemount, 9=best.

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.

The species utilizes nitrogen efficiently and is adapted to liquid manure application. However, seedling vigor of reed canarygrass is not as good as that of other commonly used forage grasses.

Prior to 1985, common reed canarygrass was described as being less palatable than most other grass species seeded for hay and pasture.

The most recent developments in reed canarygrass breeding have been the release of varieties low in indole alkaloid concentration. This factor dramatically improves animal performance and

palatability. Alkaloids are bitter, complex, nitrogen-containing compounds.

In grazing trials, lambs and steers gained more weight and sheep had less diarrhea 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.

Each of the available reed canarygrass varieties is winterhardy and persistent in Minnesota.

Trials were established in pure stands in 1993, 1999 and 2002 at Morris, Grand Rapids and Rosemount. Trials are generally harvested three times per year.

Nitrogen was applied early in the spring and after the first two harvests at a rate of 50 pounds per acre per application.

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

The wheatgrasses are valuable native forage species. They are especially suitable for growing in the northern Great Plains area of the United States.

The variety Newby 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, 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.

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.

Tall Fescue Planting Rate and Date

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

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

Variety	Vigor,* 5/1/03	Rosemount			Grand Rapids		
		1994-1996	2000-02	2003	1994-1996	2000-02	2003
Chiefton	6.5	—	3.7	5.4	—	4.9	1.8
Lara	—	3.0	—	—	—	—	—
Marathon	6.5	—	—	5.2	—	—	1.6
Palaton	5.3	3.1	3.8	5	3.5	4.8	1.6
Rival	5.0	—	3.8	5	—	4.6	1.6
Vantage	3.0	3.3	3.7	5.2	3.3	5.1	1.7
Venture	6.0	3.1	3.9	5.2	3.5	5.1	1.6
LSD 5%	0.5	NS	NS	NS	NS	.4	NS

* Rosemount vigor rating, 9=best, 1=least.

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

Variety	Grand Rapids		Rosemount		Morris
	1994-1996	1999-2001	1993-1995	1998-2000	1993-1996
Tall Fescue					
Barcel	3.0	—	5.3	—	4.5
Cajun	—	4.9	—	5.3	—
Fawn	3.3	—	4.9	—	5.0
Ky 31	3.5	4.6	5.8	—	4.7
Ky 31 endophyte-free ¹	3.3	—	5.6	5.9	4.9
Martin	3.6	4.9	5.3	4.8	4.7
Maximize	—	4.6	—	5.1	—
Mozark	3.5	4.8	5.4	5.5	4.8
Mustang	2.7	4.3	4.7	4.9	—
Seine	—	—	—	5.6	4.8
Stef	3.3	—	5.3	—	—
Festuca-Lolium Hybrids					
Kemal	—	3.8	—	3.3	—
Tandem II	—	3.8	—	3.3	—
Wheatgrasses					
Manska	2.9	—	4.0	—	4.8
Newhy	2.7	—	3.9 ²	4.2	—
Reliant	3.0	—	4.2	—	5.0
LSD 5%	0.5	0.6	0.6	0.4	NS

¹ Endophytes are fungi that invade plant tissues, reducing forage palatability and animal performance.

² Newhy main yield reported for 1993 and 1994. Winter injury was severe at Rosemount in 1994-1995, resulting in stand loss of Newhy and reducing overall varietal yield by 25%.

TIMOTHY

Timothy is adapted throughout Minnesota for use in hay and pasture mixes. When timothy is the major component in hay its stage of maturity affects both yield and quality. Harvesting timothy at early heading is the preferred time. Timothy produces the majority of its forage at the first harvest.

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

Varieties that are intermediate to late maturing should not be harvested more than twice during the growing season. Therefore, appropriately selected

timothy varieties are compatible with red clover and birdsfoot trefoil in mixtures for hay production. Varieties in the

Dry-matter yields, in tons dry matter per acre, of timothy seeded at three locations.

Variety	Vigor,**	Rosemount			Grand Rapids			Morris
	5/1/03	1993-1995	2000-2002	2003	1994-1996	2000-2002	2003	1993-1996
Early to intermediate maturity								
Aurora	6.3	—	3.3	2.9	—	3.3	1.9	—
Climax*	2	3.8	3.4	2.5	3.6	3.0	—	4.0
Colt	4.8	—	3.7	3.1	—	3.3	1.8	—
Comtal	5.8	3.7	3	2.5	3.4	2.8	1.7	—
Itasca*	2.5	—	—	2.6	—	—	—	—
Goliath	—	3.4	—	—	3.4	—	—	—
Promesse	6	—	3.1	2.5	—	3.1	1.7	—
Summit	7.3	—	—	3.2	—	—	1.6	—
Timfor	5.8	3.8	—	3	3.5	—	1.8	—
Toro	—	3.9	—	—	3.7	—	—	—
Late maturity								
Heidemij	—	3.0	—	—	3.5	—	—	3.5
Hokusen	—	3.4	—	—	3.3	—	—	3.6
Motim	—	—	3.4	—	—	2.8	—	—
LSD 5%	0.9	0.4	0.5	0.3	0.4	0.3	NS	NS

* Poor initial germination, reseeded later in 2002 trial. ** Vigor, Rosemount rating- 9=best, 1=least.

experiment station timothy trials were established in pure stands in 1992 at Rosemount and Morris and at Grand Rapids in 1993. Trials also were established at Rosemount and Grand Rapids in 1999 and 2002.

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

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 is normally less persistent than other cool-season grasses such as reed canarygrass.

**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

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 1998, 1999 and 2001 and at Grand Rapids in 1998 and 2001. The trials were harvested twice at Grand Rapids and three times at Rosemount, except in 1999 and 2001 when Rosemount was only harvested twice as well.

Roseau and Nueltin are two varieties that have increased natural tolerance to the herbicide Roundup. Steadfast, a rhizomatous birdsfoot trefoil released by the University of Missouri and USDA-ARS, was 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. Average dry matter yields were very high in 1998-99 and few differences were found among performance of the varieties. Stand losses on all entries included in the table were noted in Rosemount after the first harvest in 1999, except for the variety York.

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

Variety	Rosemount 1998-2000	Morris 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	% stand *	Rosemount			Grand Rapids		
		6/16/03	1998	1999-2001	2002	1999-2001	2002-2003
Bright	-		3.6	3.1		-	-
Dawn	48		4.0	3.8	4.0	4.8	2.8
Empire	-		4.0	-	-	4.4	-
Fergus	-		3.9	-	-	-	-
Georgia 1	-		-	3.6	-	4.6	2.3
Leo	-		3.9	3.1	-	-	-
Norcen	56		4.3	3.5	3.9	4.8	2.8
Nueltin	43		3.7	3.1	4.0	4.2	2.8
Pardee	8		-	-	3.5	-	2.5
Roseau	72		4.1	3.4	4.1	4.6	2.7
Steadfast	-		3.1	2.7	-	3.5	-
Trevig	70		4.1	-	4.2	-	-
Viking	61		3.8	3.6	4.0	4.4	2.6
WITT	68		4	3.2	4.1	-	2.6
LSD 5%	21		0.5	0.3	0.4	0.5	0.3

Experimental design = RCB with 4 reps. 2-3 harvests per year. * % stand, low numbers had most winter injury.

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

GRAIN CROPS



BARLEY

Barley varieties are compared in replicated trials at Crookston, Morris, St. Paul, Stephen and Roseau. Data collected from these trials should be used to make comparisons only among those varieties included in the trials. 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. 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. Developed by Busch-Agricultural Resources Inc. (BARI). Released 2003. **PVP (94)**

Drummond – Medium yield and medium maturity. Very good lodging resistance. 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 the currently grown varieties. Developed from crosses involving Azure, Bumper, Hazen, and Stander. Released by N.D. AES in 2000. **PVP (94)**

Legacy – High yielding 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 and slightly better net blotch resistance compared to the currently grown varieties. 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, Excel and Stander. Released by Minn. AES in 2000. **PVP (94)**

Grain yield as a percent of the mean of the varieties in trials from 2001-2003 and for 2003 alone.

Variety	Crookston		Morris		Stephen		St. Paul	Roseau		Mean	
	2003	3-Year	2003	3-Year	2003	3-Year	2-Year ¹	2003	2-Year ²	2003	3-Year
Robust	81	94	87	85	94	100	88	97	98	90	92
Excel	103	102	97	101	102	107	104	113	112	104	104
Stander	106	105	103	102	97	108	104	98	101	101	104
MNBrite	88	93	101	93	106	105	95	91	90	96	96
Lacey	103	100	105	102	98	99	116	105	105	103	103
Drummond	121	110	102	100	97	93	104	101	99	105	100
Legacy	90	90	97	98	101	101	94	96	102	96	96
Tradition	110	110	108	111	104	- ³	- ³	100	- ³	115	- ³
LSD (0.05)	18	11	15	12	12	10	13	20	14	9	6
Mean Bu/Acre	94	94	94	87	97	70	72	128	117	102	87

¹ Only two years of data, 2001-2002. ² Only two years of data, 2001 and 2003. ³ Not evaluated in all years.

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 the American Malting Barley Association (AMBA). Robust is currently the six-row variety of choice by the malting and brewing industry. 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. 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)**

Stander – High yield and late maturity. Very good lodging resistance and good

Description of barley varieties, 2000-2003.

Variety	Type	Heading*	Height, In.	Lodging	Plump, %	Protein, %
Robust	Malt	56	35	Medium	82	12.5
Excel	Malt	56	33	Medium	77	12.2
Stander	Feed	56	32	Strong	85	12.0
MNBrite	Feed	56	35	Medium	82	13.4
Lacey	Malt	55	32	Strong	83	12.2
Drummond	Malt	55	33	V. strong	79	12.5
Legacy	Malt	57	34	Medium	74	11.8
Tradition	Malt	56	33	Medium	–	–
No. of Trials		12	12	7	12	8

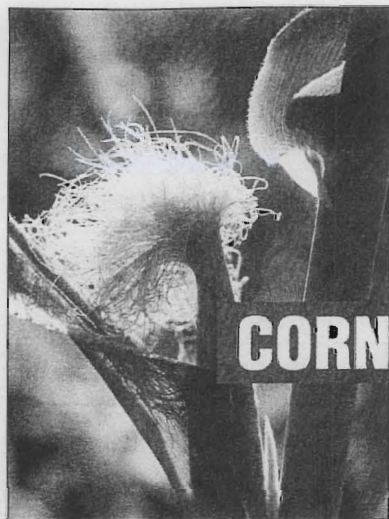
* Days after planting.

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





CORN GRAIN

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

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: Lamberton, Waseca and Plainview.

Early Maturity Trial – 105 Relative Maturity (RM) and earlier hybrids.

Late Maturity Trial – 106 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 corn seed 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 in tables on pages that follow are given for individual locations along with yields and harvest moisture contents averaged across locations for 2003. Hybrids are ranked within a maturity group by moisture content averaged across locations for 2003.

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 two hybrids differ in yield potential. The

Companies participating in the 2002 hybrid corn grain trials.

-
- Albert Lea Seed House (Viking Hybrids), Box 127, 1414 W. Main, Albert Lea, MN 56007 www.alseed.com
- Anderson Seeds, Rt. 3 Box 94, St. Peter, MN 56082 -
- Bio Gene Seeds, 5491 Tri-County Hwy, Sardinia, OH 45171 www.biogeneseeds.com
- Brown Seed Farms Inc., PO Box 7, Bay City, WI 54723 www.browngenetics.com
- Croplan Genetics, 1080 County Rd F West, Shoreview, MN 55126-2928 www.croplangenetics.com
- Crows Hybrid Corn Co., Box 306, Milford, IL 60953 www.croplangenetics.com
- Dahlman Seed Co., 73504-200th St., Dassel, MN 55325 www.dahlmanseed.com
- Dairyland Seed Co., Inc. (Stealth), Box 958, West Bend, WI 53095 www.dairylandseed.com
- DynaGro, 221 W Lake Lansing Rd 102 East, East Lansing, MI 48823 www.growers.net
- Epley Bros. Hybrids, Inc., PO Box 310, Shell Rock, IA 50670 www.epleyseed.com
- Garst Seed Co & Agripro Seeds, 2369 330th St., Box 500, Slater, IA www.garstseed.com
- Gold Country Seed Inc., 16506 Hwy 15 North, PO Box 0604, Hutchinson, MN 55350-0604 www.goldcountryseed.com
- Golden Harvest Seeds, 220 N Eldorado Rd. Suite E, Bloomington, IL 61704 www.hylandseeds.com
- Hyland Seeds, 2 Hyland Drive, Blenheim, Ontario, Canada NOP 1A0 www.hylandseeds.com
- Jung Farms Inc., 341 So. High St., Randolph, WI 53956 www.jungseedgenetics.com
- Kaystar Seed, 40329 US Hwy 14 East, PO Box 947, Huron, SD, 57350 www.kaystarseed.com
- Kruger Seed Co., 33938 180th St., Dike, IA 50624 www.krugerseed.com
- L.G. Seeds Inc., 4001 N. War Memorial Dr., Peoria, IL 61614 www.lgseeds.com
- Monsanto Co. (Dekalb), 3100 Sycamore Rd., De Kalb, IL 60115 www.monsanto.com
- Pfister Hybrid Corn Co., 187 N Fayette St., El Paso, IL 61738 www.pfisterhybrid.com
- Pioneer Hi-Bred Int'l., Inc., 99 Navaho Ave Suite 101A, Mankato, MN 56001 www.pioneer.com/usa
- Quality Seed Genetics, 307 3rd St., Alice, ND 58031 -
- RAGT Semences, Ave Saint Pierre - Site de Bourran, FR 12033 RODEZ Cedex 9, France www.ragt-saaten.com/default_de.asp
- Renk Seed Co., 6800 Wilburn Rd., Sun Prairie, WI 53590 www.renkseed.com
- Sabre Initiatives, LLC, 2508 Trott Ave SW, PO Box 388, Willmar, MN 56201 www.sabrelc.com/seeds/default.asp
- Sand Seed Service, Box 648, 4765 Hwy 143, Marcus, IA 51035 www.sandsofiowa.com
- Seeds 2000, Box 2000, Breckenridge, MN 56520 www.seedmen.com
- Stine Seed Co., 2225 Laredo Trail, Adel, IA 50003 www.stinseed.com
- Trelay, Inc., 11623 Hwy 80, Livingston, WI 53554 www.trelay.com
- Unity Seeds, 107 Fallon St., Kentland, IN 47951 www.unityseeds.com
- Wensman Seed Co., Box 190, Wadena, MN 56482 www.wensmanseed.com
-

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.

Corn Planting Rate and Date

Bushel Weight, Pounds56
 Planting Rate, Seeds/Acre33,000
 Planting DateApril 15 - May 5

Individual hybrid corn trial information, 2003.

Location	Cooperators	Previous Crop	Planting Date	Harvest Dates
Lamberton	Steve Quiring	Soybean	April 25	October 7
Waseca	Tom Hoverstad	Soybean	April 24	October 9
Plainview	Fritz Brietenbach Bruce Ihrke	Soybean	April 29	October 20
Morris	George Nelson	Wheat	May 8	October 10
Rosemount	Jerry Holz	Soybean	April 30	October 15
Staples	Norman Krause	Corn	May 13	October 14
Rothsay	George Nelson Troy Larson	Wheat	May 8	October 21

Early-maturity hybrids, southern locations, 2003.

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
97 and earlier RM hybrids							
Anderson Seed	7595	95	145	137	108	130	15.0
Epley Brothers	E1150Bt	95	132	142	137	137	15.6
Sands	SOI 9962	96	141	147	125	138	15.6
Dairyland Stealth	5497	97	154	162	121	146	16.0
Dahlman	D47-47	94	141	162	134	146	16.0
Dahlman	D48-15	95	152	164	132	149	16.1
Anderson Seed	7902	96	144	143	125	137	16.2
Dekalb	DKC47-10RRYGCB	97	164	166	133	154	16.3
Gold Country Seed	94-01CB	94	157	154	123	145	16.4
Anderson Seed	797Y	97	164	164	124	151	16.4
Anderson Seed	796R	96	160	155	130	148	16.4
Renk	RK488YGCB	97	154	149	136	146	16.5
High Cycle	7454Bt	95	160	155	123	146	16.7
Garst	8880YG1	95	166	148	128	147	16.7
Gold Country Seed	96-04CB	96	155	142	131	142	16.8
Kruger	9496YGCB	93	160	151	128	146	17.0
Viking	BT 7293	97	169	156	127	151	17.0
97 and earlier RM averages:			154	153	127	145	16.3
98 to 101 RM hybrids							
Kruger	EX 303YGCB	100	134	181	123	146	16.2
Kruger	9002YGCB	99	155	164	140	153	16.3
Pfister	1499 Bt	98	150	142	130	141	16.4
Anderson Seed	101YR	101	137	152	121	137	16.5
Anderson Seed	6527	100	151	149	124	141	16.7
Dekalb	DKC50-18YGCB	100	177	167	128	157	16.8
AgriPro	8715	101	167	160	130	152	17.0
Sands	SOI 9013	101	154	161	129	148	17.1
Viking	BT6405	100	138	140	130	136	17.3
Kruger	9203YGCB	100	171	168	114	151	17.4
Jung	2445	99	156	152	148	152	17.5
High Cycle	7560Bt	100	178	184	135	166	17.5
Wensman	W 5314Bt	101	180	166	123	156	17.7
Kruger	9404YGCB	101	130	166	122	139	17.8
Kruger	9002RRYGCB	100	152	169	147	156	18.0
Wensman	W 6315RRBt	101	172	190	144	168	18.3

Early-maturity hybrids, southern locations, 2003 (continued).

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
98 to 101 RM hybrids (continued)							
Viking	6370	100	133	146	123	134	18.3
Golden Harvest	H-7470Bt	101	152	141	125	140	18.4
Pfister	1680	99	161	168	147	159	18.5
Garst	8787YG1	101	133	177	143	151	18.5
Kruger	9203RRYGCB	100	173	171	140	161	18.8
High Cycle	7592Rb	100	153	174	127	151	19.1
Brown	5636	100	144	131	101	125	19.8
Epley Brothers	E1180Bt	100	167	166	152	153	20.9
98 to 101 RM averages:			155	162	131	149	17.8
102 to 105 RM hybrids							
Anderson Seed	102R	102	137	152	140	143	15.7
Dekalb	DKC52-45YGCB	102	159	178	145	161	16.5
Sands	SOI 103YGCB	103	163	168	105	145	16.7
Dahlman	D51-15	102	152	183	137	157	16.9
Dahlman	R51-01	102	152	176	129	152	17.0
Dahlman	D51-01	102	138	156	123	139	17.3
Sands	SOI4020LL	102	148	162	126	145	17.4
Sabre	4280	102	158	173	121	150	17.6
Crows	2192Bt	102	150	164	121	145	17.6
Gold Country Seed	1016RRBt	104	166	178	145	163	17.7
Viking	BT5370	104	149	156	110	139	17.9
Stine	8016-23	105	141	145	115	134	17.9
Renk	RK636YGCB	102	178	151	131	153	17.9
Stine	8002-35	102	129	146	126	134	18.2
Sabre	4292	102	152	170	118	146	18.2
High Cycle	7694Rb	102	166	171	119	152	18.2
Jung	6580Bt	104	142	146	109	132	18.3
Kruger	EX 105YGCB	102	144	160	124	143	18.3
Viking	CL6100	102	154	145	115	138	18.5
Golden Harvest	H-7900	103	160	152	134	149	18.7
High Cycle	7662Bt	103	156	161	129	148	18.8
Jung	2545	103	159	159	140	153	18.8
Garst	ND795YG1	102	149	159	119	142	18.8
Dekalb	DKC53-34RRYGCB	103	167	178	147	164	19.0
Brown	5345YG	103	151	159	138	149	19.2
Anderson Seed	6005	102	143	160	125	143	19.2
LG Seeds	LG 2513 Bt	104	146	161	140	149	19.2
Dairyland Stealth	5140	104	164	175	152	164	19.3
Kruger	9306YGCB	105	164	161	123	150	19.3
Viking	B5305	104	157	181	152	163	19.4
Viking	5305	104	164	173	143	160	19.4
Anderson Seed	104Y	104	161	160	138	153	19.4
Sabre	4320	103	131	159	125	138	19.5
Golden Harvest	H-8223Bt	104	139	156	138	144	19.5
Renk	RK705RRYGCB	105	147	152	136	145	19.6
High Cycle	7601Bt	102	141	167	149	152	19.6
Trelay	6400	103	121	140	128	130	19.6
Garst	ND629YG1	104	165	198	139	167	19.8
Renk	RK700YGCB	105	169	165	140	158	20.0
LG Seeds	LG 2533	105	161	168	147	158	20.3

Early-maturity hybrids, southern locations, 2003 (continued).

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
102 to 105 RM hybrids (continued)							
Dairyland Stealth	1605	105	137	149	134	140	20.8
Brown	6220	104	134	157	125	139	21.0
LG Seeds	LG 2518	102	144	157	117	139	21.1
Anderson Seed	5395	105	145	160	130	145	21.1
102 to 105 RM averages:			151	162	131	148	18.7
Southern locations, early-maturity averages:			153	160	130	148	18.0
LSD (0.20)			15	12	16	8	0.9

Late-maturity hybrids, southern locations, 2003.

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Bu/Acre	% Moisture
Later than 105 RM hybrids							
Renk	RK772YGCB	107	175	164	142	160	17.9
Anderson Seed	4033	106	155	144	143	147	18.7
Epley Brothers	E2412	106	151	153	146	150	18.9
Anderson Seed	4320	107	137	156	131	141	19.0
Kruger	9305 YGCB	108	166	149	124	146	19.6
Jung	6645Bt	106	163	165	156	161	19.7
Dairyland Stealth	1606	106	152	157	132	147	19.9
Bio Gene	BG 1075	107	147	178	149	158	19.9
Kruger	EX 107RR	107	152	150	137	146	20.0
Pioneer	35Y67	106	159	172	156	162	20.2
Kruger	9308YGCB	111	152	161	137	150	20.2
Pioneer	34H32	109	161	177	139	159	20.4
Kruger	9206YGCB	106	151	163	141	152	20.7
Epley Brothers	E2410Bt	107	155	176	135	155	20.9
Wensman	W 6421RR	106	157	157	138	151	21.1
Pioneer	35Y55	106	160	167	141	156	21.1
Dekalb	DKC58-78YGCB	108	166	176	144	162	21.4
Anderson Seed	5954	106	158	167	123	149	21.4
RAGT semences S.A.	Mix151	106	144	153	132	143	21.6
Wensman	W 5417Bt	107	156	162	149	156	21.6
Pioneer	34M93	110	163	157	125	149	21.8
Dekalb	DKC58-24RRYGCB	108	153	132	139	141	21.8
Garst	ND578YG1/IT	108	166	161	149	159	22.0
Bio Gene	BT 1071	107	159	168	146	158	22.2
Kruger	EX 108YGCB	108	171	170	144	162	22.3
Stine	8012-06	110	150	157	134	147	22.4
Stine	9619YGCB	109	145	147	142	145	22.7
Wensman	W 5437Bt	110	176	174	153	169	24.1
Pioneer	34N42	111	147	176	146	156	26.2
Stine	8007-23	107	130	138	127	131	26.8
Southern locations, late-maturity averages:			156	161	140	152	21.2
LSD(0.20)			15	15	16	9	1.1

Early-maturity hybrids, central locations, 2003.

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Bu/Acre	% Moisture
92 and earlier RM hybrids						
Wensman	W 5085Bt	85	185	109	147	16.4
Renk	RK232YGCB	88	179	97	138	17.3
Kruger	9392RR	89	194	117	155	17.6
Wensman	W 6089 RRbt	84	193	122	158	17.6
Renk	RK438YGCB	92	233	123	178	17.7
Kruger	9392YGCB	89	222	127	174	17.8
Brown	3000YG	90	223	138	181	18.0
Garst	ND922YG1	90	220	125	173	18.2
Dekalb	DKC42-95RRYGCB	92	207	113	160	18.4
High Cycle	7242Bt	90	219	142	180	18.5
Wensman	W 6116RR	91	219	144	181	18.6
LG Seeds	LG 2407 Bt	92	220	134	177	18.6
Dekalb	DKC39-48RRYGCB	89	185	126	156	18.7
Wensman	W 6117RRbt	92	218	124	171	18.7
Wensman	W 5117Bt	92	220	130	175	18.8
Hyland Seeds	HL2368	92	222	140	181	19.0
Dahlman	D45-15	92	208	145	176	19.1
High Cycle	7301Bt	92	223	130	177	19.2
Sabre	3110	91	201	123	162	19.2
Hyland Seeds	HL R234	92	201	124	163	19.3
Kruger	9496A YGCB	92	207	138	172	19.5
Stine	9201YGCB	89	187	113	150	19.8
92 RM and earlier averages:			209	126	168	18.4
93 to 95 RM hybrids						
Croplan Genetics	364CRW	95	183	118	150	17.2
Seeds 2000	2944RRbt	94	192	122	157	17.9
Stine	9307RRYGCB	93	171	115	143	18.1
Dyna-Gro	53P76	94	189	126	158	18.4
Kruger	9496YGCB	93	224	125	175	18.5
Anderson Seed	7595	95	183	106	144	18.5
Seeds 2000	2953	95	205	124	164	18.6
Bio Gene	BG 940	94	221	129	175	18.8
Dairyland Stealth	5194	94	215	132	174	18.8
Wensman	W 4212	95	214	129	172	18.8
Wensman	W 6212RR	95	217	124	170	19.0
Dekalb	DKC44-46RRYGCB	94	230	114	172	19.0
Brown	4250YG	95	217	130	173	19.0
Brown	3020YG	94	223	122	173	19.1
High Cycle	7454Bt	95	219	119	169	19.1
Sabre	3555	95	204	125	164	19.2
Dyna-Gro	53F09	94	219	125	172	19.2
Jung	6432Bt	95	212	125	168	19.4
Kruger	9496RR	93	206	124	165	19.5
Dahlman	D48-15	95	221	134	178	19.5
Pioneer	38P04	95	190	142	166	19.6
Seeds 2000	2953Bt	95	227	143	185	19.6
Dahlman	R48-15	95	200	135	168	19.7
Epley Brothers	E1150Bt	95	211	119	165	19.9

Early-maturity hybrids, central locations, 2003 (continued).

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Bu/Acre	% Moisture
93 to 95 RM hybrids (continued)						
Dahlman	D47-47	94	221	135	178	20.1
Garst	8880YG1	95	217	139	178	20.3
93 to 97 RM averages:			209	126	167	19.0
Central locations, early-maturity averages:			209	126	167	18.8
LSD(0.20)			14	11	9	0.8

Late-maturity hybrids, central locations, 2003.

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Bu/Acre	% Moisture
100 and earlier RM hybrids						
Anderson Seed	7902	96	202	120	161	18.5
Kruger	9002YGCB	99	180	108	144	18.3
Dairyland Stealth	1497	97	192	121	157	18.5
Pioneer	37F16	98	196	118	157	18.6
Dahlman	D48-01	96	199	132	166	18.7
Dekalb	DKC47-10RRYGCB	97	203	134	168	18.9
Anderson Seed	797Y	97	212	119	166	19.0
Pioneer	37R71	97	165	112	139	19.0
Dairyland Stealth	5497	97	201	119	160	19.1
Renk	RK488YGCB	97	206	129	168	19.2
High Cycle	7525Bt	98	184	113	148	19.2
Pfister	1499 Bt	98	189	139	164	19.2
Anderson Seed	796R	96	196	111	154	19.3
Wensman	W 5212Bt	96	196	130	163	19.5
LG Seeds	LG 2489	98	193	110	151	19.7
LG Seeds	LG 2463 Bt	96	201	132	166	19.8
Kruger	EX 303YGCB	100	202	112	157	20.2
Dekalb	DKC50-18YGCB	100	199	123	161	20.3
High Cycle	7560Bt	100	221	118	169	20.6
Bio Gene	BG 991	99	171	114	142	20.6
Pioneer	38A25	97	168	131	150	20.7
Unity Seeds	6100A	100	171	117	144	20.9
Kruger	9203YGCB	100	184	111	147	20.9
Jung	2445	99	189	118	153	21.2
High Cycle	7592Rb	100	197	102	150	21.8
Garst	8716	100	193	105	149	22.1
Pfister	1680	99	198	121	160	22.7
Kruger	9203RRYGCB	100	194	114	154	22.8
Kruger	9002RRYGCB	100	202	121	162	22.9
Brown	5020YGCRR	100	207	115	161	24.0
Epley Brothers	E1180Bt	100	167	93	130	24.0
100 RM and earlier averages:			193	118	155	20.3
Later than 100 RM hybrids						
Dekalb	DKC52-45YGCB	102	208	135	172	19.2
Epley Brothers	E1420Bt	101	207	100	153	19.9
Renk	RK636YGCB	102	197	117	157	21.0
Jung	6580Bt	104	215	123	169	21.6

Late-maturity hybrids, central locations, 2003 (continued).

Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Bu/Acre	% Moisture
Later than 100 RM hybrids (continued)						
Garst	8787YG1	101	202	113	158	21.7
Wensman	W 6315RRBt	101	209	113	161	21.7
Kruger	9404YGCB	101	203	115	159	21.7
Kruger	9306YGCB	105	218	112	165	21.7
Kruger	9305	102	190	110	150	22.0
Dahlman	D51-01	102	191	111	151	22.0
Jung	6573Bt	102	184	126	155	22.2
Pioneer	36N71	102	178	117	147	22.5
Wensman	W 5314Bt	101	186	109	147	22.8
Wensman	W 6421RR	106	201	101	151	23.2
Wensman	W 5417Bt	107	229	109	169	23.2
High Cycle	7601Bt	102	196	101	148	23.4
Stine	8002-35	102	172	90	131	23.4
Stine	8016-23	105	167	116	141	23.7
Epley Brothers	E1493	105	182	110	146	24.0
Kruger	EX 105YGCB	102	193	100	146	24.1
Garst	ND795YG1	102	139	110	125	24.9
Kruger	9206YGRW	102	182	95	138	25.0
Dairyland Stealth	5140	104	201	139	170	25.1
LG Seeds	LG 2518	102	200	106	153	25.4
Hyland Seeds	HL B330	102	187	123	155	25.7
Later than 100 RM averages:			194	112	153	22.8
Central locations, late-maturity averages:			193	115	154	21.4
LSD(0.20)			16	15	11	1.0

Northern locations, 2003.

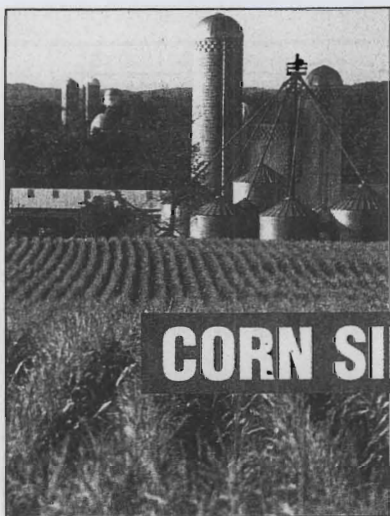
Source / Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Rothsay	Staples	Bu/Acre	% Moisture
82 and earlier RM hybrids						
Kruger	EX 85 RR	82	150	200	175	15.3
Jung	2202	82	183	213	198	16.0
Quality Seed Genetics	2483RR	81	175	218	197	16.5
Quality Seed Genetics	2484RRYGCB	82	172	211	191	16.8
Jung	6205RR/Bt	82	184	200	192	17.3
Hyland Seeds	HL 2232	79	180	188	184	17.3
Dairyland Stealth	1476	78	177	176	177	17.4
Quality Seed Genetics	2479RR	77	187	172	179	17.4
Pioneer	39M85	82	176	199	187	17.5
Quality Seed Genetics	2483YGCB	81	146	238	192	17.7
Quality Seed Genetics	2481RRYGCB	77	183	165	174	17.7
Renk	RK131	80	156	188	172	18.8
82 RM and earlier averages:			172	197	185	17.1
83 to 87 RM hybrids						
Dekalb	DKC35-01RR	85	164	159	161	15.7
Dekalb	DKC35-51RRYGCB	85	161	187	174	15.8
Renk	RK232	85	176	196	186	16.2
Dairyland Stealth	1685	85	147	206	176	16.2

Northern locations, 2003 (continued).

Source / Brand	Hybrid	-Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Rothsay	Staples	Bu/Acre	% Moisture
83 to 87 RM hybrids (continued)						
Seeds 2000	2821Bt	84	165	223	194	16.3
Wensman	W 4085	84	182	231	207	16.6
Dyna-Gro	51K95	84	164	203	183	16.6
Dahlman	R42-15	84	158	190	174	16.7
Dahlman	R1700	86	150	195	172	16.9
Pioneer	39M79	85	178	195	187	16.9
Dyna-Gro	51F85	85	194	202	198	17.0
Dahlman	D42-10Bt	85	199	223	211	17.1
Dahlman	D43-01	86	169	222	195	17.2
LG Seeds	LG 2355	84	195	212	203	17.3
Seeds 2000	2871RRBt	87	178	196	187	17.4
Wensman	W 5081Bt	83	179	225	202	17.4
RAGT semences S.A.	MX152	87	154	211	183	17.6
Wensman	W 5085Bt	85	166	215	191	17.6
Pioneer	39D82	87	171	206	188	17.6
Seeds 2000	2842RRBt	84	197	224	210	17.8
Dairyland Stealth	1483Bt	84	175	214	195	18.0
Wensman	W 6089 RRBt	84	199	198	199	18.1
Quality Seed Genetics	2490RRYGCB	87	182	222	202	18.1
Kaystar	KX-2821RR/Bt	85	156	195	176	18.2
Sabre	2789	87	186	193	189	18.4
Kruger	9491RRYGCB	87	167	227	197	18.4
83 to 87 RM averages:			173	207	190	17.2
88 to 92 RM hybrids						
Renk	RK288	88	178	208	193	16.3
Quality Seed Genetics	2492YGCB	89	174	233	204	16.7
Dekalb	DKC40-63RR	90	193	211	202	17.2
Stine	9201YGCB	89	171	185	178	17.2
Kruger	9392RR	89	163	200	182	17.2
Quality Seed Genetics	2492RRYGRW	89	191	210	200	17.3
Jung	6418RR/Bt	92	169	232	200	17.5
Kruger	9492YGCB	91	183	235	209	17.6
Renk	RK438YGCB	92	181	242	212	17.6
Kaystar	KX-4000RR/Bt	91	157	222	189	17.8
RAGT semences S.A.	MX155	89	170	229	199	17.8
Wensman	W 6117RRBt	92	188	234	211	17.8
Wensman	W 6116RR	91	164	228	196	17.8
LG Seeds	LG 2415	92	175	213	194	17.8
Seeds 2000	2892Bt	89	184	208	196	17.9
Dairyland Stealth	1692	92	155	224	189	17.9
Dahlman	D45-15	92	175	235	205	18.0
Jung	6370Bt	91	189	227	208	18.1
Kruger	9392YGCB	89	185	254	220	18.1
Quality Seed Genetics	2491YGCB	89	165	249	207	18.1
Dahlman	D45-01Bt	90	184	240	212	18.2
Kruger	9392RRYGCB	89	184	230	207	18.2
Quality Seed Genetics	2491RR	89	181	229	205	18.2
Seeds 2000	2921Bt	92	180	240	210	18.2

Northern locations, 2003 (continued).

Source/Brand	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Rothsay	Staples	Bu/Acre	% Moisture
88 to 92 RM hybrids (continued)						
LG Seeds	LG 2407 Bt	92	188	246	217	18.2
Quality Seed Genetics	2494YGCB	92	169	227	198	18.2
Wensman	W 5117Bt	92	197	250	223	18.3
Hyland Seeds	HL2368	92	175	212	194	18.3
Kruger	9491+RRYGCB	88	170	228	199	18.4
Dekalb	DKC42-95RRYGCB	92	165	231	198	18.5
Dairyland Stealth	7191	91	174	228	201	18.6
Dekalb	DKC39-48RRYGCB	89	188	234	211	18.7
Sabre	3110	91	194	221	207	18.8
Hyland Seeds	HL R234	92	184	229	207	19.0
RAGT semences S.A.	MX156	91	179	225	202	19.2
88 to 92 RM averages:			178	227	202	18.0
93 and later RM hybrids						
Stine	9307RRYGCB	93	179	192	185	17.6
Jung	6420RR/Bt	94	195	232	213	17.9
Kaystar	KX-4020Bt	96	169	230	199	18.1
Kruger	9496RR	93	189	221	205	18.2
Quality Seed Genetics	2495RR	93	186	223	205	18.3
Dekalb	DKC47-10RRYGCB	97	184	246	215	18.6
Wensman	W 4212	95	182	221	201	18.8
Gold Country Seed	94-01CB	94	174	243	209	18.8
Pioneer	38P04	95	169	215	192	18.8
Renk	RK488YGCB	97	169	228	198	19.0
Seeds 2000	2953Bt	95	182	225	204	19.1
Quality Seed Genetics	2495+YGCB	93	176	233	205	19.1
Wensman	W 5212Bt	96	174	225	199	19.2
Kruger	9496YGCB	93	198	235	216	19.3
Wensman	W 6212RR	95	153	234	194	19.3
Jung	6432Bt	95	187	233	210	19.3
Jung	2432	94	190	236	213	19.4
Dekalb	DKC44-46RRYGCB	94	181	247	214	19.5
93 and Later RM averages:			180	229	204	18.8
Northern Locations Averages:			176	218	197	17.8
LSD(0.20)			23	23	16	0.8



CORN SILAGE

Results for this year's Minnesota Hybrid Corn Silage Evaluation Program are presented in this bulletin. The program was initiated as a test to evaluate corn hybrids intended for use as silage. Unbiased forage yield and quality information provided by this program will be useful in education activities and in marketing corn hybrids grown for silage.

The program is financed in part by entry fees from private seed companies that chose to enter hybrids for testing, which are listed in this publication. Results this year are from corn silage performance trials established in two regions of extensive corn silage use, southeastern and central Minnesota, and an inaugural site in Ottertail County that represents west-central Minnesota. The locations are in the state's primary dairy regions.

Test Sites

Trials were conducted in southeastern and central Minnesota in 2003. Silage hybrids entered each of these regions were tested at both sites. Region locations are categorized as:

Southeast Dairy Region:

La Crescent (Houston County)
Potsdam (Olmsted County)

Central Dairy Region:

Paynesville (Stearns County)
Melrose (Stearns County)

A new trial was conducted in west-central Minnesota in 2003. Silage hybrids entered in this region were tested at one

site with two replications. The region is categorized as:

West-Central Dairy Region:

Ottertail (Otter Tail County)

Test Procedure

Southeast and Central

Design: Research plots were established at La Crescent, Potsdam, Paynesville and Melrose in randomized block designs with four replications. Hybrids were planted at 33,000 seeds per acre with 30-inch row spacing. Plant nutrients, 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. The whole-plant target harvest timing was a moisture content of 65% across entries at a site. Harvest at La Crescent, Potsdam, Paynesville and Melrose was on September 4, September 3, September 5 and September 2, respectively.

West-central

Design: Research plots were established at Ottertail under central pivot irrigation in randomized complete block design with two replications. Hybrids were planted at 26,000 seeds per acre with 36-

inch row spacing. Plant nutrients, 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 on September 11-12.

Results Provided

The first four tables summarize hybrid yield and forage quality results from La Crescent, Potsdam, Paynesville and Melrose; respectively; the fifth summarizes results from the new location at Ottertail. Relative maturity (RM), moisture content, whole-plant dry matter (DM) yield and silage yield are listed, with hybrids ranked in descending order by RM.

Whole-plant quality concentration traits listed include crude protein (CP), neutral detergent fiber (NDF), in vitro digestibility (IVD), 48-hour neutral detergent fiber digestibility (NDFD) and starch percent. Except for NDFD, all quality-concentration predictions are expressed as a percent of dry matter. NDFD is expressed as a percent of NDF.

Milk parameter estimates of milk per ton (Ton) and milk per acre (Acre) were calculated using a model from the spreadsheet entitled, MILK2000 developed at the University of Wisconsin. MILK2000 approximates animal perfor-

Companies participating in the 2003 hybrid corn silage performance trials:

Agventure, 65064 250 Ave, Kasson, MN 55944

Crows Hybrid Corn Co., 12812 Welcome Lane, Burnsville, MN 55337

Dairyland Seed Company, Inc., P.O. Box 958, West Bend, WI 53095-0958

Dyna Gro Seed Company, W Lake Lansing Road, 102 East, East Lansing, MI 48823

Garst Seed Company, 3366 Lee Lane, Coon Valley, WI 54623

Golden Seed Company, Inc. - Golden Harvest, 1716 La Crescent Street, Apartment 77, La Crosse, WI 54600

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

Land O' Lakes - Croplan Genetics, 1080 County Road F West, Shoreview, MN 55126

Monsanto - Dekalb Genetics, 3100 Sycamore Road, De Kalb, IL 60115

Pioneer Hi-Bred, International Inc., 99 Navaho Avenue, Suite 101A, Mankato, MN 56001

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

Seeds 2000, Box 200, Breckenridge, MN 56520

Syngenta Seeds, 7500 Olson Memorial Highway, Golden Valley, MN 55427

Trelay Seed Company, 11623 Highway 80, Livingston, WI 53554

Wensman Seed Company, P.O. Box 190, Wadena, MN 56482

mance using pounds of milk per ton of silage and per acre of cropland for a given hybrid based on standard cow weight and milk production level (1,350-pound body weight and 90 pounds of milk/day at 3.8% fat).

Values based on field calculations for hybrid moisture and DM yield; lab-determined 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

Hybrids entered in the southeast and central regions differ in dry matter and/or silage yield, silage quality and milk estimates. Because of insufficient replication, hybrid entries in the west-central region showed few significant differences at the 10% level for yield and milk parameter estimates, although there is a difference in crude protein concentration.

NDF is a negative indicator of forage intake and relates to better animal performance. IVD is a laboratory test to estimate digestibility in ruminant livestock, and NDFD estimates digestibility of the

cell wall fraction. IVD, NDFD and starch have a positive effect on animal performance. Starch concentration is associated with corn silage digestion because it is assumed to be 100% digestible. Milk per acre represents the combined impact of yield and quality.

Means and least significant difference (LSD) statistical figures at the 10% level of probability are shown at each location. Where the difference between two selected hybrids in a table is greater than the LSD value, 9 of 10 times there is a real difference for that value: moisture, yield, quality concentration or milk estimate.

Relative maturity (RM), moisture, silage yield and quality traits for corn hybrids planted at La Crescent (Houston County) in 2003.

Brand	Hybrid	RM, Rating	Moisture, %	Yield, Ton/Acre ¹		Concentration, Percent ²					Milk Yield ³	
				DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Producers Hybrids	SS110	116	63.0	9.8	26.5	8.2	45	76	48	30	3,071	30,096
Pioneer	33J57	114	67.4	10.0	30.5	8.5	42	79	51	32	3,301	32,845
Pioneer	34M93	110	60.7	11.8	30.1	8.0	43	79	52	34	3,289	38,810
Dairyland	DST-10930	109	67.1	9.0	27.3	8.4	43	80	53	31	3,346	30,030
Ag Venture	743	108	59.7	9.9	24.5	7.9	42	79	50	36	3,235	31,865
Dairyland HiDF	4200	108	61.2	9.5	24.5	7.9	42	78	49	35	3,183	30,239
Dekalb	DKC58-24RRYGCB	108	58.8	9.9	24.1	8.3	44	77	48	31	3,040	30,020
Dekalb	DKC58-78YGCB	108	61.2	10.4	26.9	8.1	41	81	53	35	3,397	35,159
NK Brand	N64-J9	108	64.2	9.1	25.3	8.2	40	82	54	34	3,537	32,098
High Cycle	7748Bt	108	64.0	9.0	25.1	8.0	43	78	49	33	3,214	29,006
Croplan Genetics	DS107	107	66.5	8.5	25.2	8.1	45	78	52	24	3,110	26,280
NK Brand	N58-D1	107	59.2	10.1	24.7	7.9	40	79	49	34	3,267	32,915
High Cycle	7698Rb	107	61.0	10.1	25.9	8.1	42	79	50	36	3,277	33,016
Ag Venture	696	106	60.0	9.8	24.6	7.7	38	81	49	38	3,391	33,317
Garst	8510YG1RR	106	60.5	9.9	25.2	7.7	42	79	49	34	3,242	32,177
Pioneer	35Y67	106	58.0	10.1	24.2	7.7	41	79	48	34	3,149	31,884
Crows	SR-470	105	63.4	8.6	23.3	7.4	41	78	47	38	3,265	27,916
Golden Harvest	H-8662Bt	105	61.6	10.1	26.2	8.0	43	77	47	35	3,145	31,607
Producers Hybrids	6605	105	61.8	9.1	23.8	7.6	45	76	47	31	3,027	27,546
Trelay	7012	105	55.7	10.1	22.7	8.0	41	80	51	37	3,219	32,351
Ag Venture	600	104	60.0	8.6	21.4	8.2	40	80	49	36	3,277	28,018
Pioneer	35D45	104	62.7	9.2	24.8	8.4	42	78	49	31	3,207	29,585
Producers Hybrids	SS104RR	104	64.6	9.3	26.4	8.1	45	78	51	27	3,159	29,458
Garst	8579RR	101	60.3	9.5	24.0	7.6	40	80	50	37	3,327	31,690
NK Brand	N33-H6	101	63.1	8.7	23.5	8.6	46	75	46	27	2,900	25,158
Croplan Genetics	DS100	100	60.4	9.3	23.3	8.4	47	75	47	29	2,884	26,677
Garst	85901T	100	61.1	9.8	25.1	7.2	42	79	50	35	3,269	31,954
Means			61.7	9.6	25.2	8.0	42	79	50	33	3,212	30,804
LSD (0.10)			1.7	1.1	3.0	0.3	2	1	2	2	174	4,256

¹ DM yield is whole-plant corn yield at 100% dry matter; silage yield is whole-plant corn yield at harvest moisture. ² Concentration description expressed as a % of DM, except NDFD, which is expressed as a % of NDF. Refer to RESULTS PROVIDED text for additional information. ³ Milk estimate values calculated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to RESULTS PROVIDED for additional information.

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Potsdam (Olmsted County) in 2003.

Brand	Hybrid	RM,		Yield, Ton/Acre ¹		Concentration, Percent ²					Milk Yield ³	
		Rating	Moisture, %	DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Producers Hybrids	SS110	116	72.0	9.9	35.4	8.0	50	74	49	25	2,947	29,175
Pioneer	33J57	114	74.3	9.9	38.5	8.6	49	77	52	24	3,128	30,967
Pioneer	34M93	110	70.7	10.5	35.9	7.6	50	75	50	24	2,972	31,280
Dairyland	DST-10930	109	74.1	7.5	28.8	8.2	48	76	50	26	3,040	22,648
Ag Venture	743	108	71.6	8.2	28.7	8.0	49	75	49	27	3,015	24,572
Dairyland HiDF	4200	108	71.9	9.2	32.6	8.1	46	77	50	30	3,153	28,850
Dekalb	DKC58-24RRYGCB	108	70.9	9.2	31.7	8.2	48	76	50	26	3,095	28,551
Dekalb	DKC58-78YGCB	108	71.8	9.1	32.4	8.4	47	77	52	28	3,197	29,173
NK Brand	N64-J9	108	72.7	8.9	32.7	8.2	46	79	53	26	3,269	29,176
High Cycle	7748Bt	108	74.2	9.3	35.9	8.0	50	74	48	24	2,907	26,890
Croplan Genetics	DS107	107	71.8	9.9	35.1	7.7	49	75	50	24	3,059	30,284
NK Brand	N58-D1	107	69.8	10.0	32.9	7.8	46	78	52	28	3,230	32,139
High Cycle	7698Rb	107	70.8	9.6	33.0	8.5	47	77	50	28	3,119	30,020
Ag Venture	696	106	71.9	9.3	33.2	8.0	47	76	50	28	3,112	29,019
Garst	8510YG1RR	106	70.5	10.4	35.3	7.4	48	75	48	27	3,045	31,744
Pioneer	35Y67	106	69.6	10.4	34.1	7.6	45	77	50	31	3,218	33,387
Crows	SR-470	105	74.0	8.6	32.9	8.2	48	76	50	28	3,119	26,667
Golden Harvest	H-8662Bt	105	70.5	9.6	32.5	8.1	48	75	49	28	3,051	29,290
Producers Hybrids	6605	105	73.0	7.0	25.7	8.6	47	77	52	27	3,179	22,094
Trelay	7012	105	71.0	8.9	30.5	8.0	48	76	50	29	3,107	27,497
Ag Venture	600	104	70.6	8.2	28.0	8.3	44	79	52	30	3,313	27,249
Pioneer	35D45	104	71.1	9.0	31.2	8.2	47	76	49	29	3,085	27,842
Producers Hybrids	SS104RR	104	72.1	9.2	33.1	7.9	49	75	49	26	3,025	27,906
Garst	8579RR	101	69.3	10.0	32.6	7.5	45	78	51	32	3,280	32,800
NK Brand	N33-H6	101	68.3	9.9	31.3	8.2	45	77	50	31	3,175	31,512
Croplan Genetics	DS100	100	66.8	9.7	29.3	7.4	50	74	47	27	2,920	28,397
Garst	85901T	100	71.5	8.4	29.6	7.6	47	77	50	29	3,151	26,547
Means			71.4	9.2	32.3	8.0	48	76	50	27	3,108	28,729
LSD (0.10)			1.7	0.9	3.0	0.4	2	2	ns	2	189	3,768

¹ DM yield is whole-plant corn yield at 100% dry matter; silage yield is whole-plant corn yield at harvest moisture. ² Concentration description expressed as a % of DM, except NDFD, which is expressed as a % of NDF. Refer to RESULTS PROVIDED text for additional information. ³ Milk estimate values calculated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to RESULTS PROVIDED for additional information.

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Paynesville (Stearns County) in 2003.

Brand	Hybrid	RM, Rating	Moisture, %	Yield, Ton/Acre ¹		Concentration, Percent ²					Milk Yield ³	
				DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Seeds 2000	3171RR	107	76.7	5.2	22.1	7.3	47	75	47	25	2,921	15,043
Dairyland Stealth	1606	106	67.3	6.4	19.6	7.5	43	79	50	32	3,263	20,883
Pioneer	35Y67	106	65.6	6.5	19.0	6.7	46	77	49	28	3,065	19,999
NK Brand	N59-Q9	106	70.3	6.9	23.1	7.3	45	77	49	28	3,074	21,134
Dairyland DST	10427	104	68.5	6.6	20.8	7.4	46	77	49	27	3,111	20,377
Hyland Seeds	HL S067	104	69.8	8.3	27.5	7.4	51	73	47	22	2,814	23,356
Pioneer	35D45	104	69.8	7.2	23.8	7.5	44	78	50	29	3,221	23,111
Dekalb	DKC53-34RRYGCB	103	66.7	7.5	22.4	7.4	42	79	51	33	3,334	24,838
Hyland Seeds	HL S058	102	68.8	8.3	26.6	7.2	47	76	49	24	3,005	24,942
Trelay	6900	102	69.2	5.7	18.5	7.5	44	79	52	27	3,203	18,257
NK Brand	N45-A6	101	63.8	6.5	17.8	6.9	44	78	50	31	3,187	20,556
NK Brand	NX3360	101	63.4	7.6	20.8	6.8	45	76	47	31	3,032	23,119
Producers Hybrids	547RR	99	61.9	7.3	19.0	7.3	41	77	45	35	3,103	22,497
Pioneer	37F16	98	64.9	6.5	18.6	6.9	44	78	49	30	3,179	20,743
Trelay	5011	98	66.1	6.8	19.9	7.5	47	74	45	29	2,823	19,055
Pioneer	37R71	97	64.8	6.3	17.9	7.0	40	80	51	35	3,390	21,357
Hyland Seeds	HL S041	95	67.3	7.6	23.2	7.7	43	79	51	31	3,289	24,914
Dekalb	DKC44-46RRYGCB	94	63.9	7.4	20.4	6.8	42	79	50	35	3,289	24,256
Garst	8865	90	66.1	7.6	22.3	7.2	46	76	48	30	3,032	22,967
Means			67.1	6.9	21.2	7.2	45	77	49	30	3,123	21,653
LSD (0.10)			4.8	1.3	2.8	0.3	2	2	2	2	204	4,176

¹DM yield is whole-plant corn yield at 100% dry matter; silage yield is whole-plant corn yield at harvest moisture. ²Concentration description expressed as a % of DM, except NDFD, which is expressed as a % of NDF. Refer to RESULTS PROVIDED text for additional information. ³Milk estimate values calculated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to RESULTS PROVIDED for additional information.

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Melrose (Stearns County) in 2003.

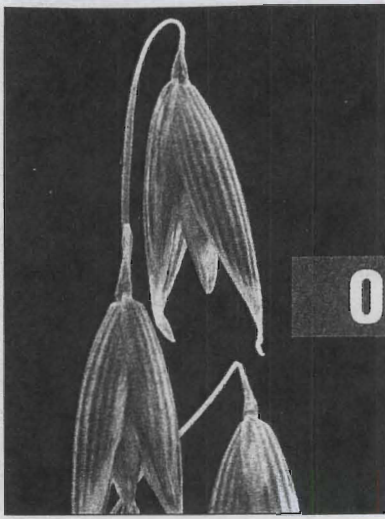
Brand	Hybrid	RM, Rating	Moisture, %	Yield, Ton/Acre ¹		Concentration, Percent ²					Milk Yield ³	
				DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acr
Seeds 2000	3171RR	107	72.2	6.1	21.8	8.2	52	74	49	17	2,617	15,835
Dairyland Stealth	1606	106	66.9	6.9	20.7	7.8	46	78	52	27	3,177	21,762
Pioneer	35Y67	106	67.3	6.2	19.0	7.7	48	76	51	23	2,975	18,515
NK Brand	N59-Q9	106	70.6	6.3	21.3	7.5	47	77	51	24	3,040	19,000
Dairyland DST	10427	104	66.8	6.4	19.4	7.7	49	75	49	25	2,947	18,934
Hyland Seeds	HL S067	104	69.9	6.2	20.6	8.0	53	73	49	17	2,663	16,511
Pioneer	35D45	104	67.6	6.1	18.7	8.1	48	76	50	22	2,905	17,575
Dekalb	DKC53-34RRYGCB	103	66.0	6.5	19.0	7.8	49	74	47	27	2,789	18,055
Hyland Seeds	HL S058	102	71.0	5.6	19.3	7.5	50	76	52	16	2,687	15,047
Trelay	6900	102	68.1	6.5	20.5	7.6	48	76	49	22	2,860	18,662
NK Brand	N45-A6	101	59.7	6.9	17.2	7.6	50	73	47	26	2,705	18,732
NK Brand	NX3360	101	66.6	6.4	19.1	8.0	53	72	46	21	2,585	16,475
Producers Hybrids	547RR	99	66.2	5.6	16.4	8.1	51	72	46	23	2,676	14,852
Pioneer	37F16	98	63.9	6.1	16.9	7.8	48	75	48	26	2,909	17,745
Trelay	5011	98	66.6	7.1	21.3	7.6	53	71	45	24	2,598	18,511
Pioneer	37R71	97	63.4	6.7	18.2	7.8	47	75	47	29	2,890	19,215
Hyland Seeds	HL S041	95	64.2	6.4	17.9	7.7	47	76	49	29	3,010	19,264
Dekalb	DKC44-46RRYGCB	94	62.4	7.0	18.7	7.2	49	74	48	28	2,835	19,915
Garst	8865	90	63.2	6.0	16.4	7.6	51	74	48	25	2,782	16,762
Means			66.5	6.4	19.1	7.8	49	75	49	24	2,824	17,967
LSD (0.10)			2.2	ns	2.3	ns	2	2	3	3	249	3,077

¹ DM yield is whole-plant corn yield at 100% dry matter; silage yield is whole-plant corn yield at harvest moisture. ² Concentration description expressed as a % of DM, except NDFD, which is expressed as a % of NDF. Refer to RESULTS PROVIDED text for additional information. ³ Milk estimate values calculated using spreadsheet MILK2000 developed at the University of Wisconsin. Refer to RESULTS PROVIDED for additional information.

Relative maturity (RM), whole-plant moisture, silage yield and quality traits for corn hybrids planted at Ottertail (Otter Tail County) in 2003.¹

Brand	Hybrid	RM, Rating	Moisture, %	Yield, Ton/Acre ²		Concentration, Percent ³					Milk Yield ⁴	
				DM	Silage	CP	NDF	IVD	NDFD	Starch	Lb/Ton	Lb/Acre
Hyland	HL S058	102	66.2	6.6	19.6	8.2	44	80	54	30	3,369	22,335
Dyna Gro	DG5227	100	61.4	6.7	17.5	7.5	44	79	52	32	3,255	21,926
Hyland	HL S041	98	61.8	7.0	18.3	8.1	40	81	53	35	3,484	24,432
Mycogen	TMF 2M405	97	62.6	7.4	19.8	8.2	44	78	50	33	3,181	23,519
Producer Hybrid	5611	96	62.8	7.0	18.8	7.8	41	80	53	35	3,426	23,944
Mycogen	2D421	95	57.4	7.1	16.6	7.7	42	79	50	34	3,171	22,481
Wensman	W4164	93	60.7	6.6	16.7	7.8	43	79	51	33	3,229	21,203
Dyna Gro	DG5195	92	63.3	6.1	16.7	8.4	43	80	54	33	3,420	20,987
Hyland	HL S034	90	58.9	6.8	16.6	7.9	42	79	51	36	3,242	22,172
Means			61.7	6.8	17.9	8.0	43	79	52	33	3,309	22,555
LSD (0.10)			ns	ns	ns	0.3	ns	ns	ns	ns	ns	ns

¹ Planted April 26-27 at 26,000 seeds / acre on 36 rows; central pivot irrigation; harvested September 11-12. ² DM yield is whole-plant corn yield at 100% dry matter; silage yield is whole-plant corn yield at harvest moisture. ³ CP is crude protein, NDF is neutral detergent fiber, IVD is in vitro digestibility, and NDFD is NDF digestibility; concentrations are expressed as a % of DM, except NDFD, which is expressed as a % of NDF. ⁴ Milk estimate values calculated using spreadsheet MILK2000 developed by the University of Wisconsin.



OAT

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 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 achieve a successful infection. The Reaction Type value gives the size of the pustule, which indicates how 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 BYDV (red leaf) susceptibility (score of 6 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 2.4 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

AC Assiniboia – Late maturity, high yield, medium height, very good lodging resistance, high test weight and groat percentage. Almost brown seed. Good resistance to crown rust and smut, tolerance to red leaf. Selected by Cereal Research Centre, Agriculture and Agri Food Canada in Winnipeg. Released in 1995.

Belle – Late maturity, medium yield, tall, good lodging resistance, high test weight and very high groat percentage. Yellow seed. Resistant to crown rust and smut, some tolerance 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)**

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**

Ebeltoft – Late maturity, short, medium yield, good lodging resistance, fair test weight and groat percentage. Ivory seed. Modest resistance to crown rust, resistant to smut, good tolerance to red leaf. Selected at N.D. AES. Released in 1999.

Gem – Medium-late maturity, high yield, medium height, fair lodging resistance, fair test weight and groat percentage. Yellow seed. Resistant to crown rust and smut, good tolerance 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)**

Oat yield, (% of mean) off-station locations, 2003 only.

Variety	Roseau	Stephen	Wells ¹	Winona ¹
Riser	–	–	93	91
Dane	–	–	92	86
Reeves	67	82	87	102
Moraine	89	93	108	113
Richard	95	104	93	92
Wabasha	93	100	81	104
Rodeo	98	111	101	116
Vista	98	97	116	87
Gem	99	92	88	91
Sesqui	112	95	119	102
Morton	90	99	114	99
Leonard	109	102	106	100
HiFi	96	99	–	–
Belle	96	92	102	117
Drumfin	118	107	–	–
Ebeltoft	114	111	–	–
Loyal	104	101	–	–
Young's	120	109	–	–
AC Assiniboia	103	108	–	–
Location Mean (Bu/Acre)	143	140	76	83
LSD 0.05 (% of Mean)	21.5	12.2	15.7	22.8

¹ Organic farmer fields.

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

Jerry – Medium maturity, medium yield, tall, good lodging resistance, very high test weight, high groat percentage. Ivory seed. Susceptible to crown rust and smut, tolerant to red leaf. Selected at N.D. AES. Released in 1994. Because of smut susceptibility, planting only treated seed is recommended. **PVP** (94)

Kildeer – Medium maturity, high yield, short, good lodging resistance, medium test weight and groat percentage. Ivory seed. Susceptible to crown rust and smut and tolerant to red leaf. Selected at N.D. AES. Released in 2001. Because of smut susceptibility, planting only treated seed is recommended.

Leonard – Medium-late maturity, high yield, medium height, fair lodging resistance, medium 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.

Milton – Medium-late maturity, medium yield, medium height, good lodging resistance, medium test weight and groat percentage. Yellow seed. Modest resistance to crown rust, resistant to smut, susceptible to red leaf. Selected at Minn. AES. Released in 1994.

Moraine – Early maturity, medium yield, medium height, 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** (94)

Morton – Medium-late maturity, high yield, tall, good lodging resistance, 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, medium yield, tall, fair lodging resistance, high test weight and 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, medium test weight and groat percentage. Yellow seed. Good resistance to crown rust and 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. Resistant to crown rust and smut, susceptible to red leaf. Selected at S.D. AES. Released in 1998.

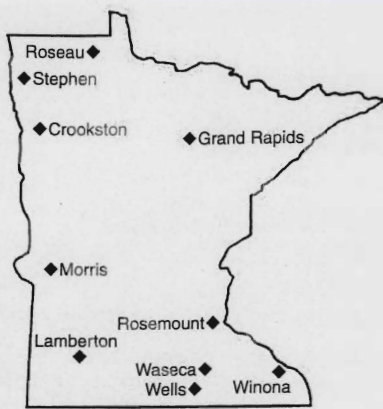
Rodeo – Medium-late maturity, high yield, very good lodging resistance, fair test weight, medium groat percentage. Yellow seed. Susceptible to crown rust and smut, tolerant to red leaf. Selected at Ill. AES. Released in 1996. Because of smut susceptibility, planting only treated seed is recommended. **PVP** (94)

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

Oat yield, percent of mean, by location, 2001-2003.

Variety	Rosemount	Waseca	Lamberton	Morris	Average of 4 locations	Crookston ¹	Grand Rapids ²	Average of 6 locations
Reeves	93	99	92	82	91	87	71	83
Moraine	102	99	92	90	95	92	91	94
Richard	96	97	98	96	97	107	114	101
Gen	97	95	100	91	96	96	96	96
Wabasha	99	97	92	101	98	100	108	99
Rodeo	102	100	105	114	106	101	114	106
Vista	105	103	102	110	105	102	92	103
Sesqui	102	97	104	107	103	111	92	102
Drymln	104	105	105	106	105	110	114	108
HiFi	106	104	100	101	103	103	113	105
Leonard	107	107	114	108	109	97	111	107
Morton ²	104	88	91	97	95	118	121	106
Belke	96	101	97	94	97	93	92	96
Loyal	98	100	103	105	102	94	87	98
Eibeltsoft	90	96	95	95	94	107	105	93
Location Mean (Bu./Acre)	74	87	85	99	86	119	105	93
LSD 0.05 (% of Mean)	8.6	8.1	8.1	8.1	4.1	9.8	15.5	4.4

¹ Data from 2001 and 2003 only. ² Data from 2002 and 2003 only.



Oat Trial Locations.

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.

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

Wabasha – Medium maturity, high yield, tall, good lodging resistance, medium test weight, high groat percentage. White seed. Moderately susceptible to crown rust, resistant to smut, tolerant to red leaf. Selected at Minn. AES. Released in 2001. **PVP** (pending)

Special-Purpose Variety

Paul – Hulless. Medium-late maturity, high yield for hulless variety, 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)

Varieties Not Adequately Tested

NEW! Drumlin – Medium-late maturity; very high yield, fair lodging resistance, medium test weight and groat percentage, yellow seed. Resistant to crown rust and smut, good 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)

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

Oat traits, 2001-2003; disease data 2003 only.

Variety	Days After Planting To Heading	Height, Inches	Lodging, 1 = Erect 5 = Flat	Test Weight, Lb/Bu	Groat %	Crown Rust ¹		Smut Score ³	BYDV Score ⁴
						Amount Infected	Reaction Type ²		
Reeves	58	37	2.5	40.8	71.6	10	MR-MS	MS	6
Moraine	59	36	1.7	39.3	71.9	5	R-MR	R	4
Richard	60	37	1.8	38.7	69.5	15	MR-MS	R	6
Gem	61	35	2.1	38.0	68.9	1	R-MR	MR	4
Wabasha	61	35	1.7	38.6	72.0	5	MR-MS	R	6
Rodeo	61	35	1.6	37.9	70.1	5	MR	S	2
Vista	62	37	2.4	39.4	71.0	1	R-MR	R	6
Sesqui	63	34	2.1	39.4	67.6	10	MS	R	4
Drumlin	63	35	2.1	38.3	70.7	1	R	MR	3
HiFi	63	37	1.7	38.7	68.6	10	S-MS	S	3
Leonard	63	35	2.1	37.2	70.6	5	MR-MS	R	2
Morton ⁵	64	40	1.4	39.5	70.0	5	R-MR	R	4
Belle	64	35	1.8	39.0	73.8	1	MR-R	MR	7
Loyal	64	39	2.4	38.6	67.2	5	MR-R	MR	6
Ebeltoft	65	33	1.9	38.0	70.0	15	MS-MR	MR	3
Mean	62	36	2.0	38.7	70.2				

¹ 2003 data only from artificially inoculated nursery. ² R = resistant, MR = moderately resistant, MS = moderately susceptible and S = susceptible. ³ Artificially inoculated, R = resistant, MR = moderately resistant, MS = moderately susceptible and S = susceptible. ⁴ 1 = no symptoms and 9 = dead. ⁵ Agronomic data from 2002 and 2003 only.



HARD RED SPRING WHEAT

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 and year of release within variety categories. Only new varieties or those varieties with better than susceptible reaction to scab are being tested.

Variety Selection Criteria

Although all data presented should be considered when choosing wheat varieties, the scab epidemics in the hard red spring wheat growing areas of the state have demonstrated the clear need to give greater weight to selecting varieties for their tolerance to this devastating disease. Scab evaluations include *disease severity*, based on visual spread of the disease on the spike, and *grain soundness*, which reflects the variety's ability to maintain plump, sound kernels. These ratings should be considered together to reduce risk of loss. The use of more than one variety to provide different days to

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

Characteristics of hard red spring wheat varieties.

Variety	Days to Heading ¹	Height, Inches ¹	Straw Strength ²	Test Weight (Lb/Bu)		Protein (%) ³		Baking Quality ⁴	Pre-Harvest Sprouting
				2003	2-year	2003	2-year		
Ingot	63	38	Medium	64.2	62.4	15.2	15.1	Medium-High	Susceptible
Briggs	63	35	Medium	62.7	61.0	14.7	14.9	—	—
Oklee	64	32	Medium	63.4	61.7	15.3	15.2	Low-Medium	Resistant
Walworth	65	34	Medium	61.7	59.8	15.0	15.0	Medium-High	Resistant
Dapps	65	37	Medium	61.8	—	16.5	—	—	Resistant
Oxen	65	32	M. Strong	61.9	59.7	14.7	14.8	High-Medium	Resistant
Alsen	66	33	Strong	62.7	61.3	15.3	15.6	High	Resistant
Reeder	66	34	Strong	62.3	60.5	14.9	14.8	Medium-High	Resistant
Knudson	66	32	M. strong	62.3	60.7	14.0	14.4	Medium-High	Resistant
Mercury	66	29	Strong	61.8	59.8	14.3	14.5	Medium	Mod. Susceptible
Parshall	66	39	Strong	63.4	61.9	15.1	15.2	High-Medium	Resistant
Russ	66	36	M. Strong	62.1	59.7	14.1	14.4	High-Medium	Resistant
Hanna	66	38	M. Strong	61.9	60.4	14.6	14.9	High	Resistant
2375	67	32	Medium	62.2	60.4	14.9	14.9	Medium	Resistant
Dandy	67	36	V. Strong	63.2	61.5	14.3	14.5	Low	Mod. Susceptible
HJ98	67	32	Medium	61.8	59.8	14.3	14.5	Medium-Low	Resistant
NorPro	68	31	Strong	61.6	59.8	14.5	14.7	Medium	Resistant
Verde	68	32	M. Strong	61.6	59.8	13.9	14.3	Low-Medium	Resistant
Granite	69	33	V. Strong	63.7	62.2	15.3	15.4	—	Resistant
Ivan	69	31	V. Strong	61.2	60.0	13.2	13.7	Low	Resistant
Marshall	69	31	Strong	61.7	59.6	13.5	13.8	Low	Resistant
Mean	66	34	—	62.5	60.7	14.8	14.8		
LSD	1	1	—	0.6	0.6	0.5	0.4		

¹ 2003 data. ² 2000-2003 data. ³ 12% moisture basis. ⁴ 2001 & 2002 crop.

Disease reactions of hard red spring wheat varieties.

Variety	Leaf Rust ¹	Stem Rust ¹	Other Leaf Diseases ¹	Scab	
				Disease Severity ¹	Grain Soundness ²
Ingot	MS	R	MS	MR-MS	2.0
Briggs	MR-MS	R	MR	MR-MS	3.0
Oklee	MS	R	MR	MR-MS	2.5
Walworth	MS	R	MS	MR-MS	2.5
Dapps	MR	R	MR-R	-	-
Oxen	MS	R	MS	MS-S	3.0
Alsen	MR	R	MR-R	MR	2.0
Reeder	MS	R	MR-R	MS	3.5
Knudson	R	R	MR-R	MR-MS	2.5
Mercury	MS	R	MR	S	5.0
Parshall	MS	R	MR-R	MR-MS	2.0
Russ	MS	R	MS	MR-MS	3.0
Hanna	MS	R	MR	MR	2.0
2375	MS	R	S	MR-MS	2.5
Dandy	MS	R	MR	MS	3.5
HJ98	MS	R	MS	MS	3.0
NorPro	MR	R	MR-R	MS	3.5
Verde	MR-MS	R	MR-R	MS	3.5
Granite	MS	R	MR	MR-MS	2.5
Ivan	R	R	MR-R	MS-S	4.0
Marshall	MS	R	MS	MS	3.5

¹ R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

² Ability to maintain plump, sound kernels under scab epidemics: 1=good, 5=poor.

heading and use of different seeding dates is highly recommended to reduce risk. Variety descriptions do not provide information on scab resistance. Table information should be used.

General Purpose Varieties

Oklee – Awned, early-midseason maturity, medium height. Resistant to stem rust and moderately susceptible to leaf rust. Moderately resistant to other leaf diseases. Medium yield and high test weight. Medium straw strength and high protein percent. Released by Minn. AES and USDA-ARS in 2003. **PVP (pending)**

Hanna – Awned, midseason maturity, tall. Resistant to stem rust and moderately susceptible to leaf rust. Moderately resistant to other leaf diseases. Low to medium yield and medium test weight. Moderately strong straw. Medium to high protein percent. Released by AgriPro in 2001. **PVP (94)**

Knudson – Awned, midseason-late maturity, semidwarf. Resistant to stem

rust and to leaf rust. Moderately resistant to other leaf diseases. High yield and medium test weight. Moderately strong straw. Medium protein percent. Released by AgriPro in 2001. **PVP (94)**

NorPro – Awned, midseason-late maturity, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Moderately resistant to other leaf diseases. Medium to high yield and low to medium test weight. Strong straw. Medium protein percent. Released by AgriPro in 1999. **PVP (94)**

Parshall – Awned, midseason maturity, tall. Resistant to stem rust and moderately susceptible to leaf rust. Moderately resistant to other leaf diseases. Low to medium yield and high test weight. Strong straw. High protein percent. Released by N.D. AES in 1999. **PVP (94)**

Reeder – Awned, midseason maturity, medium height. Resistant to stem rust and moderately susceptible to leaf rust. Moderately resistant to other leaf

diseases. Medium to high yield and medium test weight. Strong straw. Medium protein percent. Released by N.D. AES in 1999. **PVP (94)**

HJ98 – Awned, midseason-late maturity, semidwarf. Resistant to stem rust and moderately susceptible to leaf rust. Moderately susceptible to other leaf diseases. High yield and low to medium test weight. Medium straw strength. Medium protein percent. Released by Minn. AES and USDA-ARS in 1998. **PVP (94)**

Ingot – Awned, early, tall. Resistant to stem rust and moderately susceptible to leaf rust. Moderately susceptible to other leaf diseases. Low to medium yield and high test weight. Moderately strong straw. Medium to high protein percent. Released by S.D. AES in 1998. **PVP (94)**

Ivan – Awned, late maturity, semidwarf. Resistant to stem rust and to leaf rust. Moderately resistant to other leaf diseases. Medium to high yield and medium test weight. Very strong straw. Low to medium protein percent. Released by AgriPro in 1998. **PVP (94)**

Mercury – Awned, midseason maturity, semidwarf. Resistant to stem rust. Moderately susceptible to leaf rust. Moderately resistant to other leaf diseases. High yield and low to medium test weight. Strong straw. Medium protein percent. Released by NorthStar Genetics in 1997.

Oxen – Awned, early-midseason, semidwarf. Resistant to stem rust and moderately susceptible to leaf rust. Moderately susceptible to other leaf diseases. High yield and low to medium test weight. Moderately strong straw. Medium protein percent. Released by S.D. AES in 1996. **PVP (94)**

Russ – Awned, early-midseason maturity, medium height. Resistant to stem rust and moderately susceptible to leaf rust. Moderately susceptible to other leaf diseases. Medium yield and low to medium test weight. Moderately strong straw. Medium to low protein percent. Released by S.D. AES in 1995. **PVP (94)**

Verde – Awned, late maturity, semi-dwarf. Resistant to stem rust and moderately resistant to leaf rust. Moderately resistant to other leaf diseases. Medium yield and low to medium test weight. Moderately strong straw. Medium protein percent. Released by Minn. AES and USDA-ARS in 1995. **PVP (94)**

2375 – Awned, midseason maturity, medium height. Resistant to stem rust and moderately susceptible to leaf rust. Susceptible to other leaf diseases. Low to medium yield and medium test weight. Medium straw strength. Tolerant to loose smut. Moderately susceptible to shattering. Medium protein percent. Released by Pioneer Hi-Bred in 1988. Sold by N.D. State University Research Foundation 1990. **PVP (94)**

Marshall – Awned, late maturity, semi-dwarf. Resistant to stem rust and moderately susceptible to leaf rust. Moderately susceptible to other leaf diseases. Low to medium yield and test weight. Strong straw. Low to medium protein percent. Released by Minn. AES and USDA-ARS in 1982.

Walworth – Awned, early maturity, medium height. Resistant to stem rust and moderately susceptible to leaf rust. Moderately susceptible to other leaf diseases. Medium to high yield and low to medium test weight. Medium straw strength. Medium protein percent. Released by S.D. AES in 2001. **PVP (94)**

Alsen – Awned, midseason maturity, medium height. Resistant to stem rust and moderately resistant to leaf rust. Moderately resistant to other leaf diseases. Low to medium yield and high test weight. Strong straw. High protein percent. Released by N.D. AES in 2000. **PVP (94)**

Dandy – Awned, midseason-late maturity, medium height. Resistant to stem rust and moderately susceptible to leaf rust. Moderately resistant to other leaf diseases. High yield and high test weight. Very strong straw. Medium to low protein percent. Released by NorthStar Genetics in 1999. **PVP (94)**

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

Variety	Crookston			Roseau ¹		Stephen		
	2003	2-year	3-year	2003	2-year	2002	2-year	3-year
Ingot	92	93	94	102	103	99	92	94
Briggs	91	100	-	110	-	105	103	-
Oklee	97	104	107	95	100	96	95	95
Walworth	94	99	100	104	103	95	99	102
Dapps	98	-	-	94	-	97	-	-
Oxen	92	93	95	101	101	97	97	99
Alsen	91	97	95	92	95	100	103	104
Reeder	92	96	100	99	103	104	102	103
Knudson	102	103	102	107	107	106	104	102
Mercury	102	106	107	104	108	94	104	102
Parshall	98	101	98	96	100	85	83	87
Russ	98	95	95	112	102	108	103	103
Hanna	97	98	95	93	91	105	102	105
2375	107	99	100	101	99	90	93	97
Dandy	117	111	110	101	102	90	92	94
HJ98	113	107	101	110	99	115	112	107
NorPro	93	92	93	98	97	106	104	100
Verde	106	101	102	94	89	93	99	99
Granite	93	89	-	87	-	101	97	-
Ivan	101	102	102	104	104	112	114	111
Marshall	99	87	85	100	98	107	102	100
Mean (Bu/Acre)	82.9	73.5	73.3	93.5	74.6	74.9	60.3	51.3
LSD	11	8	7	12	11	14	11	11

¹ Roseau 2002 was flooded. 2-year data are 2001 and 2003.

Varieties Not Adequately Tested

Granite – Awned, late maturity, semi-dwarf. Resistant to stem rust and moderately susceptible to leaf rust. Moderately resistant to other leaf diseases. Medium yield and high test weight. Very strong straw. High protein. Released by Western Plant Breeders in 2002. **PVP (94)**

Briggs – Awned, early maturity, medium height. Resistant to stem rust and moderately resistant to leaf rust. Moderately resistant to other leaf diseases. Medium yield and high test weight. Medium straw strength. High protein percent. Released by S.D. AES in 2002. **PVP (94)**

Dapps – Awned, midseason maturity, tall. Resistant to stem rust and moderately resistant to leaf rust and other leaf diseases. Low yield and medium test weight. Medium straw strength and high protein percent. Released by NDSU Research Foundation in 2003. **PVP (pending)**

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

Line	Lamberton			Morris			St. Paul			Waseca		
	2003	2-year	3-year	2003	2-year	3-year	2003	2-year	3-year	2003	2-year	3-year
Ingot	91	87	96	96	99	96	98	99	92	97	95	94
Briggs	95	95	—	87	94	—	96	95	—	96	97	—
Oklee	98	103	97	85	92	93	84	94	95	101	107	103
Walworth	95	94	97	109	103	104	109	106	106	96	104	104
Dapps	86	—	—	84	—	—	96	—	—	94	—	—
Oxen	111	103	107	115	110	108	111	113	113	108	113	112
Alsen	95	89	96	89	87	82	95	92	93	85	84	88
Reeder	107	99	104	110	107	109	109	107	105	99	102	101
Knudson	113	109	108	103	105	101	109	103	106	111	111	108
Mercury	102	102	109	114	107	103	108	107	112	107	105	105
Parshall	76	74	85	90	90	91	108	100	93	99	100	96
Russ	102	97	101	100	99	104	105	100	99	97	99	101
Hanna	80	75	80	93	89	89	98	90	87	91	87	89
2375	97	86	92	97	97	98	81	83	88	82	82	88
Dandy	108	111	110	106	106	103	110	113	109	106	102	100
HJ98	110	107	108	108	102	102	114	107	106	103	101	104
NorPro	113	108	111	101	103	108	104	105	111	100	101	103
Verde	107	98	95	103	98	102	104	98	99	100	100	100
Granite	121	110	—	112	108	—	99	104	—	101	95	—
Ivan	116	108	107	106	104	106	88	87	91	101	98	100
Marshall	92	79	88	102	100	99	89	94	96	89	83	90
Mean (Bu/Acre)	50.9	43.6	51.7	77.8	63.7	61.9	85.4	77.7	73.6	89.1	61.0	61.2
LSD	14.2	10.3	8.5	11.7	9.4	8.4	12.1	9.8	9.4	12.6	11.1	9.1

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

Variety	State			North ¹			South ²			On-Farm		
	2003	2-year	3-year	2003	2-year	3-year	2003	2-year	3-year	2003	2-year	3-year
Ingot	97	96	95	98	95	96	96	96	94	95	90	93
Briggs	98	99	—	102	103	—	94	97	—	101	104	—
Oklee	94	99	99	96	99	101	92	99	97	104	103	102
Walworth	101	102	102	98	100	102	103	103	103	101	101	103
Dapps	93	—	—	96	—	—	91	—	—	88	—	—
Oxen	105	105	105	97	97	98	111	111	110	110	108	107
Alsen	92	92	93	94	98	98	90	89	90	95	96	95
Reeder	103	102	103	99	99	102	106	105	105	100	99	101
Knudson	107	106	105	105	105	103	109	107	106	102	110	—
Mercury	105	106	107	101	105	106	108	106	107	101	105	105
Parshall	94	93	93	93	94	95	95	93	92	95	90	91
Russ	103	100	100	106	102	99	101	99	101	—	—	—
Hanna	95	91	91	98	98	97	92	87	87	97	90	—
2375	93	91	94	100	97	99	88	87	91	—	—	—
Dandy	105	106	104	103	102	103	107	108	105	—	—	—
HJ98	110	107	104	112	109	102	109	105	105	—	—	—
NorPro	102	102	103	99	98	96	104	105	108	103	94	97
Verde	100	99	98	97	99	97	103	99	99	105	107	102
Granite	101	99	—	93	91	—	106	104	—	96	97	—
Ivan	103	102	102	105	106	105	101	98	100	—	—	—
Marshall	97	93	94	102	95	93	93	91	94	—	—	—
Mean (Bu/Acre)	79.2	65.7	63.4	83.7	72.3	65.4	75.8	61.5	62.1	85.2	59.7	60.3
LSD	5.2	4.3	3.5	7.1	7.3	5.5	4.9	5.2	4.5	9.6	8.2	5.8

¹ 2-year data are from 2003 Crookston, Roseau and Stephen and 2002 Crookston and Stephen; 3-year data add 2001 Crookston, Roseau and Stephen.

² Data from Lamberton, Morris, St. Paul and Waseca.

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

WINTER WHEAT

Winter wheat varieties are compared in trial plots at 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 Selection Criteria

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.

Varieties

Culver – Awned, early maturity, semi-dwarf. Moderate winterhardiness. Moderately strong straw. Resistant to stem rust and moderately susceptible to leaf rust. Medium test weight and protein. Released by Neb. AES and USDA-ARS 1998. **PVP** (94)

Ransom – Awned, medium-late maturity, medium height. Moderately high winterhardiness. Medium straw strength. Moderately resistant to stem rust and to leaf rust. Medium-low test weight and protein. Released by N.D. AES 1998. **PVP** (94)

Harding – Awned, medium maturity, medium height. Moderate winterhardiness. Medium straw strength. Moderately resistant to stem rust and to leaf rust. Medium to high test weight and protein. Released by S.D. AES 1997. **PVP** (94)

Tandem – Awned, early maturity, medium height. Moderate winterhardiness. Medium straw strength. Moderately resistant to stem rust and susceptible to leaf rust. High test weight and medium to high protein. Released by S.D. AES 1997. **PVP** (94)

Windstar – Awned, early-medium maturity, semi-dwarf. Moderate winterhardiness. Strong straw. Moderately resistant

to stem rust and to leaf rust. Medium weight and protein. Released by Neb. AES and USDA-ARS 1996. **PVP** (94)

Arapahoe – Awned, early maturity, medium height. Moderate winterhardiness. Moderately strong straw. Resistant to stem rust and moderately resistant to rust. Medium test weight and protein. Released by Neb. AES and USDA-ARS 1988. **PVP** (94)

Seward – Awned, medium-late maturity, tall. Moderately high winterhardiness. Medium straw strength. Moderately resistant to stem rust and susceptible to leaf rust. Low to medium test weight and low protein. Released by N.D. AES 1997. **PVP** (94)

Roughrider – Awned, medium-late maturity, tall. Very high winterhardiness. Medium straw strength. Resistant to stem rust and susceptible to leaf rust. Medium test weight and medium to high protein. Released by N.D. AES 1975. **PVP** (94)

Varieties Not Adequately Tested

Wahoo – Awned, early, semi-dwarf. Moderate winterhardiness. Moderate strong straw. Resistant to stem rust and susceptible to leaf rust. Low test weight and protein. Released by Neb. AES 2000. **PVP** (94)

Millennium – Awned, early-medium maturity, medium height. Moderate winterhardiness. Strong straw. Resistant to stem rust and moderately resistant to rust. Medium test weight and protein. Released by Neb. AES and USDA-ARS 1999. **PVP** (94)

Nuplains – Awned, medium maturity, short-semidwarf. Moderate winterhardiness. Strong straw. Moderately resistant to stem rust and to leaf rust. Medium weight and protein. White grain color. Released by USDA-ARS and the Neb. S.D. and Wyo. AES 1999. **PVP** (94)

Jerry – Awned, medium-late maturity, medium height. Moderately strong straw. Resistant to stem rust and moderately resistant to leaf rust. Medium test weight and medium to high protein. Released by N.D. AES, 2001.

Nekota – Awned, early maturity, semi-dwarf. Medium test weight and medium protein. Further evaluation required for ratings on winterhardiness, lodging, and reaction to leaf and stem rust. Co-released by the Neb. and S.D. AES and USDA, 1997.

CDC Falcon – Awned, midseason maturity, semi-dwarf. Medium test weight and medium protein. Further evaluation required for ratings on winterhardiness,

lodging, and reaction to leaf and stem rust. Developed by Crop Development Centre, Saskatchewan, 2000. Marketed by Western Plant Breeders. **FVP (94)**

CDC Raptor – Awned, medium-late maturity, semi-dwarf. Medium test weight and medium protein. Further evaluation required for ratings on winterhardiness, lodging, and reaction to leaf and stem rust. Developed by Crop Development Centre, Saskatchewan, 2002.

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

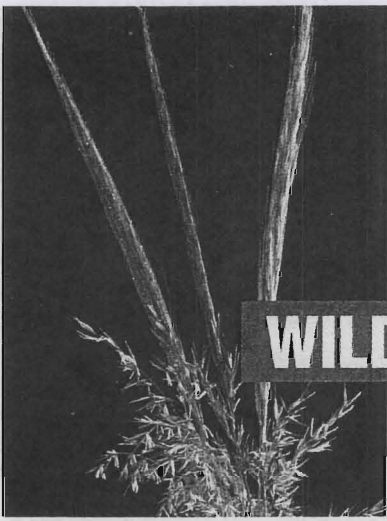
Growth characteristics of winter wheat varieties.

Variety	Heading, Days From Jan 1	Height, Inches	Winter-Hardiness ¹	Lodging Rating	Test Weight, Pounds/Bushel		Protein % at 12% Moisture		Rust Resistance ²	
					2003	2-year	2003	2-year	Leaf	Stem
Nekota	158	34.3	–	–	61.7	–	12.5	–	–	–
Tandem	159	41.6	M	Medium	61.5	60.2	13.7	14.0	S	MR
Arapahoe	160	42.1	M	M. Strong	60.3	58.8	13.1	13.5	MR	MR
Culver	160	36.7	M	M. Strong	60.9	59.1	13.1	13.3	MS	R
Windstar	161	36.0	M	Strong	60.7	59.5	12.6	12.9	MR-MS	MR
Millennium	161	40.9	M	Strong	61.3	59.5	13.2	13.3	MR	R
Wahoo	161	35.8	M	M. Strong	59.3	57.7	13.0	13.2	S	R
Nuplains ³	162	34.7	M	Strong	61.6	60.1	13.4	13.8	MR	MR
Harding	162	42.1	M	Medium	61.2	60.3	13.5	13.9	MR	MR
Ransom	162	42.1	MH	Medium	60.2	58.5	12.8	13.0	MR	MR
CDC Falcon	162	33.3	–	–	61.5	–	12.7	–	–	–
Roughrider	163	45.7	VH	Medium	60.8	59.4	13.7	14.1	S	R
Jerry	163	41.3	–	M. Strong	60.4	59.4	13.3	13.6	MR	R
Seward	165	45.3	MH	Medium	61.1	59.3	12.2	12.6	S	MR
CDC Raptor	165	35.8	–	–	59.8	–	12.3	–	–	–
Mean	162	39.5			60.8	59.4	13.1	13.5		
LSD	1.1	2.5			NS	1.3	0.7	0.6		

¹ Winterhardiness rating is a relative ranking that includes data from North Dakota, Nebraska and South Dakota: VH=very high, H=high, MH=moderately high, M=moderate. ² R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible. ³ White seeded.

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

Variety	St. Paul			Lamberton			Morris			Roseau			All Locations		
	2003	2-year	3-year	2003	2-year	3-year	2003	2-year	3-year	2003	2-year	2001	2003	2-year	3-year
Nekota	96	–	–	97	–	–	100	–	–	–	–	–	98	–	–
Tandem	111	109	99	97	101	–	100	110	–	–	–	109	103	107	105
Arapahoe	123	108	110	108	110	–	110	108	–	–	–	101	115	108	105
Culver	86	84	97	93	96	–	107	100	–	–	–	111	94	93	100
Windstar	124	130	130	111	115	–	131	117	–	–	–	105	122	121	120
Millennium	115	111	110	114	115	–	115	112	–	–	–	119	115	113	114
Wahoo	78	76	90	95	93	–	98	91	–	–	–	105	89	86	94
Nuplains	104	108	111	84	90	–	117	105	–	–	–	95	102	102	105
Harding	108	114	109	84	95	–	108	101	–	–	–	96	100	104	105
Ransom	85	96	96	110	119	–	80	104	–	–	–	98	91	106	104
CDC Falcon	111	–	–	136	–	–	110	–	–	–	–	–	118	–	–
Roughrider	74	80	78	76	77	–	59	77	–	–	–	90	70	78	80
Jerry	106	123	–	125	121	–	107	120	–	–	–	–	112	122	–
Seward	90	99	99	107	106	–	66	87	–	–	–	93	88	97	97
CDC Raptor	110	–	–	104	–	–	113	–	–	–	–	–	109	–	–
Mean (Bu/Acre)	80.9	58.9	60.6	57.8	53.5	–	53.4	58.0	–	–	–	82.6	64.1	56.8	60.1
LSD	23.6	20.3	14.8	24.8	22.9	–	21.1	20.7	–	–	–	19.4	13.6	12.1	9.6



WILDRICE

Cultivated wildrice is grown on about 20,000 acres in Minnesota. Though some wildrice paddies are grown with shattering types, most growers 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 har-

vest is delayed. Long seeds, resulting in higher percentage of long-grain seeds in A-grade width. Released 1992 by Minn. AES.

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 continue 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.

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 ¹	Shattering, Percent ²	Lodging, Score ³	FBS, Score ⁴	Yield, Lb/Acre ¹	Lodging, Score ³	FBS, Score ⁴	Yield, Lb/Acre	Shattering, Percent ²	Lodging, Score ³	FBS, Score ⁴	Yield, Lb/Acre ¹	Shattering, Percent ²	Lodging, Score ³	FBS, Score ⁴
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.
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.
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.
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.
LSD 5%	197	4	0.4	0.6	374	0.6	0.8	217	7	0.3	0.7	139	3	0.2	0.
Years	98-99-00-01-02	98-99-01	98-99-01-02	98-99-01-02	00	98	98-00	00-01-02				99-00-01-02			

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

Seed length and width, and percent long in A-grade.

Variety	Kelliher / Waskish			Clearbrook / Gully			Altkin			1998-2002 Average		
	Seed Length, 64ths in.	Seed Width, 64ths in.	Long In A-grade, %	Seed Length, 64ths in.	Seed Width, 64ths in.	Long In A-grade, %	Seed Length, 64ths in.	Seed Width, 64ths in.	Long In A-grade, %	Seed Length, 64ths in. ¹	Seed Width, 64ths in. ¹	Long In A-grade, % ²
Franklin	22.9	4.09	95	23.4	4.32	94	23.8	4.20	96	23.3	4.19	95
GIB-C9	21.9	4.19	84	23.0	4.45	89	22.6	4.18	90	22.4	4.25	87
Itasca	21.7	4.13	82	22.8	4.40	91	22.3	4.22	89	22.2	4.23	87
Petrowske Purple	21.9	4.00	86	23.1	4.19	92	22.6	4.15	87	22.4	4.10	88
LSD 5%	0.4	0.08	5	0.6	0.11	5	0.6	0.11	4	0.3	0.06	2
Years	00-01-02	00-01-02	00-01-02	00-03	00-03	00-03	00-01-02	00-01-02	00-01-02			

¹ Dried, hulled, intact seeds. ² Percentage of A-grade seeds (width >3.75/64 in.) that are in the long-grain length category (>20/64 in.), calculated on a volume basis

Forage, grass, oilseed and small-grain organizations

These organizations work in many ways in support of the commodities they represent and to provide information to the public and opportunities to their members. Contact them directly for specific information about their roles and services.

Minnesota Association of Wheat Growers and Minnesota Wheat Research and Promotion Council
2600 Wheat Drive
Red Lake Falls, MN 56750
Phone: 218-253-4311
Fax: 218-253-4320
E-mail: mnwheat@gvtel.com
Web Address: www.smallgrains.org

Minnesota Approved Seed Conditioners and Marketing Association
P.O. Box 303, Argyle, MN 56713
Phone: 218-437-6438
Fax: 218-437-6392

Minnesota Canola Council
4630 Churchill St., Suite 1
St. Paul, MN 55126
Phone: 651-638-9883
Fax: 651-638-0756
E-mail: mncanola@comcast.com

Minnesota Barley Growers Association and Minnesota Barley Research and Promotion Council
2601 Wheat Drive
Red Lake Falls, MN 56750
Phone: 218-253-4311
Fax: 218-253-4320
E-mail: mnbarley@gvtel.com

Minnesota Corn Growers Association and Minnesota Corn Research and Promotion Council
738 First Avenue East
Shakopee, MN 55379
Phone: 952-233-0333
Fax: 952-233-0420
E-mail: info@mncorn.org
Web Address: www.mncorn.org

Minnesota Crop Improvement Association
1900 Hendon Avenue
St. Paul, MN 55108
Phone: 612-625-7766
Fax: 612-625-3748
E-mail: mncia@tc.umn.edu
Web Address: www.mncia.org

Minnesota Forage and Grassland Council
4630 Churchill St., Suite 1
St. Paul, MN 55126
Phone: 651-484-3888
Fax: 651-638-0756
E-mail: mnforage@comcast.net
Web Address: www.umn.edu/mfgc

Minnesota Soybean Growers Association and Minnesota Soybean Research and Promotion Council
360 Pierce Avenue
Suite #110
North Mankato, MN 56003
Phone: 507-388-1635
Fax: 507-388-6751
Web Address: www.mnsoybean.org

Northern Minnesota Bluegrass Growers Association
3115 430th Avenue
Roseau, MN 56751-8413
Phone 218-463-2149

OILSEED CROPS



CANOLA

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.

The oil in canola seed contains less than 2 percent erucic acid, compared with 20 to 40 percent found in oilseed rape. The canola meal remaining after oil extraction contains less than 0.1 percent glucosinolates (sulfur-containing compounds) compared with about 1 percent in rapeseed meal. Consequently, canola is also referred to as "double low" or

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

"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.

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 fall 2002 near St. Hilaire yielded up to 2,400 pounds/acre. This trial is being repeated in 2003-04 at Thief River Falls, Morris and Waseca. A large variety trial was also seeded in fall 2003 with 38 winter canola varieties being tested, 8 of which are Roundup Ready.

Information Sources

The Minnesota Canola Council is a good source for information on canola. They 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). It contains detailed information on canola production practices and costs \$68.00 (U.S.). The Canola Grower's Manual is also available for viewing online at 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 management tool is a CD-ROM called the "Canola Growers Decision Support

System" available from the Canola Council of Canada for \$250.00 (U.S.).

Test Sites

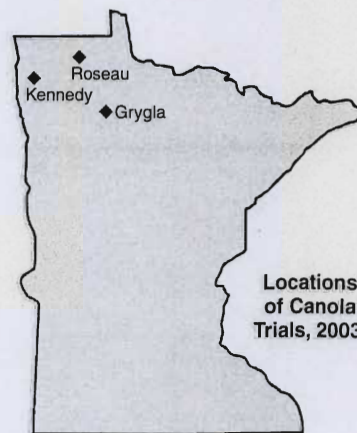
Non-Roundup Ready and Roundup Ready variety trials were conducted at three sites in 2003. The Roseau site was on Braaten Farms, the Grygla site was on the Todd Stanley farm, and the Kennedy test site was on the Rob and Tim Rynning farm. Good weather this season provided for excellent yields. The non-Roundup Ready trial at Grygla was seeded into an unforeseen problem area in the field that resulted in tremendous variability and unreliable data. For this reason that trial is not in this bulletin.

Local Support

Cenex-Harvest States of Kennedy provided sponsorship for the Kennedy site. Farmer's Union Oil of Grygla provided support for the Grygla site.

Field Day Assistance

County extension educators Nathan L. Johnson, Hans J. Kandel, Curtis W. Nyegaard, and Bill Craig provided field day assistance.



Canola seed sources for 2004 planting, keyed to "Variety Information" column in seed yield table, page 56.

Developers

- D1 Advanta Seeds, Unit 3, 75 Scurfield Blvd., Winnipeg, MB, Canada R3Y 1P6
D2 Agriprogress, P.O. Box 2499, Morden, MB, Canada R6M 1C2
-
- D3 Bayer Crop Science, 203-407 Downey Rd., Saskatoon, SK, Canada S7N 4L8
D4 DSV/Brett-Young Seeds, Box 99, St. Norbert, P.O., Winnipeg, MB, Canada R3V 1L5
-
- D5 Monsanto Canada Seeds, 2915 A Faithful Ave., Sask., SK Canada S7K 8E8, 306-657-467
D6 Pioneer Hi-Bred International, Inc., 7200 NW 62nd Ave., Johnston, IA 50131
-
- D7 Svalof Weibull Ltd., 2-411 Downey Rd., Saskatoon, SK, Canada S7N 4L8
D8 Not Available
D9 University of Guelph, 50 Stone Rd. West, Guelph, ON, Canada N1G 2W1, 519-824-4120
-

Marketers

- M1 Bayer Crop Science, 203-407 Downey Rd., Saskatoon, SK, Canada S7N 4L8, 701-775-2700
M2 Brett-Young Seeds, P.O. Box 99 St. Norbert P.S., Winnipeg, MB, Canada R3V 1L5, 204-261-6338
M3 Croplan Genetics, P.O. Box 1291, Minot, ND 59702, 701-852-3556
-
- M4 Interstate Seed Company, 1215 Parkway, West Fargo, ND 58078, 800-437-4120
M5 Monsanto, 3100 Sycamore Rd., De Kalb, IL 60115, 815-758-9323
M6 Pioneer Hi-Bred International, Inc., 7200 NW 62nd Ave., Johnston, IA 50131, 701-298-6894
-
- M7 Proseed, 705 E. Brewster, Harvey, ND 58341, 701-324-4177
M8 Seeds 2000, Box 200, Breckenridge, MN 56520, 218-643-2410
M9 Not Available
-

Canola Variety Name Changes

Old Name or Experimental Number	New Variety Name
PHS 487	IrrVigor 4870
Hyb 9387	99CH01
SW F5229 RR	SW Marksman RR
SW F5191 RR	SW Patriot RR

Seed yield of Roundup Ready canola (*Brassica napus*) varieties (lb/acre at 8% moisture) at Roseau, Kennedy and Grygla in 2003.

Variety information includes Source Codes: (D# = Developer; M# = Marketer) keyed to listing, page 51, and these supplemental codes: H = Hybrid, Op = Open Pollinated, Syn = Synthetic.

*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: R = Resistant, MR = Moderately Resistant, MS = Moderately Susceptible, S = Susceptible

Variety	Variety Information	Blackleg Resistance	Roseau	Kennedy	Grygla	Average All Sites	2002 Average Kennedy, Grygla*	2002-03 Average
Crosby	D8,M3,Op	MR	2,622	2,328	2,186	2,379	1,677	2,098
Dekalb DKL223	D1,M5,H	MS	2,447	2,170	2,274	2,297	1,766	2,085
Dekalb DKL34-55	D5,M5,Op	MR	2,546	2,246	2,099	2,297	1,402	1,939
ExCalibuRR	D9,M4,Op	R	2,596	2,128	2,116	2,280	-	-
HyCLASS 2061	D8,M3,H	MR	2,486	2,288	2,092	2,248	1,766	2,055
HyCLASS 767 SW	D7,M3,Syn	MR	2,622	2,336	2,353	2,368	1,756	2,123
HyCLASS 799RR	D4,M3,Syn	MR	2,359	1,940	2,124	2,141	1,444	1,862
HyCLASS 905	D8,M3,H	R	2,545	2,526	2,445	2,448	1,892	2,226
HyCLASS 910	D8,M3,H	R	2,634	2,615	2,585	2,611	-	-
Hyola 357 Magnum**	D1,M4,H	MR	2,758	2,349	2,087	2,398	1,764	2,144
Hyola 505 RR	D1,M4,H	R	2,586	2,335	2,333	2,365	-	-
LBD588RR	D4,M2,Op	R	2,371	2,253	2,085	2,236	-	-
Minot	D8,M3,Op	MR	2,420	2,147	2,047	2,101	1,604	1,902
Pioneer 45H21	D6,M6,H	R	2,781	2,593	2,302	2,559	1,876	2,146
Pioneer 46H23	D6,M6,H	R	2,632	2,236	2,285	2,327	-	-
Razor	D7,M7,Syn	MR	2,522	2,099	1,860	2,160	1,652	1,957
Roughrider	D2,M7,Op	MR	2,129	1,987	2,091	1,985	1,420	1,759
RR Hyb 2013	D2,M7,H	R	2,614	2,232	2,048	2,252	1,845	2,089
RR Hyb 2066	D2,M7,H	MR	2,743	2,254	1,884	2,243	1,693	2,023
SW BadgeRR	D7,M8,Syn	MR	2,367	2,050	1,911	2,065	1,533	1,852
SW Gladiator	D9,M4,Syn	MR	2,590	2,032	2,098	2,240	1,716	2,031
SW Marksman RR	D7,M4,H	MR	2,835	2,325	2,356	2,506	-	-
SW Patriot RR	D7,M4,H	MR	2,648	2,425	2,380	2,484	-	-
Mean			2,544	2,256	2,176	2,303	1,585	2,016
LSD (0.05)			247.4	207.6	358.4	187.1	216	-
C.V.			6.9	6.5	11.7	10.1	11.9	-

Growth characteristics and oil content of Roundup Ready canola varieties grown near Roseau, seeded May 2, 2003.

Total available fertilizer was 162-70-330-120+ (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		
HyCLASS 799RR	2,359	46.2	42	53	99	50	1.0
Crosby	2,622	47.6	41	52	99	47	2.0
Dekalb DKL223	2,447	41.5	41	49	93	43	3.0
Dekalb DKL34-55	2,546	45.8	41	53	96	49	1.5
ExCalibuRR	2,596	44.5	41	51	97	45	2.0
HyCLASS 2061	2,486	45.9	41	52	98	50	1.5
HyCLASS 767 SW	2,622	46.3	40	53	99	51	1.3
HyCLASS 905	2,545	46.9	41	55	99	53	1.0
HyCLASS 910	2,634	46.2	40	55	99	55	1.0
Hyola 357 Magnum	2,758	43.9	41	50	97	43	3.0
Hyola 505 RR	2,586	46.9	39	55	99	55	1.0
LBD588RR	2,371	45.8	40	54	99	52	1.0
Minot	2,420	44.1	42	51	95	43	2.5
Pioneer 45H21	2,781	46.9	37	52	96	52	2.0
Pioneer 46H23	2,632	49.5	39	52	99	50	2.0
Razor	2,522	44.2	40	53	98	49	1.8
Roughrider	2,129	48.4	44	53	99	47	1.5
RR Hyb 2013	2,614	47.0	42	54	100	54	1.0
RR Hyb 2066	2,743	45.5	41	52	96	48	1.8
SW BadgeRR	2,367	45.6	43	53	99	49	1.3
SW GladiatoR	2,590	45.9	40	51	96	50	1.5
SW Marksman RR	2,835	46.5	40	52	99	50	1.3
SW Patriot RR	2,648	46.1	38	51	97	52	2.0
Mean	2,544	46.0	41	52	98	49	1.7
LSD (0.05)	247.4	1.24	1.7	0.8	1.5	3.7	0.57
C.V.	6.9	1.9	3.0	1.1	1.1	5.4	24.4

Growth characteristics and oil content of Roundup Ready canola varieties grown near Kennedy, seeded April 24, 2003.

Total available fertilizer was 165-76-400-120+ (N-P-K-S) down to 24 inches. Included is a topdressing application of 27-0-0-12 at early flowering.

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		
HyCLASS 799RR	1,940	42.6	57	98	39	1.0
Crosby	2,328	44.1	55	101	38	2.3
Dekalb DKL223	2,170	43.0	53	96	34	3.0
Dekalb DKL34-55	2,246	42.7	55	98	37	2.3
ExCalibuRR	2,128	43.6	54	98	39	2.3
HyCLASS 2061	2,288	42.8	55	98	38	2.0
HyCLASS 767 SW	2,336	42.2	55	98	39	2.5
HyCLASS 905	2,526	43.2	58	103	42	1.5
HyCLASS 910	2,615	43.3	55	101	40	1.8
Hyola 357 Magnum	2,349	44.1	53	96	34	2.8
Hyola 505 RR	2,335	42.7	57	102	42	2.0
LBD588RR	2,253	44.7	56	98	39	2.3
Minot	2,147	43.3	54	96	36	2.5
Pioneer 45H21	2,593	44.2	55	98	41	2.5
Pioneer 46H23	2,236	43.9	56	99	39	2.5
Razor	2,099	45.3	55	97	36	2.3
Roughrider	1,987	41.9	57	102	38	2.0
RR Hyb 2013	2,232	44.1	53	100	41	1.3
RR Hyb 2066	2,254	44.1	56	96	40	2.5
SW BadgeRR	2,050	42.3	57	100	38	2.0
SW GladiatoR	2,032	43.7	54	97	37	2.5
SW Marksman RR	2,325	41.8	55	98	38	2.5
SW Patriot RR	2,425	42.6	55	98	42	2.8
Mean	2,256	43.3	55	99	38	2.2
LSD (0.05)	207.6	2.89	3.0	1.8	2.5	0.56
C.V.	6.5	4.0	3.9	1.3	4.7	18.0

Growth characteristics and oil content of Roundup Ready canola varieties grown near Grygla, seeded May 2, 2003.

Total available fertilizer was 170-80-296-120+ (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		
799RR	2,124	46.1	39	51	95	45	1.0
Crosby	2,186	48.5	41	50	97	46	1.8
Dekalb DKL223	2,274	42.1	38	46	89	44	2.8
Dekalb DKL34-55	2,099	46.1	39	49	93	47	1.5
ExCalibuRR	2,116	45.7	39	48	93	48	1.8
HyCLASS 2061	2,092	46.4	39	50	93	48	1.0
HyCLASS 767 SW	2,353	45.1	39	50	92	47	1.3
HyCLASS 905	2,445	48.7	39	52	96	50	1.3
HyCLASS 910	2,585	47.2	38	51	96	51	1.8
Hyola 357 Magnum	2,087	42.8	37	46	90	43	2.8
Hyola 505 RR	2,333	48.6	38	51	95	49	1.3
LBD588RR	2,085	46.5	37	49	93	50	1.0
Minot	2,047	44.9	39	48	90	42	2.3
Pioneer 45H21	2,302	45.8	38	49	91	50	2.8
Pioneer 46H23	2,285	49.9	38	48	94	49	3.0
Razor	1,860	44.3	39	50	93	44	2.0
Roughrider	2,091	48.6	42	52	97	49	2.8
RR Hyb 2013	2,048	47.4	42	52	95	49	1.3
RR Hyb 2066	1,884	45.6	40	49	91	47	2.5
SW BadgeRR	1,911	45.9	39	52	96	47	1.3
SW GladiatoR	2,098	43.9	38	48	91	45	1.5
SW Marksman RR	2,356	47.4	38	49	93	47	1.8
SW Patriot RR	2,380	44.9	35	47	92	49	2.3
Mean	2,176	46.2	39	49	93	47	1.8
LSD (0.05)	358.4	1.95	3.0	1.3	2.5	4.5	0.75
C.V.	11.7	2.6	5.5	1.9	1.9	6.8	28.9

Seed yield of Non-Roundup Ready canola (*Brassica napus*) varieties (lb/acre at 8% moisture) at Roseau and Kennedy in 2003.

Variety information includes Source Codes: (D# = Developer; M# = Marketer) keyed to listing, page 57, and these supplemental codes: H = Hybrid,

OP = Open Pollinated, LL = Liberty Link, C = Clearfield (Raptor tolerant).

*Average yields were analyzed using three replicates from each site.

Blackleg Resistance rating provided by seed companies: R = Resistant, MR = Moderately Resistant, S = Susceptible,

Variety	Variety Information	Blackleg Resistance	Average*		
			Roseau	Kennedy	
6045CL	D4,M2,Op,C	MR	2,212	1,864	2,038
99CH01	D2,M7,H	MR	2,255	2,107	2,181
D1034 CL	D1,M4,H,C	R	2,689	2,090	2,389
Hyola 357 Magnum**	D1,M4,H,RR	MR	2,517	2,360	2,439
Hyola 401	D1,M4,H	S	2,544	2,145	2,345
InVigor 2573	D3,M1,H,LL	R	2,720	2,411	2,565
InVigor 2663	D3,M1,H,LL	R	2,810	2,413	2,612
InVigor 2733	D3,M1,H,LL	MR	2,434	2,302	2,368
InVigor 4870	D3,M1,H,LL	R	2,863	2,369	2,616
KAB 36	D8,M3,Op,C	R	2,463	1,979	2,221
PHS 401	D3,M1,H,LL	R	2,883	2,580	2,735
PHS 597	D3,M1,H,LL	R	2,790	2,383	2,586
Mean			2,599	2,250	2,425
LSD (0.05)			180.8	161.9	119.1
C.V.			4.8	5.0	4.9

SS

Growth characteristics and oil content of Non-Roundup Ready canola varieties grown near Roseau, seeded May 2, 2003.

Total available fertilizer was 162-70-330-120+ (N-P-K-S) down to 24 inches.

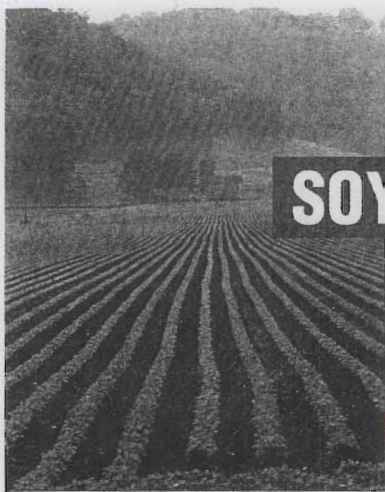
Variety	Yield, Lb/Acre at 8% Moisture	Oil, % of Seed Weight at 0% Moisture	Days After Planting to			Height, Inches	Lodging, 1 = Erect 9 = Flat
			95% Canopy Closure	Beginning Bloom	Maturity: 30% Seed Color Change on Main Raceme		
6045CL	2,212	46.2	41	51	98	46	2.8
99CH01	2,255	46.1	39	53	99	51	1.0
D1034 CL	2,689	44.3	41	52	96	53	1.8
Hyola 357 Magnum	2,517	43.9	38	49	96	48	3.0
Hyola 401	2,544	44.4	39	48	96	41	2.3
InVigor 2573	2,720	45.8	38	53	98	58	1.0
InVigor 2663	2,810	46.4	37	53	98	53	1.5
InVigor 2733	2,434	43.5	37	49	90	51	2.5
InVigor 4870	2,863	46.6	39	53	98	55	1.0
KAB 36	2,463	47.2	41	53	97	50	2.0
PHS 401	2,889	46.2	37	53	97	56	1.5
PHS 597	2,790	47.2	38	50	95	48	2.0
Mean	2,599	45.6	39	51	96	51	1.8
LSD (0.05)	180.8	1.26	1.6	0.8	1.1	3.8	0.59
C.V.	4.8	1.6	2.9	1.1	0.8	5.3	22.1

Growth characteristics and oil content of Non-Roundup Ready canola varieties grown near Kennedy, seeded April 24, 2003.

Total available fertilizer was 165-76-400-120+ (N-P-K-S) down to 24 inches. Included is a topdressing application of 27-0-0-12 at early flowering.

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			
6045CL	1,864	44.4	54	96	42	2.8	
99CH01	2,107	42.7	56	98	43	1.5	
D1034 CL	2,090	41.6	55	95	44	3.0	
Hyola 357 Magnum	2,360	42.2	53	96	37	2.8	
Hyola 401	2,145	40.4	52	94	35	2.8	
InVigor 2573	2,411	42.1	55	98	48	2.5	
InVigor 2663	2,413	43.1	56	96	48	2.3	
InVigor 2733	2,302	43.6	53	94	41	2.8	
InVigor 4870	2,369	44.2	56	97	46	2.5	
KAB 36	1,979	44.3	56	96	41	3.0	
PHS 401	2,580	44.0	55	96	45	2.5	
PHS 597	2,383	43.8	54	96	41	2.5	
Mean	2,250	43.0	55	96	42	2.6	
LSD (0.05)	161.9	1.11	1.1	1.5	2.9	0.71	
C.V.	5.0	1.5	1.4	1.1	4.8	19.2	

SLP



SOYBEAN

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

Tables on pages 60-62 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 1 and June 10 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 and 10 inches at other locations. Plot combines were used to harvest the plots

Pages 63-64 provide results of the very early (far northern Minnesota) and special southeastern Minnesota variety tests. These locations were added to provide data for environments not represented by the other location tests.

Pages 64-70 provide results from specific tests of available Roundup Ready® varieties adapted to the northern, central and southern production zones.

Page 71 shows results from the special performance tests of soybean-cyst-nematode-resistant varieties in "infested" field sites near Lamberton, Waseca, and

Madelia and "non-infested" field sites near Lamberton, Jackson, and Waseca. Planting techniques were the same as the regular performance tests.

Pages 72-76 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 2003 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 percent of the pods show their genetically programmed mature color. These dates for 2003 are provided in the tables. 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 0-9, which indicates a ranking within each maturity group. For example the variety MN0302 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.

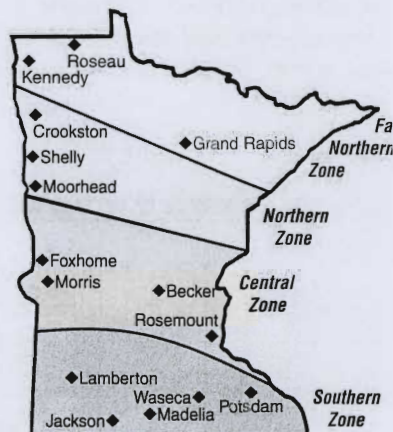
Yield

Because maturity is a very important attribute, varieties are arranged in the tables in order of their actual 2003 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 2003 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-percent level of significance is used in all these tables. This means that yield differences exceeding the stated LSD value are real 80 percent of the time.



Soybean Maturity Zones.

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 2003. 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 2003 tests are provided at the following web site 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 2003 season only. The 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-percent

moisture basis. This formula converts the protein and oil values to another moisture basis:

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

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:

$$\frac{* \text{price of meal } \$/\text{ton}}{2,000} = \text{\$/pound}$$

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 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 its 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 page 71. The ratings for SCN resistance were determined using nematode counts from naturally infested field sites and a greenhouse test using a Minnesota field population of SCN.

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 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

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																												

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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. Freeborn, IA1006, and IA2008R are available public varieties with resistance to BSR. Latham 388RR, Latham E2478T, and Latham L2136R are privately developed varieties reported to be moderately resistant to BSR. Latham 367RR, Latham E2336R, Latham E2145R and GL 1903RR are 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 or telephone number 612-625-7766.

Source information.

Contact addresses and brand names for varieties entered in 2003 tests are:

Advantage Brand Soybean (Advantage), 17303 Highway 22, Good Thunder, MN 56037

Albert Lea Seed House (Viking), P.O. Box 127, 1414 W. Main, Albert Lea, MN 56007

Anderson Seeds (Anderson), 37825 Co. Rd 63, St. Peter, MN 56082

Bio Gene (Bio Gene), 5491 Tri County Hwy, Sardinia, OH 45171

Crow's Hybrid Corn Co. (Crows), 612 E Dunlap, Kentland, IN 47951

Dairyland Seed Co., Inc. (Dairyland), PO Box 958, 357D Hwy H, West Bend, WI 53095

Dennis Ewing Farm Seed (Yield King), 6131 North Fork Road, Ames, IA 50010

Earthwise Processors (Earthwise), 4111 30th Ave S, Moorhead, MN 56560

Excel Brand (Excel Brand), 116 E. State, Camp Point, IL 62320

Farm Advantage, 1275 Hwy 69, Belmond, IA 50421

Garst and AgriPro Seeds Company (Garst/ AgriPro), 2369 330th St., Box 500, Slater, IA 50244

Gold Country Seed, Inc. (GCS), 16506 Hwy. 15 N, P.O. Box 604, Hutchinson, MN 55350

Great Lakes Hybrids, Inc. (Great Lakes), 9915 W. M-21, Ovid, MI 48866

Helena (Helena), 7137 Vista Dr., W. Des Moines., IA 50266

Hyland Seeds (Hyland), Box 130 2 Hyland Drive, Blenheim, Ontario, Canada, NOP1A0

Iowa State University Research Foundation (Iowa AES), 310 Lab of Mechanics, Ames, IA 50011

Kruger Seed Company (Kruger), Highway 20 East, Box A, Dike, IA 50624

KSC/Challenger (KSC/Challenger), Box A, Dike, IA 50624

Latham Brothers Farm (Latham), 131 180th St., Alexander, IA 50420

Latham Seed Company (Latham), 131 180th St., Alexander, IA 50420

LG Seeds (LG), 710 N Main St., Suite 201, River Falls, WI 54022

Maple Leaf Foods (MLF), 3080 Yonge St., Suite 2000, Toronto, Ontario, Canada M4N3N1

Midwest Seed Genetics (MW Genetics), 23751 Highway 30 East, Carroll, IA 51401

Minnesota Agricultural Experiment Station (Minn. AES), 190 Coffey Hall, 1420 Eckles Ave, St. Paul, MN 55108

Monsanto, (Dekalb, Asgrow), 800 N. Lindberg Blvd, St. Louis, MO 63167

Mustang Seed, Box 466, Madison, SD 57042

NDSU Research Foundation, (ND AES & RoughRider Genetics) Research Park, Rm 142A, Fargo, ND 58105

Northland Seed & Grain (Northland), 462 Holly Ave, St. Paul, MN 55102

Peterson Farm Seed (PFS), 3104 164th Ave SE, Harwood, ND 58042

Pioneer Hi-Bred Int'l, Inc. (Pioneer), 99 Navaho Ave, Suite 101-A, Mankato, MN 56001

Proseed (Proseed), 705 E Brewster, Harvey, ND 58341

Profiseed, Inc. (Profiseed), 1691 Highway 65, Hampton, IA 50441

Prairie Brand Research (PBR), 15 X Ave., Story City, IA 50248

Prairie Brand Seed Company (Prairie Brand), 15 X Ave., Story City, IA 50248

Quality Seed Co. (Quality Seed), 307 3rd Street, Alice, ND 58031

Renk Seed Co., (Renk) 6800 Wilburn Rd., Sun Prairie, WI 53590

Richland Organics (Richland Organics), 100 N. 10th St, Breckenridge, MN 56520

Sabre Initiatives LLC (Sabre), 2508 Trott Ave., SW P.O. Box 386, Willmar, MN 56201

Sand Seed Service, Inc. (Sands), PO Box 648, Marcus, IA 51035

Sansgaard Seed Farms, Inc. (Sansgaard), 15 X Ave., Story City, IA 50248

Seeds 2000 (Seeds 2000), PO Box 200, Breckenridge, MN 56520

Sodak Genetics (Sodak Genetics), Box 2207A, SDSU, Brookings, SD 57007

Star Brand Research (Star), PO Box 648, Marcus IA 51035

Stine Seed Co., (Stine), 2225 Laredo Trail, Adel, IA 50003

Stine Seed Farm, (Stine) 2225 Laredo Trail, Adel, IA 50003

Source information (continued).

Syngenta Seeds (NK Brand), 3701 W 49th St, Ste 206, Sioux Falls, SD 57106
 Thompson Agronomics, Inc., (Thompson), 40321 130th Ave., Leland, IA 50453
 Thompson Seeds, Inc., (Thompson), 40321 130th Ave., Leland, IA 50453
 Top Farm Hybrids (Top Farm), P.O. Box 850, Cokato, MN 55321
 Trelay Seeds (High Cycle), 11623 State Road 80, Livingston, WI 53544
 UAP Seed (Dyna-Gro), PO Box 10, Wall Lake, IA 51466
 Wensman Seed Company (Wensman), P.O. Box 190, Wadena, MN 56482
 Ziller Seed Co., Inc. (Ziller), 76374 380th St, Bird Island, MN 55310

Soybean Planting Rate and Date

Bushel Weight, Pounds60
 Seeds/Pound.....2,800
 Planting Rate, Pounds/Acre56
 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, 2001-2003.

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
Jim	N.D. AES	9-7	100	98	97	98	97	00.7	S	3.0
MN0071	Minn. AES	9-8	-	94	99	99	102	00.7	Rps1	2.2
Lena	Peterson Farms Seed	9-10	-	-	107	94	103	00.8	Rps1	2.8
Glacier	Minn. AES	9-10	91	88	93	104	95	00.8	Rps6	1.8
Trail	N.D. AES	9-11	106	113	108	101	98	0.0	Rps1	2.3
Bravado	Earthwise	9-12	-	-	103	94	104	00.8	S	2.3
Barnes	N.D. AES	9-14	101	104	102	100	104	0.2	Rps6	2.2
MN0201	Minn. AES	9-14	94	94	97	111	94	0.2	Rps1	2.0
Walsh	N.D. AES	9-14	99	96	96	100	101	0.2	Rps6	2.3
MN0304	Minn. AES	9-14	-	97	87	101	101	0.3	Rps1k+Rps6	2.0
MN0301	Minn. AES	9-15	102	101	99	99	103	0.3	Rps1	1.8
90B43	Pioneer	9-16	104	104	107	97	103	0.4	Rps1c	2.2
Lambert	Minn. AES	9-17	103	106	104	98	102	0.7	Rps1	3.3
MN0302	Minn. AES	9-17	98	100	101	101	101	0.3	Rps1k	2.5
Viper	Earthwise	9-18	-	-	99	108	97	0.3	S	2.8
PB-033	Prairie Brand	9-20	-	-	103	98	99	0.3	S	3.2
Mean		9-14	38.4 bu/a	36.2 bu/a	31.6 bu/a	34.0%	19.2%			
LSD 20%			5%	7%	11%					

LD

**Performance and characteristics of public and private soybean varieties, central zone;
Becker, Morris and Rosemount, 2001-2003.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chloros Score
			2001-2003	2002-2003	2003	Protein	Oil			
MN0302	Minn. AES	9-8	91	92	90	98	101	0.3	Rps1k	2.0
Barnes	N.D. AES	9-8	89	89	86	98	106	0.2	Rps6	3.0
Lambert	Minn. AES	9-11	101	102	99	99	102	0.7	Rps1	2.8
Viper	Earthwise	9-12	—	—	97	101	99	0.3	S	2.3
MN0902CN	Minn. AES	9-13	96	98	98	101	97	0.9	S	1.7
MN1005	Minn. AES	9-15	—	99	99	96	102	1.0	Rps1k	3.0
Surge	Minn. & S.D. AES	9-15	101	96	96	101	103	0.9	Rps1	2.7
91M10	Pioneer	9-17	—	—	102	100	100	1.1	S	2.3
MN1006CN	Minn. AES	9-18	—	100	106	99	100	1.0	Rps1	2.7
MN1302	Minn. AES	9-19	104	103	102	97	99	1.3	Rps1	2.5
Parker	Minn. AES	9-20	101	94	88	96	108	1.5	Rps1	3.0
Kato	Minn. AES	9-20	90	91	87	104	95	1.3	Rps1	2.2
1919	Kruger	9-21	—	—	116	103	95	1.7	S	3.3
1545	Farm Advantage	9-21	—	—	108	99	98	1.4	S	1.8
91B53	Pioneer	9-21	109	109	108	102	97	1.6	S	2.7
MN1401	Minn. AES	9-21	97	98	100	101	102	1.4	Rps1	2.0
PB-178	Prairie Brand	9-22	116	116	109	101	97	1.7	S	2.2
1918	Kruger	9-22	—	—	107	98	100	1.7	S	2.2
Freeborn	Minn. AES	9-22	97	96	92	104	96	1.6	Rps1	1.7
1549	Garst/AgriPro	9-23	—	—	112	103	100	1.5	S	2.0
PB-146	Prairie Brand	9-23	109	109	105	100	96	1.4	S	2.2
FA1545	Farm Advantage	9-23	—	110	103	100	99	1.4	S	2.7
T-3143	Thompson	9-24	—	—	92	99	104	1.4	S	2.7
Mean		9-18	51.1 bu/a	54.6 bu/a	49.3 bu/a	36.2%	18.6%			
LSD 20%			3%	7%	7%					

Performance and characteristics of public and private soybean varieties, southern zone; Jackson, Lamberton and Waseca, 2001-2003.

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
MN1401	Minn. AES	9-15	93	91	93	102	96	1.4	Rps1	2.0
MN1301	Minn. AES	9-18	92	90	95	102	99	1.3	Rps1	2.5
MN1302	Minn. AES	9-18	95	95	95	98	101	1.3	Rps1k	1.7
PB-183	Prairie Brand	9-19	-	-	122	92	104	1.8	S	1.5
1846	Farm Advantage	9-19	-	114	107	104	98	1.8	S	3.0
Parker	Minn. AES	9-19	102	100	99	101	101	1.5	Rps1	2.8
MN1801	Minn. AES	9-19	98	93	86	103	102	1.8	Rps1c	2.8
342CNBrand	Latham	9-20	-	-	104	101	99	1.9	S	3.0
T-3182	Thompson	9-20	-	108	101	95	106	1.8	S	2.8
T-3201	Thompson Seeds	9-20	105	104	90	100	97	2.0	S	2.8
T-3189	Thompson	9-21	-	-	105	103	97	1.9	S	2.3
2318	Gold Country	9-21	-	-	102	106	95	1.7	S	2.3
SOI187	Sands	9-21	-	-	102	98	101	1.8	Rps1	3.3
PB-178	Prairie Brand	9-21	104	99	98	106	99	1.7	S	2.8
Freeborn	Minn. AES	9-21	91	85	89	105	98	1.6	Rps1	2.0
IA1006	Iowa AES	9-21	94	92	87	98	99	1.6	S	2.2
1888	Viking	9-22	-	-	115	105	97	1.8	S	2.7
280Brand	Latham	9-22	-	-	104	108	94	1.7	S	2.7
SOI202	Sands	9-22	-	-	99	97	102	2.0	S	2.7
SOI212N	Sands	9-22	-	-	97	99	101	2.1	Rps1	2.3
IA1008	Iowa AES	9-22	-	-	96	97	98	2.0	S	2.0
IA2050	Iowa AES	9-22	103	103	93	99	101	2.1	S	3.0
2220+SCN	Kruger	9-23	-	-	108	99	101	2.0	Rps1	3.0
570Brand	Latham	9-23	-	-	104	99	103	2.2	S	2.5
2244	Farm Advantage	9-23	-	108	102	101	98	2.2	Rps1	2.2
PB-230	Prairie Brand	9-23	102	103	99	96	101	2.3	S	2.2
Sturdy	Minn. AES	9-23	93	92	93	98	99	2.0	Rps1	2.3
SOI234	Sands	9-23	-	-	92	100	101	2.3	Rps1	2.8
2242	Kruger	9-24	-	-	114	96	101	2.0	S	3.2
2202	Kruger	9-24	-	-	107	97	103	2.0	S	2.5
92M10	Pioneer	9-24	-	-	102	96	102	2.1	Rps1c	2.7
PB-202	PBR	9-24	103	104	94	106	97	2.0	S	2.2
T-3222	Thompson	9-25	115	117	111	105	96	2.2	S	2.3
IA2021	Iowa AES	9-25	103	100	102	93	104	2.1	Rps1k	3.0
2323SCN	Kruger	9-25	-	-	97	98	101	2.1	S	2.8
MLF128	Maple Leaf Foods	9-25	-	-	96	103	102	1.7	S	2.8
IA2052	Iowa AES	9-28	101	103	107	97	98	2.3	Rps1	2.3
IA2008R	Iowa AES	9-28	98	96	91	93	98	2.1	Rps1k	2.5
E2478T	Latham	9-29	-	-	100	98	101	2.4	S	2.8
Mean		9-22	50.8 bu/a	46.3 bu/a	39.2 bu/a	34.2%	19.7%			
LSD 20%			5%	7%	8%					

02

**Performance and characteristics of very early maturing soybean varieties;
Grand Rapids, Kennedy and Roseau, 2001-2003.**

Variety	Maturity Rating	Yield, Percent of Mean			Percent of Mean		Phytophthora Gene	Chlorosis Score
		2001-2003	2002-2003	2003	Protein	Oil		
Jim	00.7	96	103	101	100	96	S	4.0
90A07	00.7	-	100	98	98	101	S	3.0
MN0071	00.7	104	96	97	99	102	Rps1	3.0
McCall	00.7	96	93	95	101	101	S	2.7
Agassiz	0.0	104	109	110	102	101	Rps1	3.3
Traill	0.0	100	97	100	101	98	S	2.7
Mean		34.0 bu/a	34.3 bu/a	32.6 bu/a	34.0%	18.2%		
LSD 20%		3%	4%	5%				

**Performance and characteristics of conventional and Roundup Ready public and private soybean varieties,
far northern zone; Roseau and Kennedy, 2001-2003.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
Jim	N.D. AES	9-11	109	104	101	99	98	00.7	S	2.7
DKB005-51	Dekalb	9-12	-	-	88	99	104	00.5	Rps1	2.7
S00-J4	Syngenta	9-13	-	-	96	96	104	00.4	Rps1	2.7
MN0071	Minn. AES	9-15	104	98	104	99	104	00.7	Rps1	2.7
RR00-05	Proseed	9-15	-	-	101	102	98	00.5	Rps1	3.0
McCall	Minn. AES	9-15	93	93	96	99	98	00.7	S	2.7
S0076-6	Stine	9-16	-	-	109	99	98	00.8	Rps1	2.0
90A07	Pioneer	9-16	-	101	101	96	98	00.7	S	2.0
S0040-4	Stine	9-16	-	-	96	93	104	00.5	Rps1	2.5
W20091	Wensman	9-17	-	-	104	102	98	00.9	Rps1	2.0
04009RR	Peterson Farms Seeds	9-17	-	-	99	102	104	00.9	Rps1	2.3
03005RR	Peterson Farms Seeds	9-18	-	-	104	102	104	00.5	Rps1	2.3
PB0094	Prairie Brand	9-18	-	-	101	102	104	00.9	Rps1	2.0
PB0052	Prairie Brand	9-18	-	-	96	102	98	00.5	Rps1	2.5
30F05	Dyna-Gro	9-18	-	-	94	102	98	00.5	Rps1	2.7
30D09	Dyna-Gro	9-19	-	-	104	99	104	00.9	Rps1	2.2
RT0041	Croplan	9-20	-	-	94	105	98	0.0	S	2.5
RR00	Proseed	9-21	-	-	101	96	104	0.0	Rps1	2.7
PB0072	Prairie Brand	9-21	-	-	96	102	98	00.7	Rps1	2.5
Lena	Peterson Farms Seeds	9-22	-	-	112	93	109	00.8	Rps1	1.8
90B11	Pioneer	9-22	-	-	101	96	98	0.1	S	2.3
Traill	N.D. AES	9-22	96	93	99	99	98	0.0	Rps1	2.3
RG20022	RoughRider	9-22	-	-	96	102	93	0.0	S	2.0
Agassiz	Minn. AES	9-23	98	104	104	102	98	0.0	Rps1	2.3
04007RR	Peterson Farms Seeds	9-23	-	-	101	105	98	00.7	Rps1	2.3
S0086-4	Stine	9-25	-	-	101	93	109	00.8	Rps1	2.3
0095RR	Garst	9-25	-	-	99	105	93	00.9	S	2.2
RR20-11	Proseed	9-27	-	-	86	96	104	0.1	Rps1	2.3
RR10091	Proseed	9-28	-	-	94	102	98	00.9	Rps1	3.3
Mean		9-20	37.6 bu/a	39.2 bu/a	38.5 bu/a	34.4 %	18.3 %			
LSD 20%			4%	6%	9%					

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Performance and characteristics of public soybean varieties, southeastern Minn., 1999-2003.

Variety	Maturity Rating	Yield, Percent of Mean			Percent of Mean		Phytophthora Gene	Chlorosis Score
		1999-2003	2000-2003	2001-2003	Protein	Oil		
MN1302	1.3	-	-	99	94	102	Rps1k	2.3
MN1301	1.3	89	86	93	103	102	Rps1	2.0
MN1401	1.4	100	101	97	102	98	Rps1	2.7
91B53	1.5	-	-	101	102	101	S	2.7
Parker	1.5	99	97	96	101	101	Rps1	2.8
IA1006	1.6	102	101	96	99	98	S	2.7
Freeborn	1.6	93	93	91	101	99	Rps1	2.8
MN1801	1.8	102	102	101	99	100	Rps1c	3.3
Sturdy	2.0	108	110	109	102	99	Rps1	2.8
IA1008	2.0	91	89	100	98	99	S	2.8
IA2021	2.1	106	108	109	98	103	Rps1k	3.5
IA2050	2.1	107	107	103	101	98	S	3.8
IA2052	2.3	106	107	104	99	101	Rps1	3.3
Mean		41.2 bu/a	42.1 bu/a	41.4 bu/a	34.4%	18.2%		
LSD 20%		3%	5%	7%				

Performance and characteristics of Roundup Ready soybean varieties, northern zone; Crookston, Moorhead and Shelly, 2001-2003.

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
PB-0052RR	Prairie Brand	9-10	-	-	102	104	98	00.6	S	2.8
0082RR	Star	9-10	-	-	100	100	101	00.9	Rps1k	1.8
PB-0043RR	Sansgaard	9-10	-	-	92	95	107	00.4	S	1.7
PB-0094RR	Prairie Brand	9-11	-	95	110	100	101	00.9	Rps1k	1.8
PB-0093RR	Sansgaard	9-11	-	-	110	99	102	00.9	S	1.3
Ramsey	Hyland Seed	9-11	-	-	108	102	99	00.7	S	2.0
0051RR	Seeds 2000	9-11	-	-	107	99	103	00.5	S	1.0
RG20022	RoughRider	9-11	-	-	104	100	100	0.0	S	1.8
0052RR	Star	9-12	-	-	106	105	99	00.5	S	2.3
W20091RR	Wensman	9-12	-	-	104	101	102	00.9	Rps1k	1.2
0151RR	Star	9-12	-	-	99	96	104	0.0	Rps1	2.0
04007RR	Peterson Farms Seeds	9-12	-	-	98	106	99	00.7	S	1.7
0072RR	Star	9-12	-	-	95	103	99	00.7	S	2.3
PB-0072RR	Prairie Brand	9-12	-	-	92	101	98	00.7	S	1.7
0071RR	Seeds 2000	9-12	-	-	93	102	101	00.7	S	1.8
AG0201	Asgrow	9-13	-	-	100	97	102	0.2	S	2.7
AG0301	Asgrow	9-14	-	-	109	102	99	0.3	Rps1k	2.0
2021RR	Seeds 2000	9-14	-	96	108	93	105	0.2	Rps1c	3.0
PB-0232RR	Sansgaard	9-14	-	96	99	100	103	0.3	S	2.2
RR00	Proseed	9-14	-	-	91	97	104	0.0	Rps1c	2.3
6002RR	Top Farm	9-14	-	-	90	99	103	0.0	S	2.7
M-023RR	Mustang	9-15	-	103	109	100	101	0.2	Rps1k	2.2
PB-0799RR	Prairie Brand	9-15	-	101	102	98	102	0.5	Rps1k	1.7
C0551RR	LG Seeds	9-15	-	98	95	100	102	0.5	Rps1k	1.8
9095t	Pioneer	9-16	-	111	109	102	103	0.5	Rps1c	1.5
M-033RR	Mustang	9-16	-	-	105	97	101	0.3	Rps1k	1.8
S00E6-4	Stine	9-16	-	-	101	97	106	00.9	S	2.0
0402KFN	Peterson Farms Seeds	9-16	-	-	94	102	98	0.2	Rps1k	2.2
044RR	Yield King	9-16	-	-	91	100	101	0.2	Rps1k	1.3
6020RR	Top Farm	9-17	-	-	96	100	100	0.2	S	2.8

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**Performance and characteristics of Roundup Ready soybean varieties, northern zone;
Crookston, Moorhead and Shelly, 2001-2003 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
0305RR	Peterson Farms Seeds	9-18	-	-	113	102	94	0.5	S	1.8
90B74	Pioneer	9-18	-	98	112	96	105	0.7	Rps1c	2.7
PB-0423RR	Sansgaard	9-18	-	-	102	101	100	0.4	S	1.7
RR1030	Proseed	9-18	-	-	99	102	98	0.3	S	2.7
S0200-4	Stine	9-18	-	-	99	96	105	0.2	S	2.0
PB-0363RR	PBR	9-18	-	-	98	99	101	0.3	S	2.7
RR0029	Proseed	9-18	-	-	96	93	105	0.2	Rps1	2.2
W2020RR	Wensman	9-18	-	-	95	99	102	0.2	S	2.3
RR20-11	Proseed	9-18	-	-	89	94	108	0.1	Rps1k	2.2
W2062RR	Wensman	9-19	-	-	106	100	101	0.5	S	1.8
8055RR	Exel Brand	9-19	-	-	101	108	95	0.5	S	2.7
DSR-075/RR	Dairyland	9-19	100	99	99	101	99	0.8	Rps1k	2.5
8046RR	Exel Brand	9-19	-	96	97	104	97	0.4	S	2.0
T-0711RR	Quality Seed Genetics	9-20	-	-	106	96	100	0.5	S	2.5
PB-0532RR	PBR	9-20	-	109	104	104	103	0.5	S	2.5
060RR	Kruger	9-20	-	-	103	98	98	0.4	S	2.2
055RR	KSC/Challenger	9-20	-	-	101	103	95	0.3	S	2.7
M-053RR	Mustang	9-21	-	-	104	102	98	0.5	S	1.8
S0536-4	Stine	9-21	-	-	102	99	100	0.5	Rps1k	1.8
055RR	Yield King	9-21	-	-	101	96	101	0.3	S	1.8
DSR-050/RR	Dairyland	9-22	-	-	109	104	98	0.6	S	2.5
DSR-040/RR	Dairyland	9-22	-	102	103	101	99	0.4	S	2.3
PB-0643RR	PBR	9-22	-	-	96	99	99	0.5	Rps1k	1.3
W2051RR	Wensman	9-22	-	-	93	98	101	0.5	Rps1k	2.2
078RR	KSC/Challenger	9-23	-	-	113	98	100	0.5	S	3.3
T-0606RR	Quality Seed Genetics	9-23	-	-	110	107	96	0.4	S	2.3
0406RR	Peterson Farms Seeds	9-23	-	-	97	99	99	0.6	Rps1k	1.5
M-054RR	Mustang	9-23	-	-	96	99	101	0.5	Rps1k	1.8
PB-0623RR	PBR	9-24	-	-	111	102	99	0.6	S	2.7
924	Helena	9-24	-	-	108	100	98	0.9	Rps1c	2.2
077RR	Kruger	9-24	-	-	100	99	97	0.5	S	2.2
041RR	Yield King	9-25	-	-	95	101	94	0.2	Rps1c	2.2
T-0404RR	Quality Seed Genetics	9-25	-	-	87	104	94	0.2	Rps1c	2.5
091RR	Yield King	9-26	-	-	108	101	92	0.7	S	2.3
082+RR	Kruger	9-26	-	-	99	100	96	0.6	S	2.0
T-0676RR	Quality Seed Genetics	9-26	-	-	88	102	95	0.4	Rps1c	2.7
066RR	Kruger	9-27	-	-	106	104	96	0.4	Rps1c	3.0
S0632-4	Stine	9-27	-	-	87	102	96	0.5	Rps1c	3.2
090RR	KSC/Challenger	9-29	-	-	105	98	97	0.7	S	2.3
101RR	KSC/Challenger	9-31	-	-	95	97	93	0.7	Rps1k	2.7
Mean		9-18	40.2 bu/a	43.4 bu/a	34.2 bu/a	33.8%	19.6%			
LSD 20%			5%	7%	10%					

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**Performance and characteristics of Roundup Ready soybean varieties, central zone;
Becker, Rosemount and Morris, 2001-2003.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
AG0301	Asgrow	9-10	-	-	91	99	104	0.3	Rps1k	2.2
0242RR	Star	9-12	-	-	91	101	105	0.3	Rps1c	2.3
0660RR	Star	9-13	-	-	96	101	99	0.6	Rps1k	2.0
PB-0532RR	PBR	9-14	-	-	108	101	100	0.5	S	2.5
2305RR	Gold Country	9-14	-	-	104	101	101	0.5	S	1.8
0571RR	Star	9-14	-	-	103	100	101	0.5	Rps1k	1.8
RRRegal	Hyland Seeds	9-14	-	-	99	99	101	0.5	Rps1k	2.3
DKB07-52	Dekalb	9-14	-	-	98	103	99	0.7	S	1.8
DSR-075/RR	Dairyland	9-15	-	-	102	102	101	0.8	Rps1k	2.0
6042RR	Top Farm	9-15	-	-	100	98	102	0.4	S	2.3
PB-0940RR	Sansqaard	9-15	-	97	98	101	101	0.9	Rps1	1.7
0505RR	Star	9-15	-	-	98	98	103	0.5	S	3.0
AG0601	Asgrow	9-15	-	-	90	98	102	0.6	Rps1k	2.7
DKB09-52	Dekalb	9-16	-	-	103	100	105	0.9	Rps1k	1.8
W2062RR	Wensman	9-16	-	-	99	100	100	0.5	S	1.5
AG0801	Asgrow	9-16	98	96	98	100	98	0.8	Rps1k	2.0
SO10931RR	Sands	9-17	-	-	98	97	102	0.9	Rps1	2.2
RRRandell	Hyland Seeds	9-17	-	-	97	101	97	0.8	Rps1k	1.7
0901RR	Garst/AgriPro	9-17	-	-	96	97	104	0.9	Rps1c	1.7
C0990RR	LG Seeds	9-18	-	-	112	100	99	0.9	S	2.3
PB-1241RR	Sansqaard	9-18	-	99	100	103	102	1.2	S	2.0
SD1081RR	Sodak Genetics	9-18	-	93	100	101	102	0.8	Rps1	1.8
DSR-132/RR	Dairyland	9-18	-	-	97	99	98	1.3	Rps1c	2.5
SD1091RR	Sodak Genetics	9-18	97	94	97	99	101	0.9	Rps1	1.8
6102RR	Top Farm	9-18	-	96	96	99	101	0.9	Rps1	2.0
91B03	Pioneer	9-18	-	92	94	97	101	1.0	Rps1k	2.3
W2093RR	Wensman	9-19	-	104	111	98	101	0.9	S	2.2
C1410RR	LG Seeds	9-19	-	107	110	102	98	1.4	S	2.2
7143	Farm Advantage	9-19	-	-	108	105	94	1.4	S	1.8
XR12Y20	Garst/AgriPro	9-19	-	-	108	97	102	1.2	S	2.2
RS101RR	Renk	9-19	102	104	108	99	97	1.0	Rps1c	1.8
DG38M14	Dyna-Gro	9-19	-	-	106	99	98	1.4	S	2.2
BG1203RR	BioGene	9-19	-	-	104	102	102	1.2	S	2.3
7093	Farm Advantage	9-19	-	-	104	103	97	0.9	S	2.2
M-124RR	Mustang	9-19	-	-	103	99	99	1.2	S	1.7
91B33	Pioneer	9-19	93	91	103	99	105	1.3	Rps1k	2.8
PB-0732RR	Sansqaard	9-19	-	-	103	101	102	0.7	S	2.0
XR15Y04	Garst/AgriPro	9-19	-	-	102	100	105	1.4	S	2.5
121+RR	KSC/Challenger	9-19	-	-	100	102	98	1.0	S	2.7
M-094RR	Mustang	9-19	-	-	100	106	95	0.9	S	2.2
S1346-4	Stine	9-19	-	101	100	101	100	1.3	S	2.3
34043BRR	Top Farm	9-19	-	-	100	102	100	1.4	S	1.7
PB-1063RR	Prairie Brand	9-19	-	-	99	103	99	1.0	S	2.2
1343NRR	Sand Research	9-19	-	-	99	103	98	1.3	S	2.0
PB-0812RR	Sansqaard	9-19	-	102	99	97	101	0.9	S	1.7
090RR	KSC/Challenger	9-19	-	92	96	99	101	0.7	S	2.2
Exp.62339R	Ziller	9-19	-	-	96	101	100	0.9	S	2.2
8131RR	Excel Brand	9-19	-	-	94	102	100	1.3	Rps1c	2.3
PB-1043RR	Prairie Brand	9-19	-	-	91	100	99	1.0	S	2.5
1004RR	Anderson	9-19	-	-	88	104	98	1.0	S	2.2

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**Performance and characteristics of Roundup Ready soybean varieties, central zone;
Becker, Rosemount and Morris, 2001-2003 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
PB-0803RR	PBR	9-19	-	-	87	99	102	0.8	Rps1k	1.3
155+RR	Kruger	9-20	-	-	108	99	97	1.3	S	2.0
AG1401	Asgrow	9-20	-	103	106	97	100	1.4	Rps1k	2.0
DG31C15	Dyna-Gro	9-20	-	-	106	96	103	1.5	S	2.7
DSR-130/RR	Dairyland	9-20	105	104	105	98	101	1.3	S	2.3
2142RR	High Cycle	9-20	-	-	104	101	98	1.4	S	1.5
DG38J12	Dyna-Gro	9-20	-	-	103	102	94	1.2	S	2.8
S1100-4	Stine	9-20	-	-	103	102	98	1.3	S	2.5
RS093RR	Renk	9-20	-	-	99	104	98	0.9	S	2.7
118RR Brand	Latham	9-20	-	-	98	100	96	1.2	Rps1c	3.0
PB-1452RR	Prairie Brand	9-20	-	100	97	103	98	1.4	S	2.2
BT7106R	Ziller	9-20	100	100	97	96	103	1.0	Rps1c	2.0
101RR	Sabre	9-20	-	-	96	99	98	1.0	Rps1k	2.2
SO11050RR	Sands	9-20	-	-	96	101	100	1.0	S	2.2
XR10Y10	Garst/AgriPro	9-20	-	-	86	101	101	1.0	S	1.8
W2085RR	Wensman	9-20	-	-	80	101	102	0.8	Rps1k	2.2
S0943-4	Stine	9-21	-	-	111	103	98	1.0	S	2.2
1703RR	Garst/AgriPro	9-21	-	-	109	99	101	1.5	Rps1c	2.0
PB-1552RR	PBR	9-21	-	102	106	98	100	1.5	S	1.3
SO11441RR	Sands	9-21	-	-	105	97	103	1.4	S	1.8
101RR	Kruger	9-21	-	-	104	98	101	0.7	Rps1k	2.8
2131RR	High Cycle	9-21	-	101	98	103	97	1.3	S	3.2
PB-0923RR	Prairie Brand	9-21	-	-	96	98	100	0.9	Rps1k	2.0
RS159RR	Renk	9-21	103	101	96	95	100	1.5	Rps1c	1.8
W2103RR	Wensman	9-21	-	-	96	102	102	1.0	Rps1k	2.7
141RR/SCN	Yield King	9-22	-	-	110	96	101	1.2	Rps1k	2.3
91B52	Pioneer	9-22	106	105	107	102	102	1.5	Rps1k	2.0
2153RR	High Cycle	9-22	-	-	102	101	97	1.5	S	2.2
PB-1620RR	PBR	9-22	-	105	101	98	99	1.6	Rps1c	2.7
BT7150R	Ziller	9-22	104	104	100	98	98	1.5	Rps1c	2.3
DKB15-51	Dekalb	9-23	-	-	106	100	103	1.5	S	2.5
S1586-4	Stine	9-23	-	104	106	101	99	1.4	Rps1	2.8
132RR	Yield King	9-23	-	-	106	103	101	1.1	S	2.0
191+RR	KSC/Challenger	9-23	-	-	103	103	99	1.7	S	2.2
T-7166RR	Thompson	9-23	-	-	102	99	103	1.5	Rps1k	2.3
M-153RR	Mustang	9-23	-	105	101	97	102	1.5	S	1.5
131CNR	Anderson	9-23	-	-	98	94	103	1.3	Rps1k	2.0
SO11540RR	Sands	9-24	-	-	107	96	103	1.5	S	2.3
1508RR	Anderson	9-24	107	106	105	100	101	1.5	S	3.0
T-7153RR	Thompson	9-24	-	-	105	101	102	1.5	S	2.7
145RR	Sabre	9-24	-	-	103	101	101	1.4	Rps1k	2.0
DSR-155/RR	Dairyland	9-24	-	-	101	98	102	1.5	Rps1k	2.8
161RR/SCN	KSC/Challenger	9-24	-	-	97	96	103	1.4	S	2.8
7174	Farm Advantage	9-24	-	102	96	103	102	1.5	Rps1k	1.7
M-163RR	Mustang	9-25	-	105	100	103	96	1.6	S	2.5
8172RR	Excel Brand	9-25	-	100	97	99	101	1.7	Rps1k	2.7
181RR	Kruger	9-26	-	-	103	102	98	1.6	S	3.0
190RR	Kruger	9-26	-	-	102	98	101	1.7	S	2.7
194RR	Yield King	9-26	-	-	97	96	98	1.7	S	2.7
191RR	Yield King	9-27	-	-	100	96	102	1.7	Rps1k	2.0
8193RR	Excel Brand	9-27	-	103	99	101	98	1.9	Rps1k	2.2
8173RR	Excel Brand	9-27	-	-	93	102	98	1.7	S	1.8
Mean		9-20	49.1 bu/a	54.2 bu/a	45.1 bu/a	35.7%	18.8%			
LSD 20%			8%	9%	10%					

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**Performance and characteristics of Roundup Ready soybean varieties, southern zone;
Jackson, Lamberton and Waseca, 2001-2003.**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
XR15Y04	Garst/AgriPro	9-14	-	-	104	106	97	1.4	S	2.0
GL1400RR	Great Lakes	9-14	-	-	92	104	98	1.4	S	2.5
1524	Helena	9-15	-	-	101	104	99	1.4	S	2.5
W2145RR	Wensman	9-15	-	99	101	106	93	1.4	S	2.3
1508RR	Anderson	9-17	-	-	108	106	95	1.5	S	2.8
34043BRR	Top Farm	9-17	-	-	100	104	99	1.4	S	2.5
1703RR	Garst/AgriPro	9-17	-	-	92	99	99	1.5	Rps1c	2.0
ADV1660R	Advantage	9-18	-	-	92	93	100	1.6	S	2.0
BT7150R	Ziller	9-19	96	97	102	100	101	1.5	Rps1c	2.2
GL1502RR	Great Lakes	9-19	-	-	98	100	95	1.5	S	1.7
AG1701	Asgrow	9-19	-	-	93	100	98	1.7	Rps1c	2.2
1813	Helena	9-19	-	93	88	109	95	1.7	Rps1k	2.3
BG1600RR	BioGene	9-20	-	-	98	104	97	1.6	S	2.5
2162RR	High Cycle	9-20	-	-	97	97	103	1.6	Rps1k	2.3
1719RR	Anderson	9-20	99	96	95	102	102	1.7	Rps1k	2.3
2173RR	High Cycle	9-20	-	97	94	103	101	1.7	S	3.0
DKB19-52	Dekalb	9-20	-	-	93	98	102	1.9	Rps1k	2.8
PS4192	Profiseed	9-20	99	98	92	96	106	1.9	Rps1k	2.0
W2186RR	Wensman	9-20	-	95	92	105	101	1.8	Rps1k	2.8
C1712RR	LG Seeds	9-20	-	-	85	106	99	1.7	Rps1k	2.7
2182RR	High Cycle	9-20	-	-	83	104	100	1.8	Rps1k	2.7
PB-1743RR	Sansgaard	9-21	-	-	108	100	95	1.7	S	2.7
DKB15-51	Dekalb	9-21	-	100	100	99	99	1.5	S	3.0
PB-1552RR	PBR	9-21	-	-	99	103	100	1.5	S	2.0
SO11730RR	Sands	9-21	-	-	96	102	97	1.7	S	2.2
1773RR	Viking	9-21	-	-	95	106	97	1.7	Rps1k	1.8
W2162RR	Wensman	9-21	-	95	94	103	98	1.6	S	2.3
RS199RR	Renk	9-21	-	99	92	96	106	1.9	Rps1k	2.7
6202RR	Top Farm	9-21	93	90	87	106	98	1.9	S	2.7
RS172RR	Renk	9-21	-	88	85	101	99	1.7	Rps1k	2.5
XR13P04	Garst/AgriPro	9-21	-	-	84	95	100	1.9	Rps1c	2.0
T-7221RR	Thompson	9-21	-	-	83	101	103	2.2	S	1.8
E1750R	Latham	9-22	-	-	103	102	98	1.7	Rps1k	2.7
DSR-184/RR	Dairyland	9-22	-	-	100	96	101	1.8	Rps1k	2.7
210RR	Kruger	9-22	-	95	97	103	97	1.9	S	3.0
191+RR	Yield King	9-22	-	-	97	95	107	1.7	S	2.3
195+RR/SCN	Kruger	9-23	-	-	112	105	104	1.8	Rps1k	2.8
AG2107	Asgrow	9-23	-	-	106	103	104	2.1	Rps1k	1.8
1319RR	Gold Country	9-23	-	-	106	102	101	1.9	Rps1k	2.3
ADV1773R	Advantage	9-23	-	-	104	98	103	1.7	Rps1k	1.8
GL2009RR	Great Lakes	9-23	-	-	104	101	106	2.0	Rps1k	1.7
Exp.23718R	ZiWen	9-23	-	-	103	101	98	1.8	S	2.5
215RR	Sabra	9-23	-	-	102	100	105	2.1	S	2.5
ADV1883R	Advantage	9-23	-	-	101	98	103	1.8	S	2.7
191CNR	Anderson	9-23	-	-	101	101	105	1.9	Rps1k	2.3
22B13	Pioneer	9-23	-	99	101	99	98	2.1	Rps1k	2.2
M-203RR	Mustang	9-23	-	101	99	101	99	2.3	S	2.5
XR18Y82	Garst/AgriPro	9-23	-	-	97	97	105	1.9	Rps1k	2.5
C1911RR	LG Seeds	9-24	-	101	106	105	98	1.9	Rps1k	2.7
6221RR	Gold Country	9-24	-	-	105	99	103	2.2	Rps1k	2.3

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**Performance and characteristics of Roundup Ready soybean varieties, southern zone;
Jackson, Lambertson and Waseca, 2001-2003 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
ADV2135R	Advantage	9-24	105	105	103	98	101	2.1	Rps1k	2.0
DSR-228/RR	Dairyland	9-24	103	102	102	104	96	2.3	S	2.3
DKB22-51	Dekalb	9-24	-	99	100	95	102	2.2	S	2.3
181RR	KSC/Challenger	9-24	-	-	100	97	103	1.6	S	2.7
T-7213RR	Thompson	9-24	-	-	100	106	97	2.1	S	2.8
T-7232RR	Thompson	9-24	-	103	100	97	104	2.3	Rps1k	2.0
223+RR	KSC/Challenger	9-24	-	-	99	98	103	2.0	S	2.3
PS4215	Profiseed	9-24	-	101	96	102	100	2.1	Rps1k	2.2
RS212RR	Renk	9-24	-	97	92	94	104	2.1	Rps1k	2.5
211+RR	Kruger	9-24	-	-	90	95	103	2.0	S	2.2
92M00	Pioneer	9-24	-	-	89	98	101	2.0	Rps1k	1.8
497RRBrand	Latham	9-25	-	-	117	98	103	2.2	Rps1k	2.2
T-7205RR	Thompson	9-25	-	114	116	99	103	2.0	Rps1k	2.2
M-201RR	Mustang	9-25	108	103	115	99	104	2.1	Rps1k	2.3
2157RR	Viking	9-25	-	105	112	99	96	2.1	Rps1k	2.2
DSR-199/RR	Dairyland	9-25	101	99	109	101	99	1.9	Rps1k	2.0
2111RR	Anderson	9-25	-	107	107	99	101	2.1	S	2.2
233+RR	KSC/Challenger	9-25	-	-	107	101	99	2.1	Rps1k	2.8
W2211RR	Wensman	9-25	-	-	106	99	101	2.1	S	2.2
8237RR	Excel Brand	9-25	-	-	105	95	100	2.3	S	2.3
C2121RR	LG Seeds	9-25	-	-	105	98	98	2.1	S	1.3
L2136RBrand	Latham	9-25	-	-	104	101	102	2.1	S	2.3
RS223RR	Renk	9-25	-	-	104	94	106	2.2	S	2.0
T-7214RR	Thompson	9-25	-	105	104	105	98	2.1	S	2.5
227RR	Yield King	9-25	-	-	104	99	101	2.0	S	3.5
7192	Farm Advantage	9-25	-	108	103	99	104	1.9	S	2.5
BT7213R	Ziller	9-25	-	-	103	101	99	2.1	S	3.0
GR2037	Midwest	9-25	-	104	102	98	104	2.0	S	2.0
92B38	Pioneer	9-25	104	102	101	103	96	2.3	S	2.3
AG2106	Asgrow	9-25	-	-	100	96	101	2.1	Rps1k	2.3
PB-2243RR	Prairie Brand	9-25	-	-	99	101	98	2.2	S	3.5
2201RR	High Cycle	9-25	99	99	98	101	102	2.0	S	2.0
PB-1981RR	PBR	9-25	-	105	98	103	97	2.1	S	1.8
GL1903RR	Great Lakes	9-25	99	99	97	99	96	1.9	S	2.3
194RR	KSC/Challenger	9-25	-	-	97	96	102	1.7	S	2.5
PB-2352RR	PBR	9-25	-	100	97	95	104	2.3	Rps1k	2.7
DG3190RR	Dyna-Gro	9-25	-	-	96	101	96	1.9	Rps1k	2.5
GL2201RR	Great Lakes	9-25	-	-	96	99	104	2.2	S	2.2
2018RR	Garst/AgriPro	9-25	104	103	95	101	99	2.0	Rps1k	2.2
S2116-4	Stine	9-26	-	-	114	93	105	2.1	S	2.3
E2145R	Latham	9-26	-	-	109	99	98	2.1	Rps1k	2.0
S2103-4	Stine	9-26	-	106	108	99	102	2.2	Rps1k	2.0
T-7192RR	Thompson	9-26	-	-	107	104	97	1.9	Rps1k	2.5
222ARR	Yield King	9-26	-	-	107	102	98	1.9	Rps1k	2.2
8227RR	Excel Brand	9-26	-	-	104	101	99	2.2	Rps1k	2.7
PB-2112RR	Prairie Brand	9-26	-	106	104	97	102	2.1	S	2.0
8236RR	Excel Brand	9-26	-	-	101	99	100	2.3	S	1.8
191RR	Kruger	9-26	-	-	101	102	98	1.7	Rps1k	1.7
SO11940RR	Sands	9-26	-	-	100	98	101	1.9	Rps1k	2.2
7212	Farm Advantage	9-26	-	97	98	96	104	2.1	Rps1k	2.2

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**Performance and characteristics of Roundup Ready soybean varieties, southern zone;
Jackson, Lamberton and Waseca, 2001-2003 (continued).**

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean			Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score
			2001-2003	2002-2003	2003	Protein	Oil			
PS22J1RR	Profiseed	9-26	-	-	97	96	101	2.2	S	1.8
T-7239RR	Thompson	9-26	-	-	87	98	99	2.3	S	3.5
223ARR	Yield King	9-26	-	-	78	99	104	2.0	Rps1k	2.8
SOI2143RR	Sands	9-27	-	-	111	98	104	2.1	Rps1k	2.2
SOI2141ARR	Sands	9-27	-	-	110	97	102	2.1	S	1.8
E2336R	Latham	9-27	-	-	109	101	99	2.3	S	1.8
PB-1943RR	Sansqaard	9-27	-	-	107	96	103	2.0	Rps1k	2.2
BT7193R	Ziller	9-27	-	103	107	98	102	1.9	S	2.0
AG2403	Asgrow	9-27	-	-	104	96	104	2.4	Rps1k	2.2
M-234RR	Mustang	9-27	-	-	103	101	97	2.3	S	3.2
PB-1921RR	Prairie Brand	9-27	-	102	103	101	96	1.9	Rps1k	2.2
PB-2141RR	Prairie Brand	9-27	108	108	103	98	103	2.1	Rps1k	2.8
PB-2443RR	Sansqaard	9-27	-	-	103	100	99	2.4	S	3.2
DSR-221/RR	Dairyland	9-27	103	101	101	100	99	2.1	S	1.5
367RRBrand	Latham	9-27	-	-	101	99	97	1.9	Rps1k	2.2
8200WRR	Excel Brand	9-27	-	-	99	99	101	2.1	S	2.7
M-224RR	Mustang	9-27	-	-	94	99	101	2.2	Rps1k	1.8
DG3218RR	Dyna-Gro	9-27	-	99	93	96	101	2.1	S	1.8
PB-2343RR	PBR	9-27	-	-	93	99	102	2.3	S	2.0
7233	Farm Advantage	9-27	-	-	92	99	101	2.3	Rps1k	2.0
DG3200RR	Dyna-Gro	9-27	-	97	84	97	96	2.0	S	2.7
DG3242RR	Dyna-Gro	9-28	-	-	106	98	97	2.4	Rps1k	3.2
AG2105	Asgrow	9-28	-	99	105	100	98	2.1	Rps1k	2.0
7258	Farm Advantage	9-28	-	-	94	99	96	2.4	S	2.0
PB-2123RR	Sansqaard	9-29	-	-	95	97	100	2.1	Rps1k	2.2
Mean		9-23	52.9 bu/a	50.3 bu/a	41.0 bu/a	33.9%	19.7%			
LSD 20%			5%	7%	8%					

Performance and characteristics of soybean-cyst-nematode-infested (Lamberton, Madelia and Waseca) and non-infested (Jackson, Lamberton and Waseca) sites, 2001-2003.

Variety	Brand or Originator	Maturity Date	Yield, Percent of Mean						Percent of Mean		Maturity Rating	Phytophthora Gene	Chlorosis Score	SCN Rating
			Infested Sites			Non-Infested Sites			Protein	Oil				
			01-03	02-03	2003	01-03	02-03	2003						
MN1006CN	Minn. AES	9-19	-	-	87	-	-	98	100	98	1.0	Rps1	2.2	R
PB-1392NRR	PBR	9-20	-	-	97	-	-	94	101	101	1.3	S	2.0	MS
1490N	Garst/AgriPro	9-21	-	-	102	-	-	104	99	98	1.4	S	1.8	MR
Parker	Minn. AES	9-23	90	84	90	96	100	96	99	101	1.5	Rps1	2.0	S
Freeborn	Minn. AES	9-24	-	-	107	-	-	93	109	95	1.6	Rps1	2.3	R
161RR/SCN	KSC/Challenger	9-24	-	-	98	-	-	106	102	92	1.6	S	2.3	S
91M90	Pioneer	9-24	-	-	96	-	-	95	101	103	1.9	Rps1k	2.3	R
131CNR	Anderson	9-24	-	-	83	-	-	96	93	102	1.3	Rps1k	1.7	S
IA1008	Iowa AES	9-25	-	-	110	-	-	100	103	91	2.0	S	2.3	MR
2220+SCN	Kruger	9-25	-	-	107	-	-	101	101	100	2.0	Rps1	2.5	MR
2181CN	Viking	9-25	-	105	106	-	100	97	101	95	2.1	Rps1	2.7	MR
S1562-4	Stine	9-25	-	-	98	-	-	95	95	105	1.5	S	2.7	MR
T-7211CR	Thompson	9-25	-	104	96	-	89	88	100	100	2.1	S	2.5	MR
221RR/SCN	Kruger	9-25	-	-	95	-	-	100	100	95	2.0	S	2.3	MR
T-3183CN	Thompson	9-26	-	113	111	-	100	107	102	100	1.8	S	2.5	MR
195+RR/SCN	Kruger	9-26	-	-	105	-	-	107	99	103	1.8	Rps1k	2.0	MR
PB-232N	PBR	9-26	-	-	104	-	-	99	101	100	1.9	Rps1k	2.5	MR
PB-210N	Prairie Brand	9-26	116	111	104	98	97	99	99	97	2.1	Rps1	2.3	MS
PB-2092NRR	Prairie Brand	9-26	-	106	99	-	100	101	104	96	2.0	S	2.8	R
PB-1483NRR	PBR	9-26	-	-	97	-	-	105	97	100	1.4	S	1.8	R
4421NRR	Gold Country	9-26	-	-	94	-	-	93	101	101	2.0	S	2.3	MR
DG35N16	Dyna-Gro	9-26	-	-	89	-	-	90	93	104	1.6	S	2.2	MS
AG2107	Asgrow	9-27	-	-	118	-	-	104	99	105	2.1	Rps1k	3.0	R
GR2031	Midwest	9-27	-	-	113	-	-	103	98	101	2.0	Rps1k	2.0	MS
DG33X19	Dyna-Gro	9-27	-	-	111	-	-	96	98	104	1.9	Rps1k	1.8	MR
PB-2183NRR	Prairie Brand	9-27	-	-	111	-	-	103	96	103	2.1	Rps1k	1.8	R
202RR/SCN	KSC/Challenger	9-27	-	-	110	-	-	111	106	99	2.0	Rps1c	3.2	MR
92M30	Pioneer	9-27	-	-	107	-	-	109	102	99	2.3	S	2.0	R
SO12151NRR	Sands	9-27	-	-	105	-	-	110	96	102	2.1	Rps1k	1.8	MR
SO12221NRR	Sands	9-27	-	-	105	-	-	99	102	100	2.2	Rps1c	2.8	MR
191CNR	Anderson	9-27	-	-	102	-	-	99	94	106	1.9	Rps1k	2.0	MS
1908CNRR	Viking	9-27	-	-	101	-	-	108	97	105	1.9	Rps1k	2.7	MR
7204N	Farm Advantage	9-27	-	-	100	-	-	101	95	106	2.0	Rps1k	2.0	MR
2202RR/SCN	High Cycle	9-27	-	-	99	-	-	106	97	101	2.0	Rps1k	2.7	MR
DKB20-52	Dekalb	9-27	-	-	93	-	-	103	95	104	2.0	Rps1k	2.8	MR
S1962-4	Stine	9-27	-	98	91	-	95	96	103	98	1.8	Rps1c	3.2	MR
M-194NRR	Mustang	9-28	-	-	119	-	-	110	99	105	1.9	Rps1k	2.2	MR
SO12042NRR	Sands	9-28	-	-	100	-	-	102	104	98	2.0	Rps1c	2.5	MS
388RRN	Latham	9-28	-	-	98	-	-	95	104	98	1.9	Rps1c	2.5	MR
L2036R Brand	Latham	9-28	-	-	95	-	-	95	100	99	2.0	Rps1k	1.8	MS
PB-1992NRR	Prairie Brand	9-28	-	98	92	-	102	108	101	101	1.9	Rps1c	2.5	MR
SO11871NRR	Sands	9-28	-	-	90	-	-	99	100	100	1.8	S	2.3	MS
IA2021	Iowa AES	9-28	81	75	81	98	102	95	95	103	2.1	Rps1k	2.8	S
2341NRR	Sands	9-29	-	-	119	-	-	102	101	98	2.3	S	3.0	MS
2323SCN	KSC/Challenger	9-29	-	-	109	-	-	106	99	97	2.3	S	2.3	MS
C2317R	Crows	9-29	-	-	104	-	-	105	100	99	2.3	S	3.0	S
DKB24-51	Dekalb	9-29	-	-	97	-	-	94	103	100	2.4	Rps1c	3.7	MR
DG3221NRR	Dyna-Gro	9-29	-	-	97	-	-	93	97	102	2.2	Rps1c	3.0	MR
Loda	Illinois AES	9-29	-	-	94	-	-	98	103	95	2.4	Rps1	2.3	MR
DG3216NRR	Dyna-Gro	9-29	-	-	89	-	-	91	99	101	2.1	Rps1c	3.0	MR
AG2405	Asgrow	9-30	-	-	101	-	-	96	101	100	2.4	S	3.5	R
92M50	Pioneer	9-31	-	-	86	-	-	91	93	105	2.5	Rps1k	2.2	MR
Mean		9-26	33.4	35.1	35.1	50.9	46.6	40.9	34.3%	20.2%				
LSD 20%			5%	7%	16%	3%	4%	8%						

*D. G. Clark

Performance of special-use soybean varieties, northern zone; Crookston, Moorhead and Shelly, 2001-2003.

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2001-2003	2002-2003	2003	Protein	Oil
Jim	N.D. AES	9-6	108	104	97	100	97
Traill	N.D. AES	9-11	—	—	113	102	99
MN0201	Minn. AES	9-12	—	105	101	107	97
MN0203SP	Minn. AES	9-12	88	88	90	107	94
UM3	Minn. AES	9-12	91	86	84	97	104
Walsh	N.D. AES	9-13	—	109	107	96	106
MN0202SP	Minn. AES	9-13	96	93	91	90	102
MN0302	Minn. AES	9-14	121	121	118	100	102
Nannonatto	N.D. AES	9-14	—	—	92	94	98
Nornatto	N.D. AES	9-15	—	—	107	94	99
Norpro	N.D. AES	9-15	106	104	101	100	103
MK0649	Richland Organics	9-16	—	—	102	95	103
MN0205SP	Minn. AES	9-16	97	98	99	98	102
MN0303SP	Minn. AES	9-16	99	92	96	95	103
Danatto	N.D. AES	9-18	95	96	103	118	97
MK0953	Richland Organics	9-18	—	—	97	106	95
Mean		9-14	31.1 bu/a	31.1 bu/a	30.4 bu/a	35.4%	18.9%
LSD 20%			7%	8%	8%		

Performance of special-use soybean varieties, central zone; Becker, Morris and Rosemount, 2001-2003.

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2001-2003	2002-2003	2003	Protein	Oil
MN0201	Minn. AES	9-9	—	—	94	101	100
Danatto	N.D. AES	9-10	71	66	59	94	99
Proto	Minn. AES	9-11	95	97	90	102	97
MN0302	Minn. AES	9-12	—	107	107	95	107
MN0601SP	Minn. AES	9-12	88	86	84	108	90
Lambert	Minn. AES	9-13	106	106	110	98	101
MN1004SP	Minn. AES	9-13	90	91	88	93	102
MN0803SP	Minn. AES	9-14	87	87	79	101	101
Minnatto	Minn. AES	9-14	88	86	75	99	103
MN1003SP	Minn. AES	9-15	114	115	115	98	108
Evans	Minn. AES	9-15	—	—	115	93	113
MN0903SP	Minn. AES	9-15	110	107	109	97	102
MN0802SP	Minn. AES	9-15	—	96	94	93	110
Surge	Minn. & S.D. AES	9-16	119	113	117	96	105
91M10	Pioneer	9-16	—	—	117	94	105
Toyopro	Minn. AES	9-16	99	102	96	102	96
MN1302	Minn. AES	9-17	—	—	117	91	108
MN1103SP	Minn. AES	9-17	112	113	116	95	108
MN1201SP	Minn. AES	9-17	102	100	107	100	105
Minnpro	Northland Organics	9-17	—	—	93	103	94
MN1303SP	Minn. AES	9-17	95	95	82	108	88
Altapro	Northland Organics	9-18	94	92	86	109	84
Parker	Minn. AES	9-19	117	110	108	97	103
Kato	Minn. AES	9-19	106	103	98	99	99
MN1007SP	Minn. AES	9-19	87	87	73	102	92
MN1101SP	Minn. AES	9-20	—	110	116	100	104
MN1306SP	Minn. AES	9-20	—	85	78	90	103
MN1102SP	Minn. AES	9-21	115	114	115	99	104
MN1305SP	Minn. AES	9-21	—	104	101	99	101
Mean		9-16	40.2 bu/a	40.4 bu/a	36.4 bu/a	38.1%	17.3%
LSD 20%			5%	7%	9%		

Performance of special-use soybean varieties, southern zone; Jackson, Lamberton and Waseca, 2001-200

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2001-2003	2002-2003	2003	Protein	Oil
MN1103SP	Minn. AES	9-15	106	100	94	100	104
MN1101SP	Minn. AES	9-16	100	93	100	104	98
MN1004SP	Minn. AES	9-16	81	76	87	100	102
MN1001SP	Minn. AES	9-16	71	66	67	99	95
MN1404SP	Minn. AES	9-17	90	83	88	105	96
MN1502SP	Minn. AES	9-18	103	98	101	103	99
MN1604SP	Minn. AES	9-18	-	83	83	98	97
MN1302	Minn. AES	9-20	-	116	122	93	106
MN1406SP	Minn. AES	9-20	101	100	100	99	105
MN1305SP	Minn. AES	9-20	97	95	96	97	102
MN1408SP	Minn. AES	9-20	75	71	69	100	99
IA1005	Iowa AES	9-21	-	110	105	95	104
MN1306SP	Minn. AES	9-21	98	88	93	97	101
Parker	Minn. AES	9-22	124	118	128	98	103
MN1403SP	Minn. AES	9-22	114	110	115	95	106
MN1503SP	Minn. AES	9-22	111	107	115	100	102
MN1606SP	Minn. AES	9-22	-	110	112	100	105
IA1008	Iowa AES	9-22	-	113	110	97	99
IA2050	Iowa AES	9-22	-	119	109	94	105
2022	Viking	9-22	-	-	108	93	104
Royalpro	Northland Organics	9-22	105	101	101	102	101
Soyapro	Northland Organics	9-22	102	101	100	103	98
IA1009	Iowa AES	9-22	-	105	97	90	101
IA1007	Iowa AES	9-22	-	90	90	100	102
MN1501SP	Minn. AES	9-22	-	83	84	102	90
HP204	Iowa AES	9-22	-	95	79	101	96
MN1607SP	Minn. AES	9-23	-	115	122	102	101
MN1407SP	Minn. AES	9-23	112	111	112	102	98
MN1603SP	Minn. AES	9-23	98	96	99	98	98
ACHime	Maple Leaf Foods	9-23	-	-	93	102	98
IA2028	Iowa AES	9-23	-	97	93	95	108
Vinton 81	Iowa AES	9-23	96	92	91	103	96
IA2016	Iowa AES	9-23	-	97	80	98	99
IA2035	Iowa AES	9-23	-	83	71	95	92
92M10	Pioneer	9-24	-	-	120	90	109
IA2017	Iowa AES	9-24	-	106	103	99	101
IA2025	Iowa AES	9-24	-	94	92	102	98
MN1605SP	Minn. AES	9-24	-	89	92	96	97
IA2024	Iowa AES	9-24	-	85	78	94	92
MLF61	Maple Leaf Foods	9-25	-	-	115	99	98
IA2012	Iowa AES	9-25	-	100	104	98	100
IA2034	Iowa AES	9-25	-	110	100	98	101
IA2030	Iowa AES	9-25	-	99	97	98	105
IA2041	Iowa AES	9-25	-	106	93	101	98
IA2027	Iowa AES	9-25	-	95	87	96	103
IA2033	Iowa AES	9-25	-	92	83	104	98
IA2011	Iowa AES	9-26	-	102	95	97	101
IA2042	Iowa AES	9-26	-	98	93	104	94
IA2032	Iowa AES	9-26	-	100	91	99	104
IA2029	Iowa AES	9-26	-	88	84	97	102

Performance of special-use soybean varieties, southern zone; Jackson, Lamberton and Waseca, 2001-2003 (continued).

Variety	Releasing Institution	Maturity Date	Yield, Percent of Mean			Percent of Mean	
			2001-2003	2002-2003	2003	Protein	Oil
IA2020	Iowa AES	9-26	-	90	76	98	105
MN2101SP	Minn. AES	9-27	109	116	117	101	100
MN2001SP	Minn. AES	9-27	115	108	111	102	103
IA2040	Iowa AES	9-27	-	106	96	102	94
IA2023	Iowa AES	9-27	-	79	75	107	84
Mean		9-22	37.7 bu/a	36.8 bu/a	32.6 bu/a	36.7%	18.6%
LSD 20%			4%	4%	7%		

Characteristics of special-use soybean varieties, northern zone; Crookston, Moorhead and Shelly, 2001-2003.

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum	Phytophthora	Chlorosis	Seeds/Lb
				Color	Gene	Score	
Jim	N.D. AES	00.8	General Purpose	Yellow	S	2.2	3,220
Trail	N.D. AES	0.0	General Purpose	Yellow	Rps1	1.7	3,088
MN0201	Minn. AES	0.2	General Purpose	Yellow	Rps1	3.0	3,783
MN0203SP	Minn. AES	0.2	Small Seed	Yellow	Rps1	2.2	6,219
UM3	Minn. AES	00.9	Small Seed	Yellow	Rps1	3.0	7,695
Walsh	N.D. AES	0.2	General Purpose	Yellow	Rps6	2.7	3,047
MN0202SP	Minn. AES	0.2	Small Seed	Yellow	Rps1	3.0	5,821
MN0302	Minn. AES	0.3	General Purpose	Buff	Rps1k	3.0	3,691
Nannonatto	N.D. AES	0.3	Small Seed	Yellow	S	2.3	6,306
Nornatto	N.D. AES	0.2	Small Seed	Yellow	S	2.2	4,779
Norpro	N.D. AES	0.4	Higher Protein	Yellow	S	2.7	2,838
MK0649	Richland Organics	0.3	Small Seed	Yellow	S	2.2	6,394
MN0205SP	Minn. AES	0.2	Small Seed	Yellow	Rps1	2.8	5,747
MN0303SP	Minn. AES	0.3	Small Seed	Yellow	Rps1	2.5	6,306
Danatto	N.D. AES	0.4	Small Seed	Yellow	S	2.0	5,159
MK0953	Richland Organics	0.3	Large Seed, Higher Protein	Yellow	S	2.3	2,215

Characteristics of special-use soybean varieties, central zone; Becker, Morris and Rosemount, 2001-2003.

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum	Phytophthora	Chlorosis	Seeds/Lb
				Color	Gene	Score	
MN0201	Minn. AES	0.2	General Purpose	Yellow	Rps1	2.8	3,661
Danatto	N.D. AES	0.4	Small Seed	Yellow	S	3.2	5,341
Proto	Minn. AES	0.5	Higher Protein	Buff	S	2.3	2,686
MN0302	Minn. AES	0.3	General Purpose	Buff	Rps1k	3.3	3,314
MN0601SP	Minn. AES	0.6	Higher Protein	Yellow	Rps1c	3.2	4,018
Lambert	Minn. AES	0.7	General Purpose	Buff	Rps1	2.8	3,175
MN1004SP	Minn. AES	1.0	Low Sat., Low Linolenic Acid	Black	Rps1	3.2	2,987
MN0803SP	Minn. AES	0.8	Smaller Seed Higher Protein	Yellow	Rps1	2.2	4,830
Minnatto	Minn. AES	0.9	Small Seed	Yellow	Rps1	3.7	4,283
MN1003SP	Minn. AES	1.0	Higher Protein	Brown	S	2.7	2,640
Evans	Minn. AES	0.5	Yellow Hilum	Yellow	Rps1	2.5	2,948
MN0903SP	Minn. AES	0.9	Higher Protein	Yellow	Rps1	3.0	2,536
MN0802SP	Minn. AES	0.8	Low Linolenic Acid	Black	Rps1	2.2	2,892
Surge	Minn. & S.D. AES	0.9	General Purpose	Imperfect Black	Rps1	2.5	2,415
91M10	Pioneer	1.1	Yellow Hilum	Yellow	S	2.3	2,855
Toyopro	Minn. AES	0.8	Higher Protein	Yellow	S	2.7	3,175
MN1302	Minn. AES	1.3	General Purpose	Buff	Rps1k	3.0	2,624
MN1103SP	Minn. AES	1.1	Low Linolenic Acid	Black	Rps1	3.7	2,735
MN1201SP	Minn. AES	1.2	Large Seed, Higher Protein	Yellow	Rps1	2.8	2,172
Minnpro	Northland Organics	0.8	Higher Protein	Yellow	S	2.5	2,702

**Characteristics of special-use soybean varieties, central zone; Becker, Morris and Rosemount, 2001-2003.
(continued).**

MN1303SP	Minn. AES	1.3	Large Seed, Higher Protein	Yellow	S	3.3	3,632
Altapro	Northland Organics	1.0	Higher Protein	Yellow	S	3.3	3,519
Parker	Minn. AES	1.5	General Purpose	Buff	Rps1	3.3	3,027
Kato	Minn. AES	1.3	General Purpose	Black	Rps1	2.3	2,522
MN1007SP	Minn. AES	1.0	Small Seed	Yellow	Rps1	2.5	5,747
MN1101SP	Minn. AES	1.1	Large Seed, Higher Protein	Yellow	Rps1	3.7	2,162
MN1306SP	Minn. AES	1.3	Small Seed	Yellow	Rps1	2.5	7,828
MN1102SP	Minn. AES	1.1	Large Seed, Higher Protein	Yellow	Rps1	2.8	2,316
MN1305SP	Minn. AES	1.3	Large Seed, Higher Protein	Yellow	Rps1	2.3	2,102

Characteristics of special-use soybean varieties, southern zone; Jackson, Lamberton and Waseca, 2001-2003.

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum Color	Phytophthora Gene	Chlorosis Score	Seeds/Lb
MN1103SP	Minn. AES	1.1	Low Linolenic Acid	Black	Rps1	2.7	2,873
MN1101SP	Minn. AES	1.1	Large Seed	Yellow	Rps1	3.2	2,248
MN1004SP	Minn. AES	1.0	Large Seed, Higher Protein	Black	Rps1	2.7	2,967
MN1001SP	Minn. AES	1.0	Small Seed	Yellow	Rps1	2.8	6,676
MN1404SP	Minn. AES	1.4	Large Seed, Higher Protein	Yellow	Rps1	2.5	2,142
MN1502SP	Minn. AES	1.2	Large Seed, Higher Protein	Yellow	Rps1	3.0	2,377
MN1604SP	Minn. AES	1.3	Small Seed	Yellow	Rps1	2.8	6,580
MN1302	Minn. AES	1.3	General Purpose	Buff	Rps1k	2.2	3,007
MN1406SP	Minn. AES	1.4	Large Seed, Higher Protein	Yellow	Rps1	2.8	2,428
MN1305SP	Minn. AES	1.3	Large Seed, Higher Protein	Yellow	Rps1	2.8	2,204
MN1408SP	Minn. AES	1.4	Small Seed	Yellow	Rps1	3.2	6,053
IA1005	Iowa AES	1.4	Large Seed, Higher Protein	Yellow	S	2.0	2,454
MN1306SP	Minn. AES	1.3	Small Seed	Yellow	Rps1	2.5	6,879
Parker	Minn. AES	1.5	General Purpose	Buff	Rps1	2.7	2,855
MN1403SP	Minn. AES	1.4	Large Seed	Yellow	Rps1	3.2	2,536
MN1503SP	Minn. AES	1.5	Large Seed, Higher Protein	Yellow	Rps1	2.5	2,467
MN1606SP	Minn. AES	1.6	Large Seed, Higher Protein	Yellow	Rps1	2.2	2,389
IA1008	Iowa AES	1.6	Yellow Hilum	Yellow	S	3.0	3,047
IA2050	Iowa AES	1.7	General Purpose	Black	S	3.5	3,197
2022	Viking	2.0	Yellow Hilum	Yellow	Rps1c	2.8	2,892
Royalpro	Northland Organics	1.6	Large Seed, Higher Protein	Yellow	S	3.0	2,172
Soyapro	Northland Organics	1.6	Large Seed, Higher Protein	Yellow	S	3.2	2,236
IA1009	Iowa AES	1.7	Yellow Hilum	Yellow	S	3.2	3,338
IA1007	Iowa AES	1.8	Large Seed, Higher Protein	Yellow	S	3.0	1,787
MN1501SP	Minn. AES	1.8	Small Seed	Yellow	S	4.0	6,394
HP204	Iowa AES	2.0	Large Seed, Higher Protein	Yellow	S	3.7	2,352
MN1607SP	Minn. AES	1.6	Large Seed, Higher Protein	Yellow	Rps1	2.3	2,293
MN1407SP	Minn. AES	1.4	Large Seed, Higher Protein	Brown	Rps1	2.7	1,900
MN1603SP	Minn. AES	1.6	Large Seed, Higher Protein	Yellow	S	2.8	1,823
ACHime	Maple Leaf Foods	2.1	Large Seed, Higher Protein	Yellow	S	2.7	2,305
IA2028	Iowa AES	2.4	Lipoxygenase Free	Yellow	Rps1	2.7	2,454
Vinton 81	Iowa AES	2.0	Large Seed, Higher Protein	Yellow	Rps1c	3.0	2,389
IA2016	Iowa AES	2.2	Large Seed, Higher Protein	Yellow	S	3.0	2,389
IA2035	Iowa AES	2.4	Small Seed	Yellow	S	2.2	6,879
92M10	Pioneer	2.1	Yellow Hilum	Yellow	Rps1c	2.0	3,338
IA2017	Iowa AES	2.2	Large Seed, Higher Protein	Yellow	S	3.2	2,495
IA2025	Iowa AES	2.2	Lipoxygenase Free	Yellow	S	2.7	2,551
MN1605SP	Minn. AES	2.0	Small Seed	Yellow	Rps1	3.0	6,580
IA2024	Iowa AES	2.5	Small Seed	Yellow	S	2.2	6,676
MLF61	Maple Leaf Foods	1.8	Large Seed, Higher Protein	Yellow	S	3.2	2,609

Characteristics of special-use soybean varieties, southern zone; Jackson, Lambertton and Waseca, 2001-2003 (continued).

Variety	Releasing Institution	Maturity Rating	Special Characteristics	Hilum Color	Phytophthora Gene	Chlorosis Score	Seeds/Lb
IA2012	Iowa AES	2.2	Large Seed	Yellow	S	2.5	1,794
IA2034	Iowa AES	2.5	Large Seed, Higher Protein	Yellow	S	2.7	2,454
IA2030	Iowa AES	2.3	Lipoxygenase Free	Yellow	S	2.5	2,162
IA2041	Iowa AES	2.1	Large Seed, Higher Protein	Yellow	S	3.7	2,565
IA2027	Iowa AES	2.4	Lipoxygenase Free	Yellow	S	2.7	2,328
IA2033	Iowa AES	2.4	Lipoxygenase Free	Yellow	S	3.3	2,316
IA2011	Iowa AES	2.2	Lacks Lipoxygenase 2	Yellow	S	3.2	2,454
IA2042	Iowa AES	2.1	Large Seed, Higher Protein	Yellow	S	3.7	2,270
IA2032	Iowa AES	2.5	Lipoxygenase Free	Yellow	S	2.2	2,259
IA2029	Iowa AES	2.4	Lipoxygenase Free	Yellow	S	2.8	2,215
IA2020	Iowa AES	2.3	Large Seed, Higher Protein	Yellow	S	3.0	2,131
MN2101SP	Minn. AES	2.1	Large Seed, Higher Protein	Brown	Rps1	3.3	2,121
MN2001SP	Minn. AES	2.0	Large Seed, Higher Protein	Yellow	Rps1	2.5	2,270
IA2040	Iowa AES	2.4	Large Seed, Higher Protein	Yellow	S	2.3	1,831
IA2023	Iowa AES	2.4	Small Seed	Yellow	S	2.7	6,394

Characteristics of publicly developed soybean varieties entered in 2003 tests.

Variety	Releasing Institution	Maturity Rating	Phytophthora Gene	BSR Reaction	SCN Reaction	Chlorosis Score
McCall	Minn. AES	00.7	S	S	S	2.7
MN0071	Minn. AES	00.7	Rps1	S	S	2.2
Jim	N.D. AES	00.8	S	S	S	4.0
Glacier	Minn. AES	00.8	Rps6	S	S	1.8
Agassiz	Minn. AES	0.0	Rps1	S	S	3.3
Traill	N.D. AES	0.0	Rps1	S	S	2.3
Walsh	N.D. AES	0.2	Rps6	S	S	2.3
Barnes	N.D. AES	0.2	Rps6	S	S	2.2
MN0201	Minn. AES	0.2	Rps1	R	S	2.0
MN0301	Minn. AES	0.3	Rps1	S	S	1.8
MN0302	Minn. AES	0.3	Rps1k	S	S	2.5
MN0304	Minn. AES	0.3	Rps1k + Rps6	R	S	2.0
Lambert	Minn. AES	0.7	Rps1	S	S	2.8
MN0902CN	Minn. AES	0.9	Rps1	R	R	1.7
MN1005	Minn. AES	1.0	Rps1k	S	S	3.0
MN1006CN	Minn. AES	1.0	Rps1	S	R	2.7
Surge	S.D. + Minn. AES	0.9	Rps1	S	S	2.7
MN1301	Minn. AES	1.3	Rps1c	S	S	2.5
Kato	Minn. AES	1.3	Rps1	S	S	2.2
MN1302	Minn. AES	1.3	Rps1k	R	S	1.7
MN1401	Minn. AES	1.4	Rps1	S	S	2.0
Parker	Minn. AES	1.5	Rps1	S	S	2.8
Freeborn	Minn. AES	1.6	Rps1	R	R	1.7
IA1006	Iowa AES	1.6	S	R	S	2.2
MN1801	Minn. AES	1.8	Rps1c	S	S	2.8
Sturdy	Minn. AES	2.0	Rps1	S	S	2.3
IA1008	Iowa AES	2.0	S	S	R	2.0
IA2008R	Iowa AES	2.1	Rps1k	R	S	2.5
IA2021	Iowa AES	2.1	Rps1k	S	S	3.0
IA2050	Iowa AES	2.1	S	S	S	3.0
IA2052	Iowa AES	2.3	Rps1	R	S	2.3
Loda	Illinois AES	2.3	Rps1	S	R	2.3



Minnesota Crop Improvement Association (MCIA) is a nonprofit association whose primary mission is to improve the productivity, profitability and competitive position of its members. The association is governed by a member-elected board of directors and operates on fees charged for services. The Minnesota Department of Agriculture recognizes MCIA as the state's official seed-certification agency and official noxious-weed-free forage and mulch certifying agency.

Several more specialized seed-quality-assurance programs have been introduced that assure the quantity of seed products not eligible for statutory seed certifying programs, including the third-party verification of the presence of various genetically modified traits.

MCIA also is the foundation seed organization in Minnesota, with responsibility to maintain and increase parent stocks of crop varieties developed at the Minnesota Agricultural Experiment Station (MAES). The association also provides similar kinds of services to several private seed companies that require small parent-seed increases of varieties prior to engaging in large commercial increases.

MCIA has provided foundation seed services to the MAES for more than 35 years. The association's role in the delivery of new varieties to Minnesota agriculture was expanded in 2000 to include responsibility as the exclusive licensing agent for varieties developed at the MAES that are licensed to private entities.

Identity Preserved (IP) programs provide third-party verification that certain valuable genetic traits are present at the level necessary to add significant value to the end product. These programs also are capable of certifying that grain entering the food chain is free of specific genetic contamination within accepted tolerances.

Organic certification is MCIA's most recent program offering. The Association is accredited by USDA's National Organic Program (NOP) as a designated certification organization (DCO) for providing organic certification services and is recognized by USDA's Agricultural Marketing Service as conforming to the ISO Guide 65 assessment for U.S. organic certifying agencies.

Sources of Registered and Certified Seed

The listing of growers with certified seed for sale in 2004 that follows is published as a service to prospective seed buyers. It is not to be construed as an offer for sale by the grower and is not to be considered as public advertising or as the posting of public notice in any manner. Growers who wish to promote and sell seed in Minnesota must comply with all current state regulations governing seed sales.

The seller of certified seed must supply seed representative of the samples submitted to, and approved for certification by, MCIA. Seed purchasers should insist on certification being complete, with certified seed tags attached to bags or a bulk sale certificate furnished with bulk seed lots. *Please contact growers directly for information on seed quantity and price.*

Notice to Seed Buyers

Should you ever suspect misrepresentation, mislabeling or violation of regulations under which certified seed classes are produced and marketed, contact MCIA at 800-510-5242. While MCIA cannot assume financial responsibility for the performance of seed purchased from sources listed, or for disagreements over sales that may arise from this list, any complaint about certified seed that is received will be investigated.

Should a claim over seed performance involving MCIA arise, it must be addressed as provided in the Minnesota Department of Agriculture Rules for Arbitration of Seed Performance Disputes. Information on these rules and provisions is available from the department's Agronomy and Plant Services Division, 90 West Plato Blvd., St. Paul, MN 55107, phone 651-296-8309.

Growers with Certified and Registered seed for sale in 2003. Please contact growers directly for information on seed quantity and price.

Listing lines show county, grower, town, phone number and class of seed, R for Registered, C for Certified.

BARLEY

Hazen

Todd Faust, Kevin, Long Prairie 320-732-3361 R

Lacey

Clay Heartland Seeds, Moorhead 218-585-4621 C
 Clay Murphy, Dan, Felton 218-494-3414 R
 Clay Olek, Bradley, Moorhead 218-494-3440 C
 Clay Wetterlin, Jerry & Aaron, Glyndon 218-494-3339 C
 Douglas Sward Seed Farm, Nelson 320-762-0143 R C
 Freeborn Albert Lea Seed House, Inc., Albert Lea 507-373-3161 C
 Grant Lacey Ridge Farm Co. %Brian Lacey, Wendell 218-458-2595 R C
 Kittson Bloomquist Farms, Inc., Drayton 218-455-3863 R C
 Kittson Johnson Farms, Inc., Lloyd, Karlstad 218-436-2817 C
 Kittson Petersen, Ronald L., Lake Bronson 218-754-4631 C
 Mahnomen Pazdernik Farms, Inc., Waubun 218-473-2232 R
 Marshall Anderson, Travis, Argyle 218-437-8107 C
 Marshall Beaudry, Jeffrey, Argyle 218-437-8560 C
 Marshall Bring, Sharon, Strandquist 218-874-3713 C
 Marshall Jensen Farms, Stephen 218-478-3398 C
 Marshall KJ - KJ Farms, Argyle 218-437-8221 C
 Marshall Kowalski, James, Stephen 218-478-3899 C
 Marshall Peterson, Maynard, Stephen 218-478-3859 C
 Marshall R & R Rivard Partnership, Argyle 218-437-6479 R C
 Marshall Riopelle, Earl & Brent, Argyle 218-437-8291 R C
 Marshall Riopelle, Larry, Argyle 218-437-8247 R
 Marshall Stusynski, David, Strandquist 218-436-2717 C
 Norman Chisholm, Keith P., Gary 218-356-8674 C
 Otter Tail Brenden, Bruce L., Rothsay 218-867-2410 C
 Out of State Anderson, Gerald D, Grand Forks 701-775-8766 R C
 Pipestone Spronk, Art & Sons Seed Farm, Edgerton 507-442-5334 C
 Polk Fosston Co-op Seed House, Fosston 218-435-6222 C
 Polk Sonsteliie, Gordon & Gary, Winger 218-938-4189 C
 Rice Werner Farm Seeds, Dundas 507-645-7995 C
 Todd Faust, Kevin, Long Prairie 320-732-3361 C
 Todd Sweeney Seed Farm, Inc., Bertha 218-924-2921 R C

Legacy

Clay Amundson, James, Ulen 218-596-8792
 Marshall Double A Farms, Viking 218-523-4245
 Wilkin Friederichs Farm, Foxhome 218-643-2363

MNBrite

Marshall Hapka, Jon C., Warren 218-745-4507 C
 McLeod Rusch, Dale, Hutchinson 320-587-5721 C
 Pipestone Spronk, Art & Sons Seed Farm, Edgerton 507-442-5334 R C

Robust

Clay Janssen, Jerry, Barnesville 218-493-4451 C
 Douglas Sward Seed Farm, Nelson 320-762-0143 R
 Freeborn Albert Lea Seed House, Inc., Albert Lea 507-373-3161 R C
 Grant Adams Seed, Wendell 218-458-2151 R C
 Kittson Nelson, Merle L., Drayton 218-455-3508 C
 Marshall Double A Farms, Viking 218-523-4245 C
 Marshall Farmers Elevator Company, Alvarado 218-965-4812 C
 Marshall Peterson, Maynard, Stephen 218-478-3859 C
 Marshall Stusynski, David, Strandquist 218-436-2717 C
 Meeker Peterson, Melvin, Arwater 320-877-7585 C
 Meeker Peterson, Russell M., Grove City 320-877-7793
 Murray Blankers, Jerry, Lake Wilson 507-879-3103 R
 Norman Kveno, Harry, Gary 218-356-8278
 Polk Mat - Co., Inc., Fosston 218-435-6667 R C
 Polk Novak, James, Angus 218-745-5048
 Polk Stroble, D & K, Angus 218-745-4473 C
 Polk Thorson Farm, Inc., J. O., East Grand Forks 218-893-2285
 Polk Thorson, Chad, East Grand Forks 218-893-2285

Polk Thorson, Jason J., East Grand Forks 218-893-2285
 Red Lake Payment, Darrell, Red Lake Falls 218-253-2254 C
 Roseau K & L Farms (Kraig Lee), Wannaska 218-425-7719 C
 Wilkin Knapp Seed Farm, Inc., Foxhome 218-739-3366 C

Royal

Freeborn Albert Lea Seed House, Inc., Albert Lea 507-373-3161 C
 Wabasha Zabel Seeds, Plainview 507-534-2487 R C

Stander

Pipestone Spronk, Art & Sons Seed Farm, Edgerton 507-442-5334 R C

BIG BLUESTEM

Bison

Roseau Baumgartner Farms, Inc., Roseau 218-463-1332 C
 Roseau Dahl, Elmer, Roseau 218-463-3643 C
 Roseau Erickson, Douglas, Roseau 218-463-3535 C
 Roseau Slater, Gary, Roseau 218-463-1064 C
 Roseau Svoboda - Transgrud, Badger 218-528-3692 C

Bonilla

Cottonwood Iverson, Glen, Lamberton 507-445-3388 C

Sunnyview

Renville Branick, Kevin, Sioux Falls 320-329-8233 C

BIRDSFOOT TREFOIL

Norcen

Roseau Slater, Gary, Roseau 218-463-1064 C

CHICKLING VETCH

AC Greenfix

Red Lake Juneau, Dan, Red Lake Falls 218-698-4222 C

CORN

E670A Hybrid

Renville Enestvedt Bros., Sacred Heart 320-765-2728

E670ARR Hybrid

Renville Enestvedt Bros., Sacred Heart 320-765-2728

FLAX

Omega

Lac Qui Parle Harwick, Kenneth, Madison 320-752-4455 C
 Lake of the Woods Helmstetter Farm, Roosevelt 218-442-7285 R
 Roseau K & L Farms (Kraig Lee), Wannaska 218-425-7719 R
 Roseau Magnusson Farms, Roseau 218-463-2374 R

York

Kittson Bloomquist Farms, Inc., Drayton 218-455-3863 C

INDIANGRASS

Tomahawk

Roseau Baumgartner Farms, Inc., Roseau 218-463-1332 C
 Roseau Carlson, Dean A., Roseau 218-425-7763 C

KENTUCKY BLUEGRASS

Park

Lake of the Woods Northern Excellence Seed, Williams 218-783-2215 C
 Lake of the Woods Pieper Farms, Jerry, Williams 218-783-6610 C
 Lake of the Woods Pieper, Robert, Williams 218-783-4352 C
 Lake of the Woods Swanson, Leslie, Williams 218-463-2702 C
 Roseau Dahl, Stephen Ray, Roseau 218-463-1569 C
 Roseau Dahlgren, David, Roseau 218-463-3180 C

Listing lines show county, grower, town, phone number and class of seed, R for Registered, C for Certified.

Roseau	Eastman, Bob, Roseau	218-463-1621	C
Roseau	Evergreen Farms, Inc. (Johnson, Thomas), Roseau	218-425-7432	C
Roseau	Goos Farms, Inc., Roseau	218-424-7748	C
Roseau	Grahn Farms, % Mike Grahn, Roseau	218-463-1765	C
Roseau	Habstritt Farms, Inc., Roseau	218-463-1193	C
Roseau	Hagen, William, Warroad	218-386-1400	C
Roseau	Magnusson Farms, Roseau	218-463-2374	C
Roseau	Magnusson, Ardell, Roseau	218-463-1647	C
Roseau	Millner Farms, Gene Millner, Roseau	218-463-2164	C
Roseau	Northern Minnesota Bluegrass, Roseau	218-463-3888	R C
Roseau	Olafson, Mark, Roseau	218-463-3958	C
Roseau	Santl Farms (Ken Santl), Roseau	218-463-2686	C
Roseau	Slater, Gary, Roseau	218-463-1064	C

OATS

Buff Hullness

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	C
Meeker	Wigen Seed Farm, Litchfield	320-693-8182	R C
Swift	Falk Seed Farm, Murdock	320-875-4341	C

Dane

Houston	Troendle Farms, Spring Grove	507-724-2211	C
Olmsted	Meyer's Seeds, Inc., Elgin	507-876-2482	C
Redwood	Sawvells Seed, Inc., Clements	507-692-2240	C
Wright	Terning Seeds, Inc., Cokato	320-286-2168	C

Ebeltoft

Clay	Tobolt Seed, Moorhead	218-287-2904	C
Marshall	Newfolden Co-op Elevator Assn., Newfolden	218-874-7465	C
Norman	Chisholm, Mark M., Gary	218-356-8507	C
Norman	Chisholm, Tim, Gary	218-356-8507	C

Gem

Brown	Cunningham Seed Farms, Sleepy Eye	507-794-7323	C
Kandiyohi	Behm Seed Company, Atwater	320-974-3003	C
McLeod	Thalmann Seeds Inc., Plato	320-238-2185	C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	C
Stearns	Nietfeld Farm, Inc., Melrose	320-987-3442	C
Wabasha	Gerken's Feed & Grain LLC (J. M. Evers), Wabasha	651-565-2611	C
Wabasha	Zabel Seeds, Plainview	507-534-2487	C
Wright	Terning Seeds, Inc., Cokato	320-286-2168	C

Hi-Fi

Norman	Crompton, Shawn, Ada	218-784-2257	C
Pipestone	Spronk, Art & Sons Seed Farm, Edgerton	507-442-5334	C
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	C

Jerry

Clay	Tobolt Seed, Moorhead	218-287-2904	R
Marshall	Newfolden Co-op Elevator Assn., Newfolden	218-874-7465	C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	R C
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	C
Swift	Falk Seed Farm, Murdock	320-875-4341	R C

Jim

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C

Killdeer

Norman	Chisholm, Mark M., Gary	218-356-8507	C
Otter Tail	Crop Production Services, Perham	218-346-2355	C

Leonard

Douglas	Thompson Farms, Kensington	320-965-2486	C
Kandiyohi	Loge, Alan, Willmar	320-235-4178	C
Lincoln	Deutz, Daniel, Lake Benton	507-368-9234	C
Lincoln	Ivanhoe Seed & Feed, Ivanhoe	507-694-1245	C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C
Meeker	Wigen Seed Farm, Litchfield	320-693-8182	C

Milton

Todd	Schwarlike, Lloyd, Gray Eagle	320-285-5417	C
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Moraine

Brown	Cunningham Seed Farms, Sleepy Eye	507-794-7323	C
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	C
Olmsted	Meyer's Seeds, Inc., Elgin	507-876-2482	C
Rice	Werner Farm Seeds, Dundas	507-645-7995	C
Stearns	Nietfeld Farm, Inc., Melrose	320-987-3442	C
Wabasha	Zabel Seeds, Plainview	507-534-2487	C

Morton

Beltrami	Friesen, Mark, Hines	218-835-7181	C
Clearwater	Holm, DuWayne, Shevlin	218-785-2786	C
Douglas	Sward Seed Farm, Nelson	320-762-0143	C
Marshall	Stusynski, David, Strandquist	218-436-2717	C
Norman	K.L. Farms, Fertile	218-945-6271	C
Otter Tail	Crop Production Services, Perham	218-346-2355	C
Pipestone	Spronk, Art & Sons Seed Farm, Edgerton	507-442-5334	R C
Polk	Brekken Farm Partnership (Robin & Karen), Crookston	218-926-5655	C
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	C
Swift	Falk Seed Farm, Murdock	320-875-4341	R C
Todd	Faust, Kevin, Long Prairie	320-732-3361	C

Reeves

Carlton	Korhonen, Art, Kettle River	218-273-4931	R
Cottonwood	Bondhus, Barry N., Storden	507-445-3227	C
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Houston	Troendle Farms, Spring Grove	507-724-2211	C
Lake of the Woods	Nelson, Darrell M., Baudette	218-634-1864	C
Le Sueur	Stangler Farm Seed, Dick, Kilkenny	507-595-2883	R C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	C
Olmsted	Meyer's Seeds, Inc., Elgin	507-876-2482	R C
Otter Tail	Peeters, John, Menahga	218-385-2609	C
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	C
Redwood	Sawvells Seed, Inc., Clements	507-692-2240	C
Swift	Falk Seed Farm, Murdock	320-875-4341	R C
Todd	Buchholz Farms, Grey Eagle	320-285-5401	C
Wabasha	Gerken's Feed & Grain LLC (J. M. Evers), Wabasha	651-565-2611	C
Wabasha	Zabel Seeds, Plainview	507-534-2487	C
Yellow Medicine	Kopitzke, Mark, Clarkfield	320-669-4955	C

Richard

Clearwater	Holm, DuWayne, Shevlin	218-785-2786	C
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Kandiyohi	Loge, Alan, Willmar	320-235-4178	C
Le Sueur	Haas Seed Farm, Le Sueur	507-665-3683	C
Le Sueur	Stangler Farm Seed, Dick, Kilkenny	507-595-2883	R C
McLeod	Dammann Seed, Plato	320-864-3004	C
McLeod	Thalmann Seeds Inc., Plato	320-238-2185	C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	R C
Mower	Zimmerman Seeds, Racine	507-378-2077	C
Nicollet	Anderson & Sons, St. Peter	507-246-5032	C
Olmsted	Meyer's Seeds, Inc., Elgin	507-876-2482	R C
Pine	Cabak, Daniel C., Hinckley	320-384-7377	R C
Pipestone	Spronk, Art & Sons Seed Farm, Edgerton	507-442-5334	R C
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	C
Redwood	Sawvells Seed, Inc., Clements	507-692-2240	C
Renville	Kiecker, Greg, Hector	507-326-8167	C
Rice	Werner Farm Seeds, Dundas	507-645-7995	R C
Scott	Hauer Farms, Inc., Shakopee	952-445-5480	C
Stearns	Jokeland Farms, Jord & Kathy Ebnet, Holdingford	320-746-2147	C
Swift	Falk Seed Farm, Murdock	320-875-4341	R C
Todd	Sweeney Seed Farm, Inc., Bertha	218-924-2921	R C
Wabasha	Gerken's Feed & Grain LLC (J. M. Evers), Wabasha	651-565-2611	C
Wabasha	Zabel Seeds, Plainview	507-534-2487	C
Wright	Terning Seeds, Inc., Cokato	320-286-2168	C

Riser

Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	C
Olmsted	Meyer's Seeds, Inc., Elgin	507-876-2482	C
Wabasha	Gerken's Feed & Grain LLC (J. M. Evers), Wabasha	651-565-2611	C
Wabasha	Zabel Seeds, Plainview	507-534-2487	C

Sesqui

Brown	Roszbach Lakeside Seeds, Inc., Hanska	507-794-7698	C
Carlton	Korhonen, Art, Kettle River	218-273-4931	C
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Le Sueur	Haas Seed Farm, Le Sueur	507-665-3683	C
Le Sueur	Stangler Farm Seed, Dick, Kilkenny	507-595-2883	R C
McLeod	Rusch, Dale, Hutchinson	320-587-5721	C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C
Meeker	Wigen Seed Farm, Litchfield	320-693-8182	C
Mower	Zimmerman Seeds, Racine	507-378-2077	C
Nicollet	Sjogren Seed Farm, Lafayette	507-228-8141	C
Pipestone	Spronk, Art & Sons Seed Farm, Edgerton	507-442-5334	R C
Rice	Werner Farm Seeds, Dundas	507-645-7995	R C
Scott	Hauer Farms, Inc., Shakopee	952-445-5489	C
Wright	Terning Seeds, Inc., Cokato	320-286-2168	C

Troy

Todd	Schwanke, Lloyd, Grey Eagle	320-285-5417	C
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Vista

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	C
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	C
Mower	Zimmerman Seeds, Racine	507-378-2077	C
Olmsted	Meyer's Seeds, Inc., Elgin	507-876-2482	C
Rice	Werner Farm Seeds, Dundas	507-645-7995	C
Wabasha	Zabel Seeds, Plainview	507-534-2487	C

Wabasha

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Kandiyohi	Behm Seed Company, Atwater	320-974-3003	R C
Kandiyohi	Loge, Alan, Willmar	320-235-4178	C
Lake of the Woods	Helmsstetter Farm, Roosevelt	218-442-7285	C
McLeod	Rusch, Dale, Hutchinson	320-587-5721	C
Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C
Meeker	Smith, Steven, Darwin	320-693-6769	C
Meeker	Wigen Seed Farm, Litchfield	320-693-8182	C
Pipestone	Spronk, Art & Sons Seed Farm, Edgerton	507-442-5334	R
Scott	Hauer Farms, Inc., Shakopee	952-445-5489	C
Swift	Falk Seed Farm, Murdock	320-875-4341	R C
Todd	Faust, Kevin, Long Prairie	320-732-3361	C
Wright	Terning Seeds, Inc., Cokato	320-286-2168	C

RED CLOVER

Marathon

Lake of the Woods	Northern Excellence Seed, Williams	218-783-2215	C
Lake of the Woods	Pieper Farms, Jerry, Williams	218-783-6610	C

RYE

AC Remington

Todd	Sweeney Seed Farm, Inc., Bertha	218-924-2921	C
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Rymin

Meeker	Wigen Seed Farm, Litchfield	320-693-8182	R
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	R

Spooner

Wabasha	Mallard Seed Co., Inc., Plainview	507-534-2300	C
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SIDE-OATS GRAMA

Pierre

Roseau	Svoboda - Transgrud, Badger	218-528-3692	C
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SOYBEAN

Barnes

Polk	Vig Farms Inc., Fosston	218-435-1330	C
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Corsoy 79

Faribault	Willette Seed Farm, Inc., Delavan	507-854-3595	R C
Jackson	Rubis, Craig, Lakefield	507-662-6494	C

Evans

Clay	Petermann Seeds, Inc., Hawley	218-483-3302	C
Douglas	Sward Seed Farm, Nelson	320-762-0143	R

HP204

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	C

IA1006

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R
Kandiyohi	Loge, Alan, Willmar	320-235-4178	C
Rice	Werner Farm Seeds, Dundas	507-645-7995	C
Scott	Hauer Farms, Inc., Shakopee	952-445-5489	C

IA1007

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R
Olmsted	Alliance Company of Minnesota, Kasson	507-634-6060	R
Out of State	Pattison Bros, Inc., Fayette, IA	563-425-3365	R

IA1008

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R
Jackson	Brunk Bros., Gene or William, Brewster	507-842-5471	C

IA1010

Steele	SunRich, Hope	507-451-3316	R
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IA1011

Steele	SunRich, Hope	507-451-3316	R
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IA1014

Steele	SunRich, Hope	507-451-3316	R
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IA2008R

Faribault	Willette Seed Farm, Inc., Delavan	507-854-3595	R C
Le Sueur	Birr Brothers, Mark & Gene, Kasota	507-931-2218	R

IA2017

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	

IA2020

Olmsted	Alliance Company of Minnesota, Kasson	507-634-6060	R
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IA2041

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R
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IA2050

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R
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IA2053

Blue Earth	Knewton Seed Co., Good Thunder	507-278-4087	R
Faribault	Willette Seed Farm, Inc., Delavan	507-854-3595	R C
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820	C

Jim

Kittson	Carlson, James A., Hallock	218-843-3483	R
Kittson	Petersen, Ronald L., Lake Bronson	218-754-4631	C
Marshall	Anderson, Travis, Argyle	218-437-8107	C
Marshall	KJ - KJ Farms, Argyle	218-437-8221	C
Marshall	Kowalski, James, Stephen	218-478-3899	C
Marshall	Nybladh, Alvin, Stephen	218-478-3345	C
Marshall	Peterson, Maynard, Stephen	218-478-3859	R C
Marshall	Fiopelle, Larry, Argyle	218-437-8247	R
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	C
Polk	Kovar, Frank & Duane, East Grand Forks	218-773-9238	C
Polk	Larson Farms, Jerry Larson, Climax	218-57-3345	C
Polk	Mat - Co., Inc., Fosston	218-435-6667	R C
Red Lake	Swenson Seed Farm, Brooks	218-796-5285	R

Kato

Swift	Falk Seed Farm, Murdock	320-875-4341	R C
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Lambert

Douglas	Sward Seed Farm, Nelson	320-762-0143	R C
Douglas	Thompson Farms, Kensington	320-965-2486	C
Swift	Falk Seed Farm, Murdock	320-875-4341	R

MN0201

Marshall	Efta, Joe, Argyle	218-437-6457	R
Out of State	SK Food International, Fargo, ND	701-356-4106	C
Pennington	Scholin Farms, Thief River Falls	218-964-5268	C
Polk	Thorson Farm, Inc., J. O., East Grand Forks	218-893-2285	
Red Lake	Swenson Seed Farm, Brooks	218-796-5285	R C
Wilkin	Nelson, Bradley, Wolverton	218-995-2299	R

MN0302

Norman	Chisholm, Mark M., Gary	218-356-8507	C
Norman	Chisholm, Michael, Gary	218-356-8507	C
Otter Tail	Brenden, Bruce L., Rothsay	218-867-2410	C
Polk	Bauer Farms, Erskine	218-687-5356	C
Polk	Clementson, Jon, Erskine	218-687-2345	R C
Wilkin	Haugrud Seed Plant, Rothsay	218-493-4275	

MN1302

Dodge	Koss, William, Dodge Center	507-374-6786	R
Kandiyohi	Loge, Alan, Willmar	320-235-4178	C
Traverse	Rinke, David, Wheaton	320-563-4864	

MN1801

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Lincoln	Jerzak, John, Ivanhoe	507-694-1834	C
Nicollet	Anderson & Sons, St. Peter	507-246-5032	R
Scott	Hauer Farms, Inc., Shakopee	952-445-5489	C

Minn Pro

Ramsey	Northland Seed Corporation, St. Paul	651-221-0855	
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Nannonatto

Out of State	SK Food International, Fargo, ND	701-356-4106	C
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Nornatto

Out of State	SK Food International, Fargo, ND	701-356-4106	C
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Proto

Pennington	Scholin Farms, Thief River Falls	218-964-5268	R
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Royal Pro

Ramsey	Northland Seed Corporation, St. Paul	651-221-0855	
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Sturdy

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Le Sueur	Birr Brothers, Mark & Gene, Kasota	507-931-2218	R

Surge

Clay	Heartland Seeds, Moorhead	218-585-4621	C
Douglas	Sward Seed Farm, Nelson	320-762-0143	R C
Kandiyohi	Loge, Alan, Willmar	320-235-4178	C
Lyon	Olson, Jonathan, Cottonwood	507-423-6340	C
Rice	Werner Farm Seeds, Dundas	507-645-7995	C

Toyopro

Ramsey	Northland Seed Corporation, St. Paul	651-221-0855	
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Trail

Clay	Heartland Seeds, Moorhead	218-585-4621	C
Marshall	Double A Farms, Viking	218-523-4245	C
Marshall	Efta, Joe, Argyle	218-437-6457	R
Marshall	Gostanzik, Stan, Argyle	218-437-8149	R
Marshall	KJ - KJ Farms, Argyle	218-437-8221	C
Marshall	Kuznia, Kenneth J., Argyle	218-437-8203	C
Marshall	Peterson, Maynard, Stephen	218-478-3859	R
Pennington	Scholin Farms, Thief River Falls	218-964-5268	R
Polk	Bauer Farms, Erskine	218-687-5356	C
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	R C
Polk	Kovar, Frank & Duane, East Grand Forks	218-773-9238	C
Polk	Mat - Co., Inc., Fosston	218-435-6667	R C
Red Lake	Swenson Seed Farm, Brooks	218-796-5285	R C

Turner

Brown	Rosbach Lakeside Seeds, Inc., Hanska	507-794-7698
Jackson	Brunk Bros., Gene or William, Brewster	507-842-5471

Vinton 81

Blue Earth	Prairie Gold Seeds, LLC (Attn. M. Ramy), Mankato	507-387-4091
Cottonwood	Imker, Brent, Lamberton	507-752-7697
Faribault	Willette Seed Farm, Inc., Delavan	507-854-3595
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161
Lyon	Olson, Jonathan, Cottonwood	507-423-6340
Mower	Grass & Sons Seed Service, Le Roy	507-324-5820
Redwood	Sawwell's Seed, Inc., Clements	507-692-2240

Walsh

Kittson	Sedenquist Farms, Inc., Kennedy	218-674-4218
Marshall	Double A Farms, Viking	218-523-4245
Marshall	Efta, Joe, Argyle	218-437-6457
Marshall	Elseth, Elden & Robert, Warren	218-745-6515
Polk	Fosston Co-op Seed House, Fosston	218-435-6222
Polk	Novak, James, Angus	218-745-5048
Roseau	Kukowski, Jim, Strathcona	218-781-2478

TIMOTHY

Clair

Lake of the Woods	Northern Excellence Seed, Williams	218-783-2215
Marshall	Bukowski Farms, Middle River	218-222-3485
Marshall	Hagen Farm of Gatzke, Inc., Gatzke	218-459-3444
Marshall	Klamar Farms, Gatzke	218-459-3380

Climax

Koochiching	Benike Farms, Inc., Birchdale	218-634-2738
Lake of the Woods	Pieper, Robert, Williams	218-783-4352
Lake of the Woods	Rio Corp., Baudette	218-634-2041
Marshall	Cwikla, Kenneth & Sybil, Middle River	218-222-3375
Marshall	Peterson, Monty, Middle River	218-222-3371
Roseau	Didrikson, Gerald, Badger	218-528-3388
Roseau	Vatnsdal, David, Roseau	218-463-3239

WHEAT

2375

Lincoln	Popowski, John, Ivanhoe	507-694-1593
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Alsen

Becker	Hein Farms, Inc., Audubon	218-439-6621
Clay	Thompson, Richard, Barnesville	218-789-7208
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161
Kittson	Olsonawski, Jerry, Hallock	218-379-3235
Kittson	Petersen, Ronald L., Lake Bronson	218-754-4631
Kittson	Sedenquist Farms, Inc., Kennedy	218-674-4218
Lake of the Woods	Helmstetter Farm, Roosevelt	218-442-7285
Mahnomen	McNamee, Daniel, Mahnomen	218-935-2391
Mahnomen	Pazdernik Farms, Inc., Waubun	218-473-2232
Marshall	Baird Farms, Inc., Warren	218-745-5330
Marshall	Circle M, Warren	218-745-5610
Marshall	Double A Farms, Viking	218-523-4245
Marshall	Gajeski, Gene & Rick, Stephen	218-478-2749
Marshall	Green, Carl M., Strandquist	218-597-2861
Marshall	Hagen Farm of Gatzke, Inc., Gatzke	218-459-3444
Marshall	Holte, Steven, Grygla	218-294-6537
Marshall	Jensen Farms, Stephen	218-478-3398
Marshall	Kowalski, James, Stephen	218-478-3899
Marshall	Peterson, John C., Stephen	218-478-3555
Marshall	Peterson, Maynard, Stephen	218-478-3859
Marshall	Riopelle, Larry, Argyle	218-437-8247
Norman	Chisholm, Keith P., Gary	218-356-8674
Norman	Kveno, Harry, Gary	218-356-8278
Norman	Peppel Bros. Donald & Dennis, Borup	218-582-3242

Listing lines show county, grower, town, phone number and class of seed, R for Registered, C for Certified.

Polk	Balstad, Scott, Fosston	218-435-6311	C	Lac Qui Parle	Harwick, Kenneth, Madison	320-752-4455	C
Polk	Barrett, John M., East Grand Forks	218-773-0338	C	Lac Qui Parle	Kemen, Robert & Sons, Madison	320-769-4413	R C
Polk	Kovar, Frank & Duane, East Grand Forks	218-773-9238	C	Lake of the Woods	Helmstetter Farm, Roosevelt	218-442-7285	R C
Polk	LEA Farms, Inc. (Reitmeier, Everett), Crookston	218-281-6530	C	Le Sueur	Stangler Farm Seed, Dick, Kilkenny	507-595-2883	R C
Polk	Novacek, Ronald, East Grand Forks	218-773-2293	C	Lincoln	Jerzak, Jerome, Ivanhoe	507-694-1582	R
Polk	Novak, James, Angus	218-745-5048	C	Lincoln	Jerzak, John, Ivanhoe	507-694-1834	R
Polk	Peterson, D.W., Inc., Warren	218-745-4507	R	Lyon	Olson, Jonathan, Cottonwood	507-423-6340	C
Red Lake	Myhre Farms, Red Lake Falls	218-698-4485	C	Lyon	Mahnomen County		
Red Lake	Swenson Seed Farm, Brooks	218-796-5285	R C	Lyon	Haugo, David, Waubun	218-473-2254	C
Red Lake	Vatthauer Farm, Red Lake Falls	218-253-2490	C	Lyon	McNamee, Daniel, Mahnomen	218-935-2391	C
Renville	JSE, Inc. (Johnson Seed Farm),			Lyon	Pazdernik Farms, Inc., Waubun	218-473-2232	R C
Renville	Sacred Heart	320-765-2225	C	Lyon	Swiers, Duane & Sheila, Bejou	218-935-5176	R C
Roseau	Cenex Harvest States Salol Elevator (Greenbush), Greenbush	218-782-2111	C	Marshall	Anderson, Harvey O. & Luther H., Stephen	218-455-3305	R
Roseau	Habstritt Farms, Inc., Roseau	218-463-1193	C	Marshall	Anderson, Joel, Alvarado	218-965-6503	R
Roseau	Kilen, Jerel, Greenbush	218-781-2883	C	Marshall	Baird Farms, Inc., Warren	218-745-5330	R C
Roseau	Kukowski, Jim, Strathcona	218-781-2478	C	Marshall	Carlson, Doug, Alvarado	218-965-4693	C
Wright	Terning Seeds, Inc., Cokato	320-286-2168	C	Marshall	Circle M, Warren	218-745-5610	C
Argent				Marshall	Farmers Elevator Company, Alvarado	218-965-4812	C
Clay	Lee Seed Farm, Borup	218-494-3330	C	Marshall	Field, John J., Stephen	218-478-3508	C
Clay	Oberg, Chad & Rick, Felton	218-287-9883	C	Marshall	Field, Scott W., Stephen	218-478-3508	C
Yellow Medicine	Equity Elevator & Trading Co., Wood Lake	507-485-3153	R	Marshall	Gostanzik, Stan, Argyle	218-437-8149	R
Briggs				Marshall	Gryskiewicz, Donald & Jeff, Argyle	218-437-8164	C
Becker	Hein Farms, Inc., Audubon	218-439-6621	C	Marshall	Hapka, Van, Warren	218-745-4430	C
Big Stone	Clinton Ag Service, Inc., Clinton	320-325-5203	C	Marshall	Jensen Farms, Stephen	218-478-3398	R C
Big Stone	Jahnke Farms, Johnson	320-748-7687	C	Marshall	Kowalski, James, Stephen	218-478-3899	R
Chippewa	Heen, David, Clara City	320-847-3608	C	Marshall	Kuznia, Kenneth J., Argyle	218-437-8203	C
Clay	Brendemuhl, Inc., M-D, Moorhead	218-233-5192	C	Marshall	Monroe, Jeff, Warren	218-745-5668	C
Clay	Earthwise Processors, LLC, Moorhead	218-287-5510	C	Marshall	Peterson, John C., Stephen	218-478-3555	C
Clay	Evert Farms Ltd Partnership, Sabin	218-789-7651	C	Marshall	Peterson, Maynard, Stephen	218-478-3859	R C
Clay	Heartland Seeds, Moorhead	218-585-4621	C	Marshall	Philipp, D. Joe, Goodridge	218-681-5574	R C
Clay	Johnson, Brian M., Hawley	218-962-3316	C	Marshall	R & R Rivard Partnership, Argyle	218-437-6479	R
Clay	Lee Seed Farm, Borup	218-494-3330	C	Marshall	Riopelle, Earl & Brent, Argyle	218-437-8291	C
Clay	Ness, Larry & Matt, Moorhead	218-585-4179	C	Marshall	Riopelle, Larry, Argyle	218-437-8247	R
Clay	Oberg, Chad & Rick, Felton	218-287-9883	C	Marshall	Rivard Farms, G.A., Argyle	218-437-6638	C
Clay	Olsgaard, Inc., Harold, Moorhead	218-585-4535	R C	Marshall	Rivard's Quality Seeds, Inc., Argyle	218-437-6638	C
Clay	Petermann Seeds, Inc., Hawley	218-483-3302	R C	Marshall	Sedlacek, Gerald, Warren	218-745-5548	C
Clay	Tande, Harmen, Moorhead	218-287-1977	R	Marshall	Sedlacek, Tim, Warren	218-201-0384	C
Clay	Tang, Gordon & Sons, Felton	218-494-3643	C	Marshall	Stusynski, David, Strandquist	218-436-2717	C
Clay	West Central Ag Service, Ulen	218-596-8821	C	Marshall	Widner, Neil, Stephen	218-478-3616	C
Clay	Zimmerman, Wayne, Ulen	218-596-8628	C	Marshall	Yutrenka, Don and Mark, Argyle	218-437-8428	C
Grant	Adams Seed, Wendell	218-458-2151	R C	Meecker	Wigen Seed Farm, Litchfield	320-693-8182	C
Grant	Backman Seeds, Inc., Herman	320-677-2231	R C	Out of State	Nyquist, Mark, Fargo	218-232-4228	C
Grant	Jennen, Richard J. II & Family, Elbow Lake	218-685-4903	R	Norman	Black, Roger, Bejou	218-945-3550	C
Grant	Kapphan, John M., Elbow Lake	218-685-4604	C	Norman	Brandt, Robert, Ada	218-784-4093	C
Grant	Lacey Ridge Farm Co. % Brian Lacey, Wendell	218-458-2595	R	Norman	Chisholm, Joseph R., Gary	218-356-8282	R
Grant	Red River Marketing Co., Elbow Lake	218-685-6100	R C	Norman	Chisholm, Keith P., Gary	218-356-8674	C
Grant	Westrom, Chad B., Elbow Lake	218-685-4232	R	Norman	Ellingson Farms, Borup	218-861-6605	R
Kittson	Bloomquist Farms, Inc., Drayton	218-455-3863	R C	Norman	Jacobson, Corey, Ada	218-784-3040	C
Kittson	Johnson Farms, Inc., Lloyd, Karlstad	218-436-2817	R	Norman	Kveno, Harry, Gary	218-356-8278	C
Kittson	Klein, David, Scott & Kevin, Hallock	218-843-2451	C	Norman	Malme, Cecil, Shelly	218-886-8488	R
Kittson	Nelson, Merle L., Drayton	218-455-3508	C	Norman	Matson Farms (Donald & David), Gary	218-356-8580	C
Kittson	Olsonawski, Jerry, Hallock	218-379-3235	C	Norman	Sirjord Farms, Bejou	218-356-8285	C
Kittson	Osowski, Terry, Hallock	218-843-3371	C	Otter Tail	Walkup, John, Campbell	218-739-2580	C
Kittson	Petersen, Ronald L., Lake Bronson	218-754-4631	C	Pennington	Engelstad Farms of Rocksbury, Thief River Falls	218-681-1000	C
Kittson	Rickenberg, Jeff, Kennedy	218-674-4231	C	Pennington	Scholin Farms, Thief River Falls	218-964-5268	R C
Kittson	Schwenzfeier Bros., Hallock	218-754-6891	R C	Pennington	Swanson, Curtis W., Thief River Falls	218-964-5619	C
Kittson	Sugden, William, Hallock	218-843-2593	C	Polk	Trontvet, Daniel, Thief River Falls	218-681-4028	C
Kittson	Webster Farms, Inc. J & N, Kennedy	218-674-4497	C	Polk	Anderson Farms, Inc., J D, East Grand Forks	218-773-2280	C
Kittson	Weinlaeder Seed Company, Drayton	701-454-6427	R	Polk	Anvinson, Chad, East Grand Forks	218-695-3583	C
Kittson	Wiese, Inc., James C., Humboldt	218-379-3257	C	Polk	Balstad, Scott, Fosston	218-435-6311	C
Kittson	Wiese, Inc., Kenneth A., Humboldt	218-379-3120	R C	Polk	Brule, David A., Crookston	218-281-2944	C
Kittson	Wiese, Mark, Humboldt	218-379-3243	C	Polk	Brule, Todd, Crookston	218-281-3148	C
Lac Qui Parle	Buer, Reid, Canby	507-223-7946	R	Polk	Caillier, Daniel, Crookston	218-281-2840	C
				Polk	Capistran Seed Company, Crookston	218-281-7840	C
				Polk	Dufault, Tim, Crookston	218-281-1880	R

Polk	Fosston Co-op Seed House, Fosston	218-435-6222	R
Polk	Frisk, Dean, Crookston	218-281-1281	C
Polk	Gasper, Michael, Crookston	218-281-6318	C
Polk	Gullekson, Ray, Brent & Brian, Beltrami	218-926-5737	C
Polk	Hanson, Paul M, Crookston	218-281-5898	C
Polk	Johnstad, David, Beltrami	218-926-5663	C
Polk	Judovsky, Mark P., Warren	218-745-4006	C
Polk	Kasprick Farms, Angus	218-745-5016	C
Polk	Kovar, Frank & Duane, East Grand Forks	218-773-9238	C
Polk	LEA Farms, Inc. (Reitmeier, Everett), Crookston	218-281-6530	C
Polk	Larson Farms, Inc., Ralph, East Grand Forks	218-773-1463	C
Polk	Larson Farms, Jerry Larson, Climax	218-857-3345	C
Polk	Larson, Ray H., Inc., Angus	218-745-5923	C
Polk	Mat - Co., Inc., Fosston	218-435-6667	R
Polk	Mid-Valley Grain Cooperative, Crookston	218-281-2881	R C
Polk	Novak, James, Angus	218-745-5048	C
Polk	Peterson, D.W., Inc., Warren	218-745-4507	R C
Polk	Peterson, Douglas, East Grand Forks	218-773-9120	R C
Polk	Reitmeier Farms, Inc., Leroy, Crookston	218-281-5608	C
Polk	Ross Seed Co., Fisher	218-891-2211	C
Polk	Sonsteli, Gordon & Gary, Winger	218-938-4189	C
Polk	Stroble, D & K, Angus	218-745-4473	C
Polk	TDS-Wilbur Ellis, Fertile	218-945-6021	C
Polk	Thorson Farm, Inc., J. O., East Grand Forks	218-893-2285	C
Polk	Thorson, Chad, East Grand Forks	218-893-2285	C
Polk	Tiedemann, Gene R., Euclid	218-281-6723	R
Polk	Tollefson, Roger, Crookston	218-926-5661	C
Polk	Vig Farms Inc., Fosston	218-435-1330	C
Polk	Voeller Farms, Climax	218-857-3341	R C
Polk	Wentzel, Walton Farms, Inc., Fisher	218-281-2207	C
Red Lake	Hinrichs, Roger, Red Lake Falls	218-253-2295	C
Red Lake	Johnson, Jeremiah O., Oklee	218-796-4532	C
Red Lake	Swenson Seed Farm, Brooks	218-796-5285	R
Redwood	Sawvell's Seed, Inc., Clements	507-692-2240	C
Rice	Werner Farm Seeds, Dundas	507-645-7995	C
Roseau	Cenex Harvest States Salol Elevator (Greenbush), Greenbush	218-782-2111	C
Roseau	Habstritt Farms, Inc., Roseau	218-463-1193	C
Roseau	K & L Farms (Kraig Lee), Wannaska	218-425-7719	C
Roseau	Kukowski, Jim, Strathcona	218-781-2478	R
Roseau	Magnusson Farms, Roseau	218-463-2374	C
Stevens	Bruer, Michael C., Alberta	320-324-7577	C
Swift	Busse Seeds, Appleton	320-394-2315	R C
Swift	Falk Seed Farm, Murdock	320-875-4341	C
Swift	Klassen, Jim, Benson	320-843-4176	R
Traverse	Triple E Farms, Inc. (Peterson, Alan), Wheaton	320-563-4239	C
Wilkin	Aigner, Ross E., Wolverton	218-995-2173	C
Wilkin	Beyer Seed Farm, Kent	218-643-5126	C
Wilkin	Friederichs Farm, Foxhome	218-643-2363	R C
Wilkin	Haugrud Seed Plant, Rothsay	218-493-4275	C
Wilkin	Klindt, Neal, Campbell	218-630-5511	R C
Wilkin	Knapp Seed Farm, Inc., Foxhome	218-739-3366	C
Wilkin	Korinek, John, Campbell	218-643-2571	C
Wilkin	Kruse & Tischer Farms, Breckenridge	218-643-1100	C
Wilkin	Larson Farms/Eldon, Rothsay	218-867-2674	C
Wilkin	Nelson, Bradley, Wolverton	218-995-2299	R C
Wilkin	Nordick, J & R, Rothsay	218-867-2605	C
Wilkin	Torkelson, Dennis & Brent, Foxhome	218-736-4607	C
Wilkin	Yaggie, Allen, Breckenridge	218-643-2043	C
Wilkin	Yaggie, Richard, Breckenridge	218-643-2043	C
Dandy			
Goodhue	NorthStar Genetics, Wanamingo	507-824-2878	
Dapps			
Marshall	Riopelle, Larry, Argyle	218-437-8247	R

Granite

Out of State	UAP Northern Plains, Valley City	701-845-5523	
Polk	Brekken Farm Partnership, Crookston	218-926-5655	
Polk	Capistran Seed Company, Crookston	218-281-7840	
Polk	Ross Seed Co., Fisher	218-891-2211	R
HJ98			
Polk	Peterson, D.W., Inc., Warren	218-745-4507	
Hanna			
Kittson	Petersen, Ronald L., Lake Bronson	218-754-4631	
Polk	Capistran Seed Company, Crookston	218-281-7840	
Roseau	Kukowski, Jim, Strathcona	218-781-2478	
Ingot			
Clay	Evert Farms Ltd Partnership, Sabin	218-789-7651	
Douglas	Sward Seed Farm, Nelson	320-762-0143	
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R
Grant	Adams Seed, Wendell	218-458-2151	
McLeod	Thalman Seeds Inc., Plato	320-238-2185	
Meeker	Wigen Seed Farm, Litchfield	320-693-8182	
Red Lake	Vatthauer Farm, Red Lake Falls	218-253-2490	
Stevens	Haberer Seed Farm, Morris	320-795-2468	
Swift	Falk Seed Farm, Murdock	320-875-4341	R
Knudson			
Clay	Lee Seed Farm, Borup	218-494-3330	
Grant	Backman Seeds, Inc., Herman	320-677-2231	
Grant	Thiel Seed Service, Wendell	218-458-2415	
Kittson	Hunter, Daniel, Lancaster	218-762-5331	
Kittson	Petersen, Ronald L., Lake Bronson	218-754-4631	
Marshall	Rivard's Quality Seeds, Inc., Argyle	218-437-6638	
Polk	Capistran Seed Company, Crookston	218-281-7840	
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	
Polk	Ross Seed Co., Fisher	218-891-2211	
Renville	Ziller Seed Company, Inc., Bird Island	320-365-3674	
Roseau	Kukowski, Jim, Strathcona	218-781-2478	
Wilkin	Beyer Seed Farm, Kent	218-643-5126	
Lars			
Clay	Lee Seed Farm, Borup	218-494-3330	
Marshall			
Marshall	Philipp, D. Joe, Goodridge	218-681-5574	R
Nora			
Polk	Capistran Seed Company, Crookston	218-281-7840	
Norpro			
Polk	Capistran Seed Company, Crookston	218-281-7840	
Roseau	Kukowski, Jim, Strathcona	218-781-2478	
Wilkin	Beyer Seed Farm, Kent	218-643-5126	
Oklee			
Becker	Hein Farms, Inc., Audubon	218-439-6621	R
Big Stone	Clinton Ag Service, Inc., Clinton	320-325-5203	R
Big Stone	Jahnke Farms, Johnson	320-748-7687	R
Clay	Evert Farms Ltd Partnership, Sabin	218-789-7651	R
Clay	Heartland Seeds, Moorhead	218-585-4621	R
Clay	Lee Seed Farm, Borup	218-494-3330	R
Clay	Olsgaard, Inc., Harold, Moorhead	218-585-4535	R
Clay	Pearson, Karol G., Georgetown	218-861-6668	R
Clay	Petermann Seeds, Inc., Hawley	218-483-3302	R
Clay	Peterson Farm, Sherwood E., Sabin	218-789-7378	R
Clay	Tande, Harman, Moorhead	218-287-1977	R
Clay	Tobolt Seed, Moorhead	218-287-2904	R
Clay	Wetterlin, Jerry & Aaron, Glyndon	218-494-3339	R
Clay	Zimmerman, Wayne, Ulen	218-596-8628	R
Douglas	Sward Seed Farm, Nelson	320-762-0143	R
Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R
Grant	Adams Seed, Wendell	218-458-2151	R
Grant	Backman Seeds, Inc., Herman	320-677-2231	R
Grant	Kapphahn, John M., Elbow Lake	218-685-4604	R

Listing lines show county, grower, town, phone number and class of seed, R for Registered, C for Certified.

Grant	Red River Marketing Co., Elbow Lake	218-685-6100	R	Traverse	Lundquist, Gene, Wheaton	320-563-8644	R
Grant	Thiel Seed Service, Wendell	218-458-2415	R	Wilkin	Beyer Seed Farm, Kent	218-643-5126	
Kandiyohi	Behm Seed Company, Atwater	320-974-3003	R	Wilkin	Friederichs Farm, Foxhome	218-643-2363	R
Kitson	Bloomquist Farms, Inc., Drayton	218-455-3863	R	Wilkin	Haugrud Seed Plant, Rothsay	218-493-4275	
Kitson	Carlson, James A., Hallock	218-843-3483	R	Wilkin	Knapp Seed Farm, Inc., Foxhome	218-739-3366	R
Kitson	Jensen, A. Gay Farms Co., Drayton	701-454-6294	R	Wilkin	Kruse & Tischer Farms, Breckenridge	218-643-1100	R
Kitson	Nelson, Merle L., Drayton	218-455-3508	R	Wilkin	Larson Farms/Eldon, Rothsay	218-867-2674	R
Kitson	Olsonawski, Jerry, Hallock	218-379-3235	R	Wilkin	Nordick, J & R, Rothsay	218-867-2605	R
Kitson	Osowski, Terry, Hallock	218-843-3371	R	Wilkin	Steenblock Farms, Dale, Campbell	218-630-5500	R
Kitson	Petersen, Ronald L., Lake Bronson	218-754-4631	R	Wilkin	Torkelson, Dennis & Brent, Foxhome	218-736-4607	C
Kitson	Sedenquist Farms, Inc., Kennedy	218-674-4218	R	Oxen			
Kitson	Stewart, H. Shane, St. Vincent	218-379-3282	R	Becker	Hein Farms, Inc., Audubon	218-439-6621	C
Kitson	Stewart, Hilson L., St. Vincent	218-379-3282	R	Big Stone	Clinton Ag Service, Inc., Clinton	320-325-5203	C
Kitson	Weinlaeder Seed Company, Drayton	701-454-6427	R	Brown	Rossbach Lakeside Seeds, Inc., Hanska	507-794-7698	C
Lac Qui Parle	Buer, Reid, Canby	507-223-7946	R	Clay	Evert Farms Ltd Partnership, Sabin	218-789-7651	C
Lac Qui Parle	Hermanson Seed Plant, Boyd	320-855-2582	R	Clay	Heartland Seeds, Moorhead	218-585-4621	C
Lake of the Woods	Helmstetter Farm, Roosevelt	218-442-7285	R	Clay	Janssen, Jerry, Barnesville	218-493-4451	C
Lake of the Woods	Pieper, Robert, Williams	218-783-4352	R	Clay	Johnson, Brian M., Hawley	218-962-3316	C
Mahnomen	Bursch Seed Co., Inc., Mahnomen	218-935-2772	R	Clay	Ness, Larry & Matt, Moorhead	218-585-4179	C
Mahnomen	Haugo, David, Waubun	218-473-2254	R	Clay	Oberg, Chad & Rick, Felton	218-287-9883	C
Marshall	Gryskiewicz, Donald & Jeff, Argyle	218-437-8164	R	Clay	Petermann Seeds, Inc., Hawley	218-483-3302	R
Marshall	Holte, Steven, Grygla	218-294-6537	R	Clay	Thompson, Richard, Barnesville	218-789-7208	C
Marshall	Jensen Farms, Stephen	218-478-3398	R	Clay	Thompson, Shane, Moorhead	218-236-6582	C
Marshall	Kowalski, James, Stephen	218-478-3899	R	Clay	West Central Ag Service, Ulen	218-596-8821	C
Marshall	Kruger Bros. Farms, Inc., Warren	218-437-8435	R	Clay	Wetterlin, Jerry & Aaron, Glyndon	218-494-3339	C
Marshall	Kuznia, Kenneth J., Argyle	218-437-8203	R	Dodge	Koss, William, Dodge Center	507-374-6786	R
Marshall	Peterson Farms of Warren, D.L., Inc., Warren	218-745-4077	R	Douglas	Sward Seed Farm, Nelson	320-762-0143	R C
Marshall	R & R Rivard Partnership, Argyle	218-437-6479	R	Douglas	Thompson Farms, Kensington	320-965-2486	C
Marshall	Riopelle, Earl & Brent, Argyle	218-437-8291	R	Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	R C
Marshall	Riopelle, Larry, Argyle	218-437-8247	R	Grant	Adams Seed, Wendell	218-458-2151	R C
Marshall	Widner, Neil, Stephen	218-478-3616	R	Grant	Backman Seeds, Inc., Herman	320-677-2231	C
Marshall	Yutzenka, Don and Mark, Argyle	218-437-8428	R	Grant	Backman, Tim, Herman	320-677-2785	R
Meeker	Miller Seed Farm, Dassel	320-275-2463	R	Grant	Biss, Larry, Wendell	218-458-2205	R C
Norman	Brandt, Robert Jr., Ada	218-784-4093	R	Grant	Jensen, Richard J. II & Family, Elbow Lake	218-685-4903	R
Norman	Brandt, Wayne G. & John, Ada	218-784-4774	R	Grant	Kjesbo, Noel J., Wendell	320-284-2226	C
Norman	Chisholm, Keith P., Gary	218-356-8674	R	Grant	Red River Marketing Co., Elbow Lake	218-685-6100	R C
Norman	Chisholm, Mark M., Gary	218-356-8507	R	Grant	Thiel Seed Service, Wendell	218-458-2415	R C
Norman	Circle C Seeds, Gary	218-356-8214	R	Grant	Westrom, Chad B., Elbow Lake	218-685-4232	R C
Otter Tail	Brenden, Bruce L., Rothsay	218-867-2410	R	Kandiyohi	Behm Seed Company, Atwater	320-974-3003	R C
Otter Tail	Walkup, John, Campbell	218-739-2580	R	Kandiyohi	Loge, Alan, Willmar	320-235-4178	C
Pennington	Engelstad Farms of Rocksbury, Thief River Falls	218-681-1000	R	Lac Qui Parle	Buer, Reid, Canby	507-223-7946	C
Pennington	Scholin Farms, Thief River Falls	218-964-5268	R	Lac Qui Parle	Hermanson Seed Plant, Boyd	320-855-2582	C
Polk	Anderson Farms, Inc., J D, East Grand Forks	218-773-2280	R	Lac Qui Parle	Kemen, Robert & Sons, Madison	320-769-4413	R C
Polk	Balstad, Scott, Fosston	218-435-6311	R	Lake of the Woods	Helmstetter Farm, Roosevelt	218-442-7285	R C
Polk	Capistran Seed Company, Crookston	218-281-7840	R	Le Sueur	Stangler Farm Seed, Dick, Killbuck	507-595-2883	R C
Polk	Capistran, Kevin, Crookston	218-281-5705	R	Lincoln	Jerzak, John, Ivanhoe	507-694-1834	R C
Polk	Clementson, Jon, Erskine	218-687-2345	R	Lyon	Olson, Jonathan, Cottonwood	507-423-6340	C
Polk	Larson Farms, Inc., Ralph, East Grand Forks	218-773-1463	R	Mahnomen	Pazdernik Farms, Inc., Waubun	218-473-2232	C
Polk	Larson, Ray H., Inc., Angus	218-745-5923	R	Marshall	Circle M, Warren	218-745-5610	C
Polk	Mid-Valley Grain Cooperative, Crookston	218-281-2881	R	Marshall	Jensen Farms, Stephen	218-478-3398	C
Polk	Peterson, D.W., Inc., Warren	218-745-4507	R	Marshall	Kowalski, James, Stephen	218-478-3899	C
Polk	Peterson, Douglas, East Grand Forks	218-773-9120	R	McLeod	Dammann Seed, Plato	320-864-3004	C
Polk	Ross Seed Co., Fisher	218-891-2211	R	McLeod	Thalman Seeds Inc., Plato	320-238-2185	C
Polk	Thorson Farm, Inc., J. O., East Grand Forks	218-893-2285	R	Meeker	Anderson Seeds, Dassel	320-286-2700	C
Polk	Tiedemann, Gene R., Euclid	218-281-6723	R	Meeker	Johnson Seeds of Dassel, Inc., Dassel	320-275-2430	C
Polk	Vig Farms Inc., Fosston	218-435-1330	R	Meeker	Miller Seed Farm, Dassel	320-275-2463	R C
Red Lake	Myhre Farms, Red Lake Falls	218-698-4485	R	Out of State	Nyquist, Mark, Fargo, ND	218-232-4228	C
Red Lake	Swenson Seed Farm, Brooks	218-796-5285	R	Norman	Chisholm, Keith P., Gary	218-356-8674	R C
Redwood	Sawwell's Seed, Inc., Clements	507-692-2240	R	Norman	Hanson, Corey M., Gary	218-356-8678	C
Roseau	Eastman, Bob, Roseau	218-463-1621	R	Norman	Jacobson, Corey, Ada	218-784-3040	C
Roseau	Kukowski, Jim, Strathcona	218-781-2478	R	Polk	Bauer Farms, Erskine	218-687-5356	C
Roseau	Magnusson Farms, Roseau	218-463-2374	R	Polk	Christian Farms, Stuart & Dwight, Fertile	218-945-6021	C
Stevens	Haberer Seed Farm, Morris	320-795-2468	R	Polk	Clementson, Jon, Erskine	218-687-2345	R C
Swift	Falk Seed Farm, Murdock	320-875-4341	R	Polk	Fosston Co-op Seed House, Fosston	218-435-6222	R
Traverse	Johnson, Merton, Wheaton	320-563-8025		Polk	Mat - Co., Inc., Fosston	218-435-6667	R C
				Polk	Peterson, D.W., Inc., Warren	218-745-4507	R C

Listing lines show county, grower, town, phone number and class of seed, R for Registered, C for Certified.

Polk	Sonsteli, Gordon & Gary, Winger	218-938-4189	C	Norman	Black, Roger, Bejou	218-945-3550
Polk	Vig Farms Inc., Fosston	218-435-1330	C	Norman	Borge, Brian, Ada	218-784-2168
Redwood	Sawvell's Seed, Inc., Clements	507-692-2240	C	Norman	Chisholm, Keith P., Gary	218-356-8674
Renville	Enestvedt Bros., Sacred Heart	320-765-2728	R	Norman	Pennington County	
Renville	Kiecker, Greg, Hector	507-426-8167	R C	Norman	Engelstad Farms of Rocksbury, Thief River Falls	218-681-1000
Roseau	Cenex Harvest States Salol Elevator (Greenbush), Greenbush	218-782-2111	C	Norman	Novak, Gary, St. Hilaire	218-964-5346
Roseau	Habstritt Farms, Inc., Roseau	218-463-1193	C	Norman	Scholm Farms, Thief River Falls	218-964-5268
Roseau	Kilen, Jerel, Greenbush	218-781-2883	C	Polk	Balstad, Scott, Fosston	218-435-6311
Roseau	Kukowski, Jim, Strathcona	218-781-2478	R C	Polk	Brule, David A., Crookston	218-281-2944
Scott	Hauer Farms, Inc., Shakopee	952-445-5489	C	Polk	Caillier, Daniel, Crookston	218-281-2840
Sibley	Boeder Seed Farms, Hector	507-426-8167	C	Polk	Gasper, Michael, Crookston	218-281-6318
Stevens	Haberer Seed Farm, Morris	320-795-2468	C	Polk	Hanson, Paul M, Crookston	218-281-5898
Stevens	Sperr, Duane & Rollie, Donnelly	320-246-3496	C	Polk	Kovar, Frank & Duane, East Grand Forks	218-773-9238
Swift	Busse Seeds, Appleton	320-394-2315	C	Polk	Peterson, D.W., Inc., Warren	218-745-4507
Swift	Falk Seed Farm, Murdock	320-875-4341	R C	Polk	Peterson, Douglas, East Grand Forks	218-773-9120
Swift	Lee's Seed Farm, Benson	320-843-2857	C	Red Lake	Swenson Seed Farm, Brooks	218-796-5285
Traverse	Lundquist Seed, Inc., Wheaton	320-563-8622	C	Red Lake	Vatthauer Farm, Red Lake Falls	218-253-2490
Traverse	Lundquist, Steven, Wheaton	320-563-8644	C	Roseau	Cenex Harvest States Salol Elevator (Greenbush), Greenbush	218-782-2111
Wilkin	Beyer Seed Farm, Kent	218-643-5126		Roseau	Kukowski, Jim, Strathcona	218-781-2478
Wilkin	Friedrichs Farm, Foxhome	218-643-2363	R C			
Wilkin	Haugrud Seed Plant, Rothsay	218-493-4275		Russ		
Wilkin	Knapp Seed Farm, Inc., Foxhome	218-739-3366	C	Otter Tail	Brenden, Bruce L., Rothsay	218-867-2410
Wilkin	Nordick, J & R, Rothsay	218-867-2605	C	Wilkin	Knapp Seed Farm, Inc., Foxhome	218-739-3366
Wilkin	Steenblock Farms, Dale, Campbell	218-630-5500	C			
Wilkin	Yaggie, Richard, Breckenridge	218-643-2043	C	Verde		
Wright	Dahico Seeds, Inc., Cokato	320-286-5982	C	Polk	Bergman Farms, James, Oslo	218-965-4913
Wright	Hopkins, Joseph, Buffalo	763-682-1868	C			
Wright	Terning Seeds, Inc., Cokato	320-286-2168	C	Walworth		
Yellow Medicine	Antony, David N., Porter	507-223-7144		Big Stone	Clinton Ag Service, Inc., Clinton	320-325-5203
				Clay	Iverson, Dwight, Hitterdal	218-962-3219
Parshall				Clay	Janssen, Jerry, Barnesville	218-493-4451
Clay	Lee Thomas Farm, Moorhead	218-233-8066	C	Clay	Lee Thomas Farm, Moorhead	218-233-8066
Clay	West Central Ag Service, Ulen	218-596-8821	C	Clay	Petermann Seeds, Inc., Hawley	218-483-3302
Kittson	Petersen, Ronald L., Lake Bronson	218-754-4631	C	Clay	West Central Ag Service, Ulen	218-596-8821
Lake of the Woods	Nelson, Darrell M., Baudette	218-634-1864	C	Clay	Zimmerman, Wayne, Ulen	218-596-8628
Marshall	Bring, Sharon, Strandquist	218-874-3713	C	Douglas	Sward Seed Farm, Nelson	320-762-0143
Marshall	Double A Farms, Viking	218-523-4245	C	Grant	Adams Seed, Wendell	218-458-2151
Marshall	Elseth, Elden & Robert, Warren	218-745-6515	R	Kittson	Bloomquist Farms, Inc., Drayton	218-455-3863
Marshall	Nelson Farm, Doyle, Goodridge	218-681-6972	R	Kittson	Olsonawski, Jerry, Hallock	218-379-3235
Marshall	Peterson, Maynard, Stephen	218-478-3859	R C	Kittson	Schwenzfeier Bros., Hallock	218-754-6891
Marshall	Riopelle, Larry, Argyle	218-437-8247	R	Kittson	Younggren, Dan, Hallock	218-843-3318
Norman	Ellingson Farms, Borup	218-861-6605	C	Lac Qui Parle	Kemen, Robert & Sons, Madison	320-769-4413
Polk	Balstad, Scott, Fosston	218-435-6311	C	Lake of the Woods	Helmstetter Farm, Roosevelt	218-442-7285
Polk	H & J Farms, Inc., Warren	218-745-5018	C	Le Sueur	Haas Seed Farm, Le Sueur	507-665-3683
Polk	Kovar, Frank & Duane, East Grand Forks	218-773-9238	C	Le Sueur	Stangler Farm Seed, Dick, Kilkenny	507-595-2883
Polk	Peterson, D.W., Inc., Warren	218-745-4507	R C	Lincoln	Jerzak, John, Ivanhoe	507-694-1834
Red Lake	Johnson, Jeremiah O., Oklee	218-796-4532	C	Lincoln	Jerzak, William W., Ivanhoe	507-694-1736
Red Lake	Vatthauer Farm, Red Lake Falls	218-253-2490	C	Mahnomen	McNamee, Daniel, Mahnomen	218-935-2391
Roseau	Cenex Harvest States Salol Elevator (Greenbush), Greenbush	218-782-2111	C	Mahnomen	Pazdernik Farms, Inc., Waubun	218-473-2232
Roseau	Kilen, Jerel, Greenbush	218-781-2883	C	Marshall	Double A Farms, Viking	218-523-4245
Roseau	Kukowski, Jim, Strathcona	218-781-2478	R	Marshall	Farmers Elevator Company, Alvarado	218-965-4812
				Marshall	Jensen Farms, Stephen	218-478-3398
Reeder				Marshall	Kowalski, James, Stephen	218-478-3899
Clay	Heartland Seeds, Moorhead	218-585-4621	C	Marshall	McGlynn, Neil, Stephen	218-478-2777
Kittson	Bloomquist Farms, Inc., Drayton	218-455-3863	R	Meeker	Smith, Steven, Darwin	320-693-6769
Kittson	Olsonawski, Jerry, Hallock	218-379-3235	R	Norman	Brandt, Robert Jr., Ada	218-784-4093
Kittson	Petersen, Ronald L., Lake Bronson	218-754-4631	C	Norman	Chisholm, Keith P., Gary	218-356-8674
Kittson	Sedenquist Farms, Inc., Kennedy	218-674-4218	C	Norman	Jacobson, Corey, Ada	218-784-3040
Marshall	Bring, Sharon, Strandquist	218-874-3713	C	Norman	Sirjord Farms, Bejou	218-356-8285
Marshall	Green, Carl M., Strandquist	218-597-2861	C	Out of State	Anderson, Gerald D., Grand Forks	701-775-8766
Marshall	Gryskiewicz, Donald & Jeff, Argyle	218-437-8164	C	Pennington	Engelstad Farms of Rocksbury, Thief River Falls	218-681-1000
Marshall	Holte, Steven, Grygla	218-294-6537	C	Pennington	Scholm Farms, Thief River Falls	218-964-5268
Marshall	Jensen Farms, Stephen	218-478-3398	R C	Polk	Anverson, Chad, East Grand Forks	218-695-3583
Marshall	Kowalski, James, Stephen	218-478-3899	R	Polk	Bauer Farms, Erskine	218-687-5356
Marshall	McGlynn, Neil, Stephen	218-478-2777	C	Polk	Bergman Farms, James, Oslo	218-965-4913
Marshall	Riopelle, Larry, Argyle	218-437-8247	R	Polk	Brule, David A., Crookston	218-281-2944
Marshall	Vutrenka, Don and Mark, Argyle	218-437-8428	C	Polk	Clemenson, Jon, Erskine	218-687-2343

ES

Listing lines show county, grower, town, phone number and class of seed, R for Registered, C for Certified.

Polk	Fosston Co-op Seed House, Fosston	218-435-6222	R
Polk	Frisk, Dean, Crookston	218-281-1281	C
Polk	Gasper, Michael, Crookston	218-281-6318	C
Polk	Johnson, Myron J., East Grand Forks	218-773-1791	C
Polk	Mat - Co., Inc., Fosston	218-435-6667	R C
Polk	Mattson, Scott, East Grand Forks	218-773-7606	C
Polk	Novacek, Ronald, East Grand Forks	218-773-2293	C
Polk	Ostenaar, Sidney & DeWayne, Mc Intosh	218-563-7395	C
Polk	Sonstelie, Gordon & Gary, Winger	218-938-4189	C
Polk	Thompson Bros. Farms, LLP, East Grand Forks	218-773-2251	C
Polk	Vig Farms Inc., Fosston	218-435-1330	C
Red Lake	Hinrichs, Roger, Red Lake Falls	218-253-2295	C
Red Lake	Johnson, Jeremiah O., Oklee	218-796-4532	C
Roseau	Cenex Harvest States Salol Elevator (Greenbush), Greenbush	218-782-2111	C
Roseau	Kukowski, Jim, Strathcona	218-781-2478	C
Scott	Hauer Farms, Inc., Shakopee	952-445-5489	C
Swift	Lee's Seed Farm, Benson	320-843-2857	C
Wilkin	Friederichs Farm, Foxhome	218-643-2363	R C
Wilkin	Haugrud Seed Plant, Rothsay	218-493-4275	C
Wilkin	Klindt, Neal, Campbell	218-630-5511	C
Wilkin	Nelson, Bradley, Wolverton	218-995-2299	C
Wilkin	Steenblock Farms, Dale, Campbell	218-630-5500	C
Wilkin	Torkelson, Dennis & Brent, Foxhome	218-736-4607	C
Yellow Medicine	Antony, David N., Porter	507-223-7144	C

WINTER WHEAT

Arapahoe

Freeborn	Albert Lea Seed House, Inc., Albert Lea	507-373-3161	C
Le Sueur	Stangler Farm Seed, Dick, Kilkenny	507-595-2883	C
McLeod	Thalman Seeds Inc., Plato	320-238-2185	C
Norman	Chisholm, Keith P., Gary	218-356-8674	C
Polk	Fosston Co-op Seed House, Fosston	218-435-6222	C
Rice	Werner Farm Seeds, Dundas	507-645-7995	C

Harding

Meeker	Wigen Seed Farm, Litchfield	320-693-8182	C
Roseau	Magnusson Farms, Roseau	218-463-2374	C

Jerry

Le Sueur	Ebert Farms, Nathan, Kilkenny	507-595-2074	C
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Nekota

Roseau	Magnusson Farms, Roseau	218-463-2374	C
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Seward

Scott	Hauer Farms, Inc., Shakopee	952-445-5489	C
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Tandem

Le Sueur	Stangler Farm Seed, Dick, Kilkenny	507-595-2883	C
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Minnesota Approved Seed Conditioners and Marketing Association

Member plants of this association are identified by the symbol at the right. In addition to being approved for conditioning certified seed by the Minnesota Crop Improvement Association (MCI) they voluntarily maintain membership in the Minnesota Approved Seed Conditioners and Marketing Association to promote professionalism in seed conditioning and distribution.



For more than a half a century approved seed plants have played a significant role in distributing seed of varieties

developed by the Minnesota Agricultural Experiment Station and in maintaining and improving the quality of seed planted in the state. They are designed specifically for the proper conditioning of seed, are properly built and equipped and meet specific seed-handling standards. The plants are inspected at least annually by MCI to assure that they are properly equipped and that all requirements for approved plant status are maintained.

Look to seed conditioning plants identified by the symbol of the Minnesota Approved Seed Conditioners and Marketing Association and listed below for quality seed conditioning services.

Adams Seed	Wendell	218-458-2151	L.B. Grain	Lake Bronson	218-754-4200
Albert Lea Seed House	Albert Lea	507-373-3161	Lee Seed Farm	Borup	218-494-3330
Angell Seed Farm	Blooming Prairie	507-583-7581	Lee's Seed Farm	Benson	320-843-2857
Backman Seeds	Herman	320-677-2231	Meyer's Seed	Elgin	507-876-2482
Behm Seed Company	Atwater	320-974-3003	Mid-Valley Grain Cooperative	Crookston	218-281-2881
Beyer Seed Farm	Kent	218-643-5126	Nietfeld Farm	Melrose	320-987-3442
Bloomquist Farms	Drayton, N.D.	218-455-3863	Petermann Seeds	Hawley	218-483-3302
Borg Seed Farms	Cokato	320-286-2222	Red River Marketing Company	Elbow Lake	218-685-6100
Bursch Seed Company	Mahnomen	218-935-2772	Rivard's Quality Seeds	Argyle	218-437-6638
Capistran Seed Company	Crookston	218-281-7840	Ron Petersen Seeds	Lake Bronson	218-754-4631
Circle C Seeds	Gary	218-356-8214	Ross Seed Company	Fisher	218-891-2211
Clearwater Valley Seeds	Gully	218-268-4171	Rosbach Lakeside Seeds	Hanska	507-794-7698
Clinton Ag Service	Clinton	320-325-5203	Sawvell's Seed	Clements	507-692-2240
Corning Seed & Supply	Austin	507-433-9002	Spronk & Sons Seed Farm	Edgerton	507-442-5334
Dahlco Seeds	Cokato	320-286-5982	Storden Seed & Chemical Service	Storden	507-445-3217
Dammann Seed Farms	Plato	320-864-3004	Swenson Seed Farm	Brooks	218-796-5285
Enestvedt Brothers	Sacred Heart	320-765-2728	Thiel Seed Service	Wendell	218-458-2415
Falk Seed Farm	Murdock	320-875-4341	Tobolt Seed	Moorhead	218-287-2904
Farmers Cooperative Assn.	Jackson	507-847-4160	Watsonwan Farm Service	Kiester	507-294-3697
Haberer Seed Farm	Morris	320-795-2468	Weinlader Seed Company	Drayton, N.D.	701-454-6427
Habstritt Farms	Roseau	218-463-1193	Werner Farm Seeds	Dundas	507-645-7995
Haugrud Seed Plant	Rothsay	218-493-4275	Wigen Seed Farm	Litchfield	320-693-8182
Heartland Seeds	Moorhead	218-585-4621	Willette Seed Farm	Delavan	507-854-3595
Hermanson Seed Plant	Boyd	320-855-2582	Zabel Seeds	Plainview	507-534-2487
Jensen Seed Company	Stephen	218-478-3397	Ziller Seed Company	Bird Island	320-365-3674
JSF, Inc. (Johnson Seed Farm)	Sacred Heart	320-765-2225	Zimmerman Seeds	Racine	507-378-2077
Knapp Seed Farm	Foxhome	218-739-3366			

NOTES

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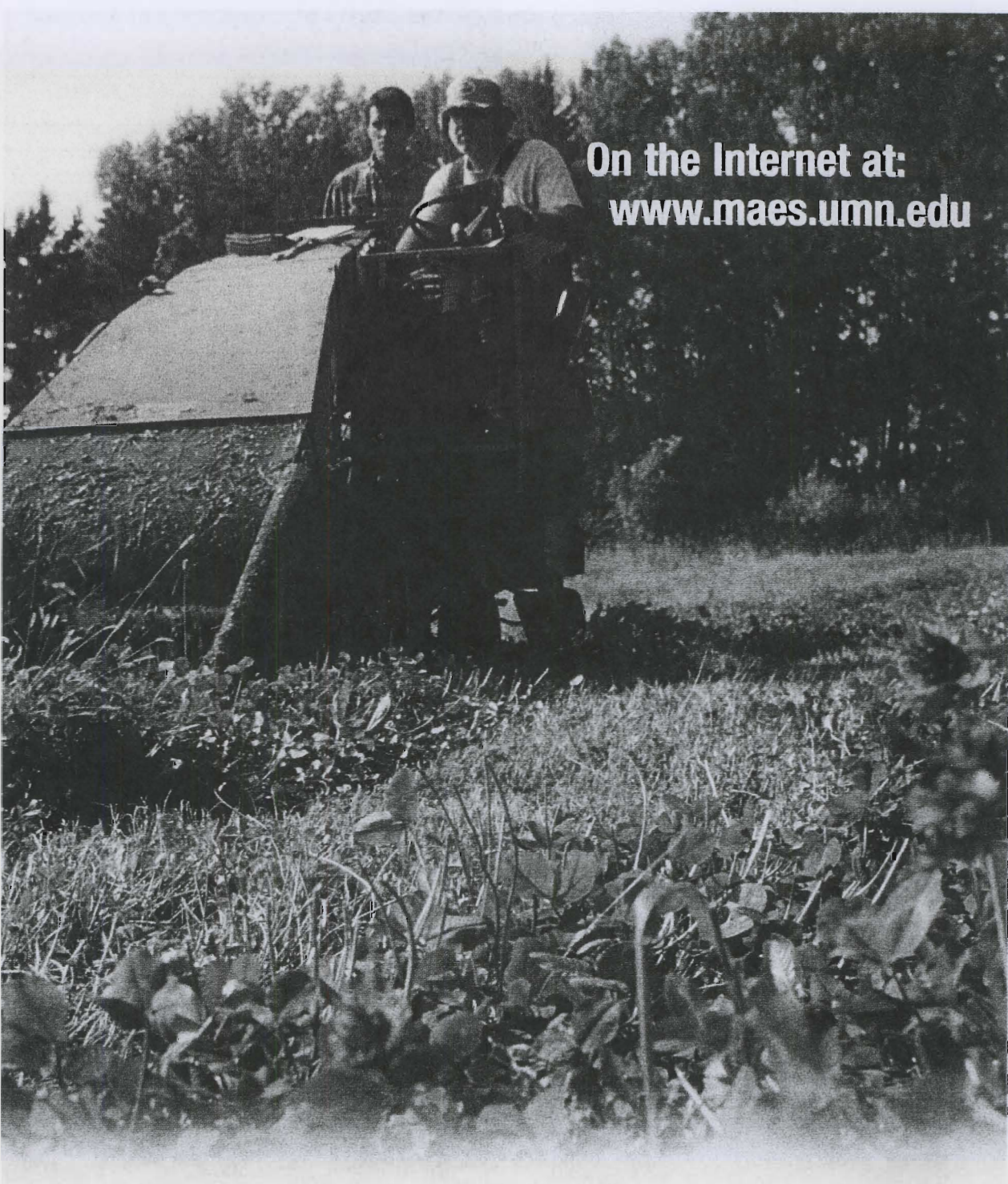
NOTES

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) ¹	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
Fieldbean					
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
Forage grasses, perennial					
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
Forage legumes, perennial					
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 ²		14,000	113	28/sq. ft.	Early spring
Wheat, hard red winter		14,500	75+	25/sq. ft.	August 20/September 20
Other Crops					
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	130	9/sq. ft.	Early spring
Fieldpea with 1½ 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
Sweetclover	60	240,000	10	55/sq. ft.	Early spring
Wildrice (wet)	25	7,900	33	6/sq. ft.	Late fall

¹ U.S. legal bushel weight or, if not established, the weight most widely accepted. ² See page 46 for best way to calculate hard red spring wheat planting rate.



On the Internet at:
www.maes.umn.edu

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