

Minnesota **VARIETAL TRIALS RESULTS**

MP 98 December 1998

FILE SAMPLE
DO NOT REMOVE

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

MINNESOTA AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MINNESOTA

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Minnesota Varietal Trials Results

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The information in this miscellaneous publication of the Minnesota Agricultural Experiment Station is presented under authority granted by the Hatch Act of 1887, to conduct performance trials on farm crops and interpret data to the public. Data in this publication are preliminary. Only crops for which new data were

compiled in the 1998 growing year are included. A version that incorporates corrections, revisions and additions is maintained in electronic form on the world wide web site of the Minnesota Agricultural Experiment Station, <http://www3.extension.umn.edu/maes>. Electronic versions of some past years reports on these and other crops can also be found at that world wide web site.

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December 1, 1998

The Minnesota Agricultural Experiment Station, now in its 111th year of crop improvement work, is pleased to again bring you the research results of varietal trials of farm crops conducted throughout the state.

In 1888, the year after the Minnesota Agricultural Experiment Station was established, its faculty began research to find the varieties of wheat best suited for Minnesota. Their goal was to identify the wheats that would yield the largest profits per acre for the farmer, that would supply Minnesota's flour mills with wheat of superior quality, and that would be the most nourishing and valuable for human food.

By December 31, 1898, 552 varieties or samples of wheat had been entered in the Station's Variety History Book. Most of them came from foreign countries and states, several came from Minnesota farms, and 49 had been originated at the Station, six of them crossbred varieties. The Experiment Station's 1899 annual report contained the first summary of wheat research at the University, including yield data and recommendations for cultural practices.

Half a century later the Station had begun publishing *Varietal Trials of Farm Crops*, and the University's Agricultural Extension Service was issuing a companion piece, Extension Folder 22, *Varieties of Farm Crops*, which identified varieties as "approved," "not adequately tested" and "not recommended." This folder later was merged into *Varietal Trials of Farm Crops*; which became highly regarded by Minnesota farmers and seed producers as a reliable, impartial source of information on crop varieties.

Thanks to an allocation from the Experiment Station's fee-for-use program and generous, much-appreciated financial support of the Minnesota Soybean Growers Association, the Minnesota Approved Seed Conditioners and Marketing Association and the Minnesota Seed Producers and Promotion Association, we are delighted to again be able to provide this report through county Extension offices without charge, and to distribute it widely. I hope that you find it useful, and that you will feel free to send me your comments or suggestions for improvement. You can write me at the address above, or reach me by e-mail at phill@tc.emn.edu.

A handwritten signature in cursive script that reads "Philip O. Larsen".

Philip O. Larsen
Interim Vice President and Dean
College of Agricultural, Food and Environmental Sciences
and Director, Minnesota Agricultural Experiment Station

Minnesota VARIETAL TRIAL RESULTS

Successful crop production depends a good deal 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 *Varietal Trials* are not included in 1998 performance trials. Questions about them can be addressed to the logical individual listed under the "Authors and Researchers" heading.

Variety Classifications

Varieties of some of the crops evaluated are classified into groups under headings such as "recommended," "special purpose," "other" and "not adequately tested," and some crops may have further groupings within these categories.

Recommended, special purpose and other classifications are determined each year by the Experiment Station Crop Variety Review Committee. To qualify for the recommended group a variety must excel in important characteristics in three years of testing.

New varieties from other public experiment stations and private plant breeders not sufficiently evaluated in Minnesota are listed as "varieties not adequately tested." Available information is presented for these varieties, but no conclusions are drawn regarding their suitability for Minnesota conditions.

Varieties in an "other varieties" listing usually are inferior in one or more categories in comparative tests. Varieties in the "private" category have performed well, but the Minnesota Agricultural Experiment Station does not make recommendations on them.

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 83.

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 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 weight given is generally accepted in the United States.

Plant Variety Protection

PVP Varieties covered by the U.S. Plant Variety Protection Act are identified by the symbol above. When the symbol is followed by (94) seed of the variety may not be sold by a producer, not even to a relative or a neighbor, without express permission of the variety's developer/owner.

Abbreviations

For the sake of economy in many listings, the abbreviation "AES" designates Agricultural Experiment Station.

Acknowledgments

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Minnesota Corn Growers Association and Minnesota Corn Research and Promotion Council, Minnesota Forage and Grassland Council, and the Minnesota Association of Wheat Growers and Minnesota Wheat Council in the distribution, and the Minnesota Crop Improvement Association in the coordination and distribution of this report.

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November 24, 1998

Dear Minnesota crop producers:

I am pleased to greet you from this page of the new and improved Minnesota Varietal Trials results publication. In past years the delivery of this publication to all county extension offices in Minnesota signaled the start of another year of education and outreach to agricultural producers and related industries in this state. This publication and Cultural and Chemical Weed Control in Field Crops have always been the most-requested items in our agricultural publications inventory.

I am pleased to announce that this publication is again being provided to crop producers free of charge, by direct mail. This is the result of a cooperative effort among Extension, crop-related commodity organizations (corn, soybean, wheat, barley, oat, forages, canola) and the U of M Agricultural Experiment Station.

I hope you find this publication useful as you begin planning for the next cropping season. I encourage you to contact your University of Minnesota Extension Service county office with other questions or needs. May the information in this and other U of M publications help to make the next crop year your best ever.

Sincerely yours,

Katherine Fennelly
Dean and Director



FORAGE CROPS



Severe winters make winterhardiness a primary consideration in variety selection for most areas of Minnesota. The 1989-90, 1991-92 and 1994-95 winters were very damaging to alfalfa stands over wide areas of the state, confirming previous observations about areas of the state most prone to winter injury. Several ice sheet events last winter and cold temperatures in April following limited green-up and reduced older stands at Lamberton and Grand Rapids in 1998.

The greatest winterhardiness is needed in the west central and northwest Minnesota area. Because of the high frequency of severe winters in this area, only winterhardy varieties should be selected. The east central and southeast areas also experience frequent severe winters. Winterhardy varieties with high levels of disease resistance should be selected for this area. The southwest area seldom experiences severe winter injury because of dry soils, high soil potassium levels and neutral soil pH. The northeast area seldom experiences severe winter injury because of dependable snow cover.

Winter Survival

Winterhardiness of varieties is extremely difficult to determine because winter injury can occur as a result of many different weather events, and alfalfa plants of differing ages respond differently to various weather events. A new test called "Winter Survival Index" (WSI) is used to determine winterhardiness of varieties. This 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 or five locations—Arlington, Lancaster and Marshfield, Wis.

and Rosemount and Morris, Minn. are the basis for the WSI, table 2.

The WSI was averaged over all test locations to provide an estimate of winterhardiness and is presented beside yield data in tables 1.1a and 1.2a. Varieties are rated from Superior to Adequate in winter survivability. Vernal, a traditional winterhardy variety is rated Superior. Varieties rated Adequate in winter survivability are expected to be injured the most after a severe winter. Varieties tested to date are rated above Adequate, section a of tables 1.1 and 1.2. Varieties not tested for winter survival are listed alphabetically in sections b or c. If a variety does not have a WSI, (company has not entered variety in Winter Survival Trial) the Fall Dormancy index is the next best indicator of winterhardiness: 1 = very winterhardy, 2 = winterhardy, 3 and 4 = moderately winterhardy.

Fall Dormancy and Yield

Fall dormancy ratings of varieties are listed alphabetically in table 4. Very fall dormant varieties produce very little fall growth and are slow to recover after cutting. They usually are not high yielding, recover slowly for the second crop and produce only a small third crop because of early cessation of growth. Never-

theless, these are very dependable varieties in areas where frequent winter injury is expected and where soil moisture limits third crop yields. These types of varieties survived the 1989-90 and 1991-92 winters with little injury.

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

Moderately fall dormant varieties produce good fall growth, are characterized by rapid recovery after harvest, and usually reach 1/10 bloom several days earlier than more dormant varieties. The general pattern of production for moderately dormant varieties under a four-harvest management has been to produce high yields during the first year after seeding, good yields, similar to winterhardy fall-dormant varieties, for year 2, and reduced yields, usually associated with winter injury, in years 3 and 4.

Alfalfa yield of a given variety is best predicted after seedings at three test locations have been measured over 4 years of stand life (3 years after seeding). Variety yield performance is not as different the first 2 years after seeding as with older stands. Thus, to choose a variety



for short-term stands 1 to 2 years after seeding, use the all-location yield for 1+2 years after seeding. For long-term stands, choose varieties based on their performance over all locations 3 years after seeding. Varieties with less than 3 test years are not accurately characterized for yield performance (table 1.1c, 1.2c).

Annual Alfalfa

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

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

Other non-winterhardy varieties (fall dormancy 8 and 9) not in the tables include 5715, 5888, 13R Supreme, 58N57, Alto, Baralfa 85, Condor, DK 180 ML, DK 189, El Grande, El Tigre Verde, Falcon, GT 13R Plus, Magna 8, Maricopa, Mesa, Moapa 69, Prestige, SW 8112, SW 8200, SW 8210, Tulare, Weststar, WL 516, WL 525 HQ, Yolo, 5939, Baralfa 92, Beacon, Coronado, CUF 101, DK 191, Highline, Magna 9, Mecca, Mecca II, Sundor, SW 9301, SW 14, UC Cibola and WL 612.

Forage Quality

Alfalfa varieties differ in forage quality or feeding value. Alfalfa varieties have been evaluated for forage quality at Rosemount, Minn., since 1991, (table 3). An NAAIC Standardized Forage Quality Test has been performed at Arlington, Wis. and Rosemount, Minn. since 1995. Varieties in the seeding year are evaluated on one cut taken in late August. Production year evaluation (first year after seeding only) is done by analyzing each of three cuttings taken at late bud to 1/10-bloom stages of maturity.

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

Disease Resistance and Stand Persistence

Alfalfa root and crown diseases occur in most Minnesota soils. The most important diseases are bacterial wilt, Phytophthora root rot, Fusarium wilt, Anthracnose, Verticillium wilt, and Aphanomyces root rot. Plant resistance is available for all six diseases. The variety resistance ratings for each disease are presented in table 4. While moderate resistance (MR) to a disease will protect 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 east-central and southeast 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 es-

pecially in the east central and southeast area of the state. It can cause stand losses of seedlings, and can contribute to lower productivity in older stands if the soil remains wet for a week or more.

Fusarium Wilt – The fungus that causes Fusarium wilt is present in most soils. It contributes to stand decline mainly in combination with other disease organisms. Therefore, resistance to Fusarium 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. The disease is favored by hot, moist conditions, and will therefore be most frequently observed in southeast Minnesota.

Verticillium Wilt – This potentially destructive fungus disease was first found in several eastern Minnesota fields in 1981. It has usually been found in 2- or 3-year-old fields. Its spread in the state has been slow. Planting resistant varieties will help provide insurance for long-lived stands. Varieties having at least a low level of resistance are indicated in table 4.

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

Alfalfa Planting Rate and Date

Bushel Weight, Pounds.....	60
Seeds/Pound.....	220,000
Planting Rate, Pounds/Acre	
Alone	11
With Grass.....	7
Planting Rate, Seeds/Sq.Ft.	
Alone	55
With grass	35
Planting Date	Early Spring,Late Summer

Table 1.1a Alfalfa Yield, Winter Survival Index, ALL and Southeastern sites, percent of checks for seedings with one or more harvest years, 1969-1998.

Variety, by WSI Category, year 1+2	Winter Survival Index	Average yield for years 1, 1+2, and 3 after seeding year per test location							
		ALL Sites			Test Sites (Seedings)	Production Years 1-3	Rosemount, Waseca, Lewiston		
		1	1+2	3			1	1+2	3
Checks, tons hay/acre, 15% moisture		5.80	5.75	5.19	80	199	6.28	6.22	5.59
Superior Winter Survival									
ABT 205	1.6	101	100	104	6	15	104	101	109
Vernal (check)	1.8	100	100	100	80	199	100	100	100
Very Good Winter Survival									
5454	2.3	107	109	107	23	38	108	110	111
Wintergreen	2.5	108	109	139	6	6	110	115	—
620	2.4	107	108	106	12	19	108	109	110
Extend	2.9	108	108	—	3	6	106	108	—
Defiant	2.3	108	107	102	5	12	107	108	104
Notice	2.6	106	106	104	3	9	104	104	103
Garst 645	2.8	107	106	116	12	28	106	106	104
DK 142	2.9	106	106	112	2	4	106	106	112
Avalanche+Z	2.4	104	105	104	7	17	110	109	100
Innovator+Z	2.3	103	104	100	7	12	105	107	98
WinterStar	2.4	107	104	116	8	10	107	106	105
DK 127	2.6	104	104	106	12	22	108	107	105
ABT 405	2.6	104	104	106	3	9	103	104	107
Vitro	2.6	107	104	—	4	3	108	105	—
Complete	2.7	104	103	104	3	7	108	106	103
Rushmore	2.7	106	103	99	5	14	107	105	97
Exceed	2.8	105	102	—	3	6	104	103	—
Rainier	2.9	101	102	—	7	7	103	102	—
Ranger	2.9	102	102	102	8	24	100	100	101
MP 2000	2.7	102	101	108	3	9	102	103	108
LegenDairy 2.0	2.8	101	99	96	4	7	101	99	96
Spredor 3 (check)	2.0	99	96	88	17	22	97	95.5	88
Feast+EV	2.2	101	—	—	3	1	—	—	—
Arrest	2.6	—	—	—	—	—	—	—	—
MultiMist	2.7	—	—	—	—	—	—	—	—
Geneva	2.7	—	—	—	3	0	—	—	—
Baralfa 32 IQ	2.9	104	—	—	4	1	104	—	—
Good Winter Survival									
UltraLeaf 87	3.2	111	107	96	6	15	111	107	108
5312	3.0	106	106	109	12	24	107	108	112
Columbia 2000	3.1	109	106	—	4	6	107	106	—
Dart	3.2	107	106	111	13	34	109	108	108
Aspen	3.2	109	106	—	3	6	104	103	—
Award	3.3	109	106	—	4	7	107	103	—
Viking 1	3.0	104	104	101	10	24	105	107	101
Ace	3.1	100	104	99	4	5	100	104	99
Big Horn	3.1	104	104	97	4	5	104	104	97
8498	3.1	98	100	—	3	6	99	101	—
Ciba 2888	3.2	102	100	105	4	8	102	100	105
Lightning	3.3	99	100	102	4	12	105	102	101
GH 767	3.0	102	99	112	5	9	104	102	109
Guardian	3.0	99	98	104	3	9	109	109	110
DK 140	3.0	105	—	—	7	3	109	—	—
DK141	3.4	105	—	—	7	3	102	—	—

Table 1.1b. Yields with 3 or more seedings but no Winter Survival test, at ALL and Southeastern sites, as percent of checks for seedings with one or more harvest years, 1969-1998.

Variety, in alphabetical sequence	Winter Survival Index	Average yield for years 1, 1+2, and 3 after seeding year per test location							
		ALL Sites			Test Sites (Seedings)	Production Years 1-3	Rosemount, Waseca, Lewiston		
		1	1+2	3			1	1+2	3
Checks, tons hay/acre, 15% moisture		5.80	5.75	5.19	80	199	6.28	6.22	5.59
120	—	107	109	112	10	29	111	111	115
630	—	105	107	109	11	29	107	110	—
631	—	108	108	110	11	23	108	107	112
9326	—	111	112	—	3	4	111	112	—
2555 ML	—	107	106	106	6	14	106	105	105
329 (Max)	—	111	105	98	4	9	110	106	98
3452 ML	—	103	103	103	5	12	103	102	99
53Q60	—	—	—	—	5	0	—	—	—
53V63	—	—	—	—	5	0	—	—	—
A-295	—	106	106	95	3	7	106	106	95
A-395	—	105	105	101	4	7	105	105	101
ABT 350	—	110	112	113	4	5	110	112	113
Achieva	—	113	108	91	4	9	109	107	91
Affinity+Z	—	104	103	106	7	18	102	102	105
Agate	—	98	99	106	20	56	99	101	110
Alfagraze	—	113	107	106	3	7	104	104	110
AlfaStar	—	103	100	99	7	19	103	102	85
ALPHA 2001	—	99	101	104	4	9	102	101	—
AmeriGraze 401+Z	—	101	101	106	4	5	101	101	106
AmeriStand 201+Z	—	—	—	—	3	0	—	—	—
Apollo Supreme	—	100	101	105	7	20	106	107	108
Banquet	—	101	96	99	3	7	98	97	99
Blazer XL	—	108	103	101	3	8	106	101	—
Bounty	—	117	112	108	6	12	111	107	108
Breakout	—	—	—	—	3	0	—	—	—
Ciba 2444	—	109	115	—	4	6	111	116	—
Crown II	—	105	106	116	6	15	117	112	—
Crystal	—	104	103	112	6	17	99	97	95
Demand	—	105	103	102	4	9	106	103	101
Depend+EV	—	106	103	130	4	8	105	103	—
Dividend	—	102	102	98	7	18	99	99	100
DK 122	—	107	104	103	18	44	110	104	81
DK 124	—	—	—	—	5	0	—	—	—
DK 133	—	107	107	103	14	32	106	105	99
DK 134	—	—	—	—	4	0	—	—	—
Dominator	—	107	106	108	4	9	109	108	108
Emperor	—	—	—	—	3	0	—	—	—
Empire	—	100	99	99	6	9	102	97	96
Enhancer	—	106	106	116	3	8	106	107	116
Evolution	—	108	107	101	5	12	110	110	100
Fortress	—	94	97	90	8	24	105	102	84
FQ 314	—	—	—	—	3	0	—	—	—
Gateway	—	112	—	—	3	1	112	—	—
GH 755	—	117	111	91	4	9	112	109	91
GH 766QP	—	102	105	96	6	8	102	104	96
GH 787	—	108	106	100	6	12	108	105	103
Gold Plus	—	—	—	—	3	0	—	—	—
Good as Gold	—	112	109	117	7	18	116	109	99

Variety, in alphabetical sequence	Winter Survival Index	Average yield for years 1, 1+2, and 3 after seeding year per test location							
		ALL Sites			Test Sites (Seedings)	Production Years 1-3	Rosemount, Waseca, Lewiston		
		1	1+2	3			1	1+2	3
GreenField	—	105	103	100	3	7	103	102	100
Imperial	—	107	108	103	4	7	107	108	103
Iroquois	—	104	106	99	10	26	103	104	98
Jade	—	114	113	118	6	16	118	116	109
Jade II	—	106	—	—	4	2	106	—	—
Lactator	—	104	103	97	4	7	104	103	97
Laser	—	111	112	102	3	7	116	115	102
LegenDairy	—	110	111	100	4	9	110	114	—
Magnum III	—	109	110	114	9	25	111	110	110
Magnum III-Wet	—	112	111	99	6	11	112	111	99
Magnum IV	—	108	109	104	6	14	108	109	104
Magnum V	—	112	113	112	7	7	107	107	112
Mariner	—	111	107	—	3	6	107	105	—
Milk River	—	118	111	—	3	5	104	—	—
Monument	—	104	108	108	7	10	106	106	—
Multi 5301	—	100	—	—	4	1	100	—	—
MultiQueen	—	117	111	—	3	5	104	—	—
Nemesis	—	103	105	—	4	5	102	105	—
Oneida VR (check)	—	98	101	101	16	22	102	103	103
Oneida (check)	—	104	102	104	8	19	103	102	104
Pacesetter	—	107	107	93	3	7	104	104	—
Persist	—	111	113	—	7	9	110	113	—
Proof	—	102	99	96	4	11	121	121	—
Quantum	—	114	110	99	4	9	109	107	99
Rhino	—	101	95	—	3	3	101	95	—
Rustler II	—	112	112	—	5	6	112	112	—
Saranac	—	105	104	99	23	64	104	104	98
Spirit	—	107	114	—	3	3	107	114	—
Spur	—	—	—	—	3	0	—	—	—
Sterling	—	106	104	105	4	12	105	102	104
Surpass	—	110	110	107	8	20	113	113	108
Target II	—	112	109	96	4	10	117	110	84
Target II Plus	—	112	114	117	4	5	112	114	117
TMF 421	—	102	—	—	5	1	102	—	—
TMF Generation	—	103	101	101	5	11	106	106	104
TMF Multi-plier II	—	102	100	95	5	9	102	100	95
Total+Z	—	100	103	102	3	7	107	112	—
Trident II	—	108	106	112	8	20	107	105	94
Voyager II	—	109	109	105	7	15	108	109	—
Webfoot MPR	—	107	103	—	5	9	105	102	—
WetLand	—	105	104	103	4	9	105	104	103
WinterKing	—	106	104	107	6	3	106	104	107
WL 232 HQ	—	102	—	—	4	1	102	—	—
WL 252 HQ	—	100	104	105	5	10	106	108	105
WL 322 HQ	—	103	99	112	3	9	101	94	104
WL 323	—	109	106	106	6	14	108	106	107
WL 324	—	108	108	118	5	8	109	111	118
WL 325 HQ	—	107	106	96	6	8	107	106	96
Wrangler	—	102	103	101	8	23	104	106	107
Yielder	—	100	104	—	3	2	100	104	—
Zenith	—	109	107	111	8	17	107	107	—

Table 1.1c. Yields with less than 3 seedings, but no Winter Survival test, at ALL and Southeastern sites, as percent of checks for seedings with one or more harvest years, 1969-1998. NOTE: Varieties with less than 3 seedings cannot be reliably compared with those in table 1.1b

Variety, in alphabetical sequence	Winter Survival Index	Average yield for years 1, 1+2, and 3 after seeding year per test location							
		ALL Sites			Test sites	Production Years 1-3	Lewiston, Rosemount, Waseca		
		1	1+2	3			1	1+2	3
Checks, tons hay/acre, 15% moisture		5.80	5.75	5.19	80	199	6.28	6.22	5.59
6410	—	—	—	—	2	0	—	—	—
ABT 400 SCL	—	—	—	—	1	0	—	—	—
Allegro	—	94	98	101	2	6	—	—	—
Bolt ML	—	114	111	94	1	3	114	111	94
Clean Sweep 1000	—	102	—	—	1	1	102	—	—
Forecast 3000	—	—	—	—	1	0	—	—	—
GH757	—	106	—	—	2	1	106	—	—
GH777	—	112	110	99	1	3	112	110	99
GreenFeast	—	111	107	—	1	2	111	107	—
Legend Gold	—	107	105	—	1	2	107	105	—
MagnaGraze	—	111	110	101	2	5	111	110	101
Mainstay	—	—	—	—	2	0	—	—	—
PowerPlant	—	107	—	—	1	1	107	—	—
Pristine	—	—	—	—	2	0	—	—	—
Rebound 4.2	—	—	—	—	1	0	—	—	—
Sierra	—	110	112	—	1	2	110	112	—
Stampede	—	109	110	—	2	4	109	110	—
Synergy	—	104	103	—	1	2	104	103	—
Teton	—	103	102	102	1	3	—	—	—
Travois	—	95	94	96	1	3	—	—	—

Table 1.2a. Alfalfa Yield with Winter Survival Index, West, Central, Northeast sites, as % of checks for seedings with one or more harvest years, 1969-1998.

Variety, by WSI Category, year 1+2	Winter Survival Index	Average yield for years 1, 1+2, and 3 after seeding year per test location										
		ALL Sites		Morris, Stearns Co., Crookston			Lamberton, Minn. Valley			Grand Rapids		
		1	1+2	1	1+2	3	1	1+2	3	1	1+2	3
Checks, tons hay/acre, 15% moisture		5.75	5.19	5.70	5.56	4.97	5.49	5.60	4.89	4.06	4.04	3.97
Superior Winter Survival												
ABT 205	1.6	100	104	106	104	104	92	94	100	93	100	—
Vernal (check)	1.8	100	100	99	99	100	102	101	100	100	100	100
Very Good Winter Survival												
5454	2.3	109	107	111	113	114	101	103	107	108	107	101
Wintergreen	2.5	109	139	—	—	—	—	—	—	103	102	139
620	2.4	108	106	111	111	99	104	103	104	—	—	—
Extend	2.9	108	—	—	—	—	—	—	—	111	108	—
Defiant	2.3	107	102	110	105	95	105	107	106	—	—	—
Notice	2.6	106	104	113	111	104	102	102	105	—	—	—
Garst 645	2.8	106	116	109	108	116	106	105	127	—	—	—
DK 142	2.9	106	112	—	—	—	—	—	—	—	—	—
Avalanche+Z	2.4	105	104	104	109	106	91	95	107	95	100	—
Innovator+Z	2.3	104	100	—	—	—	91	94	105	—	—	—
Winter Star	2.4	104	116	108	—	—	—	—	—	105	100	128
DK 127	2.6	104	106	101	102	108	100	96	104	104	107	—
ABT 405	2.6	104	106	108	107	106	100	100	105	—	—	—
Vitro	2.6	104	—	105	—	—	—	—	—	—	—	—
Complete	2.7	103	104	—	—	—	96	99	106	—	—	—
Rushmore	2.7	103	99	114	109	96	105	102	101	98	94	100
Exceed	2.8	102	—	—	—	—	—	—	—	107	100	—

Checks, tons hay/acre, 15% moisture	5.75	5.19	5.70	5.56	4.97	5.49	5.60	4.89	4.06	4.04	3.97	
Rainier	2.9	102	—	—	—	102	—	—	96	100	—	
Ranger	2.9	102	102	119	125	117	98	97	99	—	—	
MP 2000	2.7	101	108	107	107	113	97	94	105	—	—	
LegenDairy 2.0	2.8	99	96	—	—	—	—	—	—	—	—	
Spredor 3 (check)	2.0	96	88	108	—	—	104	—	—	96	94	
Feast+EV	2.2	—	—	101	—	—	—	—	—	—	—	
Arrest	2.6	—	—	—	—	—	—	—	—	—	—	
MultiMist	2.7	—	—	—	—	—	—	—	—	—	—	
Geneva	2.7	—	—	—	—	—	—	—	—	—	—	
Baralfa 32 IQ	2.9	—	—	—	—	—	—	—	—	—	—	
Good Winter Survival												
UltraLeaf 87	3.2	107	96	—	—	—	—	—	111	106	90	
5312	3.0	106	109	102	105	109	107	105	98	107	104	116
Columbia 2000	3.1	106	—	—	—	—	—	—	—	111	105	—
Dart	3.2	106	111	103	104	113	106	104	112	117	109	108
Aspen	3.2	106	—	—	—	—	—	—	—	120	112	—
Award	3.3	106	—	—	—	—	—	—	—	114	112	—
Viking 1	3.0	104	101	107	105	99	93	94	96	112	112	106
Ace	3.1	104	99	—	—	—	—	—	—	—	—	—
Big Horn	3.1	104	97	—	—	—	—	—	—	—	—	—
8498	3.1	100	—	—	—	—	—	—	—	94	96	—
Ciba 2888	3.2	100	105	—	—	—	—	—	—	—	—	—
Lightning	3.3	100	102	105	113	104	81	83	101	—	—	—
GH 767	3.0	99	112	—	—	—	—	—	—	98	93	115
Guardian	3.0	98	104	99	98	104	89	87	97	—	—	—
DK 140	3.0	—	—	106	—	—	100	—	—	—	—	—
DK 141	3.4	—	—	105	—	—	108	—	—	—	—	—

Table 1.2b Yields with 3 or more seedings, but no Winter Survival test, at West, Central and Northeast sites, as % of checks for seedings with one or more harvest years, 1969-1998.

Variety, in alphabetical sequence	Winter Survival Index	Average yield for years 1, 1+2, and 3 after seeding year per test location										
		ALL Sites		Morris, Stearns Co., Crookston			Lamberton, Minn. Valley			Grand Rapids		
		1	1+2	1	1+2	3	1	1+2	3	1	1+2	3
Checks, tons hay/acre, 15% moisture		5.75	5.19	5.70	5.56	4.97	5.49	5.60	4.89	4.06	4.04	3.97
120	—	109	112	98	103	107	101	103	—	113	112	107
630	—	107	109	100	102	100	105	107	107	102	99	112
631	—	108	110	112	115	108	101	101	109	—	—	—
9326	—	112	—	—	—	—	—	—	—	—	—	—
2555 ML	—	106	106	107	106	102	108	108	112	—	—	—
329 (Max)	—	105	98	—	—	—	—	—	—	114	103	—
3452ML	—	103	103	107	106	104	92	99	106	—	—	—
53Q60	—	—	—	—	—	—	—	—	—	—	—	—
53V63	—	—	—	—	—	—	—	—	—	—	—	—
A-295	—	106	95	—	—	—	—	—	—	—	—	—
A-395	—	105	101	—	—	—	—	—	—	—	—	—
ABT 350	—	112	113	—	—	—	—	—	—	—	—	—
Achieva	—	108	91	124	111	—	—	—	—	—	—	—
Affinity+Z	—	103	106	107	104	102	105	107	112	105	104	—
Agate	—	99	106	99	97	101	100	100	100	86	89	96
Alfagraz	—	107	106	118	—	—	117	108	102	—	—	—
AlfaStar	—	100	99	102	97	106	103	101	117	106	103	94
ALPHA 2001	—	101	104	111	113	103	82	88	104	—	—	—
AmeriGraze 401+	—	101	106	—	—	—	—	—	—	—	—	—

Checks, tons hay/acre, 15% moisture	5.75	5.19	5.70	5.56	4.97	5.49	5.60	4.89	4.06	4.04	3.97	
Ameristand 201+Z	—	—	—	—	—	—	—	—	—	—	—	
Apollo Supreme	—	101	105	83	90	103	99	100	99	116	107	112
Banquet	—	96	99	—	—	—	—	—	—	105	95	—
Blazer XL	—	103	101	106	101	98	111	105	103	—	—	—
Bounty	—	112	108	122	115	108	—	—	—	—	—	—
Breakout	—	—	—	—	—	—	—	—	—	—	—	—
Ciba 2444	—	115	—	104	—	—	110	—	—	—	—	—
Crown II	—	106	116	88	96	107	109	110	124	—	—	—
Crystal	—	103	112	104	104	112	118	117	144	—	—	—
Demand	—	103	102	—	—	—	104	102	103	—	—	—
Depend+EV	—	103	130	—	—	—	—	—	—	107	103	130
Dividend	—	102	98	106	106	94	89	95	98	110	108	101
DK 122	—	104	103	102	102	108	109	107	120	106	104	102
DK 124	—	—	—	—	—	—	—	—	—	—	—	—
DK 133	—	107	103	109	108	115	113	109	—	108	110	101
DK 134	—	—	—	—	—	—	—	—	—	—	—	—
Dominator	—	106	108	—	—	—	—	101	99	—	—	—
Emperor	—	—	—	—	—	—	—	—	—	—	—	—
Empire	—	99	99	107	105	104	92	95	98	—	—	—
Enhancer	—	106	116	—	—	—	108	105	116	—	—	—
Evolution	—	107	101	106	—	—	—	—	—	101	98	105
Fortress	—	97	90	63	80	98	99	106	89	108	103	98
FQ 314	—	—	—	—	—	—	—	—	—	—	—	—
Gateway	—	—	—	—	—	—	—	—	—	—	—	—
GH 755	—	111	91	130	117	—	—	—	—	—	—	—
GH 766QP	—	105	96	—	—	—	—	—	—	103	105	—
GH 787	—	106	100	—	—	—	—	—	—	104	109	98
Gold Plus	—	—	—	—	—	—	—	—	—	—	—	—
Good as Gold	—	109	117	109	113	117	113	104	135	108	108	115
GreenField	—	103	100	—	—	—	109	106	—	—	—	—
Imperial	—	108	103	—	—	—	—	—	—	—	—	—
Iroquois	—	106	99	105	105	103	102	100	99	108	111	96
Jade	—	113	118	113	116	121	115	107	131	109	109	108
Jade II	—	—	—	—	—	—	107	—	—	—	—	—
Lactator	—	103	97	—	—	—	—	—	—	—	—	—
Laser	—	112	102	115	117	—	102	103	—	—	—	—
LegenDairy	—	111	100	—	—	—	—	—	—	109	104	100
Magnum III	—	110	114	100	106	103	111	116	132	114	104	108
Magnum III-Wet	—	111	99	110	111	—	—	—	—	—	—	—
Magnum IV	—	109	104	113	114	—	105	107	—	—	—	—
Magnum V	—	113	112	118	119	—	112	112	—	—	—	—
Mariner	—	107	—	—	—	—	—	—	—	120	111	—
Milk River	—	111	—	133	122	—	117	108	—	—	—	—
Monument	—	108	108	110	114	111	93	100	104	107	110	—
Multi 5301	—	—	—	—	—	—	—	—	—	—	—	—
MultiQueen	—	111	—	142	127	—	105	102	—	—	—	—
Nemesis	—	105	—	105	—	—	100	—	—	—	—	—
Oneida VR (check)	—	101	101	97	103	103	91	93	95	98	100	—
Oneida (check)	—	102	104	105	103	102	96	98	106	110	106	—
Pacesetter	—	107	93	—	—	—	—	—	—	112	112	93
Persist	—	113	—	118	121	—	107	105	—	—	—	—
Proof	—	99	96	91	93	94	96	90	88	100	90	105
Quantum	—	110	99	127	118	—	—	—	—	—	—	—
Rhino	—	95	—	—	—	—	—	—	—	—	—	—

Checks, tons hay/acre, 15% moisture	5.75	5.19	5.70	5.56	4.97	5.49	5.60	4.89	4.06	4.04	3.97
Rustler II	—	112	—	—	—	—	—	—	—	—	—
Saranac	—	104	99	106	106	109	105	102	96	—	—
Spirit	—	114	—	—	—	—	—	—	—	—	—
Spur	—	—	—	—	—	—	—	—	—	—	—
Sterling	—	104	105	111	111	111	102	99	100	—	—
Surpass	—	110	107	112	104	105	95	108	105	111	108
Target II	—	109	96	108	111	106	—	—	—	105	105
Target II Plus	—	114	117	—	—	—	—	—	—	—	—
TMF 421	—	—	—	—	—	—	—	—	—	—	—
TMF Generation	—	101	101	106	101	100	99	95	98	—	—
TMF Multi-plier II	—	100	95	—	—	—	—	—	—	104	100
Trident II	—	106	112	107	106	113	112	108	134	105	104
Total+Z	—	103	102	—	—	—	97	98	102	—	—
Voyager II	—	109	105	109	108	105	114	109	105	—	—
Webfoot MPR	—	103	—	119	108	—	103	100	—	—	—
WetLand	—	104	103	—	—	—	—	—	—	—	—
WinterKing	—	104	107	—	—	—	—	—	—	—	—
WL 232 HQ	—	—	—	—	—	—	—	—	—	—	—
WL 252 HQ	—	104	105	88	98	—	112	107	—	—	—
WL 322 HQ	—	99	112	111	110	121	96	92	113	—	—
WL 323	—	106	106	113	109	104	105	101	—	—	—
WL 324	—	108	118	106	—	—	—	—	—	110	104
WL 325 HQ	—	106	96	102	—	—	—	—	—	111	110
Wrangler	—	103	101	100	106	103	97	98	106	103	100
Yielder	—	104	—	—	—	—	—	—	—	—	—
Zenith	—	107	111	111	108	105	110	107	117	—	—

Table 1.2c. Yields with less than 3 seedings, but no Winter Survival test, at West, Central and Northeast sites, as percent of checks for seedings with one or more harvest years, 1969-1998. Varieties with less than 3 seedings cannot be reliably compared with those in table 1.2b.

Variety, in alphabetical sequence	Winter Survival Index	Average yield for years 1, 1+2, and 3 after seeding year per test location										
		ALL Sites		Morris, Stearns Co., Crookston			Lamberton, Minn. Valley			Grand Rapids		
		1	1+2	1	1+2	3	1	1+2	3	1	1+2	3
Checks, tons hay/acre, 15% moisture		5.75	5.19	5.70	5.56	4.97	5.49	5.60	4.89	4.06	4.04	3.97
6410	—	—	—	—	—	—	—	—	—	—	—	—
ABT 400 SCL	—	—	—	—	—	—	—	—	—	—	—	—
Allegro	—	98	101	—	—	—	79	87	104	—	—	—
Bolt ML	—	111	94	—	—	—	—	—	—	—	—	—
Clean Sweep 1000	—	—	—	—	—	—	—	—	—	—	—	—
Forecast 3000	—	—	—	—	—	—	—	—	—	—	—	—
GH757	—	—	—	—	—	—	—	—	—	—	—	—
GH777	—	110	99	—	—	—	—	—	—	—	—	—
GreenFeast	—	107	—	—	—	—	—	—	—	—	—	—
Legend Gold	—	105	—	—	—	—	—	—	—	—	—	—
MagnaGraze	—	110	101	—	—	—	—	—	—	—	—	—
Mainstay	—	—	—	—	—	—	—	—	—	—	—	—
PowerPlant	—	—	—	—	—	—	—	—	—	—	—	—
Pristine	—	—	—	—	—	—	—	—	—	—	—	—
Rebound 4.2	—	—	—	—	—	—	—	—	—	—	—	—
Sierra	—	112	—	—	—	—	—	—	—	—	—	—
Stampede	—	110	—	—	—	—	—	—	—	—	—	—
Synergy	—	103	—	—	—	—	—	—	—	—	—	—
Teton	—	102	102	103	102	102	—	—	—	—	—	—
Travois	—	94	96	95	94	96	—	—	—	—	—	—

Table 2. Alfalfa Winter Survival test results for Wisconsin and Minnesota, planted in 1997, rated in May 1998.

Variety	Winter Survival Index, 1=Superior Winter Survival, 2=Very Good, 3=Good, 4=Adequate, 5=Low, 6=None				
	Arlington, WI	Lancaster, WI	Morris, MN	Rosemount, MN	MEAN
Beaver (check)	1.2	1.0	0.8	1.0	1.0
Norseman (check)	1.0	1.1	1.2	1.0	1.1
Vernal (check)	1.8	1.8	2.1	1.9	1.9
Spredor 3	2.1	1.7	2.0	2.4	2.0
620	2.7	2.0	1.8	2.1	2.2
Feast +EV	2.3	1.7	2.2	2.7	2.2
Winterstar	2.3	2.3	2.8	2.4	2.4
526 (check)	2.4	2.5	2.6	2.6	2.5
Arrest	2.0	2.5	2.8	2.9	2.6
DK 127	2.0	3.0	2.9	2.6	2.6
Vitro	2.4	2.6	3.0	2.5	2.6
Baralfa 32 IQ	2.6	2.7	3.7	2.5	2.9
DK 142	2.7	2.5	3.9	2.4	2.9
Ranger (check)	2.7	2.6	3.3	3.2	2.9
DK 140	2.8	2.6	3.9	2.8	3.0
GH 767	2.7	2.5	4.1	2.8	3.0
Big Horn	2.8	3.1	3.6	3.0	3.1
Dart (check)	3.4	3.4	2.9	2.9	3.1
Choice	3.3	3.2	3.0	3.2	3.2
Award	3.3	3.3	3.9	2.6	3.3
DK 141	2.8	3.3	4.2	3.2	3.4
Fortress (check)	3.5	3.7	3.7	3.8	3.7
Archer (check)	3.6	4.4	4.9	4.5	4.3
G-2852 (check)	5.1	4.6	4.2	4.2	4.5
Southern Special (check)	5.2	5.1	5.1	5.1	5.1
MOAPA 69 (check)	6.0	5.9	5.9	5.8	5.9
CUF 101 (check)	6.0	6.0	6.0	6.0	6.0

Note for Tables 1 and 2

The winter survival index (WSI) is from joint Minnesota-Wisconsin 1996-98 trials, except for table 2, which is 1998 WSI data only.

Total production years (after seed year) for any location with reliable data. Year 1+2 data averages 2 production years.

Seed years or production years that winter killed or developed unacceptably variable stands are excluded.

Tests at Waseca were discontinued after 1994 and replaced by a SE (Winona County) site.

Tests were discontinued at Crookston after 1995 and replaced by a Stearns County site.

Each seeding year in any location counts as one test site.

Test data from experimental seed is retired as data from tests on commercial seed is sufficient to replace it.

Table 3. Forage Quality as Relative Feed Value and Milk per acre of alfalfa varieties, percent of checks, Minnesota and Wisconsin.

Variety	Seed Years 1991-96 Production Years 1992-97			Seed Year 1997, Production Year 1998				
	RFV ²	Milk/Ac	N	Minnesota		Wisconsin		
				RFV	Milk/Acre	RFV	Milk/Acre	
5454	102	105	1	Award	100	110	110	114
630	107	109	1	Baralfa 32 IQ	102	111	108	113
8498	102	118	2	DK 127	103	115	107	127
9326	104	113	2	DK 140	105	125	104	122
ABT 205	102	110	2	DK 141	100	108	101	114
Agate	108	104	2	GH 766QP	102	110	110	113
Ciba 2888	102	112	2	GH 767	102	118	107	118
Dart	106	99	1	Multi 5301	102	116	107	115
Dividend	108	104	1	Nemesis	103	120	105	118
DK 122	104	107	3	WinterStar	97	102	106	113
DK 127	105	113	5	Vernal (check)	94	88	100	100
DK 133	103	107	5	WL 322 HQ (check)	104	108	108	102
Dominator	105	98	1	Checks	125	7,353	167	9,051
Exceed	102	114	2	Test Mean	128	8,194	174	9,836
Extend	102	111	2	LSD .05	6	13	7	11
Garst 645	106	105	1	CV%	4.3	8.5	4.7	7.4
GH 755	108	102	1	Seed Year 1998, Production Year 1998				
GH 766QP	102	100	2	Minnesota		Wisconsin		
GH 767	105	109	4	Variety	RFV	Milk/Acre	RFV	Milk/Acre
GH 787	105	109	4	53Q60	102	104	96	101
Good As Gold	105	102	1	53V63	105	110	95	114
Imperial	102	109	1	Baralfa 32 IQ	105	105	104	108
Innovator+Z	103	105	2	Breakout	104	106	98	111
Legend Gold	104	117	2	DK 124	110	114	98	112
LegenDairy	110	104	1	DK 134	106	113	102	125
Lightning	102	111	2	DK 140	105	119	103	115
Magnum III	102	105	1	DK 141	94	111	93	111
Magnum III-Wet	111	102	1	FQ 314	105	104	94	114
Magnum IV	99	102	1	Geneva	106	92	100	118
Max 329	104	110	2	GH 757	95	98	92	111
Oneida	104	106	2	Spur	101	103	—	—
Rainier	103	110	2	WinterKing	107	96	102	104
Rushmore	98	105	1	Vernal (check)	94	91	95	96
Sierra	103	109	1	WL 322 HQ (check)	106	109	105	104
Spirit	98	114	2	Checks	137	1,996	164	6,000
Sterling	103	107	1	Test Mean	142	2,117	163	6,710
Target II Plus	105	108	1	LSD .05	9	18	11	14
Ultraleaf 87	103	108	2	CV%	5.8	11.9	7.5	9.0
Viking 1	106	103	1					
WL 252 HQ	105	108	3					
Vernal (check)	99	99	8					
WL 322 HQ (check)	105	104	6					
Checks	151	10,924	8					
Test Mean	156	11,611	8					

Notes for Table 3

Bold indicates not significantly different from highest variety in trial.

Varieties listed include joint Minn.-Wis. quality trials (seed years 1995-98), plus varieties from prior Minn. quality trials currently marketed in Minn.

The relative feed value index (RFV) is calculated from NDF and ADF.

Minn. milk-per-acre is calculated using season average quality and season average yield at Rosemount. Wis. milk-per-acre is calculated using season average quality and season average yield at Arlington.

Vernal was used as a check until 1994, Vernal and WL322HQ for seed years 1995-98.

CV= coefficient of variation. A smaller number indicates less variation between replicates.

Table 4. Disease Resistance and Fall Dormancy of alfalfa varieties marketed in Minnesota.

Variety ¹	Developer or Marketer ²	Seed Source ³	FD ⁴	Disease Resistance Ratings ^{5, 6}					
				BW	VW	FW	An	PRR	Aph
Dormant									
120	DeKalb Genetics	21	3	HR	—	R	LR	R	—
2555 ML	Garst Seed	26, 33, 50	2	HR	R	HR	HR	HR	R
329 (Max)	AgriBioTech	3	3	HR	HR	HR	HR	HR	R
3452 ML	Garst Seed	26	3	HR	R	HR	HR	HR	R
5312	Pioneer Hi-Bred Int'l	54	3	HR	HR	HR	HR	HR	R
5347LH	Pioneer Hi-Bred Int'l	54	3	HR	R	HR	HR	HR	R
53Q60	Pioneer Hi-Bred Int'l	54	3	HR	R	R	HR	HR	R
53V63	Pioneer Hi-Bred Int'l	54	3d	HR	HR	HR	HR	HR	HR
5454	Pioneer Hi-Bred Int'l	54	4	R	MR	HR	HR	HR	LR
620	Garst Seed	26, 33	2	HR	R	HR	HR	HR	R
630	Garst Seed	33	4	HR	MR	R	MR	R	—
631	Garst Seed	26	4	HR	R	HR	R	HR	MR
6310	Garst Seed	26	3d	HR	HR	HR	HR	HR	R
6410	Garst Seed	26	4d	HR	HR	HR	HR	HR	HR
6420	Garst Seed	26	4d	HR	R	HR	R	HR	R
8498	Mallard Seeds	42	3	HR	R	HR	HR	HR	R
9326	L.G. Seeds	41	3	HR	R	HR	R	HR	R
A-295	PGI / MBS	43	2	HR	R	HR	R	HR	R
A-395	PGI / MBS	43	3	HR	R	HR	HR	HR	R
Abound	Asgrow Seed	11	3d	HR	HR	HR	HR	HR	HR
ABT 205	AgriBioTech	1, 22	2	HR	R	HR	R	HR	R
ABT 227LH	AgriBioTech	1, 22	2	HR	R	R	HR	HR	R
ABT 350	AgriBioTech	1, 22	3	HR	HR	HR	HR	HR	HR
ABT 400 SCL	AgriBioTech	1	4d	HR	HR	HR	HR	HR	HR
ABT 405	AgriBioTech	1, 22	4	HR	HR	HR	R	HR	R
Ace	UAP Seeds	67	4	HR	R	HR	HR	HR	R
Achieva	Allied Seed	7, 8	3	R	R	HR	HR	HR	R
Affinity+Z	America's Alfalfa	9, 50	4	HR	HR	HR	HR	HR	R
Agate	USDA / Minn.AES	2, 22, 57, 70	2	HR	—	HR	MR	R	—
Alfagraz	America's Alfalfa	50	2	R	—	R	MR	LR	—
AlfaStar	Hoffman Seed / Sexauer	37, 60	4	HR	R	HR	HR	HR	R
Allegro	Mycogen Seeds	46	4	HR	R	HR	HR	HR	R
ALPHA 2001	Great Lakes Hybrids	31	4	HR	HR	HR	HR	HR	R
AmeriGraze 401+Z	America's Alfalfa	9, 50, 64	4	HR	HR	HR	HR	HR	R
AmeriGuard 302+Z	America's Alfalfa	9, 50, 64	3d	HR	HR	HR	HR	HR	HR
AmeriStand 201+Z	America's Alfalfa	9, 50, 64	2d	HR	HR	HR	R	HR	HR
Apollo Supreme	America's Alfalfa	50	4	HR	R	HR	HR	R	—
Arrest	Novartis Seeds / Hoffman	49	3	HR	HR	HR	HR	HR	R
Aspen	Brown Seed Farms	14	4	HR	R	HR	HR	HR	R
Avalanche+Z	America's Alfalfa	9, 33, 50, 64	2	HR	HR	HR	HR	HR	R
Award	Asgrow Seed	11	4	HR	HR	HR	HR	HR	R
Banquet	Tri-State Seed / Fontanelle	24, 65	4	HR	HR	HR	HR	HR	R
Baralfa 32 IQ	Barenbrug USA	12	3	HR	R	HR	HR	HR	HR
Baralfa 54	Barenbrug USA	12	5	R	R	HR	HR	HR	—
Big Horn	Cargill Hybrid Seeds	16	4	HR	R	HR	HR	HR	HR
Blazer XL	Croplan Genetics	16	3	R	R	HR	HR	HR	R
Bolt ML	Research Seeds / Jung	35	3	R	R	HR	HR	HR	HR
Bountiful Plus	Tri-State Seed	65	3	HR	HR	HR	R	HR	
Bounty	PGI / MBS	63	2	HR	R	HR	HR	HR	R

Variety ¹	Developer or Marketer ²	Seed Source ³	FD ⁴	Disease Resistance Ratings ^{5,6}					
				BW	VW	FW	An	PRR	Aph
Breakout	Brown Seed Farms	14	4	HR	R	HR	HR	HR	R
Ciba 2444	Novartis Seeds	49	3	HR	R	HR	HR	HR	R
Ciba 2888	Novartis Seeds	49	3	HR	HR	HR	HR	HR	R
Clean Sweep 1000	Agway / Allied Seed	8	3	HR	R	HR	HR	HR	R
Columbia 2000	Allied Seed	2, 7, 36	4	R	R	R	LR	LR	S
Complete	Arrow / Fontanelle Hybrids	24	3	HR	HR	HR	HR	HR	R
Crown II	Cargill Hybrid Seeds	16	3	HR	R	HR	HR	HR	—
Crystal	PGI / MBS	43	4	HR	R	HR	R	HR	LR
Cyclone	Tri-State Seed	65	3d	HR	R	HR	HR	HR	HR
Dart	AgriPro Seeds	4	3	HR	R	HR	R	HR	—
Defense+EV	AgriPro Seeds	4	3d	HR	HR	HR	HR	HR	HR
Defiant	AgriPro Seeds	4	2	HR	HR	HR	R	HR	R
Demand	AgriPro Seeds	4	3	HR	HR	HR	HR	HR	R
Depend+EV	AgriPro Seeds	4	4	HR	HR	HR	HR	HR	R
Dividend	Agway / Allied Seed	8	2	HR	R	HR	HR	HR	R
DK 122	DeKalb Genetics	21	2	HR	R	R	HR	HR	—
DK 124	DeKalb Genetics	21	2d	HR	HR	HR	HR	HR	HR
DK 127	DeKalb Genetics	21	3	HR	R	R	HR	HR	HR
DK 133	DeKalb Genetics	21	4	HR	R	HR	HR	HR	R
DK 134	DeKalb Genetics	21	3d	HR	HR	HR	HR	HR	HR
DK 140	DeKalb Genetics	21	4	HR	R	HR	HR	HR	HR
DK 141	DeKalb Genetics	21	4	HR	HR	HR	HR	HR	HR
DK 142	DeKalb Genetics	21	4	HR	R	HR	R	HR	HR
Dominator	AgriPro Seeds	4	4	HR	R	HR	HR	HR	R
Emperor	ABI Alfalfa	15	4	HR	HR	HR	HR	HR	HR
Empire	Brunner Seed Farm	9	2	HR	R	HR	HR	HR	R
Enhancer	Drussel/Bio-Plant/Gooding	13	4	HR	R	HR	R	HR	MR
Evolution	Mycogen Seeds	46	2	HR	R	HR	HR	HR	R
Exceed	Specialty Seeds	62	3d	HR	R	HR	HR	HR	R
Extend	Spangler / Grassland West	61	4	HR	R	R	HR	HR	R
Feast+EV	AgriPro Seeds	4	3	HR	R	HR	HR	HR	R
Forecast 1000	Dairyland Seed	20	3	HR	R	HR	R	HR	R
Forecast 3000	Dairyland Seed	20	4	HR	R	HR	R	R	MR
Fortress	Novartis Seeds	49	4	R	R	R	—	HR	—
FQ 314	Cargill Hybrid Seeds	16	3	HR	HR	HR	HR	HR	HR
Garst 645	Garst Seed	26	3	HR	R	R	HR	HR	MR
Garst 645 II	Garst Seed	26, 33	3d	HR	HR	HR	HR	HR	R
Gateway	Jung Seed Genetics	35	4	HR	R	HR	HR	HR	R
Geneva	Novartis Seeds	49	4d	HR	HR	HR	HR	HR	
GH 755	Golden Harvest	29, 34, 30	4	HR	R	HR	HR	HR	R
GH 757	Golden Harvest	28, 30	4	HR	HR	HR	HR	HR	HR
GH 766 QP	Golden Harvest	29, 34, 30	3	HR	R	HR	HR	HR	R
GH 767	Golden Harvest	28, 30	2	HR	R	HR	HR	HR	R
GH 777	Golden Harvest	30	3	HR	R	HR	R	HR	R
GH 787	Golden Harvest	28, 30	3	HR	R	R	HR	HR	R
Gold Plus	PGI / MBS	43	4	HR	R	HR	HR	HR	R
Good as Gold	Johnston / Top Farm	63	4	HR	R	HR	R	HR	LR
GreenFeast	Hoegemeyer Hybrids	53	2d	HR	HR	HR	HR	HR	HR
GreenField	Hoegemeyer Hybrids	53	3	HR	R	HR	HR	HR	R
Guardian	AgVenture	5, 6	3	HR	HR	HR	HR	HR	R
Hay Maker II	Mid-Atlantic / Kussmaul	38	4	HR	R	HR	HR	HR	R

Disease Resistance Ratings ^{5,6}

Variety ¹	Developer or Marketer ²	Seed Source ³	FD ⁴	Disease Resistance Ratings ^{5,6}					
				BW	VW	FW	An	PRR	Aph
Hunter	Ramy International	58	4d	HR	R	HR	HR	HR	R
Imperial	ABI Alfalfa / Top Farm	63	3	HR	R	HR	HR	HR	R
Innovator+Z	America's Alfalfa	9, 33, 50, 64	3	HR	HR	HR	HR	HR	R
Interceptor	AgriPro Seeds	4	3	HR	R	HR	HR	HR	R
Iroquois	Cornell Univ.	2, 7, 57	2	HR	S	MR	S	S	—
Jade	NC+ Hybrids	47	4	HR	R	R	R	HR	—
Jade II	NC+ Hybrids	47	4	HR	R	HR	R	HR	MR
Lactator	Elk Mound Feed & Farm	23	2	HR	HR	HR	HR	R	R
Laser	J-V / Patriot / Rainier	52	4	HR	R	HR	R	HR	MR
Legend Gold	Legend Seeds	39	3d	HR	HR	HR	HR	HR	HR
LegenDairy	Croplan Genetics	17	2	HR	HR	HR	HR	HR	R
LegenDairy 2.0	Croplan Genetics	17	3	HR	R	HR	HR	HR	R
Lightning	Jung Seed Genetics	35	3	HR	R	HR	HR	HR	HR
MagnaGraze	Dairyland Seed	20	3	HR	R	HR	R	HR	R
Magnum III	Dairyland Seed	20	4	R	MR	R	MR	R	LR
Magnum III-Wet	Dairyland Seed	20	3	R	MR	R	MR	R	MR
Magnum IV	Dairyland Seed	20	4	HR	R	HR	R	HR	MR
Magnum V	Dairyland Seed	20	4d	HR	R	HR	R	HR	MR
Mainstay	AgVenture	6	3d	HR	R	HR	HR	HR	R
Mariner	Agway / Allied Seed	58	2	R	MR	HR	MR	HR	MR
Maxi-Graze GT	Croplan Genetics	17	2d	HR	R	HR	R	HR	R
Milk River	R.J.Hunt Seed	57	3d	HR	R	HR	HR	HR	R
Monument	Geertson Seed Farm	27	3d	R	LR	R		MR	—
MP2000	Croplan Genetics	17	3	HR	R	HR	HR	HR	HR
Multi 5301	Geertson Seed Farm	27	4d	R	R	HR	HR	MR	—
MultiMist	Lemke Seeds	40	3d	HR	R	HR	HR	HR	R
MultiQueen	Fred Gutwein & Sons	25	4	HR	R	HR	HR	HR	R
Nemesis	Renk Seed	59	3	R	HR	HR	HR	HR	HR
Notice	Midwest Seed Genetics	44	3	HR	R	HR	HR	HR	R
Oneida VR (check)	N.Y.S.I.P./Public	check	3	R	HR	HR	MR	MR	—
Oneida (check)	Cornell Univ.	check	3	HR	—	HR	S	HR	—
Pacesetter	Research Seeds / Brown	14	2	HR	R	R	HR	HR	—
Persist	Kaltenberg Seed Farms	36	4	HR	R	HR	R	HR	MR
Pointer	Dahlco Seeds	19	3d	HR	R	HR	HR	HR	R
PowerPlant	Peterson Seed / Crow's	18, 53	3d	HR	HR	HR	HR	HR	R
Pristine	Doebler's	64	4	HR	R	HR	HR	HR	R
Proof	Mycogen Seeds	46	3	HR	R	HR	HR	HR	R
Quantum	Renk Seed	59	2	HR	HR	HR	HR	HR	R
Rainier	Novartis Seeds	49	3	HR	R	HR	HR	HR	HR
Ranger	USDA / Nebr.AES	2, 22	3	MR	S	MR	S	S	—
Rebound 4.2	Croplan Genetics	17	4d	HR	HR	HR	HR	HR	HR
Rhino	Geertson Seed Farm	27	3	HR	R	R	R	R	R
Rushmore	Novartis Seeds	49	4	HR	R	HR	HR	HR	HR
Rustler II	Andrews Seed	10	4	HR	HR	HR	HR	HR	R
Saranac	Cornell Univ.	22	4	R	S	R	S	S	—
Sierra	NC+ Hybrids	47	3	HR	R	HR	R	HR	MR
Spirit	Fontanelle Hybrids	24	3	HR	R	HR	R	HR	MR
Spredor 3 (check)	Novartis Seeds	49	1	HR	MR	HR	R	MR	S
Sprint	Specialty Seeds	62	3d	HR	R	HR	R	HR	HR
Spur	Wheatland Seed	7, 8	4	HR	R	HR	HR	HR	R
Stampede	Agway / Allied Seed	55	3	HR	R	R	—	HR	R

Variety ¹	Developer or Marketer ²	Seed Source ³	FD ⁴	BW	Disease Resistance Ratings ^{5,6}				
					VW	FW	An	PRR	Aph
Sterling	Cargill Hybrid Seeds	16	2	HR	R	HR	HR	HR	R
Surpass	Andrews Seed	7, 10, 57	3	HR	R	HR	MR	R	—
Synergy	Crow's Hybrid Corn	18	3	HR	R	HR	HR	HR	R
Target II	Bio-Plant Research	56	4	HR	R	HR	R	HR	S
Target II Plus	Bio-Plant Research	56	3	HR	R	HR	R	HR	MR
Teton	S.Dakota Agr.Exp.Sta.	2, 22	1	LR		MR	S	LR	—
TMF 421	Mycogen Seeds	46	2	HR	HR	R	HR	HR	HR
TMF 4355LH	Mycogen Seeds	46	3d	HR	R	HR	HR	HR	R
TMF Generation	Mycogen Seeds	46	4	HR	HR	HR	HR	HR	R
TMF Multi-plier II	Mycogen Seeds	46	3	HR	HR	HR	HR	HR	R
Total+Z	America's Alfalfa	9	3	HR	HR	HR	HR	HR	R
Trail Blazer 3.0	Croplan Genetics	17	3d	HR	HR	R	HR	HR	R
Travois	S.Dakota Agr.Exp.Sta.	2, 22	1	R	—	MR	S	S	—
Trident II	Cargill Hybrid Seeds	16	3	HR	R	R	R	HR	MR
UltraLeaf 87	La Crosse Seed	1, 22	3	HR	R	HR	HR	HR	R
Vernal (check)	USDA / Wisc.AES	2, 7, 22, 57	2	R	—	MR	—	—	—
Viking 1	Novartis Seeds	49	2	R	HR	HR	R	R	—
Vitro	North-Gro Seed	48	3	HR	HR	HR	HR	HR	R
Voyager II	Bio-Plant Research	71	4	HR	R	HR	R	HR	MR
Webfoot MPR	Great Lakes Hybrids	31	4	HR	HR	HR	HR	HR	R
WetLand	Bio-Plant Research	56, 71	3	R	MR	R	R	HR	MR
WinterGreen	Renk Seed	59	3	HR	HR	HR	HR	HR	R
WinterKing	Wensman Seed	69	3	HR	HR	HR	HR	HR	R
WinterStar	Wensman Seed	69	2	HR	HR	HR	HR	HR	R
WL 232 HQ	W-L Research	6,45,51,67,68	2	HR	HR	HR	HR	HR	HR
WL 252 HQ	W-L Research	6,45,51,67,68	2	HR	R	HR	HR	HR	LR
WL 322 HQ	W-L Research	6,45,51,67,68	4	HR	R	HR	MR	R	—
WL 323	W-L Research	6,45,51,67,68	4	HR	R	HR	HR	HR	R
WL 324	W-L Research	6,45,51,67,68	3	HR	R	HR	HR	HR	HR
WL 325 HQ	W-L Research	6,45,51,67,68	3	HR	R	HR	HR	HR	R
WL 326 GZ	W-L Research	6,45,51,67,68	4	HR	HR	HR	HR	HR	HR
Wrangler	USDA / Nebr.AES	2, 7, 22, 57, 70	2	R	LR	R	LR	HR	—
XGrazer	Cargill Hybrid Seeds	16	2	HR	HR	HR	HR	HR	R
Yielder	AgriPro Seeds	4	3d	HR	R	HR	HR	HR	R
Zenith	Garst Seed	26	3	HR	R	HR	HR	HR	R
Non-dormant									
Nitro	USDA / Minn. AES	7, 55	8		—	—	—	—	R

Notes to Table 4

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

²The developers list generally follows Certified Alfalfa Seed Council (CASC) 1998/99 Edition.

³Seed source numbers reference "1999 Forage Seed Sources" Key following the forage crop section.

⁴Fall dormancy and pest resistance ratings are as reported in CASC publication, or provided by a developer, (shown as "d") with dormancy based on fall growth in mid-October after cutting 1st week of September: 9=tallest (tend to be least winterhardy), 1=shortest.

⁵Diseases are abbreviated as BW: Bacterial Wilt, PRR: Phytophthora Root Rot, FW: Fusarium Wilt, An: Anthracnose, VW: Verticillium Wilt, Aph: Aphanomyces Root Rot

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

BIRDSFOOT TREFOIL

Birdsfoot trefoil is an excellent nonbloating pasture legume which 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 and Grand Rapids in 1993 and 1994. The trial was harvested twice at Grand Rapids and three times at Rosemount from 1994 through 1996. Yields were lower at Grand Rapids than at Rosemount due to less-favorable growing conditions. A birdsfoot trefoil variety trial was established at Rosemount in 1997. Few differences were observed in forage yield in 1998. Steadfast, a rhizomatous birdsfoot trefoil, was significantly lower yielding than the other varieties in the trial.

Dry matter yield, in tons dry matter per acre, of birdsfoot trefoil varieties seeded at Grand Rapids and Rosemount, 1994-1998.

Variety	Rosemount			Grand Rapids	
	1994-95 ¹	1995 ¹ -96	1998	1994-95	1995-96
AU-Dewey	2.4	—	—	2.5	—
Bright	—	—	3.6	—	—
Carroll	4.1	—	—	3.0	—
Dawn	—	—	4.0	2.5	—
Empire	—	3.6	4.0	2.8	2.2
Fergus	4.0	—	3.9	2.9	—
Leo	—	3.5	3.9	—	2.3
Norcen	3.8	3.6	4.3	2.8	2.2
Steadfast	—	—	3.1	—	—
Trevig	—	—	4.1	—	—
Viking	—	3.8	3.8	—	2.2
LSD 5%	0.4	NS	0.5	0.3	0.2

¹ Severe winter injury in 1995.

Winterhardy varieties such as Norcen produced the highest overall yields. Norcen was released in 1983 by the agricultural experiment stations of Minnesota and six other states and has performed exceptionally well in grazing trials.

Birdsfoot Trefoil Planting Rate and Date

Bushel Weight, Pounds.....	60
Seeds/Pound.....	372,000
Planting Rate, Pounds/Acre	
Alone.....	7
In Mixtures.....	4
Planting Rate, Seeds/Sq.Ft.	
Alone.....	60
In Mixtures.....	34
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 winter-hardy. Some stand losses may occur when bromegrass is managed under three- and four-cut alfalfa harvest systems.

Varieties are currently being evaluated in pure stands at Minnesota experiment stations. Nitrogen was applied at all locations in early spring and after harvest at a rate of 50 pounds per acre. Average dry matter yields were very high in 1998 and few differences were found between performance of the varieties.

Dry matter yield, in tons dry matter per acre, of smooth bromegrass seeded at two locations, 1998.

Variety	Rosemount	Morris
Alpha	5.6	3.2
Badger	5.4	5.0
Bounty	5.3	3.2
Lincoln ¹	4.8	—
York	5.3	3.4
LSD 5%	0.6	NS

¹ Seedlot of Lincoln has low germination which resulted in poor stand establishment.

Bromegrass Planting Rate and Date

Bushel Weight, Pounds.....	14
Seeds/Pound.....	136,000
Planting Rate, Pounds/Acre	
Alone.....	16
In Mixtures.....	10
Planting Rate, Seeds/Sq.Ft.	
Alone.....	50
In Mixtures.....	31
Planting Date.....	Early Spring or Late 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 stand in 1989 at Rosemount and Grand Rapids and in 1997 at Rosemount and Morris.

Experimental plots were generally harvested three times per year. Nitrogen was applied in the early spring and after each harvest at a rate of 50 pounds of nitrogen per acre.

Orchardgrass Planting Rate and Date

Bushel Weight, Pounds.....	14
Seeds/Pound.....	5653,000
Planting Rate, Pounds/Acre	
In Mixtures.....	2
Planting Rate, Seeds/Sq.Ft.	
In Mixtures.....	30
Planting Date.....	Early Spring or Summer
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	Grand Rapids	Rosemount		Morris 1998
	1990-1994	1990-1992	1998	
Ambassador	3.5	4.7	4.9	2.7
Condor	—	—	5.0	2.7
Crown	3.5	4.6	4.8	—
Dawn	3.6	4.6	—	—
Duke	—	—	5.5	2.8
Elsie	3.5	4.8	—	—
Haymate	—	—	4.8	3.0
Justus	3.4	4.7	5.0	3.0
Napier	3.6	4.6	4.5	2.3
Orbit	3.4	4.5	3.9	2.7
Orion	3.7	5.0	5.0	2.6
Potomac	3.5	4.5	5.1	2.7
Shawnee	3.3	4.5	—	—
Sterling	3.4	4.8	—	—
LSD 5%	NS	0.5	0.7	0.5

RED CLOVER

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

Historically, the winterhardy varieties of red

clover have not persisted beyond two crop years in Minnesota because they are susceptible to diseases. Most of the improved varieties currently sold for use in Minnesota can, however, persist for three years if the weather provides good winter snow cover.

Minnesota Agricultural Experiment Station scientists established performance trials of red clover at three locations in 1995. These trials were harvested at Grand Rapids, Morris and Rosemount in 1996 and at Rosemount and Morris in 1997 and 1998. Severe winter injury destroyed the trial at Grand Rapids.

Dry matter yield of red clover, in tons dry matter per acre, seeded at 3 locations in 1995.

Variety	Grand Rapids	Morris			Rosemount			Mean ²
	1996 ¹	1996	1997	1998	1996	1997	1998	
Arlington	3.7	2.6	3.3	2.9	3.2	2.0	4.8	3.1
Astred	3.3	2.2	2.2	2.7	2.5	1.8	3.3	2.4
Cinnamon	4.0	3.1	3.7	3.0	3.4	2.1	5.3	3.4
Concord	4.3	—	—	—	—	—	—	—
Marathon	4.3	3.2	3.5	2.6	3.4	1.7	4.5	3.2
Randolph	3.8	3.7	3.5	2.8	3.8	2.0	4.7	3.4
Redland III	—	—	—	2.8	3.3	1.9	—	—
Scarlett	3.0	3.0	3.5	2.8	3.7	1.8	4.8	3.3
LSD 5%	0.9	0.9	0.5	NS	NS	0.3	0.8	0.5

¹Trial destroyed by severe winter injury during the winter of 1996-97. ² Rosemount and Morris only.

Varietal differences for forage yield were found at all locations except Morris in 1996. Yields were highest at Grand Rapids due to favorable environmental conditions, and lowest in 1966 at Rosemount due to winter injury and at Morris in 1998. The newer varieties, such as Marathon, tended to produce higher forage yields during the third production year.

Red Clover Planting Rate and Date

Bushel Weight, Pounds.....	60
Seeds/Pound.....	252,000
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 Mixture.....	Use Date for Legume

REED CANARYGRASS

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

Prior to 1985 common reed canarygrass had been described as being less palatable than most other grass species seeded for hay and pasture. Cattle produced well on the grass only if it was grazed when between 6 and 24 inches tall.

The most recent development in reed canarygrass breeding has 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.

Trials were established in pure stands in 1989 at Morris and Rosemount. The trial was harvested twice at Morris and three times at Rosemount in 1990, 1991 and 1992. Trials were also established in 1993 at Morris, Grand Rapids and Rosemount. In 1994 these trial were harvested twice at Grand Rapids and Rosemount, and three times at

Morris. In 1995 and 1996, the trials were harvested three times per year. Nitrogen was applied early in the spring and after each harvest at a rate of 40 to 50 pounds per acre.

Each of the available varieties is winterhardy and persistent in Minnesota. High yielding, low-alkaloid varieties Palaton and Venture are currently marketed here.

Dry matter yields, in tons dry matter per acre, of reed canarygrass at three locations.

Variety	Grand Rapids	Rosemount		Morris	
	1994-1996	1990-1992	1994-1996	1990-1992	1994-1996
Lara	—	—	3.0	—	—
Palaton	3.5	6.9	3.1	3.8	6.1
Rise	—	6.2	—	4.0	—
Vantage	3.3	6.3	3.3	4.0	5.7
Venture	3.5	7.1	3.1	4.3	5.5
LSD 5%	NS	0.8	NS	NS	NS

TALL FESCUE

Tall fescue, a bunchgrass, may be planted in mixtures with other grasses and legumes. It es-

tablishes rapidly, withstands trampling, tolerates summer drought and produces fall season pasture when other grasses become dormant.

Tall fescue is subject to winter injury, but may remain productive in areas with reliable snow cover. *(continued)*

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

Variety	Grand Rapids	Rosemount		Morris
	1994-1996	1993-1995	1998	1993-1996
Tall Fescue				
Barcel	3.0	5.3	—	4.5
Cajun	—	—	6.5	—
Fawn	3.3	4.9	—	5.0
Ky 31-endophyte infected ¹	3.5	5.8	—	4.7
Ky 31-endophyte free ¹	3.3	5.6	7.2	4.9
Martin	3.6	5.3	5.5	4.7
Maximize	—	—	6.0	—
Mozark	3.5	5.4	6.4	4.8
Mustang	2.7	4.7	6.0	—
Seine	—	—	6.8	4.8
Stif	3.3	5.3	—	—
Fescue x Ryegrass Hybrids				
Kernal	—	—	4.6 ³	—
Tandem	—	—	4.2 ³	—
Wheatgrasses				
Manska	2.9	4.0	—	4.8
Newhy ²	2.7	3.9	4.8	—
Reliant	3.0	4.2	—	5.0
LSD 5%	0.5	0.6	0.7	NS

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

² Newhy, a quackgrass x wheatgrass hybrid, mean yield reported for 1993 and 1994. Severe winter injury at Rosemount in 1994-1995 resulted in stand loss of Newhy and reduced overall varietal yield by 25%.

³ Deer predation on third harvest reduced yields.

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

TIMOTHY

Tall Fescue, continued

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

The wheatgrasses are valuable, native forage species. They are especially suitable for growing in the northern Great Plains area of the United States. Wheatgrasses can produce excellent forage yields and sustain 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 western areas of Minnesota.

Minnesota Agricultural Experiment Station scientists initiated performance trials of tall fescue and the wheatgrasses in 1992 and 1997. The trials were harvested three times per year. Nitrogen was applied in the early spring and after each harvest at a rate of 50 pounds per acre.

Yields were high in 1993, 1994 and 1998 due to good snow cover and favorable conditions during the growing season. Severe winter injury in 1995 reduced forage yields significantly at Rosemount. The wheatgrasses and fescue x ryegrass hybrids did yield less forage than the tall fescue varieties. The wheatgrasses have better relative yields in drier climates.

Tall Fescue Planting Rate and Date

Bushel Weight, Pounds.....	25
Seeds/Pound.....	299,000
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 Summer
With Legumes.....	Use Date for Legume

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 ones 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 experiment station timothy trials were established in pure stands in 1992 at Rosemount and Morris and again at Grand Rapids in 1993. Nitrogen was applied at all lo-

cations in the early spring and after each harvest 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.

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

Dry matter yields, in tons dry matter per acre, of timothy seeded at 3 locations.

Variety	Grand Rapids 1994-1996	Rosemount 1993-1995	Morris 1993-1996	Mean
Early-Intermediate maturity				
Climax	3.6	3.8	4.0	3.8
Comtal	3.4	3.7	—	3.6
Goliath	3.4	3.4	—	3.4
Timfor	3.5	3.8	—	3.7
Toro	3.7	3.9	—	3.8
Late maturity				
Heidemij	3.5	3.0	3.5	3.3
Hokusen	3.3	3.4	3.6	3.4
LSD 5%	0.4	0.4	NS	

FORAGE SEED SOURCES, Key number refers to Seed Source Column in table 4, beginning on page 17.

- | | | |
|--|---|---|
| *1 ABT/La Crosse Seed Co.,
PO Box 187, LaCrosse WI 54601
800-658-9428 | 12 Barenbrug USA
P.O. Box 239 Tangent OR 97389
800-547-4101 | *26 Garst Seed Co.
2369 330th St Slater IA 50244
800-831-6630 |
| *2 Agassiz Seed & Supply
445 7th St. NW, West Fargo ND 58078
701-282-8118 | 13 Bio Plant Research
P.O. Box 320 Camp Point IL 62320
800-593-7708 | *27 Geertson Seed Farm
1665 Burrough Rd Adrian OR 97901
541-339-3768 |
| 3 AgriBioTech, Inc.
120 Corporate Park Dr. Henderson NV 89012
702-566-2440 | 14 Brown Seed Farms
720 Croix St. Prescott WI 54021
715-262-4331 | 28 Golden Harvest
27420 137th Ave. North Cordova IL 61242
309-654-2234 |
| 4 AgriPro Seeds, Inc.
824 2nd St. South Brookings SD 57006
800-658-5526 | 15 Brunner Seed
W3850 U.S. Hwy 10 Durand WI 54736
715-672-5887 | 28 Golden Harvest
251 West main St. Wabasha MN 55981
612-565-2945 |
| 4 AgriPro Seeds, Inc.
PO Box 2962, Shawnee Mission KS 66201
913-384-4940 | 16 Cargill Hybrid Seeds
PO Box 5645 MS16 Minneapolis MN 55440
612-742-6743 | 29 Golden Harvest
PO Box A, 100 J.C. Robinson Blvd
Waterloo NE 68069
402-779-2531 |
| 5 AgServices
1395 Roberts Road, Hutchinson MN 55350
320-587-8972 | *17 Croplan Genetics
PO Box 64089, Cenex/Land O' Lakes
St. Paul MN 55164
612-451-5490 | 30 Golden Harvest
220 N. Eldorado Rd, Ste E
Bloomington IL 61704
800-610-7333 |
| 6 AgVenture Central
513 Main St, Madison Lake MN 56063
507-243-3263 | 18 Crow's Hybrids
PO Box 306 Hwy 1 N. Milford IL 60953
815-889-4151 | 31 Great Lakes Hybrids
RR. 6 Box 6600 Mankato MN 56001
507-625-1103 |
| 6 AgVenture East
Rte 2, Box 58, Kasson MN 55944
800-657-4890 | 19 Dahlco Seeds
14730 15th St Cokato Mn 55321
320-286-5982 | *32 International Seeds Inc.
P.O. Box 168 Halsey OR 97348
541-369-2251 |
| 6 AgVenture, Inc
207 N 7th Kentland IN 47951
219-474-5557 | 20 Dairyland Seed Co.
PO Box 958 West Bend WI 53095
800-236-0163 | 33 Interstate Payco Seed Co.
Box 338 West Fargo ND 58078
701-282-7338 |
| *7 Albert Lea Seed House
1414 West Main, P.O Box 127
Albert Lea MN 56007
507-373-3161, 800-352-5247 | 21 DeKalb Genetics Corp.
7665 Commerce Way, Suite 101
Eden Prairie MN 55344
612-934-0134 | 34 J.C. Robinson Seed Co
PO Box A Waterloo NE 68069
800-228-9906 |
| 8 Allied Seed Cooperative
PO Box 945 Angola IN 46703
800-813-5025 | 21 DeKalb Genetics Corp.
3100 Sycamore Rd. Dekalb IL 60115
815-758-9323 | 35 Jung Seed Genetics
1229 NW 41st St Rochester MN 55901
507-288-1930 |
| 9 America's Alfalfa
PO Box 2962 Shawnee Mission KS 66201
913-384-4940 | *22 Discount Farm Center
PO Box 84, West Hwy 212 Watertown SD 57201
605-886-5888 | 35 Jung Seed Genetics
335 South High St. Randolph WI 53956
800-242-1855 |
| 10 Andrews Seed Co.
580 S. Oregon Ontario OR 9791
541-889-9109 | 23 Elk Mound Seed
PO Box 187, 308 Railroad Ave
Elk Mound WI 54739
715-879-5556 | 36 Kaltenberg Seed Farms
20155 Biscayne Ave. West
Farmington MN 55024
612-463-8997 |
| 11 Asgrow Seed Company
2605 East Killigore Rd. Kalamazoo MI 4900
616-384-5500 | 24 Fontanelle Hybrids
10981 8th St Fontanelle NE 68044
402-721-1410 | 36 Kaltenberg Seed Farms
PO Box 278 Waunakee WI 53597
800-383-3276 |
| 12 Barenbrug Midwest
1506 W. 3rd. St. Vinton IA 52349
888-470-5569, 319-472-5569 | 25 Fred Gutwein & Sons
25691 West 6005 Francesville IN 47946
219-567-9141 | 37 KayStar Seeds
PO Box 947 Huron SD 57350
605-352-8791 |

- 38 Kussmaul Seeds
9020 Hwy 18 Mt. Hope WI 53816
608-988-4568
- 39 Legend Seeds
PO Box 241 Desmet SD 57231
605-854-3346
- 40 Lemke Seeds
10220 N. Granville Rd. Mequon WI 53092
414-242-2647
- 41 LG Seeds
PO Box 216, 925 Dexter Prescott WI 54021
800-637-2887
- 42 Mallard Seed
PO Box 637 Plainview MN 55964
507-534-2300
- 43 MBS Inc.
225 West 1st St. Story City IA 52101
515-733-5274
- 44 Midwest Seed Genetics
PO Box 518, 23751 Hwy 30 E. Carroll IA 51401
800-369-8218
- 45 Midwest Valley Chemical
PO Box 80 Wall Lake IA 51466
712-664-2444
- 46 Mycogen Seeds
1340 Corporate Center Curve, Box 21428
Eagan MN 55121-1233
612-405-5973
- 47 NC+ Hybrids
RR 2, Box 52 Sanborn MN 56023
507-648-3378
- 47 NC+ Hybrids
Box 4408 Lincoln NE 68504
402-467-2517
- 48 North-Gro Seeds
613 N. Randolph St. Cuba City WI 53807
608-744-7333
- 49 Novartis Seeds
PO Box 959 Minneapolis MN 55440
612-593-7395
- *50 Olds Seed Co.
Box 7790 Madison WI 53707
800-356-7333, 608-249-9291
- 51 Ostlund Chemical Co.
PO Box 5015 Fargo ND 58105
701-282-7300
- 52 Patriot Seed, Inc.
PO Box 97, 208 South Warrell
Bowen IL 62316
800-643-1518
- *53 Peterson Seed Co.
Box 346 Savage MN 55378
800-328-5898
- 54 Pioneer Hi-Bred International, Inc
130 Willmar Ave. SE Willmar MN 56201
612-235-7420
- *55 Premium Seed Co., Inc.
7800 E. State Hwy 101 Shakopee MN 55379
612-496-1783
- 56 Producers Hybrids, Inc.
Box C Battle Creek NE 68715
402-675-2975, 888-675-3190
- *57 R.J. Hunt Seed Co.
13477 Co Rd 101 Wadena MN 56482
218-631-4190
- 58 Ramy International
1329 River Front Dr Mankato MN 56001
800-658-7269
- 59 Renk Seed Company
6800 Wilburn Rd. Sun Prairie WI 53590
608-837-7351
- 60 Shepherd Seeds
RR 1 535 Middle Rd South Beloit IL 61080
800-383-2676
- 61 Spangler Seeds
803 W. Racine St. Jefferson WI 53549
414-674-4606
- 62 Specialty Seeds
26787 Hillhaven Drive Cold Spring MN 56320
800-685-4521
- *63 Top Farm Hybrids
17177 60th St SW Cokato MN 55321
320-286-5516
- *64 Trelay, Inc.
11623 Hwy 80 N Livingston WI 53554
800-421-0397, 608-943-6363
- 65 Tri-State Seed
Rte 1 Box 354 Sleepy Eye MN 56085
800-203-8581, 507-794-3078
- *66 Twin Cities Seeds
7265 Washington Ave South Edina MN 55439
800-545-8873
- 67 United Ag Products/MN IA Seed Division
PO Box 55 Kasota MN 56050
800-722-2274
- 68 W-L Alfalfas
349 North Duck Lake Ave
Madison lake MN 56063
507-243-3660
- 68 W-L Research, Inc.
8701 W U.S. Hwy 14 Evansville Wi 53536
608-882-4100
- 69 Wensman Seed Co.
PO Box 190 Wadena MN 56482
218-631-2954
- *70 Werner Farm Seeds
3104 Millersburg Blvd. Dundas MN 55019
507-645-7995
- 71 Ziller Seed Co., Inc.
RR 1, Box 122 Bird Island MN 55310
320-365-3674

* These sources are useful contacts for several other for-
ages species, such as red clover, birdsfoot trefoil, kura
clover, smooth brome, orchardgrass, timothy, and tall
fescue.

The College of Agricultural, Food and Environmental Sciences

A Reputation for Excellence, A Tradition of Service

The bill drafted for the Minnesota legislature to establish an agricultural college at Glencoe, Minn., became law March 10, 1858. It specified two terms, April-October and December-February, and free tuition, but with students doing three to four hours of manual labor on the farm each day.

A contract to construct a college building in Glencoe was scheduled for signing in February 1861, but Governor Ramsey was then in Washington, D.C., meeting with President Lincoln to offer the first Minnesota Infantry Regiment for the defense of the Union. Plans for the college at Glencoe lay dormant during the Civil War.

In 1866, after several disputes over the use of land granted to Minnesota through terms of the Morrill Land Grant Act, Glencoe was determined to be too remote for an agricultural college. The Reorganization Act of Feb. 18, 1868, directed the regents of the University of Minnesota to secure suitable land near the University's Minneapolis campus for an agricultural college and experimental farm.

Regent John Pillsbury, sold a piece of land he owned east of the campus to the University for his cost. The land was sandy and swampy, of little use for agriculture. In 1873 William Watts Folwell, the University's first president, said, "So far as I am aware, not a single young man has come to the University to learn the science of farming." Historian James Gray wrote, "On that arid soil of the University farm, nothing was sown but dissension and nothing reaped but problems."

In 1882 a new 155-acre farm was purchased four miles east of the Minneapolis campus. The old farm, which cost \$8,500, was sold for \$150,000. The proceeds were used to buy the new farm for \$59,000 and to pay for a farm house, a main barn, an experiment station building and the home building for the School of Agriculture.

Over the years the School of Agriculture became the College of Agricultural, Food and Environmental Science. It is consistently ranked among the top colleges of agriculture in the United States and its faculty has become world-renowned for its contributions to the science of agriculture. Notable among them are the contributions of new and improved crop varieties and in combating plant disease.

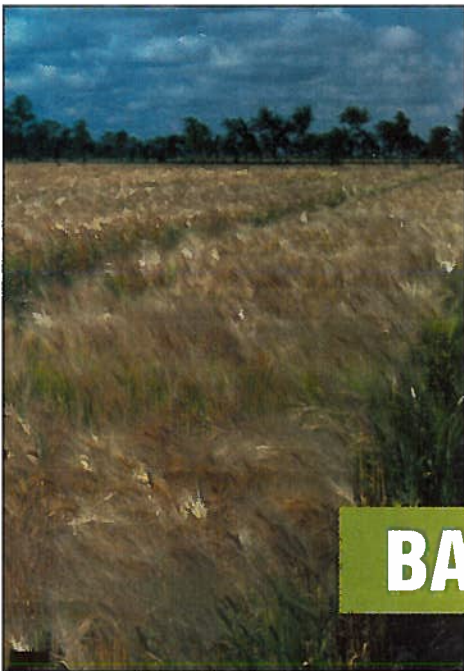
The student body of the College of Agricultural, Food and Environmental Sciences has a near-equal split of women and men. Their majors represent a broad spectrum of programs in the applied sciences of soil, plant, animal, food and environment, education, communications, business and the social sciences. The College shares the 700-acre St. Paul Campus with the colleges of Human Ecology, Natural Resources, Biological Sciences and Veterinary Medicine.

The St. Paul campus also is home to the University of Minnesota Extension Service and the Minnesota Agricultural Experiment Station, which has branch stations at Crookston, Grand Rapids, Lamberton, Morris, Rosemount and Waseca. The Station supports a comprehensive agricultural research program and provides a sizable teaching laboratory for undergraduate and graduate education.

As a part of the University of Minnesota, the College of Agricultural, Food and Environmental Sciences is strongly committed to its Land Grant mission of teaching, research and service to the citizens of Minnesota. Through the work of its faculty and alumni, the College's reputation and influence reach throughout the United States and around the world.



GRAIN CROPS



BARLEY

Fusarium head blight (scab) caused losses in barley again in 1998. The largest loss was due to vomitoxin (DON), but yield and quality were also reduced. Vomitoxin level in harvested grain was down from 1997, but vomitoxin still caused discounting in the marketplace in many areas.

New Variety

MNBrite, a new barley with intermediate resistance to Fusarium head blight, was released by the Minnesota Agricultural Experiment Station in 1998. Seed will be available for commercial production in 1999. See description below and data in tables 3 and 4 on scab severity and toxin (DON) level in MNBrite compared to Robust and Stander.

Recommended Public Varieties

Foster – Medium yield. Maturity similar to Robust. Kernel plumpness good, similar to Robust. Intermediate in lodging reaction between Robust and Stander. Resistant to spot blotch.

Six-rowed, semi-smooth awns, colorless aleurone. Has long rachilla hairs allowing grain to be distinguished from that of Robust and Stander. Classified as a malting variety by American Malting Barley Association (AMBA). Some discounting in the marketplace has occurred as compared to Robust. Developed by N.D. AES from a cross involving Robust, ND 5570, Glenn and Karl. Released in 1995. **PVP**

MNBrite – Provides some protection against Fusarium head blight (scab); has about one-half as many infected kernels per head as Robust and Stander, and its toxin level (DON) is also about one-half of Robust and Stander. The

kernels are brighter and more disease-free than for other varieties, hence the name MNBrite. It is similar to Robust in yield, maturity, and kernel plumpness, as well as lodging reaction, except that the straw is more fragile at maturity. Resistant to spot blotch. Malting and brewing quality evaluation by industry is underway. One concern is that MNBrite is higher in grain protein than Robust. Six-rowed, semi-smooth awns, colorless aleurone. Grain samples difficult to distinguish from Robust and Stander. Developed by Minn. AES; released in 1998. **PVP** (pending)

Robust – Medium yield and medium maturity. Fair lodging resistance and kernel plumpness. Six-rowed, semi-smooth awn, short rachilla hairs, colorless aleurone. Classified as a malting variety by AMBA. Robust is currently the six-rowed variety of choice for malting and brewing in the Midwest. Resistant to spot blotch. Developed by Minn. AES from a cross of Morex and Manker and released in 1983. **PVP**

Stander – High yield. Superior in lodging resistance to Robust and Foster. Good kernel plumpness, similar to Foster. Six-rowed, semi-smooth awn, short rachilla hairs, colorless aleurone. While classified as a malting variety by AMBA, some maltsters and brewers prefer Robust over Stander. Resistant to spot blotch. Developed by Minn. AES from crosses involving Excel, Robust, and Bumper. Released in 1993. **PVP**

Grain yield of selected barley varieties in bushels per acre, 1996-1998.

	Crookston	Morris	Stephen	St. Paul	Roseau	Mean
Number of trials	7	5	2	4	2	20
Variety						
Robust	99	104	102	78	80	94
Stander	117	112	107	91	87	106
Foster	110	108	100	90	79	101
MNBrite	104	106	104	82	83	98
LSD 0.05	5	8	10	8	11	4

SPECIAL PURPOSE VARIETY

Royal – Intended for use as a forage-companion crop and feed-grain variety. Not a malting type. Six-rowed, semi-smooth awn, blue aleurone, semidwarf stature. Forage quality superior 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 by the Minn. AES from crosses involving Robust, Azure and semidwarf Minn. M32. Released in 1994. **PVP**

Other Varieties

Bowman – Medium yield. Medium maturity. Very good kernel plumpness. Medium lodging resistance. Two-rowed, smooth awns, long rachilla hairs, colorless aleurone. Not approved for malting by AMBA. Limited demand for two-rowed non-malting type in Minnesota. Similar to Robust in resistance to leaf diseases. Developed by N.D. AES from cross involving several parents. Released in 1984.

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

Morex – Low yield. Susceptible to lodging. Kernel plumpness intermediate. Six-rowed, semi-smooth awn, short rachilla hairs, colorless aleurone. Awns may drop off as crop approaches maturity. Threshes easily. Classified as a malting variety by AMBA. Moderate resistance to spot blotch. Developed by Minn. AES from a cross of Cree and Bonanza. Released in 1978.

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

Agronomic traits of selected barley varieties, 1996-1998.

	Heading Date	Height, cm	Lodging, %	Plump, %
Number of trials	12	13	6	6
Variety				
Robust	6-22	91	46	80
Foster	6-22	89	47	80
MNBrite	6-23	89	44	78
Stander	6-24	84	38	82

Scab severity, percent infected kernels/spike in selected barley varieties, 1996-1998.

Variety	Inoculated		Non-Inoculated	
	Mindak ¹ 4 locations	A-Screening ² 2 yrs, 3 locations	Crookston, MN 3 trials	Langdon, ND 2 trials
Robust	20	30	10	15
Foster	20	—	—	15
MNBrite	12	14	5	6
Stander	29	37	11	15

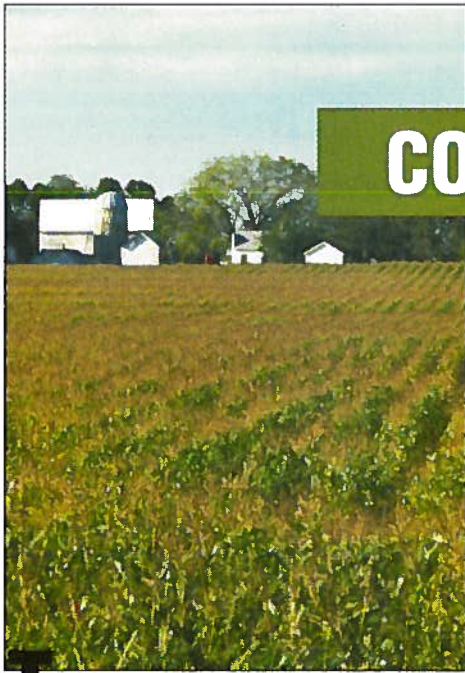
¹ Cooperative tri-state FHB nursery grown at Crookston and St. Paul, MN and Fargo and Langdon, N.D.

² Locations are Crookston, Morris and St. Paul, Minn.

Toxin (DON, ppm) values in selected barley varieties.

Variety	Crookston, 3 trials, 1996		Crookston, 2 trials, 1998	
	Natural		Natural	Inoculated
Robust	3.4		9.1	15.7
MNBrite	2.7		4.1	14.4
Stander	5.6		11.8	18.8





CORN Silage

Testing Sites

Trials were conducted at Rosemount and Waseca. Locations and maturity are categorized as follows:

Southern Zone: Waseca

Early maturity group – hybrids rated 105-day Relative Maturity (RM) and earlier.

Late maturity group – hybrids rated 110 & 115 RM.

Central Zone: Rosemount

Early maturity group – hybrids rated 95 RM and earlier.

Late maturity group – hybrids rated 100 & 105 RM.

Testing Procedure

Design: Plots were established at Waseca and Rosemount in randomized block designs with four replications. Hybrids were planted at a 32,000-seed-per-acre seeding rate with 30-inch row spacing. Standard check hybrids were included to represent the RM groups at each location.

Harvesting: Plots were harvested and herbage sampled for yield and forage quality determination for each RM group. The target maturity was whole-plant moisture content of 60 to 65 percent. Harvest at Waseca was on August 31 and at Rosemount on September 4 for both RM groups. After grain maturation, two rows adjacent to those sampled for silage were harvested for grain and yields adjusted to 15.5 percent moisture.

Using The Tables

Whole-plant dry matter yields, silage yields, moisture content, grain yields taken after physiological maturity, and crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), and in vitro digestive dry matter (IVDDM) concentrations are given for entries in each RM group. Means and least significant difference (LSD) statistical figures are given for each RM group. Hybrids are ranked by average moisture content and differ in dry matter, silage and grain yields. ADF and NDF are negative indicators of forage di-

The Minnesota Hybrid Corn Silage Evaluation Program was initiated 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.

Table 1. Moisture, yield and quality traits for Early relative maturity corn hybrids at Waseca.

Brand	Hybrid	Yield ¹				Concentration, Percent ²			
		Moisture, Percent	Grain, bu/a	DM, ton/a	Silage, ton/a	CP	ADF	NDF	IVDDM
Golden Harvest	H-2382	55.8	185	10.1	22.8	8.4	20	36	69
Dairyland	Stealth 1203	58.9	176	10.1	24.9	7.8	22	38	68
Cargill	3677 ³	60.2	168	10.7	27.0	7.8	24	41	67
Dairyland	Stealth 1407	61.4	180	11.8	30.5	7.4	22	39	68
Top Farm	TFsx 2103	62.7	196	10.9	29.3	7.5	25	43	66
DeKalb	DK551	63.4	217	12.4	33.8	7.7	24	42	67
DeKalb	DK527	64.0	177	9.3	25.7	7.8	23	40	67
Terra	TR1066	64.4	203	11.5	32.2	8.1	25	44	66
Early RM Averages:		61.3	188	10.8	28.3	7.8	23	40	67
LSD (0.05)			19	1.3	3.2	NS	2	3	2

¹ DM yield is whole-plant yield at 100% dry matter. Silage yield is whole-plant yield at harvest moisture. Grain harvested Oct. 12, 1998, and adjusted to 15.5% moisture.

² See "Using the Tables" text for description of concentration items. ³ Standard check entry.

Table 2. Moisture, yield and quality traits for Late relative maturity corn hybrids at Waseca.

Brand	Hybrid	Yield ¹				Concentration, Percent ²			
		Moisture, Percent	Grain, bu/a	DM, ton/a	Silage, ton/a	CP	ADF	NDF	IVDDM
Pioneer	35R57 ³	61.8	196	11.0	28.9	7.9	23	39	69
Top Farm	TFsx 2111	62.7	208	10.1	27.1	7.4	24	41	67
Dairyland	Stealth 1508	63.6	189	11.6	31.9	7.4	24	42	66
DeKalb	DK580	64.2	194	10.8	30.3	8.0	24	42	67
DeKalb	DK618	64.6	216	10.6	30.0	7.7	24	40	68
Wilson	1390	64.8	195	11.2	31.8	7.7	26	44	65
DeKalb	DK586	64.9	189	10.9	30.9	7.6	24	42	67
Terra	TR1106	66.6	202	11.6	34.8	7.7	25	42	67
Garst	24X	67.4	232	11.6	35.4	8.4	25	43	67
Terra	TR1136	67.6	220	11.9	36.6	7.6	26	44	67
Mallard	K-88-G	68.2	177	10.9	34.5	7.8	27	45	65
Late RM Averages		65.1	202	11.1	32.0	7.8	25	42	67
LSD (0.05)			27	NS	3.4	NS	2	2	2

¹ DM yield is whole-plant yield at 100% dry matter. Silage yield is whole-plant yield at harvest moisture. Grain harvested October 12, 1998, and adjusted to 15.5% moisture. ² See "Using the Tables" text for description of concentration items. ³ Standard check entry.

Table 3. Moisture, yield and quality traits for Early relative maturity corn hybrids at Rosemount.

Brand	Hybrid	Yield ¹				Concentration, Percent ²			
		Moisture, Percent	Grain, bu/a	DM, ton/a	Silage, ton/a	CP	ADF	NDF	IVDDM
Dairyland	Stealth 1297	62.2	198	10.3	27.3	7.7	21	35	69
DeKalb	DK440	62.8	186	11.2	30.1	7.6	22	38	67
Kruger	K9898 ³	64.3	218	11.3	31.6	8.2	21	37	69
Terra	TR966	64.9	200	9.6	27.2	8.1	22	39	68
Terra	E968	66.3	201	9.7	28.9	7.9	22	37	69
Early RM Averages:		64.1	201	10.4	29.0	7.9	22	37	68
LSD (0.05)			NS	1.2	2.7	NS	NS	NS	NS

¹ DM yield is whole-plant yield at 100% dry matter. Silage yield is whole-plant yield at harvest moisture. Grain harvested November 2, 1998, and adjusted to 15.5% moisture. ² See "Using the Tables" text for description of concentration items. ³ Standard check entry.

gestibility and intake respectively. Lower ADF and NDF numbers are related to better animal performance. IVDDM is a laboratory test to estimate digestibility in ruminant livestock. Tables 1 and 2 summarize performance results at Waseca for early and late RM groups respectively. Tables 3 and 4 summarize performance results for early and late RM groups at Rosemount.

PARTICIPATING COMPANIES

These companies participated in the 1998 hybrid corn silage trials.

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

DeKalb Genetics Corporation,
3100 Sycamore Rd.
DeKalb, IL 60115

Garst Seed Company
2369 330th Street, P.O. Box 500
Slater, IA 50244

J. C. Robinson Seed Company
100 J.C. Robinson Boulevard
P.O. Box A
Waterloo, NE 68069

Mallard Seed Co., Inc.
P.O. Box 637
Plainview, MN 55964

Terra International, Inc.
600 Fourth St., P.O. Box 6000
Sioux City, IA 51102

Top Farm Hybrids
P.O. Box 850
Cokato, MN 55321

Wilson Seeds, Inc.
East Highway 44, P.O. Box 391
Harlan, IA 51537

Table 4. Moisture, yield and quality traits for Late relative maturity corn hybrids at Rosemount.

Brand	Hybrid	Yield ¹				Concentration, Percent ²			
		Moisture, Percent	Grain, bu/a	DM, ton/a	Silage, ton/a	CP	ADF	NDF	IVDDM
Golden Harvest	H-2315	60.4	189	9.6	24.1	8.7	21	37	70
Garst	8780HPH	61.3	200	10.9	28.2	7.8	22	39	71
Dairyland	Stealth 1203	61.5	213	11.7	30.3	8.3	21	38	71
Cargill	3677 ³	62.1	225	10.8	28.4	8.4	22	38	71
Garst	8707	62.3	225	12.0	31.8	8.0	24	42	68
Dairyland	DST 10208	62.6	203	11.6	31.1	8.6	22	40	70
Top Farm	TF 3199	63.0	193	10.8	29.4	8.5	23	41	69
Top Farm	TFsx 2100	63.6	197	10.9	30.1	8.5	23	41	69
Dairyland	DST 10212	64.2	229	11.0	30.9	9.0	22	40	70
DeKalb	DK493BtX	64.3	234	11.2	31.4	8.3	22	39	70
Dairyland	Stealth 1500	64.4	214	11.2	31.4	8.5	22	40	69
Top Farm	TFsx 2103	65.6	222	11.1	32.2	8.3	23	41	69
Garst	8640	67.1	215	11.1	33.7	8.4	24	42	69
Late RM Averages:		63.2	212	11.1	30.2	8.4	22	40	70
LSD (0.05)			21	1.1	2.2	NS	2	3	NS

¹ DM yield is whole-plant yield at 100% dry matter. Silage yield is whole-plant yield at harvest moisture. Grain harvested Nov. 2, 1998, and adjusted to 15.5% moisture.

² See "Using the Tables" text for description of concentration items. ³ Standard check entry.

Forage, grass, oilseed and small-grain organizations

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

American Oat Association
415 Shelard Parkway
Suite #101
Minneapolis, MN 55426
Phone: 612-542-9817
Fax: 612-397-7451

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@redlakefalls.polaristel.net
Web Address: <http://www.smallgrains.org>

Minnesota Approved Seed Conditioners and Marketing Association
P.O. Box 303
Argyle, MN 56713
Phone: 218-437-6638
Fax: 218-437-6392

Minnesota Barley Growers Association and Minnesota Barley Research and Promotion Council
2600 Wheat Drive
Red Lake Falls, MN 56570
Phone: 218-253-4311
Fax: 218-253-4320
E-mail: mnbarley@redlakefalls.polaristel.net

Minnesota Canola Council
1306 West County Road F, #109
St. Paul, MN 55112
Phone: 651-638-9883
Fax: 651-638-0756

Minnesota Corn Growers Association and Minnesota Corn Research and Promotion Council
14198 Commerce Avenue Northeast
Suite 600
Prior Lake, MN 55372
Phone: 612-447-2676
Fax: 612-447-2072
Web address: <http://www.mncorn.org>

Minnesota Crop Improvement Association
1900 Hendon Avenue
St. Paul, MN 55108
Phone: 612-625-7766
Fax: 612-625-3748
E-mail: beilx001@gold.tc.umn.edu
Web Address: <http://www.mncia.org>

Minnesota Forage and Grassland Council
411 Borlaug Hall
1991 Buford Circle
St. Paul, MN 55108
Phone: 651-436-3930
Fax: 651-436-7210
E-mail: mfgc@coafes.umn.edu

Minnesota Seed Producers and Promotion Association
14826 Madison Street NE
Ham Lake, MN 55304
Phone: 612-434-9594
Fax: 612-494-9451
Web address: mpseed.com

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: <http://www.mnsoybean.org>

Northern Minnesota Bluegrass Growers Association
Route 2, Box 37
Roseau, MN 56751
Phone 218-463-2119

Grain

Test Locations

Trial locations and maturities are as follows:

Southern Zone: Lamberton, Waseca and Lewiston

Early Maturity Trial - 107 Relative Maturity (RM) and earlier

Late Maturity Trial - 108 and later RM

Central Zone: Morris and Rosemount

Early Maturity Trial - 97 RM and earlier

Late Maturity Trial - 98 through 107 RM

Northern Zone: Staples and Rothsay

All entries 97 RM and earlier

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, consequently, there may be more than six hybrids for a company in a test.

Presentation of Data

Yields are given for individual locations; yields and harvest moisture contents are averaged across locations. Hybrids are ranked within a maturity group by moisture content.

Least Significant Difference

LSD values of 20% probability are given in the tables. When two hybrids differ in yield equal to or greater than the LSD with a 20% probability, the conclusion is that there is an 80% chance that the yield difference is real.

How to Use the Results

The best indication of performance next year comes from the performance shown in the multiple location yield column. Yields from individual locations are given, but more emphasis should be given to the multiple location yield data. Ranking of hybrids on the basis of yield from high to low may change from location to location. However, high-yielding hybrids at one location usually are high-yielding hybrids at another location and the multiple-location average is the best predictor of yield performance next year.

Names and addresses of companies participating in the 1998 trials

Agripro Seeds Inc., Box 250, Brookings, SD 57006

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

Anderson Seeds, Rt. 3, Box 94, St. Peter, MN 56082

Asgrow Seed Co., 2605 E. Kilgore Rd., Kalamazoo, MI 49001

Brown Seed Farms Inc., N1279 530th St., Bay City, WI 54723

Brunner Seed Farm, Rt. 1, Box 34, Durand, WI 54736

Cargill Hybrid Seeds, Box 5645, Minneapolis, MN 55440

Crows Hybrid Corn Co., Box 306, Milford, IL 60953

Dahlman Seed Co., 73504-200th St., Dassel, MN 55325

Dairyland Seed Co., Inc. (Stealth, DST) Box 958, West Bend, WI 53095

DeKalb Genetics Corporation, 3100 Sycamore Rd., DeKalb, IL 60115

Epley Bros. Hybrids, Inc., 22494 Yale Ave., Shell Rock, IA 50670

Fontanelle Hybrids, Rt. 1, Box 18, Nickerson, NE 68044

Garst Seed Co., 3469 330th St., Box 500, Slater, IA

Great Lakes Hybrids, 9915 W, M-21 Ovid, MI 48866

Hyland Seeds, Blenheim, Ontario, Canada NOP 1A0

J.C. Robinson Seed Co. (Golden Harvest) 100 Robinson Blvd. Waterloo, NE 69069

Jung Farms Inc., 335 High St., Randolph, WI 53957

Kaltenberg Seed Farms, Inc., 5506 Hwy 19, Waunakee, WI 53597

Kruger Seed Co., Box A, Hwy 20 East, Dike, IA 50624

KSC/Challenger Seed Co., Box A, Dike, IA 50624

L.G. Seeds Inc., 4001 N. War Memorial Dr., Peoria, IL 61614

Mallard Seed Co. Inc., 311 West Broadway, Plainview MN 55964

Mycogen Plant Sciences, 720 St. Croix St., Prescott, WI 54021

NC+, PO Box 4408, Lincoln, NE 68504

North Star Genetics, Box 40 Wanamingo, MN 55983

Novartis Seeds (NK Brand), P.O. Box 959, Minneapolis, MN 5540-0959

Payco, PO Box 338, West Fargo, ND 58078+A9

Pfister Hybrid Corn Co., P.O. Box 187, El Paso, IL 61738

Pioneer Hi-Bred Int'l., Inc., 130 SE Willmar Ave, Willmar, MN 56201

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

Renze Hybrids, Inc., RR 3, Box 235, Carroll, IA 51401

Sand Seed Service, PO Box 648, 4765 Hwy 143, Marcus, IA 51035

Terra Industries Inc., 600 4th St., PO Box 6000, Sioux City, IA 51102

Top Farm Hybrids, Box 850, Cokato, MN 55321

Trelay, Inc., RR 1, Livingston, WI 53554

Wensman Seed Co., PO Box 190, Wadena, MN 56482

Wilson Seeds, Inc., PO Box 391, Harlan, IA 51537

Corn Planting Rate and Date

Bushel Weight, Pounds.....56

Seeds/Pound.....1,400

Planting Rate, Pounds/Acre17

Planting Rate, Seeds/Acre24,000

Planting Date.....Late April/Early May

Individual Trial Information, 1998

Location	Cooperators	Previous Crop	Planting Date	Harvest Dates	Tillage	Soil Tests			Fertilizer Amount ¹ and Time Applied	
						pH	P	K		
Lamberton	Steve Quiring Paul Porter	Soybean	April 24	Oct 1	Spring Field cult.	6.1	22	172	135+0+0	Fall
Waseca	Tom Hoverstad	Soybean	April 22	Oct 20-21	Chisel	6.9	23	171	160+0+0	Spring
Plainview	Bruce Ihrke	Soybean	April 24	Oct 22-23	Chisel	6.8	66	154	140+0+0	Spring
Morris	George Nelson	Wheat	April 29	Oct 13-14	Chisel	8.2	16	200	124+46+60	Fall
Rosemount	Jerry Holz	Soybean	April 30	Oct 30	Chisel		N/A ²		125+0+0	Spring
Staples	Mel Wiens	Corn	May 7	Oct 12	Plow		N/A		200+10+72	Spring
Rothsay	Troy Larson	Wheat	May 6	Oct 15	Chisel		N/A		100+90+90	Fall

¹ Pounds of N, P and K, respectively. ² Not available.

Early Maturity Hybrids, Southern Locations, 1998

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Yield, Bu/A	Moisture %
97 and earlier RM hybrids							
Renze	6038	95	170	165	191	175	15.1
DeKalb	DK440	95	174	174	203	183	15.9
Wensman	MAX 007	93	190	157	189	179	16.1
DeKalb	DK449	95	191	202	195	196	16.4
Renk	RK552	95	171	190	164	175	16.5
Anderson	7525	95	189	171	185	182	16.5
KSC/Challenger	K-9896	95	209	184	199	197	16.5
Wensman	W 4146	95	154	153	198	168	16.5
LG Seeds	LG2442	95	167	170	201	180	17.0
Wensman	MAX 127	96	207	189	196	197	17.1
97 and earlier RM averages:			182	176	192	183	16.4
98 to 102 RM hybrids							
Dahlman	1699	100	185	196	215	198	16.2
DeKalb	DK477	100	162	186	211	186	16.2
Anderson	6076	98	175	183	205	188	16.4
Sands	SO19008	100	199	150	171	174	16.4
Renze	6078	100	188	183	199	190	16.5
NC+	1728	100	155	158	178	164	16.5
Viking	6870	99	175	158	193	175	16.5
Fontanelle	3997	100	182	178	211	190	16.5
Viking	6801	99	187	172	199	186	16.6
Sands	SO19998	100	166	197	203	189	16.6
DeKalb	DK493BI	100	208	183	203	198	16.6
Renze	X8099	100	157	164	185	169	16.6
Top Farm	TFSX2201	100	165	182	185	178	16.7
Mycogen	2500	100	177	146	169	164	16.7
Garst	8766	100	181	170	194	182	16.7
Garst	8707	100	176	190	226	197	16.7
Great Lakes	4526	100	166	170	198	178	16.7
Pioneer	37R71	99	184	177	184	182	16.8
Kruger	K-9902	100	192	189	211	197	16.8
Renk	RK599	100	173	143	193	170	16.8

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Yield, Bu/A	Moisture %
Cargill	3677	100	197	188	196	194	17.1
Trelay	5004	98	184	215	213	204	17.2
Kruger	K-9802	100	181	161	202	181	17.2
Sands	SOI9027	100	187	158	201	182	17.2
Top Farm	TFSX2100	100	192	168	173	178	17.3
DeKalb	DK525	100	207	189	228	208	17.3
Stealth	1401	100	165	144	219	176	17.3
Mycogen	2545	101	185	188	190	188	17.3
NC+	2395	100	176	181	191	182	17.4
LG Seeds	LG2483	100	188	190	183	187	17.4
Sands	SOI9991	100	179	152	181	171	17.5
Kruger	EX 801	100	187	165	203	185	17.6
Trelay	5003	98	179	149	182	170	17.6
Pioneer	36F30	99	200	188	216	202	17.7
Cargill	4111	100	204	217	233	218	17.7
Stealth	1402	100	173	168	184	175	17.7
Pioneer	36H36	100	207	200	210	206	17.8
Kruger	K-9803	100	202	128	182	170	17.9
Renk	RK681	102	161	159	175	165	17.9
Renk	RK611	101	177	179	190	182	17.9
Wensman	W 4237	100	199	161	184	181	18.1
Pioneer	36Y95	102	214	180	226	207	18.1
Wensman	MAX 88	100	194	176	205	192	18.3
Crows	200	102	190	176	238	202	18.3
Renze	8158 BT	100	204	187	226	206	19.6
LG Seeds	LG2499	100	179	183	208	190	19.8
98 to 102 RM averages:			184	174	199	186	17.3
103 to 105 RM hybrids							
Dahlman	1720	105	175	158	185	173	16.0
Wilson	1098	105	178	172	197	182	16.0
Viking	5955	103	199	173	193	188	16.7
Renze	6167	105	188	139	208	178	16.9
Golden Harvest	H-2390	105	191	176	173	180	17.0
Golden Harvest	H-2382	105	189	173	189	184	17.1
Renk	RK691	105	171	178	187	179	17.2
DeKalb	DK512BiY	105	189	188	208	195	17.2
North Star	7103	103	197	161	179	179	17.3
Dahlman	1702	105	184	162	182	176	17.4
DST	10408	104	154	197	198	183	17.4
Fontanelle	4286	105	172	158	192	174	17.5
Great Lakes	4848	105	180	163	225	190	17.6
Mycogen	2593	103	195	196	200	197	17.7
KSC/Challenger	EX806	105	169	193	161	174	17.8
Golden Harvest	H-2377	105	196	185	212	197	17.8
Asgrow	RX490	105	199	184	186	190	17.9
Renze	6208IP	105	202	188	208	199	18.0
Kruger	K-9807	105	175	192	215	194	18.1

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Yield, Bu/A	Moisture %
Epley Brothers	EX 1500	105	188	182	207	192	18.1
Pioneer	35R57	104	198	193	223	205	18.2
KSC/Challenger	K-9806B	105	215	189	236	213	18.2
DeKalb	DK540	105	187	163	202	184	18.3
Fontanelle	4567	105	151	162	207	173	18.3
KSC/Challenger	K-9706	105	140	150	221	170	18.3
Top Farm	TFSX2103	105	198	201	205	201	18.4
Garst	8686	105	199	180	223	201	18.4
Kaltenberg	K5109	105	179	178	216	191	18.4
Garst	8640	105	158	181	226	188	18.4
Great Lakes	4758	105	163	162	177	167	18.5
DeKalb	DK545BtY	105	197	157	215	190	18.5
Sands	SOI9067	105	181	187	203	190	18.5
Asgrow	RX530	105	176	175	213	188	18.6
Top Farm	TFSX2202	105	214	177	205	199	18.6
Asgrow	RX505Bt	105	203	149	249	200	18.8
KSC/Challenger	EX805	105	163	172	215	183	18.9
Mycogen	2620	105	209	199	218	209	18.9
DeKalb	DK551	105	207	165	235	202	19.0
Terra	TR1047	104	176	197	245	206	19.0
Stealth	1108	105	192	179	168	180	19.1
Stealth	1505	105	167	185	237	196	19.2
Top Farm	TFSX2104	105	184	198	206	196	19.3
Trelay	7002	105	195	191	206	197	19.3
Wensman	W 4297	103	198	215	207	207	19.4
Stealth	1406	105	178	203	199	193	19.4
Trelay	6005	103	181	184	211	192	19.6
Brunner	S-5474	105	163	173	211	183	19.6
Renze	8248 BT	105	214	201	204	206	20.7
Kruger	EX 807	105	200	186	214	200	21.0
103 to 105 RM averages			185	179	206	190	18.3
Trial averages:			184	177	202	188	17.6

Late Maturity Hybrids, Southern Locations, 1998

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at			Average Across Locations	
			Lamberton	Plainview	Waseca	Yield, Bu/A	Moisture %
Later than 105 RM hybrids							
Mycogen	2598	106	196	204	233	211	17.8
Asgrow	RX587	109	195	131	191	173	17.9
Cargill	5611	110	184	176	228	196	18.2
Golden Harvest	H-2478	110	182	189	220	197	18.3
Terra	TR1077IT	107	197	170	241	203	18.4
Jung	2656	106	180	161	239	193	18.5
Anderson	4028	106	200	162	227	196	18.5
Anderson	4000A	106	176	200	199	191	18.9
Asgrow	RX601	110	199	175	239	205	18.9
Pioneer	34G81	107	218	210	258	229	18.9
Renk	RK775	108	146	202	230	193	18.9
Terra	TR1066	106	124	168	233	175	19.0
Epley Brothers	EX 3242	110	134	158	225	172	19.3
Jung	2668	108	165	187	223	192	19.6
Kaltenberg	K6106	110	188	182	207	192	20.2
Cargill	6303	110	193	214	231	212	20.2
Kaltenberg	K6801	110	198	175	250	208	20.4
Cargill	5021BT	110	199	194	210	201	20.4
Terra	E1089IT	108	165	184	241	196	20.5
Jung	2706	111	204	146	249	199	20.6
Terra	TR1087	108	202	172	245	206	20.7
Terra	TR1107IT	107	196	147	209	184	21.2
Kaltenberg	K7101	115	189	188	228	202	21.7
AgriPro	AP9565	115	212	206	242	220	21.7
Later than 105 RM averages:			185	179	229	198	19.5
LSD(0.20)			14	19	18	10	0.3

Early Maturity Hybrids, Central Locations, 1998

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Yield, Bu/A	Moisture %
92 and earlier RM hybrids						
DeKalb	DK405	90	157	204	181	16.1
Stealth	1289	90	198	198	198	16.2
Cargill	2610	90	174	181	178	16.7
Asgrow	RX355	90	183	175	179	16.9
Epley Brothers	EX 1122	92	186	186	186	17.1
Kaltenberg	K3904	90	197	226	212	17.3
Wensman	MAX80	91	176	208	192	17.7
Cargill	2777	90	197	213	205	17.7
Wensman	MAX78	90	179	212	195	17.8
Asgrow	RX352	90	147	175	161	17.9
Stealth	1292	90	161	180	171	18.5
Pioneer	38B22	92	160	169	165	18.8
Wensman	W 5108 Bt	90	198	204	201	19.0
Pioneer	38W36	83	194	192	193	19.2
Dahlman	1490	90	219	217	218	19.9
92 and earlier RM averages:			182	196	189	17.8
93 to 97 RM hybrids						
DeKalb	DK431	95	185	217	201	16.5
North Star	7195	95	189	214	201	16.8
Dahlman	1599	95	189	206	198	17.1
Payco	457	95	218	200	209	17.1
Wensman	WX 306	94	204	211	208	17.1
Terra	E969	96	183	190	186	17.2
Trelay	4002	95	189	240	214	17.2
Mallard	UC-414	95	212	209	211	17.2
Brunner	S-4242	95	176	187	181	17.4
Kaltenberg	X486	95	205	199	202	17.5
Mycogen	2420	95	169	199	184	17.5
KSC/Challenger	K-9893	95	202	226	214	17.5
Kruger	K-9995	95	215	179	197	17.6
Anderson	7525	95	218	207	212	17.6
Renk	RK552	95	188	224	206	17.7
Jung	2430	93	167	204	186	17.9
Epley Bros.	EX 1140	95	177	209	193	17.9
Renk	RK546	95	205	234	220	17.9
Wensman	MAX 007	93	198	201	200	18.1
Payco (Garst)	468	95	196	222	209	18.3
Top Farm	TFSX2193	95	194	182	188	18.3
Renk	RK450	94	184	186	185	18.4
DeKalb	DK440	95	190	224	207	18.4
Top Farm	TFSX2196	95	181	184	182	18.4
DeKalb	DK449	95	189	207	198	18.5
Pioneer	38P05	94	199	217	208	18.6
Stealth	1297	95	224	221	222	18.7
Golden Harvest	H-2309	95	174	213	194	18.8
Garst	8830	95	210	212	211	18.9
LG Seeds	LG2473	95	202	201	202	18.9

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Yield, Bu/A	Moisture %
LG Seeds	LG2442	95	160	204	182	19.0
Mycogen	2395	95	192	187	190	19.0
Trelay	4600	96	191	217	204	19.1
Kruger	K-9898	95	173	221	197	19.1
LG Seeds	LG2421	95	195	182	189	19.1
Terra	E968	96	189	198	193	19.2
KSC/Challenger	K-9896	95	199	234	216	19.4
Wensman	MAX 127	96	193	210	201	19.5
93 to 97 RM averages:			193	207	200	18.1
98 and later RM hybrids						
Epley Bros.	EX 1160	98	191	243	217	17.7
Anderson	6076	98	177	234	205	18.8
Terra	E988IT	98	173	206	190	18.9
Trelay	5003	98	201	205	203	19.5
Pioneer	37R71	99	212	217	214	19.7
Jung	2488a	98	210	209	210	19.9
Pioneer	36F30	99	219	226	222	20.1
98 and later RM averages:			197	220	209	19.2
Trial averages:			191	206	198	18.2
LSD(0.20)			19	14	12	0.6

Late Maturity Hybrids, Central Locations, 1998

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Yield, Bu/A	Moisture %
102 and earlier RM hybrids						
Mallard	UC-585	100	201	224	213	17.2
Dahlman	1699	100	192	227	210	17.3
DeKalb	DK493Bt	100	226	214	220	17.6
Payco	607	100	179	220	199	17.9
Stealth	1496	100	192	229	210	17.9
Brunner	S-4709	100	191	182	187	18.1
Hyland	HL2507	100	217	226	221	18.5
Hyland	HL2505	100	179	222	201	18.5
DeKalb	DK477	100	189	220	205	18.6
Renk	RK599	100	192	195	193	18.6
Top Farm	TFSX2201	100	221	202	212	18.7
Mycogen	2500	100	197	186	192	18.7
Kaltenberg	K4809	100	188	217	202	18.8
Mallard	UC-595-A	100	205	253	229	18.9
Pioneer	36H36	100	215	203	209	18.9
Asgrow	RX456	100	189	197	193	18.9
Kruger	K-9902	100	194	213	203	18.9
Jung	2545	100	186	226	206	19.2
Top Farm	TFSX2101	100	219	212	216	19.3
Jung	2540	101	218	214	216	19.4
Cargill	3677	100	200	219	210	19.5
AgriPro	AP9300	100	211	197	204	19.6
Renk	RK611	101	192	196	194	19.6
Garst	8766	100	188	187	187	19.6

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Yield, Bu/A	Moisture %
Golden Harvest	H-2315	100	187	191	189	19.8
Kruger	K-9802	100	206	199	202	19.8
Top Farm	TFSX2100	100	217	201	209	19.9
Hyland	HL2614	100	205	197	201	20.0
Cargill	4111	100	208	258	233	20.1
DST	10212	100	188	195	192	20.2
Asgrow	RX492	100	187	210	199	20.4
Stealth	1402	100	202	219	210	20.4
Hyland	HL2521	100	197	196	196	20.5
Kruger	EX 801	100	177	252	215	20.7
Mycogen	2545	101	216	216	216	20.8
Kruger	K-9803	100	179	236	207	20.9
KSC/Challenger	K-9501	100	163	230	197	21.5
Jung	2544	102	178	200	189	21.5
Hyland	HL2626	100	195	209	202	22.5
102 and earlier RM hybrid averages:			197	213	205	19.4
Later than 103 RM hybrids						
Dahlman	1720	105	199	203	201	17.5
Golden Harvest	H-2382	105	192	214	203	19.4
Dahlman	1702	105	209	195	202	19.5
Epley Brothers	EX 1500	105	218	233	226	21.4
Terra	TR1047	104	210	236	223	21.9
AgriPro	AP9355Bt	105	250	252	251	22.1
KSC/Challenger	K-9904	105	222	218	220	22.1
KSC/Challenger	EX806	105	189	234	212	22.5
Golden Harvest	H-2377	105	183	196	189	23.0
KSC/Challenger	EX805	105	201	220	211	23.1
Kaltenberg	K5109	105	174	197	186	23.4
Terra	TR1066	106	217	195	206	24.1
Later than 103 RM hybrid averages:			205	216	211	21.7
Trial averages:			199	213	206	19.9
LSD(0.20)			18	17	12	0.6

Northern Locations, 1998.

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Yield, Bu/A	Moisture %
77 and earlier RM hybrids						
Hyland	HL2161	75	149	128	139	17.7
Mycogen	1376	76	153	132	143	17.9
Brunner	B-1030	75	109	162	135	18.1
Hyland	HL2262	75	173	136	155	18.4
Hyland	HL2160	75	130	124	127	18.7
Stealth	1275	75	151	88	120	18.7
Hyland	HL2017	70	115	116	115	18.7
Kaltenberg	X201	75	112	124	118	18.8
Brown	X1821	77	132	142	137	18.8
77 and earlier RM hybrid averages			136	128	132	18.4
78 to 82 RM hybrids						
Wensman	W 5018 Bt	81	184	147	165	18.1
Cargill	1877	80	171	124	148	18.1

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Yield, Bu/A	Moisture %
Stealth	1280	80	131	136	133	18.5
Payco	155	80	161	146	153	18.5
Hyland	HL2241	80	161	101	131	18.6
Pioneer	3941	82	157	104	131	18.7
Stealth	1480	80	168	136	152	18.7
Brunner	B-2098	80	178	107	142	18.8
Mycogen	2110	81	176	160	168	18.8
DeKalb	DK325	80	162	160	161	19.0
Jung	2178	78	113	111	112	19.1
Brunner	Exp-80	80	147	136	141	19.1
North Star	7180	80	158	103	130	19.1
Top Farm	TFSX2182	80	172	143	158	19.3
Brown	1967	82	140	142	141	19.3
Cargill	X1801	80	142	151	146	19.4
Trelay	1007	80	160	135	147	19.7
Kallenberg	K2701	80	139	135	137	20.1
Pioneer	3963	79	138	162	150	20.2
Hyland	HL2202	80	129	159	144	20.6
Renk	RK221	82	162	178	170	20.9
Terra	E808	80	162	152	157	20.9
78 to 82 RM hybrid averages:			155	138	146	19.2
83 to 87 RM hybrids						
DeKalb	DK355	85	160	123	141	17.6
DeKalb	DK345	85	160	131	145	17.8
Trelay	1003	83	140	126	133	18.0
DeKalb	DK365	85	176	128	152	18.5
Garst	N5966	87	171	173	172	18.7
Kaltenberg	K2609	85	175	110	142	18.7
Mallard	UC-382-B	85	188	110	149	19.1
Payco	237	83	136	170	153	19.2
Terra	E857	85	168	126	147	19.4
Top Farm	TFSX2187	85	140	114	127	19.8
Top Farm	TFSX2184	85	162	169	165	19.8
Pioneer	3914	86	167	112	140	20.0
Stealth	1485	85	164	159	162	20.2
Dahlman	1300	85	175	165	170	20.3
Trelay	2006	86	153	174	164	20.4
Terra	E858	85	151	161	156	20.5
Renk	RK277	85	159	170	165	20.6
Wensman	W 5048 Bt	84	151	167	159	20.6
Golden Harvest	H-2226	85	151	91	121	20.6
LG Seeds	LG2378	85	167	186	176	20.6
Jung	2285	87	182	172	177	20.7
Wensman	W 5088 Bt	87	187	182	185	20.8
Wensman	MAX70	86	185	120	153	20.9
LG Seeds	LG2367	85	160	179	170	21.0
Hyland	HLX802	85	173	115	144	22.9
83 to 87 RM hybrid averages:			164	145	155	19.9

Source	Hybrid	Relative Maturity	Yield, Bushels/Acre at		Average Across Locations	
			Morris	Rosemount	Yield, Bu/A	Moisture %
88 to 92 RM hybrids						
Garst	8972IT	90	141	150	146	18.2
Renk	RK366	88	159	145	151	19.1
Cargill	2610	90	179	112	145	19.2
DeKalb	DK385B	90	159	144	152	19.8
Mycogen	2250	89	179	92	135	19.8
DeKalb	DK405	90	152	168	160	19.9
Pioneer	3905	89	167	170	169	19.9
Pioneer	38B22	92	159	86	122	20.1
Brown	2080	89	159	91	125	20.2
Dahlman	1488	90	158	128	143	20.4
Hyland	HL2309	90	160	163	162	20.5
Golden Harvest	H-2265	90	173	181	177	20.5
Mallard	UC-389-A	90	121	150	136	20.8
Top Farm	TFSX2191	90	139	172	155	20.8
North Star	7190	90	171	141	156	20.9
Wensman	MAX78	90	186	144	165	20.9
Hyland	HL2387	90	168	134	151	20.9
Cargill	2777	90	167	128	148	21.0
Trelay	3700	90	200	178	189	21.1
Stealth	1292	90	126	138	132	21.4
Hyland	HL2240	90	180	176	178	21.6
Pioneer	38R21	92	188	194	191	21.6
Terra	TR906	90	175	179	177	21.7
Dahlman	1490	90	161	147	154	22.2
Kaltenberg	K3904	90	145	184	164	22.4
88 to 92 RM hybrid averages:			163	148	155	20.6
93 and later RM hybrids						
Stealth	1595	95	181	110	146	19.9
Renk	RK450	94	164	127	145	20.5
Terra	E958	95	152	111	131	21.3
Wensman	MAX 007	93	186	176	181	21.4
Crows	169	94	162	187	174	21.7
Dahlman	1599	95	160	174	167	22.4
AgriPro	AP9195	95	172	145	158	22.5
Golden Harvest	H-2309	95	161	104	132	22.6
Mycogen	2395	95	177	189	180	22.6
93 and later RM hybrid averages:			168	147	157	21.7
Trial averages:			159	143	151	20.0
LSD(0.20)			19	18	10	0.9



OAT

Oat varieties are classed into groups under the headings Recommended, Not Adequately Tested, Special Purpose, and Other. Variety descriptions are arranged alphabetically within these groups.

The relative maturities of varieties are indicated in the tables as date of heading, measured as days after planting.

Crown Rust Caution

Crown rust infection has dramatically increased in Minnesota oat fields since 1990, and at least five new races have been identified in recent years. As a result, varieties previously reported to have good crown rust resistance are now known to be vulnerable. Varieties with little or no rust resistance should be grown with caution.

Recommended Varieties

Belle—Late maturity, high yield, tall, fair 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** (pending).

Gem – Medium-late maturity, high yield, medium height, good lodging resistance, high test weight and groat percentage, yellow seed. Resistant to crown rust and smut, good tolerance to red leaf. Selected at Wis. AES. Re-

leased in 1995. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. **PVP** (pending).

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

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

Special-Purpose Varieties

Pal – Forage establishment only. Medium-late maturity, low grain yield, very short, good lodging resistance, low test weight, medium groat percentage, yellow seed. Moderately susceptible to crown rust, susceptible to red leaf, resistant to smut. Selected at the Minn. AES. Released in 1994 as a special-purpose forage oat variety. Pal has good forage yield with high

levels of crude protein and good relative feed value, although no forage data are provided in this publication.

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

Varieties Not Adequately Tested

Blaze – Medium maturity, high yield, medium height, good lodging resistance, very high test weight and groat percentage. Ivory seed. Susceptible to rust and smut, very tolerant to red leaf. Selected at Ill. AES. Released in 1997. Because of smut susceptibility, planting only treated seed is recommended.

Chaps – Medium maturity, high yield, good lodging resistance, high test weight and groat percentage. Yellow seed. Susceptible to crown rust and smut, tolerant to red leaf. Selected at Ill. AES. Released in 1997. Because of smut susceptibility, planting only treated seed is recommended.

Riser – Early maturity, lower yield, short, fair lodging resistance. High test weight and groat

Oat yield, bushels/acre by location, 1996-1998.

	Rosemount	Waseca	Lamberton	Morris	Crookston	Grand Rapids	Average
Variety							
Riser*	59	69	48	79	91	79	71
Dane	69	64	54	94	93	102	79
Jim	70	68	57	80	99	84	76
Chaps**	86	84	89	106	97	131	99
Jerry	84	89	72	100	97	120	94
Blaze**	90	84	76	95	120	135	100
Gem	85	88	94	103	111	115	99
Rodeo	84	87	90	98	117	117	99
Ida	82	77	80	80	112	102	89
Milton	81	88	72	97	120	119	96
Jud*	94	93	100	66	101	122	96
Belle	81	84	81	93	123	108	95
Whitestone	88	83	88	89	124	117	98
Paul***	42	53	66	69	80	61	62
Mean	78	79	76	89	106	108	90
LSD .05	8	5	9	14	13	16	5

* 1998 data only. **1997 and 1998 data only. ***1996 and 1998 data only.

percentage, yellow seed. Selected at S.D.

AES. Released in 1998 **PVP** (pending)

Jud – Late maturity, high yield, very tall, poor lodging resistance. Very high test weight and groat percentage, white seed. Selected at N.D.

AES. Released in 1998. **PVP** (pending)

Other Oat Varieties

Dane – Early maturity, lower yield, short, good lodging resistance, fair test weight, high groat percentage, yellow seed. Moderately resistant to crown rust and smut, susceptible to red leaf. Selected at Wis. AES. Released in 1990. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. **PVP**

Don – Early maturity, medium yield, short, fair lodging resistance, medium test weight and groat percentage, low protein percentage, white seed. Susceptible to crown rust and red leaf, some resistance to smut. Selected at Ill. AES. Released in 1985.

Ida – Late maturity, medium yield and height, good lodging resistance, fair test weight and groat percentage. Ivory seed. Susceptible to rust, moderately susceptible to smut and tolerant to red leaf. Selected at Mich. AES. Released in 1997.

Jim – Early maturity, lower yield, short, good lodging resistance, high test weight and groat percentage, yellow seed. Small resistance to crown rust, resistant to smut, good tolerance to red leaf. Selected at Minn. AES. Released in 1996. **PVP** (pending)

Premier – Medium maturity, yield and height, good lodging resistance, medium test weight,



Location of oat trials

Oat traits, in maturity order, 1998 only.

Variety	Heading Date, Days After Planting	Height, Inches	Lodging, 1 = Erect, 5 = Flat	Test Wt, lb/bushel	Groat Percent	% Smut Infection	Crown Rust*	BYD**
Riser	52	32	2.6	39	76	1	R	7.0
Dane	53	34	2.6	37	75	30	S	8.0
Jim	55	34	1.9	38	75	0	S	5.5
Chaps	57	37	2.1	38	75	50	S	5.5
Jerry	58	38	2.4	41	74	50	MS	6.0
Blaze	59	36	3.0	38	74	50	MS	3.5
Gem	59	36	2.6	38	74	30	MR	4.2
Rodeo	59	36	2.2	37	73	40	S	4.5
Ida	60	38	2.6	36	73	50	S	4.0
Milton	60	35	2.1	38	74	12	S	6.5
Jud	63	42	3.4	41	75	1	MS	4.0
Belle	63	36	2.6	39	76	10	MR	7.0
Whitestone	63	36	2.9	37	72	40	MS	6.5
Paul	64	40	2.6	42	96	0	MR	5.0
Mean	59	36	2.5	38	76			

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

**Barley yellow dwarf virus (Red leaf) score: 1=No Symptoms, 9=Dead.

Oat yield bushels per acre at off-station locations, 1998 data only.

Variety	Roseau	Stephen	Winona	Wells	Madison	Average
Riser	99	91	43	49	56	68
Dane	95	125	51	51	29	70
Jim	90	112	69	81	47	80
Chaps	115	137	79	79	62	94
Jerry	105	123	42	69	57	79
Blaze	103	165	79	86	48	96
Gem	129	147	78	72	25	90
Rodeo	138	161	91	88	41	104
Ida	109	167	85	73	38	94
Milton	102	126	67	80	31	81
Jud	118	155	82	51	35	88
Belle	111	150	69	67	35	87
Whitestone	101	164	72	64	58	92
Paul	91	108	58	59	32	70
Mean	108	138	69	69	43	85

Winona, Wells and Madison are pesticide-free fields.

groat percentage and protein percentage, yellow seed. Susceptible to crown rust, resistant to smut, some tolerance to red leaf. Selected at Minn. AES from a cross between Noble and an unreleased Wisconsin line. Released in 1990. **PVP**

Rodeo – Medium-late maturity, high yield, good lodging resistance, fair test weight, high 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.

Starter – Early maturity, lower yield, short, fair lodging resistance, medium test weight and groat percentage, medium protein percentage, yellow seed. Susceptible to crown rust and red leaf, resistant to smut. Selected at Minn. AES from a cross of Noble and a Pal derivative. Released in 1986. Well suited for companion cropping. **PVP**

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

Whitestone – Late maturity, high yield, medium height, fair lodging resistance, high test weight and groat percentage, white seed. Resistant to crown rust and smut, some tolerance to red leaf. Selected at N.D. AES. Released in 1994. Because of smut susceptibility, planting only treated seed is recommended. **PVP** (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

Minnesota Crop Improvement Association (MCIA), an independent non-profit association, leases a building on the University of Minnesota St. Paul campus that provides offices, a laboratory and seed conditioning facility. A staff of 17 full-time employees carry out the functions of the association. While most are located at the University of Minnesota Agricultural facility in St. Paul, four field supervisors are located throughout the state to better coordinate the association's field inspection functions.



MCIA's ties to the University of Minnesota date back nearly 100 years. University plant breeders interested in the "systematic encouragement of the use of pedigreed seeds" founded the association in 1903. It was known then as the Minnesota Field Crop Breeder's Association. In 1907 it combined with the Agricultural Association of Minnesota and in 1913 the name was changed to Minnesota Crop Improvement Association. Its main functions then were to collect and disseminate crop information, improve by breeding and selection, encourage better cultivation, publish transactions and to aid in the organization of subordinate and auxiliary organizations throughout the state.

Today the association is recognized as Minnesota's official seed certifying agency as well as the state's official noxious weed-seed-free forage and mulch certifying agency. In conjunction with its seed certification and noxious weed-seed-free forage and mulch programs, MCIA provides Identity Preserved®, Quality Assurance® and pre-variety certification of forest reproductive materials and native grasses and forbs services to members. MCIA's Foundation Seed Department maintains a memorandum of agreement with the University of Minnesota to produce and distribute Foundation seed of public varieties. The Foundation seed department also performs contract production services for several private companies.

THE LIST OF MCIA MEMBERS WITH REGISTERED AND CERTIFIED SEED OF PUBLIC VARIETIES AVAILABLE FOR 1999 BEGINS ON PAGE 83.

MCIA also maintains a purity and germination laboratory that provides certification and special-service testing services to association members.

An 11-member board of directors governs the association. These directors represent seed producers and conditioners in seven geographic areas of the state. One represents the University of Minnesota, one, the secretary, is appointed by the board of directors, one represents the private seed industry and another represents the wholesale seed industry. MCIA receives no public funds. All of its operating costs are from membership, service fees and proceeds from the sale of Foundation seed.

MCIA continues to evaluate new services and programs to better enhance member productivity, profitability and competitive position. For additional information contact Gary Beil, president and CEO, MCIA, 1900 Hendon Avenue, St. Paul, MN 55108, phone 800-510-6242, fax 612-625-3748.



WHEAT

Hard Red Spring

Successful hard red spring varieties are compared in replicated trial plots on Minnesota Agricultural Experiment Station fields at Waseca, Lamberton, Morris, Crookston, Stephen, Roseau and St. Paul. Tested varieties are listed in the order of their maturity. Only new varieties or those varieties with better than susceptible reaction to scab are being tested. Neither hard red spring nor hard red winter wheat trials are 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.

Crop Background

The Minnesota Agricultural Experiment Station no longer makes recommendations for hard red spring wheat varieties. The basis on which recommendations were made in the past is no longer considered appropriate because of the severity of scab epidemics.

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. Consequently, only newly released varieties where reaction to scab has not been well documented, and older varieties with scab ratings better than susceptible, are tested and described. Scab evaluations provide severity ratings, based on visual spread of the disease on the spike and tolerance scores, which reflect

the variety's ability to maintain plump seed. These ratings should be considered together to reduce risk of loss. The use of more than one variety to provide different days to heading and to use different seeding dates is highly recommended to reduce risk. Variety descriptions do not provide information on scab resistance. Table information should be used. Varieties are listed in maturity order.

Varieties

BacUp – Awned, very early, medium height. Resistant to stem rust and moderately resistant to leaf rust. Low to medium yield and very high test weight. Susceptible to foliar disease complex and lodging. High tolerance to scab. Very high protein percent. Specialty variety release for scab tolerance with recommendation that it not be used on more than 15% to 20% of acreage. Released by USDA-ARS and Minn. AES in 1996.

Forge – Awned, early, medium height. Resistant to stem rust and moderately resistant to leaf rust. High yield and test weight. Moderately susceptible to lodging. Moderately susceptible to foliar diseases. Medium protein percent. Released by S.D. AES in 1997. **PVP** (94)

Ingot – Awned, early, tall. Resistant to stem rust and moderately resistant to leaf rust. High yield and very high test weight. Moderately susceptible to lodging and to foliar diseases. Medium protein percent. Released by S.D. AES in 1998. **PVP** (94)

Kulm – Awned, early, medium height. Resistant to stem rust and moderately resistant to leaf rust. High to medium yield and high test weight. Moderately susceptible to lodging. High protein percent. Released by N.D. AES in 1994. **PVP** (94)

Sharp – Awned, early, medium height. Resistant to stem rust and moderately resistant to leaf rust. High yield and test weight. Moderately susceptible to lodging and black chaff. Medium protein percent. Released by S.D. AES in 1990.

Sharpshooter – Awned, early, medium height. Resistant to stem rust and moderately resistant to leaf rust. Medium to high yield and high test weight. Moderately susceptible to foliar disease complex and lodging. Medium protein percent. Similar to Sharp, selected for possibly enhanced scab tolerance. Released by Western Plant Breeders in 1996. **PVP** (94)

Oxen – Awned, early-midseason, semidwarf. Moderately resistant to stem rust and moderately susceptible to leaf rust. Very high yield and medium test weight. Moderately susceptible to foliar diseases. Medium protein percent. Released by S.D. AES in 1996. **PVP** (94)

Russ – Awned, early-midseason maturity, medium height. Moderately resistant to stem rust and leaf rust. High yield and medium test weight. Moderately susceptible to lodging. Susceptible to foliar diseases. Medium protein percent. Released by S.D. AES in 1995.

Grandin – Awned, early, semidwarf. Resistant to stem rust and moderately susceptible to leaf rust. High yield and test weight. Moderate lodging resistance. Moderately susceptible to foliar diseases. High protein percent. Released by N.D. AES in 1989.

Hamer – Awned, early-midseason maturity, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Very high yield and medium test weight. Good lodging resistance. Moderately resistant to foliar diseases. Medium to low protein percent. Released by AgriPro in 1995. **PVP** (94)

Growth and quality characteristics of hard red spring wheat varieties, 1996-1998.

Variety	Heading Date	Height, Inches	Lodging, 1=erect 9=flat	Test Weight, lb/bu		% Protein @ 12% Moisture	Milling/Baking Quality
				Station	On Farm ¹		
BacUp	6-24	33	4.3	61.3	60.8	17.1	high
Forge	6-24	32	2.7	60.2	60.4	15.1	med
Ingot ²	6-24	35	3.6	61.8	62.4	15.4	hi-med
Kulm	6-25	35	3.0	60.1	—	15.7	hi-med
Sharp	6-25	34	3.4	60.8	60.4	15.1	med
Sharpshooter ²	6-26	35	3.5	60.8	61.8	15.1	med
Oxen	6-26	31	3.1	58.9	58.7	15.2	med
Russ	6-27	34	3.3	58.8	59.2	14.9	med
Grandin	6-27	33	2.6	59.4	58.3	15.5	high
Hamer	6-27	31	2.2	59.4	59	14.9	med-low
Nora ²	6-27	28	3.3	57.9	57.5	15.5	med
AC Domain	6-27	35	3.2	59.1	—	16.0	med-hi
2375	6-28	33	4.3	59.9	59.6	14.9	med
Trenton	6-28	37	3.7	59.5	—	15.6	hi-med
HJ98	6-28	32	3.9	58.2	59.1	14.5	med
Mercury ²	6-28	28	2.3	58.4	—	14.4	med
Keene ¹	6-28	38	3.0	58.9	—	15.4	med-hi
Lars	6-29	28	2.3	58.0	56.7	14.1	med-low
Norm ³	6-29	32	2.3	57.1	—	14.0	med-hi
Verde	6-30	32	2.7	59.0	59.3	14.3	med
AC Cora	6-30	37	4.3	58.5	—	15.9	med
AC Barrie ⁴	6-30	37	2.7	58.6	58.9	15.5	med
Hager ²	6-30	32	2.7	58.0	57.2	15.1	med
Ivan ⁴	6-30	30	2.2	58.1	—	14.0	med-low
AC Majestic	6-30	35	3.2	58.0	—	15.7	med
Marshall	7-1	30	1.9	57.5	57.6	14.3	med-low
Gunner	7-1	34	2.7	60.3	61.2	16.1	med

¹ On-farm test weight from 13 locations grown in 1998. ² Data from 1997 - 1998. ³ Scab-susceptible check. ⁴ Data from 1998 only.

Nora – Awned, midseason, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Medium to low yield and low to medium test weight. Moderately susceptible to lodging and moderately resistant to foliar diseases. Medium protein percent. Released by AgriPro in 1996. **PVP** (94)

AC Domain – Awnless, midseason-early, medium height. Resistant to stem rust and moderately resistant to leaf rust. Medium yield and high test weight. Moderately susceptible to lodging and foliar diseases. High to medium protein percent. Released by Agriculture and Agri-Food, Manitoba, Canada, in 1993. Seed sales regulated by SeCan.

2375 – Awned, early, medium height. Resistant to stem rust and moderately susceptible to leaf rust. High yield and test weight. Tolerant to loose smut. Moderately susceptible to lodging, shattering and foliar diseases. Medium protein percent. Released by Pioneer Hi-Bred in 1988. Sold by N.D. State University Research Foundation since 1990. **PVP**

Disease susceptibility and tolerances of hard red spring wheat varieties, 1996-1998.

Variety	Leaf Rust ¹	Stem Rust ¹	Foliar Disease ^{1,2}	Scab Severity ¹	Scab Tolerance ³
BacUp	MS	R	S	MR	1.5
Forge	MS	R	MS	MS-S	2.5
Ingot ⁴	MR	R	MS	MS-MR	2.0
Kulm	MR	R	S	S-MS	2.5
Sharp	MR	R	MS	MS-MR	2.5
Sharpshooter ⁴	MR	R	MS	MS-MR	2.5
Oxen	MS	MR	MS	MS-S	3.0
Russ	MR	MR	S	MS	3.0
Grandin	MS	R	S	MS-S	3.0
Hamer	MR	R	MR	MS-S	3.5
Nora ⁴	MR	R	MR	S	4.0
AC Domain	MR	R	MS	MS-S	3.0
2375	MS	R	S	MS	2.5
Trenton	MS	MR	MS	MS-S	3.0
HJ98	MR	R	MS	MS	3.5
Mercury ⁴	MR	R	MS	S	4.5
Keene ⁴	MR	R	MR	MS	3.0
Lars	MR	R	MR	S	4.5
Norm ⁵	R	R	MR	S	5.0
Verde	MR	R	MR	MS-S	3.0
AC Cora	MR	R	MR	MS	3.0
AC Barrie ⁶	MS	R	MR	MS	2.5
Hager ⁴	MR	R	MS	S-MS	3.5
Ivan ⁶	MR	R	MS	S-MS	3.5
AC Majestic	MR	R	MR	MS	3.0
Marshall	MS	R	MS	MS-S	3.5
Gunner	MR	R	MR	MR-MS	2.5

¹ R = Resistant, MR = Moderately Resistant, MS = Moderately Susceptible, S = Susceptible. ² Rating based on N.D. State University data from 1996-1998. ³ Tolerance to maintain plump kernels under scab epidemics: 1=very well, 2=well, 3=moderate, 4=fair, 5=poor. ⁴ Two-year data, 1997-1998. ⁵ Scab-susceptible check. ⁶ Data from 1998 only

Trenton – Awned, midseason, medium height. Moderately resistant to stem rust and moderately susceptible to leaf rust. Medium to high yield and test weight. Moderately susceptible to lodging. Moderately susceptible to foliar diseases. Medium-high protein percent. Recommended by N.D. State University for western and central North Dakota. Released by N.D. AES in 1995. **PVP** (94)

HJ98 – Awned, midseason, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Very high yield and medium test weight. Moderately susceptible to lodging and to foliar diseases. Medium to low percent protein. Released by Minn, AES and USDA-ARS in 1998. **PVP** (94)

Mercury – Awned, midseason, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. High yield and medium test weight. Good lodging resistance. Moderately susceptible to foliar diseases. Medium to low percent protein. Released by North Star Genetics in 1998. **PVP** (94)

Keene – Awned, midseason-late, tall. Resistant to stem rust and moderately resistant to leaf rust. Medium to high yield and test weight. Moderately susceptible to lodging. Medium protein percent Released by N.D. AES in 1997. **PVP** (94)

Lars – Awned, midseason, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Very high yield and low test weight. Good lodging resistance. Moderately resistant to foliar diseases. Low to medium protein percent. Released by AgriPro in 1995. **PVP** (94).

Verde – Awned, midseason-late maturity, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Very high yield and medium test weight. Good lodging resistance. Moderately resistant to foliar diseases. Medium to low protein percent. Released by Minn. AES and USDA-ARS in 1995. **PVP** (94)

AC Cora – Awnless, late, tall. Resistant to stem rust and moderately resistant to leaf rust. Medium to low yield and medium test weight. Susceptible to lodging. Moderately resistant to foliar diseases. High protein percent. Released by Agriculture and Agri-Food, Manitoba, Canada, in 1993. Seed sales regulated by SeCan.

AC Barrie – Awnless, late, tall. Resistant to stem rust and moderately susceptible to leaf rust. Low to medium yield and medium test weight. Moderately susceptible to lodging. Moderately resistant to foliar diseases. High to medium protein percent. Released by Agriculture and Agri-Food, Manitoba, Canada to Cargill in 1997. **PVP** (94)

Hager – Awned, late, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Medium to high yield and medium test weight. Good lodging resistance. Moderately susceptible to foliar diseases. Medium protein percent. Released by AgriPro in 1998. **PVP** (94)

Yields, bushels per acre, of hard red spring wheat varieties, 1996-1998.

Variety	North				South				Average		
	Crookston	Stephen	Roseau	On Farm ¹	St. Paul	Morris	Waseca	Lamberton	North	South	State
BacUp	32	39	40	46	34	51	30	46	38	40	39
Forge	48	46	55	67	49	56	45	58	50	52	51
Ingot ²	48	47	54	69	49	56	45	58	50	52	51
Kulm	45	43	52	—	45	74	45	61	47	54	50
Sharp	45	48	52	59	41	68	43	53	49	49	49
Sharpshooter ²	42	48	52	58	45	58	45	44	48	48	48
Oxen	51	48	58	69	55	76	45	61	53	56	55
Russ	39	49	48	71	43	74	50	53	46	53	50
Grandin	48	44	46	55	51	57	39	51	46	49	47
Hamer	53	45	58	69	53	63	47	58	52	55	53
Nora ²	53	44	43	57	49	58	38	45	45	46	45
AC Domain	40	44	48	—	43	59	34	50	45	45	45
2375	49	51	53	66	47	63	44	53	52	51	51
Trenton	42	42	50	—	38	58	44	58	45	50	48
HJ98	49	58	59	72	53	61	44	60	56	55	55
Mercury ²	45	50	56	—	57	62	48	59	53	55	54
Keene ²	39	44	47	—	45	62	41	57	43	51	48
Lars	54	50	54	63	57	70	45	53	53	54	53
Norm ³	44	40	53	—	52	61	45	59	46	54	50
Verde	50	50	61	71	55	65	47	60	54	56	55
AC Cora	39	47	47	—	38	43	38	55	45	45	45
AC Barrie ⁴	—	45	48	56	41	58	33	44	44	40	41
Hager ³	48	45	56	64	47	55	37	51	50	48	48
Ivan ⁴	—	52	58	—	57	67	41	53	54	51	53
AC Majestic	37	50	38	—	36	45	33	48	42	41	41
Marshall	51	47	45	60	51	30	32	47	47	43	45
Gunner	42	52	49	67	44	50	38	47	48	44	46
LSD 0.05	10.2	8.0	8.3	3.9	6.6	10.1	7.6	8.9	5.4	5.4	3.9

¹ Results from 13 locations grown in 1998. ² Data from 1997-1998. ³ Scab-susceptible check. ⁴ Data from 1998 only.

Ivan – Awned, late, semidwarf. Resistant to stem and moderately resistant to leaf rust. High yield and medium test weight. Moderately susceptible to foliar disease. Medium to low protein percent. Released by AgriPro in 1998. **PVP** (94)

AC Majestic – Awnless, late, medium height. Resistant to stem and moderately resistant to leaf rust. Low to medium yield and test weight. Moderately susceptible to foliar disease. High to medium protein percent. Released by Agriculture and Agri-Food, Manitoba, Canada to Cargill in 1996. **PVP** (94)

Marshall – Awned, late semidwarf. Resistant to stem rust and moderately susceptible to leaf rust. Medium to high yield and test weight. Moderately susceptible to foliar disease complex. Resistant to lodging. Low to medium protein percent. Released by Minn. AES and USDA-ARS in 1982.

Gunner – Awned, late, medium height. Moderately resistant to stem rust and resistant to leaf rust. Medium yield and high test weight. Moderately susceptible to foliar disease complex and lodging. Tolerance to scab. High protein percent. Released by AgriPro in 1996. **PVP** (94)

plex and lodging. Tolerance to scab. High protein percent. Released by AgriPro in 1996. **PVP** (94)

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

Pounds/Bushel	
Bushel Weight	60
Seeds/pound	15,200
Pounds Rate/acre	90-120
Seeds/Sq.Ft.	29
Planting Date.....	Early Spring

Hard Red Winter Wheat

Crop Background

Successful production of winter wheat depends to a considerable extent on selecting the best varieties for a particular farm. Hard red winter wheat varieties are compared in replicated trial plots on Minnesota Agricultural Experiment Station fields at Morris, Rosemount, and Roseau. Only a limited number of varieties are available. Varieties are listed in order of heading. A minimum of two years of testing is required before any data will be presented. 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

Tandem – Awned, semidwarf, early, good lodging resistance. Moderate winterhardiness. Very long coleoptile. Resistant to stem rust and susceptible to leaf rust. High test weight, excellent quality. Released by S.D. AES in 1997. **PVP**

Arapahoe – Awned, semidwarf, early and good lodging resistance. Moderate winterhardiness. Medium length coleoptile. Resistant to stem rust, moderately resistant to leaf rust. Medium test weight, satisfactory quality. Released by Nebraska AES and USDA-ARS in 1988. **PVP**

Crimson – Awned, red-chaffed, medium height, early-medium maturity, very good lodging resistance. Moderately high winterhardiness. Very long coleoptile. Moderately resistant to stem rust, susceptible to leaf rust. Moderate resistance to Septoria tritici blotch. Very high test weight, good quality. Released by S.D. AES in 1997. **PVP**

Roughrider – Awned, tall, medium maturity and fair lodging resistance. Very high winterhardiness. Very long coleoptile. Resistant to stem rust but susceptible to leaf rust. High test weight, excellent quality. Released by N.D. AES in 1975.

Growth characteristics of publicly developed winter wheat varieties, 1995, 1996, 1998.

Variety	Heading Date	Height, Inches	Hardiness ¹	Lodging, 1 = erect 9 = flat	Rust Resistance ²	
					Leaf	Stem
Tandem ³	6-6	39	M	2	S	R
Arapahoe ⁴	6-8	41	M	2	MR	R
Crimson	6-8	39	MH	1	S	MR
Roughrider	6-10	42	VH	4	S	R
Seward	6-11	41	MH	2	S	R
Elkhorn	6-11	42	H	4	MS	R

¹ Winter hardiness rating: VH=very high, H=high, MH=moderately high, M=moderate. ² Resistance to rust: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible. ³ 1996, 1998 data only. ⁴ 1995, 1996 data only.

Yield (percent of the mean) and characteristics of publicly developed winter wheat varieties, 1995, 1996, 1998.

Variety	Test Wt, lb/bu	% Protein @ 12% Moisture	Yield (percent of the mean)*			
			Rosemount	Morris	Roseau ¹	Average
Tandem ²	59.3	13.8	106	102	100	104
Arapahoe ³	58.0	13.1	117	97	—	101
Crimson	59.7	13.4	98	100	94	98
Roughrider	59.2	13.1	86	93	89	90
Seward	58.4	12.4	116	107	108	111
Elkhorn	58.0	13.9	99	101	102	100
LSD			28.0	10.5	NS	10.4
Mean (bu/acre)			51.7	59	37.6	52.7

*Yield is shown as a percent of the mean (average) yield for all locations. While values above the mean (100%) are not always statistically significant, they are useful indicators of superior yield performance. Varietal characteristics such as lodging and disease resistance will affect yield performance.

¹ 1998 data only. ² 1996, 1998 data only. ³ 1995-1996 data only.

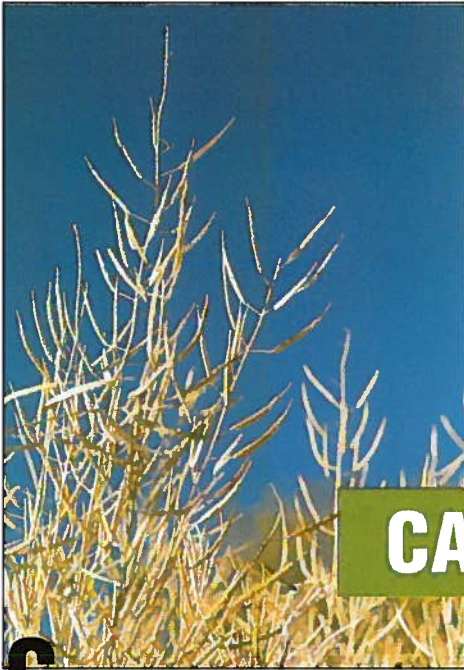
Seward – Awned, tall, medium-late, good lodging resistance. Moderately high winterhardiness. Long coleoptile. Resistant to stem rust, moderately susceptible to leaf rust. Medium test weight, satisfactory quality. Released by N.D. AES in 1987.

Elkhorn – Awned, tall, medium-late, fair lodging resistance. High winterhardiness. Long coleoptile. Resistant to stem rust and moderately susceptible to leaf rust. Medium test weight, good quality. Released by N.D. AES in 1995. **PVP**

Hard Red Winter Wheat Planting Rate and Date

Pounds/Bushel	
Bushel Weight	60
Seeds/pound	14,500
Pounds Rate/acre.....	75+
Seeds/Sq.Ft.	25
Planting Date.....	Aug. 20 - Sept. 20

OILSEED CROPS



CANOLA

Canola (*Brassica napus* or *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. Interest in spring canola has increased recently in Minnesota, where the acreage grown has 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. This compares with the 20 to 40 percent level of erucic acid found in oilseed rape. The meal remaining after oil extraction contains less than 0.1 percent of glucosinolate (sulfur-containing compounds) compared with about 1 percent in rapeseed meal. High levels of erucic acid in food oils are hazardous to

health, and high levels of glucosinolates are detrimental in livestock feeds. Consequently, canola is also referred to as “double low” or “00” rapeseed.

The canola varieties described here are all spring-sown *Brassica napus* types. Winter canola varieties were previously evaluated by University of Minnesota researchers at locations throughout the state. In trials over 15 year/locations, fewer than 30 percent of the trials successfully overwintered.

The Crookston testing site was on the Monte Casavan farm. At Fosston the testing site was on the Roger Rinckenberger and Elsworth Danielson farm. The Kennedy testing site was on the Rob and Tim Ryanning farm, and at Roseau the testing site was on the Steve Dahl farm.

General assistance for field work was provided by county extension educators Vincent W. Crary, Nathan L. Johnson, Herman J. Kandel, Eric Levenson, Curtis W. Nyegaard and Russell K. Severson.

Production information is provided in the canola chapter of the Alternative Field Crops Manual, which is available for \$45 from county extension educators or the Center for Alternative Plant & Animal Products, 352 Alderman Hall, University of Minnesota, St. Paul, MN 55108. Either source can provide more information about this publication.

The more complete Canola Growers Manual on canola production is available from the Canola Council of Canada, 400-167 Lombard Ave, Winnipeg, Manitoba R3B 0T6 (telephone 204-982-2100). It contains detailed information on canola production practices and costs \$68.00 (U.S.). The Canola Council also provides free annual updates to keep the information in the manual current. Please keep in mind if 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.

The Minnesota Canola Council, (see page 32) is another source for information on canola.

Canola Variety Name Changes

Old Name or Experiment Number	New Variety Name
Proseed Exp2, Hy2	Blue Ribbon
Exp 95-09	I079
SW02766	Senator
ZSNA00	Z005
9422685NDA	Q2



Location of canola trials

Table 1. Seed yield of canola (*Brassica napus*) varieties, pounds per acre at 8 percent moisture, at Roseau, Crookston, Fosston, Kennedy and Morris, 1998

Variety information includes Source Codes (D = developer; M = marketer) keyed to listing (pages 56, 57) and these supplemental codes: 99 = New in 1999, A = Apetalous, Exp = Experimental, Hy = Hybrid, Imi = Imidazolinone Tolerant, L = Laurate, SP = Specialty Oil, Syn = Synthetic

Long term averages of Global and Hyola 401 (1991-93,95-98) are 1,759 and 2,014 lb/acre respectively.

Variety	Variety Information	Roseau	Crookston	Fosston	R-C-F Average	Kennedy	Morris	1997-98 Average Roseau/Crookston
1709	D12,M13	2,474	—	—	—	—	—	—
179165	D8,M2	1,783	2,325	—	—	—	—	—
179166	D8,M2	2,365	2,636	—	—	—	—	—
1-9118	D8,M16	1,610	2,027	—	—	—	—	—
1-9173	D8,M2	2,253	2,628	—	—	—	—	—
21/95	D7,M7,Exp	2,276	2,339	2,083	2,233	2,234	1,382	—
44A89	D16,M17	1,616	2,007	2,140	1,921	2,025	1,629	1,549
45A01	D16,M17	2,209	2,142	1,657	2,003	1,844	1,596	—
45A02	D16,M17	1,830	2,323	2,318	2,157	2,294	1,554	—
45A71	D16,M17,Imi	1,715	2,338	2,203	2,085	1,984	1,478	1,802
46A65	D16,M17	2,152	2,439	2,209	2,267	2,407	1,868	1,932
46A74	D16,M17,Imi	2,239	2,312	2,331	2,294	2,030	1,319	1,746
91-15026NA	D19,M14,Exp	2,670	2,813	—	—	—	1,072	2,080
93KN	D10,M14	1,872	2,176	—	—	—	—	1,684
A97-14N	D19,M14,Exp	2,450	2,274	—	—	—	1,440	—
A97-16N	D19,M14,Exp	1,960	2,661	—	—	—	1,480	—
Advantage	D9,M9	2,366	—	1,971	—	—	—	—
Battleford	D8,M9	2,352	—	1,955	—	—	—	—
BC801	D3,M14,Exp	2,214	—	—	—	—	—	—
BC97-101	D3,M14,Exp	2,003	—	—	—	—	—	—
Beacon	D18,M18	2,018	2,247	—	—	2,133	—	—
Blue Ribbon	D9,M18,Hy	2,543	2,451	—	—	2,249	—	—
Cavalier	D6,M6	1,713	1,976	2,061	1,917	2,131	—	1,582
CL 2070	D7,M7,Hy	2,517	2,786	2,371	2,558	2,552	—	2,133
CL 2078	D7,M7,Syn	2,605	2,614	2,401	2,540	2,346	—	—
CL EX57	D7,M7,Exp	2,250	2,345	1,963	2,186	2,105	—	—
Coronet	D18,M20	2,149	—	—	—	—	—	—
Cracker Jack	D18,M9	2,761	—	2,384	—	—	—	—
Crown	D7,M7	2,312	2,492	2,237	2,347	2,192	1,679	—
Crusher	D18,M10	2,494	2,378	2,225	2,366	2,242	—	2,024
Dakini	D8,M16	2,146	2,323	—	—	—	—	1,875
DMS-100	D12,M14,Exp	2,116	—	—	—	—	—	—
Dynamite	D15,M10	2,027	2,388	2,293	2,236	2,258	—	—
Eagle	D18,M9	2,129	—	2,164	—	—	—	—
Ebony	D11,M12	2,686	2,633	2,359	2,559	—	—	2,101
Global	D18,M14	2,653	2,432	2,225	2,437	2,484	—	2,072
Golden Boy	D18,M19	2,284	—	2,433	—	2,250	1,625	—
Goldpro 701	D18,M20,'99	2,163	—	2,520	—	2,323	1,447	—
HCN 35	D1,M14	—	—	2,301	—	—	—	—
HCN 41	D1,M14	—	—	2,240	—	—	—	—
Hudson	D7,M7	1,747	2,184	2,027	1,986	2,273	—	1,686
HyC606	D6,M6,Hy	2,594	3,034	2,573	2,734	2,454	—	2,205
Hyola 308	D20,M10,Hy	—	1,879	—	—	1,876	—	—

Variety	Variety Information	Roseau	Crookston	Fosston	R-C-F Average	Kennedy	Morris	1997-98 Average Roseau/Crookston
Hyola 330	D20,M10,Hy	2,110	2,722	2,393	2,408	2,257	—	1,998
Hyola 401	D20,M10,Hy	2,303	2,510	2,019	2,277	2,217	1,782	1,978
Hyola 420	D20,M10,Hy	2,074	2,519	2,500	2,364	2,291	1,606	1,974
IMC 130	D10,M14	2,015	2,184	—	—	—	—	1,753
IMC 140	D10,M14	1,700	2,103	—	—	—	—	1,656
KC-701	D13,M11,Hy	2,775	—	—	—	—	—	—
LA 161	D5,M5,L	2,296	2,424	2,010	2,243	2,094	—	—
LA 269	D5,M5,L	1,765	1,881	1,704	1,783	1,950	—	—
LG 3222	D11,M12	2,100	2,324	2,266	2,230	—	—	—
LG 3260	D11,M12	1,493	2,007	2,202	1,901	—	—	1,605
LG 3333	D11,M12	2,106	2,433	2,257	2,265	—	1,984	—
LG 3360	D11,M12	2,340	2,717	2,686	2,581	—	—	—
LG 3369	D11,M12	—	—	—	—	—	1,546	—
LG 3388	D11,M12	2,347	2,540	2,544	2,477	—	—	—
LG 3430	D11,M12	2,310	2,448	2,387	2,382	—	—	—
LG 3930	D11,M12,SP	2,112	2,097	2,056	2,088	—	—	—
OAC Summit	D15,M3	2,398	2,785	2,315	2,499	—	1,945	—
Oscar	D7,M7	2,385	2,476	1,856	2,239	2,053	—	1,958
PF 7528/95	D14,M2,Hy	2,473	2,709	—	—	—	—	—
Promark 220	D18,M18,Syn	2,500	2,455	2,634	2,530	2,577	1,431	—
Q2	D19,M10,'99	2,081	2,498	—	—	—	1,301	—
Quantum	D19,M10	2,026	2,328	2,269	2,208	2,332	1,619	1,893
Roseau	D6,M6	2,381	2,716	2,163	2,420	2,629	—	—
SchP015	D13,M6,Hy	1,903	—	1,942	—	—	—	—
Senator	D18,M14	2,770	—	—	—	—	—	—
Sponsor	D16,M2	2,454	—	—	—	—	—	—
SR 96278	D4,M4,Exp	2,169	2,420	2,167	2,252	2,061	1,858	—
SV095-08	D12,M14,Exp	2,532	—	—	—	—	—	—
SW 02582	D18,M14,Exp	2,343	—	—	—	—	—	—
SW 02765	D18,M14,Exp	2,121	—	—	—	—	—	—
SW 02771	D18,M14,Exp	1,927	—	—	—	—	—	—
SW 9621477	D18,M14,Exp	2,130	—	—	—	—	—	—
SW A2636	D18,M14,Exp	2,423	—	—	—	—	—	—
SW A2655	D18,M14,Exp	2,194	—	—	—	—	—	—
SWLM 98011	D18,M14,Exp	2,419	—	—	—	—	—	—
Topscore	D9,M18	2,045	2,323	—	—	2,084	—	1,883
Trail Blazer	D11,M15	2,180	—	—	—	—	—	—
X5.189	D6,M6,Exp	—	2,783	—	—	2,051	—	—
X9801	D10,M14	2,141	2,430	—	—	—	—	—
X9804	D10,M14	2,046	2,459	—	—	—	—	—
X9806	D10,M14	2,253	2,390	—	—	—	—	—
Z005	D20,M10,A,'99	1,719	—	1,621	—	—	—	—
MEANS		2,202	2,408	2,209	2,277	2,214	1,574	1,909
LSD (.05)		308	302	279	192	315	508	—

Table 2. Bloom and maturity characteristics, expressed as days after planting of canola variety, 1998.

Variety	At Beginning (10%) Bloom					At Physiological Maturity				
	Roseau	Crookston	Fosston	Kennedy	Morris	Roseau	Crookston	Fosston	Kennedy	Morris
1709	54	—	—	—	—	102	—	—	—	—
179165	50	55	—	—	—	97	95	—	—	—
179166	52	56	—	—	—	101	98	—	—	—
1-9118	52	57	—	—	—	98	97	—	—	—
1-9173	52	55	—	—	—	97	97	—	—	—
21/95	50	57	50	53	49	100	98	96	101	90
44A89	51	56	50	53	49	92	94	91	93	87
45A01	50	56	49	54	48	97	94	92	97	87
45A02	50	57	49	54	48	94	97	92	96	88
45A71	52	57	51	55	49	99	97	95	99	90
46A65	50	57	48	53	47	100	99	95	102	91
46A74	55	57	53	56	51	102	100	96	102	94
91-15026NA	57	56	—	—	52	104	102	—	—	93
93KN	53	57	—	—	—	100	97	—	—	—
A97-14N	56	58	—	—	50	101	98	—	—	89
A97-16N	54	56	—	—	49	101	100	—	—	93
Advantage	54	—	51	—	—	103	—	96	—	—
Battleford	51	—	49	—	—	103	—	94	—	—
BC801	50	—	—	—	—	98	—	—	—	—
BC97-101	53	—	—	—	—	97	—	—	—	—
Beacon	50	57	—	53	—	98	97	—	98	—
Blue Ribbon	56	58	—	58	—	105	105	—	104	—
Cavalier	51	54	49	53	—	94	93	93	96	—
CL 2070	54	56	53	58	—	102	103	95	104	—
CL 2078	55	57	53	57	—	103	103	96	103	—
CL EX57	56	56	56	58	—	103	99	97	104	—
Coronet	52	—	—	—	—	102	—	—	—	—
Cracker Jack	52	—	52	—	—	103	—	96	—	—
Crown	51	55	49	53	47	101	100	96	101	90
Crusher	57	57	54	59	—	103	101	96	104	—
Dakini	58	58	—	—	—	106	105	—	—	—
DMS-100	55	—	—	—	—	104	—	—	—	—
Dynamite	52	58	51	55	—	102	97	95	101	—
Eagle	52	—	50	—	—	96	—	93	—	—
Ebony	55	56	53	—	—	104	103	96	—	—
Global	57	57	55	60	—	105	107	97	107	—
Golden Boy	54	—	52	54	50	101	—	95	99	94
Goldpro 701	50	—	49	52	48	100	—	95	100	92
HCN 35	—	—	51	—	—	—	—	94	—	—
HCN 41	—	—	54	—	—	—	—	96	—	—
Hudson	50	54	47	52	—	97	94	89	95	—
HyC606	51	57	50	53	—	102	103	95	98	—
Hyola 308	—	54	—	48	—	—	90	—	87	—
Hyola 330	48	55	46	51	—	94	96	91	93	—
Hyola 401	50	57	48	51	45	99	98	93	95	88
Hyola 420	50	57	48	52	47	97	100	94	97	87

Variety	At Beginning (10%) Bloom					At Physiological Maturity				
	Roseau	Crookston	Fosston	Kennedy	Morris	Roseau	Crookston	Fosston	Kennedy	Morris
IMC 130	56	56	—	—	—	99	99	—	—	—
IMC 140	53	57	—	—	—	101	102	—	—	—
KC-701	53	—	—	—	—	102	—	—	—	—
LA 161	58	57	55	59	—	104	105	97	105	—
LA 269	57	58	57	60	—	103	100	98	105	—
LG 3222	52	56	49	—	—	101	99	95	—	—
LG 3260	50	55	48	—	—	93	92	93	—	—
LG 3333	49	56	45	—	46	98	97	94	—	91
LG 3360	51	54	48	—	—	100	100	95	—	—
LG 3369	—	—	—	—	48	—	—	—	—	92
LG 3388	52	56	50	—	—	101	98	95	—	—
LG 3430	53	56	51	—	—	104	102	96	—	—
LG 3930	53	57	52	—	—	103	101	96	—	—
OAC Summit	54	55	53	—	51	103	100	94	—	93
Oscar	55	58	55	56	—	102	103	96	103	—
PF 7528/95	50	55	—	—	—	101	99	—	—	—
Promark 220	53	58	51	55	52	101	99	96	99	94
Q2	54	56	—	—	50	99	98	—	—	91
Quantum	52	56	53	54	49	99	97	95	98	93
Roseau	57	57	53	60	—	104	103	97	105	—
SchP015	54	—	53	—	—	101	—	97	—	—
Senator	54	—	—	—	—	103	—	—	—	—
Sponsor	54	—	—	—	—	102	—	—	—	—
SR 96278	53	56	51	56	50	101	97	95	100	96
SVO95-08	57	—	—	—	—	107	—	—	—	—
SW 02582	51	—	—	—	—	102	—	—	—	—
SW 02765	54	—	—	—	—	103	—	—	—	—
SW 02771	56	—	—	—	—	102	—	—	—	—
SW 9621477	57	—	—	—	—	104	—	—	—	—
SW A2636	50	—	—	—	—	100	—	—	—	—
SW A2655	50	—	—	—	—	100	—	—	—	—
SWLM 98011	51	—	—	—	—	100	—	—	—	—
Topscore	53	58	—	55	—	100	100	—	100	—
Trail Blazer	52	—	—	—	—	102	—	—	—	—
X5.189	—	56	—	56	—	—	103	—	101	—
X9801	53	56	—	—	—	101	98	—	—	—
X9804	52	57	—	—	—	101	104	—	—	—
X9806	51	56	—	—	—	100	99	—	—	—
Z005	51	—	52	—	—	96	—	91	—	—
MEANS	53	56	51	55	49	101	99	95	100	91
LSD (.05)	1.2	2.5	1.5	1.5	1.2	2.4	3.4	1.6	3.4	3.4

Table 3. Disease, canopy closure, and test weight information for canola varieties, 1998.

Blackleg: Resistance rating provided by the seed companies. R = Resistant, MR = Moderately resistant, MS = Moderately Susceptible, S = Susceptible. White Mold: Sclerotinia infection ratings based on a visual estimate of percent of plants infected. Ratings taken shortly before swathing. Canopy: Days after planting to 95% canopy closure in the plot.

Variety	Blackleg	White Mold				Canopy Closure	
		Roseau	Crookston	Fosston	Kennedy	Roseau	Fosston
1709	R	12	—	—	—	43	—
179165	MR	23	13	—	—	44	—
179166	MR	13	8	—	—	43	—
1-9118	MR	16	9	—	—	45	—
1-9173	MR	25	9	—	—	44	—
21/95	MR	13	10	3	12	44	41
44A89	R	44	16	9	17	44	39
45A01	R	17	13	4	11	44	41
45A02	R	30	10	4	11	43	37
45A71	R	11	11	3	10	46	41
46A65	R	13	11	6	11	46	40
46A74	MR	7	8	3	8	44	39
91-15026NA	R	5	7	—	—	43	—
93KN	MS	12	12	—	—	44	—
A97-14N	R	16	9	—	—	43	—
A97-16N	R	19	10	—	—	42	—
Advantage	MR+	8	—	4	—	45	38
Battleford	MR+	25	—	5	—	43	40
BC801		13	—	—	—	42	—
BC97-101		26	—	—	—	44	—
Beacon	MR	17	12	—	12	44	—
Blue Ribbon	MR	12	14	—	11	42	—
Cavalier	MR	21	16	7	15	44	39
CL 2070	MR	13	8	3	9	44	37
CL 2078	MR	5	8	2	9	44	40
CL EX57	MR	7	7	3	9	46	41
Coronet	MR	20	—	—	—	44	—
Cracker Jack	MR	10	—	4	—	42	40
Crown	MR	12	10	2	11	46	41
Crusher	MS	12	12	4	10	44	40
Dakini	MS	21	8	—	—	45	—
DMS-100	MR	12	—	—	—	45	—
Dynamite	MR	18	14	3	13	42	40
Eagle	MR	20	—	6	—	45	39
Ebony	MR	11	6	4	—	43	40
Global	na	8	7	2	9	44	40
Golden Boy	MR	14	—	3	10	44	38
Goldpro 701	MR	17	—	5	10	43	37
HCN 35	MR	—	—	4	—	—	39
HCN 41	MR	—	—	5	—	—	39
Hudson	MS	18	14	8	14	45	38

Canola Planting Rate and Date

B. napus

Bushel Weight, Pounds.....	50
Seeds/Pound.....	75,000 to 150,000
Planting Rate, Pounds/Acre.....	4 to 8
Planting Rate, Seeds/Sq.Ft.	12
Planting Date	May

Canola seed sources for 1999 planting,

keyed to Source Codes column in Table 1.

Developers

D1	AgrEvo #104-111 Research Drive Saskatoon, Saskatchewan Canada S7N 3R2 306-477-9409
D2	Alberta Pool Box 2700, Calgary Alberta, Canada T2P ZP5
D3	Bonis & Co. P.O. Box 217, Lindsay, Ontario, Canada K9V 5Z4
D4	Brett Young Box 99, St. Nobert P.S. Winnipeg, Manitoba, Canada
D5	Calgene Box M, 705 Park Street Park River, ND 58270
D6	Cargill Hybrid Seeds P.O. Box 5645, Minneapolis, MN 55440
D7	Croplan Genetics P.O. Box 1291, Minot ND 58702
D8	Danisco Seed Mariba Seeds Copenhagen, Denmark
D9	DLF Trifolium, Germany
D10	InterMountain Canola (Now Cargill Hybrid Seeds)
D11	Limagrain P.O. Box 250, Listowel Ontario, Canada N4W 3H2
D12	Mycogen 1340 Corporate Center Curve Eagan, MN 55121
D13	(No information available)
D14	NPZ Lembke Hohenlieta, 24363 Holtsee, Germany
D15	University of Guelph Guelph, Ontario, Canada
D16	Pioneer Hi-Bred International 720 S. 48th St. Grand Forks, ND 58201
D17	Proseed 110 E. 7th, Box 69 Harvey, ND 58341
D18	Svalof Weibull Seed P.O. Box 217 Lindsay, Ontario, Canada K9V 5Z4
D19	University of Alberta Department of Agronomy Edmonton, Alberta, Canada

Variety	Blackleg	White Mold				Canopy Closure	
		Roseau	Crookston	Fosston	Kennedy	Roseau	Fosston
HyC606	MR	13	8	6	11	39	36
Hyola 308	MS	—	14	—	15	—	—
Hyola 330	MS	19	10	5	14	42	34
Hyola 401	S	16	10	4	10	41	37
Hyola 420	MR	18	9	4	13	42	36
IMC 130	MS	12	15	—	—	46	—
IMC 140	MS	15	10	—	—	45	—
KC-701	MR	11	—	—	—	42	—
LA 161	MR	13	13	3	10	44	41
LA 269	MS	13	12	2	11	46	44
LG 3222	MR	17	10	8	—	43	36
LG 3260	MS	43	19	8	—	43	39
LG 3333	MR	30	11	10	—	43	38
LG 3360	MR	13	10	3	—	43	37
LG 3369	MR	—	—	—	—	—	—
LG 3388	MR	20	11	5	—	43	37
LG 3430	R	8	9	3	—	43	40
LG 3930	MR	10	9	3	—	46	41
OAC Summit	MS	26	9	4	—	43	39
Oscar	MR	11	8	3	10	44	40
PF 7528/95	MR	17	8	—	—	42	—
Promark 220	MR	13	13	3	11	43	39
Q2	R	11	7	—	—	44	—
Quantum	R	13	11	4	13	46	40
Roseau	MR	16	10	4	9	43	38
SchP015	—	18	—	4	—	37	33
Senator	MR	11	—	—	—	43	—
Sponsor	na	19	—	—	—	43	—
SR 96278	MR	23	16	6	12	43	39
SVO95-08	MR	10	—	—	—	44	—
SW 02582	MR	13	—	—	—	43	—
SW 02765	MR	11	—	—	—	44	—
SW 02771	MR	18	—	—	—	43	—
SW 9621477	MR	11	—	—	—	45	—
SW A2636	MR	11	—	—	—	43	—
SW A2655	MR	18	—	—	—	40	—
SWLM 98011	MR	16	—	—	—	44	—
Topscore	MR	17	10	—	11	45	—
Trail Blazer	MR	19	—	—	—	42	—
X5.189	MR	—	10	—	10	—	—
X9801	MS	23	11	—	—	45	—
X9804	MS	17	10	—	—	46	—
X9806	MS	16	13	—	—	45	—
Z005	MS	16	—	4	—	46	40
MEANS		16	11	4	11	44	39
LSD (.05)		8.9	4.1	3.5	2.6	1.9	2.6

D20 Zeneca
Winnipeg, Manitoba, Canada

Marketers

- M1 AgrEvo
#104-111 Research Drive
Saskatoon, Saskatchewan
Canada S7N 3R2
306-477-9409
- M2 Agriprogress
P.O. Box 2499,
Morden, Manitoba, Canada R6M 1C2
204-822-4956
- M3 Agri-Tel Grain LTD.
Box 808
Beausejour, Manitoba, Canada R0E 0C0
204-268-1415
- M4 Brett Young Seed LTD.
Box 99 St. Nohert P.S.
Winnipeg, Manitoba, Canada
204-261-7932
- M5 Calgene
Box M, 705 Park Street
Park River, ND 58270
- M6 Cargill Hybrid Seeds
P.O. Box 5645
Minneapolis, MN 55440
612-742-6731
- M7 Croplan Genetics
P.O. Box 1291, Minot ND 58702
701-852-3556
- M8 InterMountain Canola
(Now Cargill Hybrid Seeds)
- M9 Integra Seed
P.O. Box 40
Bozeman, MT 59771-0040
406-582-8375
- M10 Interstate Seed Co.
1215 Prairie Parkway
West Fargo, ND 58078
800-437-4120
- M11 Kaystar Seed
P.O. Box 947, Huron, SD 57350
605-352-8791
- M12 Limagrain
P.O. Box 250, Listowel
Ontario, Canada N4W 3112
306-249-4220
- M13 Mycogen
1340 Corporate Center Curve
Eagan, MN 55121
651-405-5800
- M14 (No information available)
- M15 North Star Seeds
Box 2220
Neepawa, MB, Canada R0H 1J0
204-476-5241
- M16 Performance Seeds
Box 35028
Regina, Sask., Canada S4X 4C6
306-791-0550
- M17 Pioneer Hi-Bred Int.
720 S. 48th St.
Grand Forks, ND 58201
701-775-2546
- M18 Proseed
110 E. 7th, Box 69
Harvey, ND 58341
701-324-4177
- M19 Seeds 2000
P.O. Box 101
Breckenridge, MN 56520
218-643-1208
- M20 Wheat City Seeds
389 Park Ave. E.
Brandon, MB, Canada R7A 7A5

Table 4. Canola seed oil content and test weight, 1998.

Variety	Oil Content, % of Seed Weight at 8% Moisture					Test Weight, lb/bu at 8% Moisture				
	Roseau	Crookston	Fosston	Kennedy	Morris	Roseau	Crookston	Fosston	Kennedy	Morris
1709	41.7	—	—	—	—	49.8	—	—	—	—
179165	42.3	42.1	—	—	—	51.1	51.9	—	—	—
179166	43.2	43.0	—	—	—	51.2	51.4	—	—	—
1-9118	45.1	44.7	—	—	—	50.6	51.3	—	—	—
1-9173	43.8	43.0	—	—	—	51.5	52.0	—	—	—
21/95	40.7	39.7	40.8	40.4	37.1	50.7	51.6	51.0	50.8	51.5
44A89	40.4	39.5	41.9	41.5	38.0	51.7	51.9	51.4	50.9	51.9
45A01	41.5	40.4	40.1	40.3	37.8	51.5	52.1	51.8	51.6	52.8
45A02	39.9	41.3	41.5	41.1	37.8	52.1	52.2	52.0	51.8	52.9
45A71	39.9	39.3	41.1	40.9	35.8	50.6	52.0	51.2	51.0	51.9
46A65	42.8	42.0	42.5	41.5	39.4	50.3	51.2	50.6	50.4	52.0
46A74	41.4	40.6	41.1	42.2	37.9	49.6	51.2	50.8	50.7	51.8
91-15026NA	40.3	39.1	—	—	36.5	51.5	52.5	—	—	52.9
93KN	40.8	41.1	—	—	—	50.8	52.0	—	—	—
A97-14N	42.8	40.7	—	—	38.0	51.4	52.1	—	—	52.5
A97-16N	39.8	40.5	—	—	38.2	51.6	52.3	—	—	53.0
Advantage	40.1	—	40.7	—	—	50.3	—	51.2	—	—
Battleford	41.1	—	42.9	—	—	51.8	—	51.7	—	—
BC801	39.5	—	—	—	—	50.0	—	—	—	—
BC97-101	41.4	—	—	—	—	51.9	—	—	—	—
Beacon	40.8	40.7	—	39.5	—	50.2	51.3	—	51.0	—
Blue Ribbon	40.5	39.2	—	40.4	—	50.1	51.4	—	51.1	—
Cavalier	42.2	40.6	43.3	41.6	—	51.9	52.2	52.0	51.7	—
CL 2070	40.5	38.9	40.7	40.4	—	49.8	51.1	50.6	50.0	—
CL 2078	40.4	39.8	40.5	41.1	—	49.7	50.9	51.0	50.8	—
CL EX57	39.2	37.3	36.5	39.2	—	52.0	53.2	52.6	52.2	—
Coronet	39.8	—	—	—	—	52.0	—	—	—	—
Cracker Jack	41.9	—	41.7	—	—	49.9	—	50.7	—	—
Crown	45.0	42.6	42.5	44.3	41.2	51.0	51.4	51.1	50.1	51.8
Crusher	42.1	40.9	40.3	42.5	—	51.5	52.3	52.0	51.8	—
Dakini	42.1	41.4	—	—	—	50.4	51.5	—	—	—
DMS-100	40.1	—	—	—	—	51.3	—	—	—	—
Dynamite	39.2	41.5	42.8	40.5	—	50.0	51.6	50.7	51.1	—
Eagle	40.3	—	40.8	—	—	51.6	—	51.6	—	—
Ebony	43.2	42.0	42.3	—	—	50.4	50.9	51.1	—	—
Global	39.8	39.2	39.3	41.6	—	50.7	51.4	51.7	51.4	—
Golden Boy	41.5	—	42.9	41.9	37.0	50.3	—	50.3	50.9	52.6
Goldpro 701	40.8	—	42.3	42.8	38.5	49.7	—	49.4	49.8	51.3
HCN 35	—	—	44.9	—	—	—	—	50.8	—	—
HCN 41	—	—	40.1	—	—	—	—	51.5	—	—
Hudson	39.3	38.3	41.5	39.7	—	50.5	51.8	51.5	51.2	—
HYC606	39.8	38.7	41.0	39.9	—	51.0	51.5	51.7	51.5	—
Hyola 308	—	37.3	—	37.6	—	—	52.4	—	50.4	—
Hyola 401	38.9	40.6	41.7	40.0	37.9	51.7	52.0	51.2	51.3	52.2
Hyola 420	39.9	41.5	42.5	40.6	39.0	51.3	51.2	50.2	51.0	51.2

Variety	Oil Content, % of Seed Weight at 8% Moisture					Test Weight, lb/bu at 8% Moisture				
	Roseau	Crookston	Fosston	Kennedy	Morris	Roseau	Crookston	Fosston	Kennedy	Morris
IMC 130	39.7	39.5	—	—	—	51.8	52.4	—	—	—
IMC 140	40.5	41.7	—	—	—	51.4	51.4	—	—	—
KC-701	41.6	—	—	—	—	49.5	—	—	—	—
LA 161	38.6	36.4	38.9	37.3	—	51.9	52.4	52.5	52.8	—
LA 269	38.6	36.2	36.8	38.1	—	51.9	52.6	51.8	52.1	—
LG 3222	43.4	42.3	42.2	—	—	51.4	51.8	55.5	—	—
LG3260	40.6	39.9	42.3	—	—	51.2	51.9	51.7	—	—
LG 3333	39.8	41.3	41.0	—	38.2	51.4	51.8	51.0	—	51.9
LG 3360	41.4	40.9	41.7	—	—	51.0	51.5	51.0	—	—
LG 3369	—	—	—	—	39.4	—	—	—	—	52.2
LG3388	40.5	41.6	43.0	—	—	50.5	51.3	50.4	—	—
LG 3430	40.1	40.9	41.7	—	—	50.4	51.0	50.7	—	—
LG3930	42.8	42.3	41.8	—	—	50.8	51.0	50.7	—	—
OAC Summit	41.1	40.1	43.9	—	38.0	51.4	52.3	51.7	—	53.3
Oscar	38.2	36.8	37.6	39.7	—	52.3	53.0	52.7	52.5	—
PF7528/95	41.2	41.0	—	—	—	49.6	50.7	—	—	—
Promark 220	41.0	40.8	41.3	41.5	38.1	51.0	56.1	51.2	51.0	51.8
Q2	41.9	40.9	—	—	36.4	52.0	52.7	—	c	53.9
Quantum	40.7	38.9	39.4	38.9	36.2	52.4	53.1	52.5	52.8	53.9
Roseau	42.2	40.2	41.4	41.1	—	48.6	50.2	50.4	50.2	—
SchP015	41.2	—	40.6	—	—	52.2	—	52.0	—	—
Senator	41.3	—	—	—	—	50.0	—	—	—	—
Sponsor	40.3	—	—	—	—	52.6	—	—	—	—
SRE 906278	40.1	39.8	43.0	41.3	37.3	51.4	52.3	51.2	51.6	52.6
SV095-08	39.9	—	—	—	—	50.1	—	—	—	—
SW 02582	41.1	—	—	—	—	51.5	—	—	—	—
SW 02765	37.6	—	—	—	—	50.8	—	—	—	—
SW 02771	37.9	—	—	—	—	50.9	—	—	—	—
SW9621477	38.4	—	—	—	—	50.3	—	—	—	—
SW A2636	40.0	—	—	—	—	51.6	—	—	—	—
SW A2655	39.9	—	—	—	—	51.3	—	—	—	—
SWLM 98011	41.6	—	—	—	—	49.7	—	—	—	—
Topscore	40.9	40.5	—	41.9	—	51.4	52.2	—	51.6	—
Trail Blazer	40.6	—	—	—	—	50.7	—	—	—	—
X5.189	—	39.7	—	41.3	—	—	51.7	—	51.3	—
X9801	39.0	39.8	—	—	—	51.3	51.6	—	—	—
X9804	40.2	38.4	—	—	—	51.9	52.1	—	—	—
X9806	42.1	41.7	—	—	—	51.3	52.0	—	—	—
Z005	38.6	—	40.7	—	—	50.0	—	50.4	—	—
MEAN	40.8	40.3	41.3	40.7	37.9	51.0	51.9	51.4	51.2	52.4
LSD (.05)	1.5	1.2	1.6	2.2	1.5	0.5	1.6	1.8	0.8	0.7

Table 5. Canola plant height and lodging, based on notes taken shortly before swathing, 1998.

Variety	Height, Inches					Lodging Score, 1 = Erect, 9 = Flat			
	Roseau	Crookston	Fosston	Kennedy	Morris	Roseau	Crookston	Fosston	Kennedy
1709	44.8	—	—	—	—	4.0	—	—	—
179165	40.5	42.8	—	—	—	4.0	2.5	—	—
179166	45.3	49.3	—	—	—	4.8	2.5	—	—
1-9118	43.3	43.0	—	—	—	5.0	2.8	—	—
1-9173	44.8	49.8	—	—	—	5.0	3.5	—	—
21/95	48.5	51.3	52.8	44.8	53.0	4.3	2.3	3.0	2.8
44A89	42.3	46.0	50.8	43.3	53.0	4.0	1.5	1.8	1.8
45A01	45.8	48.0	44.0	44.5	56.0	4.8	2.0	3.3	3.8
45A02	41.8	49.5	47.5	45.8	54.0	4.3	2.3	2.8	2.8
45A71	46.0	49.3	51.3	45.3	59.0	4.8	2.5	3.3	3.0
46A65	38.3	45.8	47.8	43.8	55.0	5.3	2.5	2.8	3.3
46A74	49.0	48.5	53.8	47.5	54.0	4.3	2.0	2.5	2.8
91-15026NA	50.3	50.3	—	—	53.0	3.0	1.5	—	—
93KN	41.5	46.5	—	—	—	5.0	2.8	—	—
A97-14N	48.3	51.5	—	—	54.0	3.3	2.3	—	—
A97-16N	49.0	49.0	—	—	54.0	4.5	2.5	—	—
Advantage	49.8	—	54.0	—	—	3.5	—	2.5	—
Battleford	49.0	—	51.5	—	—	5.0	—	2.0	—
BC801	46.3	—	—	—	—	3.0	—	—	—
BC97-101	45.3	—	—	—	—	4.0	—	—	—
Beacon	43.0	48.3	—	46.3	—	4.8	2.3	—	3.0
Blue Ribbon	50.8	55.5	—	51.8	—	3.5	2.0	—	2.3
Cavalier	39.5	44.3	49.0	43.3	—	4.5	2.8	3.3	3.3
CL 2070	46.8	47.8	50.5	45.3	—	3.8	2.3	2.0	2.3
CL 2078	48.3	50.3	53.0	47.8	—	3.5	1.5	2.3	2.0
CL EX57	44.5	49.5	52.8	45.3	—	4.8	2.5	3.3	3.8
Coronet	51.3	—	—	—	—	5.5	—	—	—
Cracker Jack	46.0	—	52.0	—	—	3.5	—	2.0	—
Crown	40.5	48.5	48.8	43.3	54.0	4.5	2.3	3.0	3.0
Crusher	47.8	51.8	55.0	49.8	—	3.3	1.0	2.0	1.8
Dakini	51.0	49.5	—	—	—	6.3	3.3	—	—
DMS-100	48.5	—	—	—	—	5.0	—	—	—
Dynamite	48.3	48.3	50.3	46.3	—	4.8	1.5	2.0	2.5
Eagle	41.8	—	49.3	—	—	4.5	—	2.5	—
Ebony	45.3	49.8	53.0	—	—	3.5	1.8	2.0	—
Global	50.0	53.8	58.8	50.0	—	4.3	2.0	2.3	2.8
Golden Boy	47.0	—	49.8	49.8	58.0	3.5	—	1.8	2.0
Goldpro 701	46.0	—	50.5	48.0	55.8	3.3	—	1.5	2.0
HCN 35	—	—	50.3	—	—	—	—	2.3	—
HCN 41	—	—	54.0	—	—	—	—	2.5	—
Hudson	41.5	44.3	45.5	42.8	—	4.0	2.0	2.0	3.0
HyC606	48.8	49.8	52.0	47.5	—	4.0	2.8	2.8	3.0
Hyola 308	—	42.5	—	41.5	—	—	2.0	—	2.3
Hyola 330	36.8	41.3	43.5	39.0	—	4.3	2.0	2.8	2.8
Hyola 401	39.8	41.8	45.8	38.8	49.0	4.8	2.0	2.0	2.8

Variety	Height, Inches					Lodging Score, 1 = Erect, 9 = Flat			
	Roseau	Crookston	Fosston	Kennedy	Morris	Roseau	Crookston	Fosston	Kennedy
Hyola 420	44.0	46.5	46.5	42.8	52.0	4.3	2.5	2.5	3.0
IMC 130	45.5	49.8	—	—	—	5.0	3.0	—	—
IMC 140	44.0	47.0	—	—	—	4.8	3.3	—	—
KC-701	49.3	—	—	—	—	3.5	—	—	—
LA 161	48.5	53.3	52.8	49.8	—	4.3	4.0	3.0	3.8
LA 269	49.0	50.0	52.5	49.0	—	4.8	3.3	5.0	4.3
LG 3222	45.5	47.5	47.3	—	—	3.5	2.0	2.3	—
LG 3260	40.3	43.8	45.0	—	—	3.8	2.3	2.5	—
LG 3333	41.8	45.8	47.5	—	51.0	4.8	2.3	3.0	—
LG 3360	46.5	48.0	50.5	—	—	4.8	2.3	3.0	—
LG 3369	—	—	—	—	53.0	—	—	—	—
LG 3388	47.3	49.3	50.8	—	—	4.5	2.0	2.8	—
LG 3430	49.0	49.8	53.3	—	—	3.5	1.8	2.0	—
LG 3930	48.5	48.8	49.5	—	—	4.5	3.3	2.8	—
OAC Summit	50.0	51.5	52.3	—	57.0	5.5	2.5	2.3	—
Oscar	46.8	47.3	47.0	44.0	—	3.8	1.8	2.8	3.3
PF 7528/95	47.8	50.5	—	—	—	3.5	1.5	—	—
Promark 220	48.5	50.5	54.5	50.8	56.0	3.3	1.0	1.8	1.5
Q2	46.8	49.3	—	—	53.0	3.5	1.8	—	—
Quantum	44.8	49.8	53.3	50.0	55.0	4.0	2.0	2.5	2.5
Roseau	49.3	53.8	56.5	51.5	—	3.8	2.0	2.0	2.5
SchP015	49.8	—	51.5	—	—	5.8	—	3.3	—
Senator	49.3	—	—	—	—	4.0	—	—	—
Sponsor	46.5	—	—	—	—	3.0	—	—	—
SR 96278	50.3	50.3	52.5	45.3	58.0	5.0	2.5	2.3	2.5
SVO95-08	49.0	—	—	—	—	3.3	—	—	—
SW 02582	47.5	—	—	—	—	4.3	—	—	—
SW 02765	48.3	—	—	—	—	4.3	—	—	—
SW 02771	46.5	—	—	—	—	3.5	—	—	—
SW 9621477	47.0	—	—	—	—	3.0	—	—	—
SW A2636	47.8	—	—	—	—	3.3	—	—	—
SW A2655	48.8	—	—	—	—	4.3	—	—	—
SWLM 98011	44.8	—	—	—	—	3.0	—	—	—
Topscore	45.5	47.3	—	49.0	—	4.0	2.0	—	3.0
Trail Blazer	50.5	—	—	—	—	4.8	—	—	—
X5.189	—	49.0	—	49.5	—	—	2.5	—	3.3
X9801	48.0	51.3	—	—	—	5.5	4.0	—	—
X9804	41.0	49.8	—	—	—	5.8	2.8	—	—
X9806	46.8	49.8	—	—	—	4.3	2.0	—	—
Z005	39.5	—	47.8	—	—	4.8	—	2.3	—
MEANS	46.1	48.4	50.6	46.2	54.4	4.2	2.3	2.5	2.8
LSD (.05)	5.7	3.5	3.4	3.5	5.5	0.9	0.9	0.7	0.9



SOYBEAN

A recent survey conducted by the Minnesota Agricultural Statistics Service indicated that more than 600 varieties of soybeans were available for planting in Minnesota. Since successful production depends on selecting the best variety for any particular farm, Minnesota Agricultural Experiment Station scientists annually conduct tests of adapted public and private varieties. Companies are charged a fee for each variety they enter and these fees are used to partially cover the costs of conducting these tests. One of the stipulations for entering a variety in the testing program is that the company is marketing or intends to begin marketing the variety in the next season.

Tables 1 to 3 present performance and characteristics data from the regular public and private variety tests that are conducted annually at various locations within the northern, central and southern production zones. The map shows soybean maturity zone boundaries. All of these tests were planted between May 1 and May 25 at planting rates of 160,000 plants/acre. Preplant and post-emergence herbicides were used as necessary for good weed control. Row spacings were 30 inches at Becker and Fairmont and 10 inches at all other locations.

Tables 4 and 5 provide results from specific tests of Roundup Ready® varieties adapted to the central and southern production zones. Planting was accomplished as described above,

except that the only herbicide used was two applications of the labeled rates of Roundup®.

Table 6 provides results from the special performance tests of soybean cyst nematode resistant varieties in “infested” field sites near East Chain, Waseca and St. James and “non-infested” field sites near Fairmont, Lamberton, and Waseca. Planting techniques were the same as the regular performance tests.

Table 7 provides results from the special variety tests conducted in white mold infested field sites near Olivia and Lewisville.

Tables 8 and 9 provide results of the very early (northern Minnesota) and special southern Minnesota Public Variety tests. These locations were added to the program to provide data for environments not represented by the other location tests.

Table 10 provides results from the special-use soybean variety tests conducted at several locations. These tests were added to provide reliable data for growers who are interested in producing these types of soybeans, which are typically grown under contract.

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 is affected by latitude. Each soybean 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 1998 are provided in the performance tables. Harvest dates are typically 7 to 14 days later, depending upon drying conditions.

Relative maturity ratings are also provided for each variety in the tables. 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 Agassiz is indicated as 0.0, making it the earliest group 0 variety, while Hendricks, 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 1998 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, and 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.

LSD values associated with the data in these tables are measures of variability within the trials. If a yield difference between two varieties within a single column exceeds this LSD value you can assume that the higher yielding variety

Soybean Maturity Zones



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.

Chlorosis

These ratings are based on how much of the leaf area was yellowing in tests conducted on high lime (high pH) soils in southwest Minnesota in 1998. Comparing chlorosis scores of varieties permits you to estimate how well they perform relative to each other at this site. Actual chlorosis ratings can vary depending on the specific site and year of test.

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

Numerical Score		Rating
1-5 scale	1-9 scale	Rating
1 to 2	1 to 2.5	Resistant (R)
2.1 to 3	2.6 to 5	Moderately Resistant (MR)
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 on mature seed using near infrared reflectance analysis equipment. This formula converts the protein and oil values to another moisture basis:

100-desired moisture value	x	protein or oil given in the table
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The value of a bushel of soybeans (APV) based on its oil and protein content can be calculated by:

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

Where:

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

And:

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

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	
Rps1a																												
Rps1b																												
Rps1c																												
Rps1k																												
Rps3																												
Rps4																												
Rps6																												

The table values are for the 1998 season only, absolute values of protein and oil can vary from year to year. Protein and oil values are expressed on a 13 percent moisture basis.

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 which Phytophthora gene or genes is/are present in each variety. The chart above shows which genes provide resistance to the various races.

Soybean Cyst Nematode

Soybean Cyst Nematode (SCN) was first identified in Minnesota in 1978 and 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, moderately resistant, and resistant varieties planted in infested and non-infested fields in southern Minnesota are provided in Table 6. Additional information on procedures for testing your

fields for SCN can be obtained from your county extension office or the Soybean Nematology Lab at the Southern Experiment Station in Waseca, MN 56093.

Management information is available from your county extension office or from the Minnesota Soybean Research and Promotion Council, 360 Pierce Avenue, Suite 110, North Mankato, MN 56003, 1-888-896-9678, or www.mnsoybean.org.

White Mold

This disease is also known as Sclerotinia stem rot. Accurate ratings for resistance to this disease are difficult to obtain because the infection process is very dependent on environmental conditions during flowering. Because of this variability, a variety can appear to be resistant one year or in one location and be devastated elsewhere if conditions are more conducive to spread of the disease. Growers should plant varieties that consistently show less disease over several years of testing.

In 1997 and 1998 some varieties were evaluated under field conditions in two locations in the major soybean production area of Minnesota. These tests were conducted by Bruce Potter, Area Integrated Pest Management Specialist at Lamberton, Minn. (table 7). Data collected consisted of ratings of percentages of infected plants present in the various plots during these growing seasons. All tested varieties were then grouped into one of four general categories: moderately resistant, slightly resistant, moderately susceptible or susceptible.

Additional white mold management information is available from Minnesota Soybean Research and Promotion Council, 360 Pierce Avenue, Suite 110, North Mankato, MN 56003, 1-888-896-9678, www.mnsoybean.org

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. IA 1006, Freeborn, Granite, Faribault, Archer, and IA2008R are available public varieties with resistance to BSR. CroPlan L1187, L1475, L2126, L1309CN, RT 1557, and Sands Exp 0927, 2204 and 9619 are the privately developed varieties reported to be resistant to BSR.

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

Special-Use Varieties

Recently there has been increased interest in producing soybeans with characteristics important to specialty food product manufacturers. Soybean scientists previously developed some of these special-use varieties, which were general releases, but more recently have been releasing some of them under exclusive contracts to specific companies who will then contract with growers for their production.

Table 10 presents the most recent data available on the performance and characteristics of several of these special use varieties. Contact the owner/developer or exclusive marketing company, if you are interested in further information about these varieties.

Publicly Developed Varieties

Information about publicly developed varieties entered in 1998 tests is presented in tables 11 and 12.

Soybean Planting Rate and Date

Bushel Weight, Pounds.....	60
Seeds/Pound.....	2,800
Planting Rate, Pounds/Acre	56
Planting Rate, Seeds Ft. of Row	
7-inch rows.....	2
10-inch rows.....	3
20-inch rows.....	6
22-inch rows.....	7
30-inch rows.....	9
Planting Date.....	May 5 to May 25

Privately Developed Varieties

Contact addresses and brand names for privately developed varieties entered in these 1998 tests are:

Agri-Tel , Box 808, Beause Jour, MB, Roe OCO (Agri-Tel)
AgriPro Seeds , 824 2nd Street South, P.O. Box 250, Brookings, SD 57006-0250 (AgriPro)
Albert Lea Seed House , P.O. Box 127, 1414 W. Main, Albert Lea, MN 56007 (Viking)
Asgrow , P.O. Box 447, Mapleton, MN 56065 (Asgrow)
Croplan Genetics , P.O. Box 64098, St. Paul, MN 55164-0089 (Croplan)
Dahlco Seeds , 14730 15th St. S.W., Cokato, MN 55321 (Dahlco)
Dahlman Seeds , 73504 200th St., Dassel, MN 55325 (Dahlman)
Dairyland Seed Co., Inc. , P.O. Box 958, 3570 Highway H, West Bend, WI 53095 (Dairyland)
DeKalb Genetics Corp. , 3100 Sycamore Rd., DeKalb, IL 60115 (DeKalb)
Dennis Ewing Farm Seed , 6131 North Fork Road, Ames, IA 50010 (Yield King)
Domestic Seed & Supply, Inc. , 306 South Washington, Madison, SD 57042 (Mustang)
Garst Seed Co. , 2369 330th Street, Slater, IA 50244 (Garst)
Gold Country Seed, Inc. , 16506 Hwy. 15 N, P.O. Box 604, Hutchinson, MN 55350 (GCS)
Golden Harvest Seeds , 100 J.C. Robinson Blvd., P.O. Box A, Waterloo, NE 68069 (Golden Harvest)
Great Lakes Hybrids, Inc. , 9915 W. M21, Ovid, MI 48866 (Great Lakes)
Interstate Payco Seed Company , Box 338, 1215 Prairie Parkway, West Fargo, ND 58078 (Payco)
Kaltenberg Seeds , P.O. Box 278, Waunakee, WI 53597 (Kaltenberg)
Kruger Seed Company , Highway 20 East, Box A, Dike, IA 50624 (Kruger)
KSC/Challenger , Box A, Dike, IA 50624 (KSC/Challenger)
Latham Brothers Farm , 131 180th St., Alexander, IA 50420 (Latham)
LG Seeds , 905 Dexter St., Box 216, Prescott, WI 54021 (LG Seeds)
Midwest Seed Genetics , P.O. Box 518, Carroll, IA 51401 (Midwest Seed Genetics, MWSG)
Mycogen Seeds , 1340 Corporate Center Curve, St. Paul, MN 55121-1428 (Mycogen Seeds)
NorthStar Genetics , Box 40, Wanamingo, MN 55983 (North Star Genetics)
Novartis Seeds , P.O. Box 959, Minneapolis, MN 55440-0959 (NK Brand, Novartis)
Peterson Farms Seeds, Inc. , 3104 164th Avenue SE, Harwood, ND 58042 (Peterson Farms Seed)
Pioneer HiBred International, Inc. , 130 SE Willmar Ave., Willmar, MN 56201 (Pioneer)
Prairie Brand Research , 15 X Ave., Story City, IA 50248 (PBR)
Prairie Brand Seed Company , 15 X Ave, Story City, IA 50248 (Prairie Brand)
Profiseed, Inc. , 1691 Highway 65, Hampton, IA 50441 (ProfiSeed)
Ramy International, Ltd. , 1329 N. Riverfront Dr., P.O. Box 3722, Mankato, MN 56002-3722 (Ramy)
Renk Seed Co. , 6800 Wilburn Rd., Sun Prairie, WI 53590 (Renk)
Renze Hybrids, Inc. , 27410 Kittyhawk Avenue, Carroll, IA 51401 (Renze)
Sand Seed Service, Inc. , 4765 Highway 143, Marcus, IA 51035 (Sands, SOI)
Sansgaard Seed Farms, Inc. , 15 X Avenue, Story City, IA 50248 (Sansgaard)
Stine Seed Co. , 2225 Laredo Trail, Adel, IA 50003 (Stine)
Stine Seed Farm , 2225 Laredo Trail, Adel, IA 50003 (Stine)
Terra Industries, Inc. , P.O. Box 6000, Sioux City, IA 51102-6000 (Terra)
Thompson Agronomics, Inc. , 40321 130th Avenue, Leland, IA 50453 (Thompson)
Thompson Seeds, Inc. , 40321 130th Ave., Leland, IA 50453 (Thompson)
Top Farm Hybrids , 17177 60th Street SW, Cokato, MN 55321 (Top Farm)
Trelay Seeds , 11623 State Road 80, Livingston, WI 53544 (Trelay, High Cycle)
UAP Seeds/Dyna Gro , Box 55, Kasota, MN 56050 (Dyna Gro)
Wensman Seed Company , P.O. Box 190, 102 Aldrich Avenue, Wadena, MN 56482 (Wensman)
Ziller Seed Co., Inc. , R.R. 1, Box 122, Bird Island, MN 55310 (Ziller)

Table 1. Performance and characteristics of public and private soybean varieties, northern zone; Crookston, Moorhead and Shelly, 1996-1998.

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
OAC Vision	Prograin	9-8	-	-	25	38	16	00.0	S	MS
5006	Mycogen	9-9	-	32	30	36	19	00.6	S	R
D085	Garst	9-9	-	-	30	35	19	0.8	Rps1k	MR
McCall	Minn. AES	9-11	35	33	31	35	18	00.7	S	MR
Jim	N.D. AES	9-13	-	38	40	36	18	00.8	S	R
Daksoy	N.D. AES	9-14	-	35	33	36	18	00.7	S	S
9007	Pioneer	9-16	33	31	28	35	18	00.7	Rps1a	MR
Glacier	Minn. AES	9-17	33	31	24	36	18	00.8	Rps6	MR
L0083	Croplan	9-17	-	-	24	35	18	0.1	S	MS
Agassiz	Minn. AES	9-18	33	28	20	36	18	0.0	Rps1a	MR
Aquilon	Agri-Tel	9-19	-	-	19	38	18	0.0	S	MS
Traill	N.D. AES	9-20	-	33	31	37	17	0.0	S	MR
9042	Pioneer	9-21	35	31	27	34	18	0.4	Rps1a	MR
MN0301	Minn. AES	9-23	38	36	29	34	18	0.3	Rps1a	MR
9041	Dahlco	9-23	-	-	28	35	18	0.4	S	MR
Ozzie	Minn. AES	9-23	32	29	21	37	17	0.3	Rps1a	MR
E-049	Mustang	9-24	-	-	31	35	18	0.4	S	MS
90B43	Pioneer	9-24	-	-	29	35	19	0.4	Rps1c	MR
X044	Golden Harvest	9-24	-	-	26	35	18	0.3	Rps1k	S
0201	Northstar	9-24	-	-	25	35	19	0.2	S	R
CX025	DeKalb	9-24	34	30	24	36	18	0.2	Rps1a	MR
9030	Dahlco	9-24	-	30	21	35	18	0.3	Rps1a	MR
90B21	Pioneer	9-25	-	-	31	34	18	0.2	Rps1k	MS
X89599	GSC	9-25	-	-	26	34	18	0.4	S	MR
Dawson	Minn. AES	9-25	35	32	26	34	18	0.6	Rps1a	MR
Bygland	GSC	9-25	-	32	26	36	18	0.3	Rps1a	MR
Council	N.D. AES	9-25	35	32	25	35	18	0.5	Rps1a	MS
EXP 0301	Sand	9-25	-	-	24	35	18	0.3	S	MS
013	Mycogen	9-25	36	33	24	36	18	0.1	Rps1a	MS
CX046	DeKalb	9-26	35	33	31	37	16	0.4	S	MR
Evans	Minn. AES	9-26	36	35	31	35	18	0.6	Rps1a	MR
TS036	Terra	9-26	-	-	27	36	18	0.3	S	S
Premia	Prograin	9-26	-	-	23	34	19	0.1	S	MS
0523	Northstar	9-26	-	-	21	37	18	0.5	S	MS
TF 6038	Topfarm	9-26	-	-	19	35	18	0.3	S	MS
0480	Stine	9-27	-	-	32	36	18	0.3	S	MR
D061	Garst	9-27	-	-	31	36	17	0.6	S	MR
M-0700	Mustang	9-27	-	-	30	35	18	0.7	Rps1a	MS
Lambert	Minn. AES	9-27	37	34	29	36	18	0.8	Rps1a	MS
Korada	Prograin	9-27	36	34	28	36	17	0.1	Rps1c	MS
CX075	DeKalb	9-27	-	-	27	35	18	0.7	Rps1c	S
DSR-065	Dairyland	9-27	37	33	26	35	18	0.5	Rps1c	MR
M-0970	Mustang	9-28	-	-	32	35	18	0.9	Rps1c	MS
Windsor	GCS	9-28	-	33	27	35	18	0.6	S	MS
9609	Payco	9-28	-	-	26	35	18	0.9	S	MR
Oie	Peterson Farms	9-28	-	-	24	35	18	0.7	Rps1c	MS

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
DST1109	Dairyland	9-29	-	-	32	36	18	0.9	Rps1c	MR
M-0958	Mustang	9-29	-	-	32	36	17	0.9	S	MR
Hendricks	Minn. AES	9-29	-	-	31	36	18	0.9	Rps1a	MR
9809	Payco	9-29	-	-	31	36	18	0.9	S	MR
690	Ramy	9-29	37	35	29	33	18	0.3	Rps1c	MS
1073-0	Stine	9-29	-	35	29	35	18	0.3	Rps1c	S
9508	Payco	9-29	38	34	27	35	17	0.8	S	MR
9906	Payco	9-29	-	-	19	34	19	0.6	Rps1a	S
1090-6	Stine	9-30	-	-	34	36	17	0.3	S	MR
PB-097	Prairie Brand	9-30	40	38	33	35	18	0.9	S	MS
PB-098	Prairie Brand	9-30	-	35	31	35	18	0.9	S	MR
PB-091X	Prairie Brand	9-30	-	-	26	35	18	0.9	S	MS
W3036	Wensman	9-30	-	29	20	36	18	0.3	S	S
PB-103X	Prairie Brand	9-31	-	-	23	35	18	1.0	S	MS
LSD 20%			1	1	3					

Table 2. Performance and characteristics of public and private soybean varieties, central zone; Becker, Morris and Rosemount, 1996-1998.

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
OAC Atwood	Agri-Tel	9-3	-	-	43	37	17	0.9	S	MS
Ozzie	Minn. AES	9-7	45	48	51	38	16	0.3	Rps1a	MR
5072	Mycogen	9-8	-	-	63	36	18	0.7	Rps1a	MS
990	Ramy	9-8	52	57	62	36	17	0.9	S	MS
TF6078	Topfarm	9-8	-	-	61	37	18	0.7	Rps1a	S
W3078	Wensman	9-8	-	-	60	37	17	0.7	Rps1a	MS
TS067	Terra	9-8	-	-	60	36	18	0.6	Rps1c	S
H-1082	Golden Harvest	9-8	50	55	60	37	17	0.8	S	MS
KB076	Kaltenberg	9-8	-	-	59	37	16	0.7	Rps1a	S
Lambert	Minn. AES	9-8	49	52	58	38	17	0.8	Rps1a	MS
Evans	Minn. AES	9-8	46	52	57	37	17	0.6	Rps1a	MR
MN0301	Minn. AES	9-8	-	52	55	37	17	0.3	Rps1a	MR
Council	N.D. AES	9-8	47	50	52	37	17	0.5	Rps1a	MR
9071	Pioneer	9-10	53	57	62	36	18	0.7	Rps1c	MR
91B01	Pioneer	9-11	-	58	62	36	18	1.0	Rps1k	MS
Surge	Minn. & S.D. AES	9-12	-	58	64	37	17	1.3	Rps1a	MS
9610	Payco	9-12	52	56	62	37	17	1.0	S	MS
EXP 0927	Sands	9-12	-	-	62	37	17	0.9	Rps1k	MR
EXP20771	Ziller	9-12	-	-	62	37	17	0.9	S	MR
W3096	Wensman	9-12	-	56	61	37	17	0.9	S	S
D085	Garst	9-12	-	-	60	37	17	0.8	Rps1k	MR
095	Trelay	9-13	-	-	62	36	17	0.9	S	MS
5100	Mycogen	9-13	50	54	62	37	17	1.0	S	MR
E098	Terra	9-13	-	-	61	36	17	0.9	S	S
Hendricks	Minn. AES	9-13	50	55	59	38	17	0.9	Rps1a	MR
K-0999+	KSC/Challenger	9-14	-	-	69	38	16	0.8	S	MS
M-1128	Mustang	9-14	-	-	67	37	17	1.2	S	MR

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
K-0909+	Kruger	9-14	56	62	66	38	16	0.8	S	S
Julius	Dahlman	9-14	-	-	65	37	17	0.9	S	R
CX105	DeKalb	9-14	-	-	64	36	17	1.0	Rps1k	MS
TF6077	Topfarm	9-14	-	-	61	36	17	0.6	Rps1c	MS
3134	Dyna Gro	9-14	-	-	58	38	16	1.3	Rps1c	MS
A0868	Asgrow	9-15	-	-	66	37	17	0.8	Rps1k	MS
5121	Mycogen	9-15	-	-	66	37	17	1.2	Rps1k	MR
6091	LG Seeds	9-15	-	59	66	36	17	0.9	S	MR
SOI 101	Sands	9-15	-	-	65	37	17	1.0	Rps1c	MS
933	Northstar	9-15	-	-	64	38	16	0.9	S	MR
H-1103	Golden Harvest	9-15	-	-	64	38	16	1.0	Rps1c	MS
W3107	Wensman	9-15	-	57	62	37	17	1.0	Rps1c	MS
3095	Dyna Gro	9-15	-	-	60	38	16	0.9	Rps1k	MR
EXP21175	Ziller	9-16	-	-	68	38	16	1.5	S	MS
9151	Dahlco	9-16	-	-	66	36	17	1.0	S	MR
K-0999	Kruger	9-16	55	62	66	37	17	0.8	Rps1a	S
KB128	Kaltenberg	9-16	-	58	65	37	17	1.2	Rps1c	MS
K-0999A	Yield King	9-16	-	-	64	36	17	0.8	Rps1a	MS
9140	Dahlco	9-16	-	57	63	39	16	1.4	Rps1k	S
5143	Mycogen	9-17	56	62	70	37	17	1.4	S	MR
K-1414	KSC/Challenger	9-17	-	-	69	38	16	1.2	S	MR
TS107	Terra	9-17	-	60	65	37	17	1.0	Rps1c	MS
9151	Pioneer	9-17	57	62	65	36	17	1.5	Rps1k	MR
9141	Dahlco	9-17	-	59	65	37	17	1.4	Rps1a	MR
X3812	GCS	9-17	-	-	63	38	16	1.2	Rps1k	MR
W3148	Wensman	9-18	-	-	77	37	17	1.4	S	MR
PB-146	Prairie Brand	9-18	-	67	74	38	16	1.4	S	MR
1386-6	Stine	9-18	-	66	74	38	17	1.3	S	MS
A1553	Asgrow	9-18	-	-	72	36	18	1.5	Rps1k	MS
1725	Ramy	9-18	-	-	72	37	16	1.5	Rps1a	S
PBR-159X	PBR	9-18	-	-	72	38	16	1.5	S	MS
X3814	GCS	9-18	-	-	71	38	17	1.4	S	MR
M-1138	Mustang	9-18	-	-	71	38	17	1.3	S	MR
PBR-133X	PBR	9-18	-	-	71	38	17	1.3	S	MR
M-1160	Mustang	9-18	-	62	70	37	16	1.6	S	MR
K-1333	Kruger	9-18	-	67	70	38	16	1.2	Rps1a	MR
1443	Northstar	9-18	-	-	70	38	17	1.4	S	MR
T-3142	Thompson	9-18	-	-	69	37	17	1.4	S	MR
SOI 177	Sands	9-18	57	63	69	37	16	1.4	S	S
1499	Profiseed	9-18	-	-	69	38	16	1.4	S	MR
6145	LG Seeds	9-18	56	62	69	36	17	1.4	S	MS
EXP 1444	Sands	9-18	-	-	69	38	17	1.4	S	MR
PB-140X	Prairie Brand	9-18	-	-	68	38	16	1.4	S	MR
1486	Stine	9-18	-	-	67	38	16	1.4	S	MS
E158	Terra	9-18	-	-	67	38	17	1.5	S	MR
9150	Dahlco	9-18	-	61	67	36	17	1.5	Rps1k	MS
D142	Garst	9-18	-	-	67	37	16	1.4	S	S
EX8124	Garst	9-18	-	-	67	37	16	1.4	Rps1c	MS

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
DSR-173	Dairyland	9-18	54	60	66	38	16	1.6	Rps1a	MS
KB145	Kaltenberg	9-18	-	-	66	37	17	1.4	S	MS
PBR-127	PBR	9-18	54	59	65	37	17	1.2	S	MS
CX173	DeKalb	9-18	-	61	64	36	16	1.7	Rps1c	MR
X93857	GCS	9-18	-	-	64	38	16	1.5	S	MR
L1187	Croplan	9-18	-	-	63	37	16	1.2	Rps1k	MR
9163	Pioneer	9-18	-	-	63	37	17	1.6	Rps1c	MS
MN1301	Minn. AES	9-18	-	56	63	38	16	1.3	Rps1c	MR
L1475	Croplan	9-18	-	-	60	36	17	1.4	Rps1a	MR
MN1401	Minn. AES	9-18	-	-	59	39	16	1.4	Rps1a	MR
EX-140	Latham	9-19	-	-	70	38	16	1.2	S	MR
K-1444+	Yield King	9-19	-	64	69	37	17	1.2	S	MS
DSR-158	Dairyland	9-19	-	61	68	38	16	1.5	S	MR
H-1147	Golden Harvest	9-19	-	-	66	38	16	1.4	Rps1a	MS
M-1167	Mustang	9-19	-	-	66	37	17	1.6	Rps1a	MS
T-3162	Thompson	9-19	53	60	65	38	16	1.5	S	MR
1525	Ramy	9-19	-	58	61	37	17	1.5	S	MR
Parker	Minn. AES	9-19	51	56	60	37	17	1.5	Rps1a	MS
KATO	Minn. AES	9-19	48	54	59	40	15	1.3	Rps1a	MS
K-1777	KSC/Challenger	9-20	59	67	74	37	16	1.5	S	S
TF6147	Topfarm	9-20	-	-	71	39	16	1.4	S	MR
2500	Stine	9-20	-	66	71	38	16	1.5	S	MS
K-1990	Kruger	9-20	59	65	70	38	16	1.6	Rps1a	MS
EX8156	Garst	9-20	-	-	69	37	16	1.5	Rps1k	MR
EX6245	Thompson	9-20	-	67	69	38	16	1.5	S	MS
DSR-180/STS	Dairyland	9-20	-	62	69	38	16	1.9	S	MS
PBR-169+	Prairie Brand	9-21	-	70	73	38	16	1.6	S	MS
1680	Stine	9-21	-	68	73	37	16	1.5	S	S
K-2125	KSC/Challenger	9-21	-	-	73	37	16	1.6	S	MS
250 Brand	Latham	9-21	-	-	69	38	16	1.8	S	MS
PBR-177X	PBR	9-21	-	-	69	38	16	1.7	S	S
K-1515+	Yield King	9-21	-	-	68	37	17	1.2	S	MR
Freeborn	Minn. AES	9-21	-	-	62	39	16	1.6	Rps1a	MS
K-1943+	Yield King	9-22	-	-	75	37	16	1.8	S	MR
Granite	Minn. AES	9-22	-	-	61	38	16	1.8	Rps1a	MR
PB-173	Prairie Brand	9-25	-	65	67	39	16	1.7	S	MS
LSD 20%			1	1	2					

Table 3. Performance and characteristics of public and private soybean varieties, southern zone; Fairmont, Lamberton and Waseca, 1996-1998.

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
MN1301	Minn. AES	9-11	-	50	54	38	17	1.3	Rps1c	MR
Kato	Minn. AES	9-12	49	50	54	38	17	1.3	Rps1a	MS
MN1401	Minn. AES	9-13	-	-	57	37	17	1.4	Rps1a	MR
Stride	Minn. & S.D. AES	9-13	-	52	53	36	18	1.3	Rps1a	MS
D177N	Garst	9-14	-	-	57	37	17	1.7	Rps1k	MS
Parker	Minn. AES	9-14	51	52	54	36	18	1.5	Rps1a	MS

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
W3148	Wensman	9-15	-	-	63	37	18	1.4	S	MS
GL1559	Great Lakes	9-15	-	55	59	38	16	1.5	Rps1a	MS
9163	Pioneer	9-15	52	54	56	36	18	1.6	Rps1c	MS
Freeborn	Minn. AES	9-15	48	52	55	38	17	1.6	Rps1a	MR
E158	Terra	9-16	-	-	64	37	18	1.5	S	MR
9184	Dahlco	9-16	-	-	61	37	17	1.8	S	MR
EX7217	Thompson	9-16	-	-	60	36	18	1.9	S	S
9172	Pioneer	9-16	54	57	59	36	17	1.7	Rps1k	MS
AP1755	Agripro	9-16	-	-	59	36	17	1.7	Rps1c	MS
Russel	Dahlman	9-16	-	-	57	38	16	1.6	Rps1k	MS
Bert	Minn. AES	9-16	48	52	56	35	18	1.8	Rps1a	MS
EXP21377	Ziller	9-17	-	-	63	37	17	1.8	S	MS
9190	Dahlco	9-17	-	50	63	36	17	1.9	S	S
168	Trelay	9-17	-	-	63	36	18	1.6	S	MS
1796	Viking	9-17	55	57	61	36	17	1.7	S	MS
Hardin 91	Iowa AES	9-17	52	55	59	37	18	2.0	Rps1k	S
Granite	Minn. AES	9-17	52	54	57	37	17	1.8	Rps1a	MR
S-190X	Sansgaard	9-18	-	-	67	38	17	1.9	S	S
H-1194	Golden Harvest	9-18	59	62	66	36	18	1.9	S	MS
GL1872	Great Lakes	9-18	59	61	65	37	17	1.8	S	MS
TS200	Terra	9-18	59	61	65	36	17	2.0	S	MS
9210	Dahlco	9-18	-	62	64	37	17	2.1	S	MR
410 Brand	Latham	9-18	58	60	64	37	17	1.9	S	MS
200	Mycogen	9-18	59	61	62	36	17	2.1	S	S
Kinbrae	GCS	9-18	-	58	61	37	17	2.0	Rps1k	MR
A1923	Asgrow	9-18	-	-	59	37	17	1.9	Rps1k	MR
6192	LG Seeds	9-18	-	58	59	36	17	1.9	S	MR
IA1006	Iowa AES	9-18	-	56	58	36	18	1.6	S	MR
Archer	Iowa AES	9-18	49	50	53	36	18	1.9	Rps1k+6	MR
G1885	Midwest Seed	9-19	62	65	66	37	17	1.8	S	S
TS194	Terra	9-19	59	61	66	37	17	1.9	S	S
T-3193	Thompson	9-19	-	-	66	36	17	2.0	Rps1c	MR
3202	Dyna Gro	9-19	-	63	66	36	17	2.0	Rps1c	MR
H-1184	Golden Harvest	9-19	-	-	66	37	17	1.8	S	MS
Ex-330	Latham	9-19	-	62	65	36	17	1.9	Rps1c	R
207	Trelay	9-19	-	-	64	37	17	2.0	S	S
T-3203	Thompson	9-19	-	-	64	37	17	2.0	S	S
92B23	Pioneer	9-19	-	-	64	36	18	2.2	Rps1k	MS
2302	Northstar	9-19	-	61	63	37	17	2.3	S	S
E-201	Mustang	9-19	-	-	62	36	17	2.0	Rps1a	MS
DSR-180/STS	Dairyland	9-19	-	-	62	37	17	1.9	S	MS
DSR-195	Dairyland	9-19	57	60	61	37	17	1.9	S	MS
D189	Garst	9-19	-	-	61	36	18	1.8	Rps1k	MR
2098	Viking	9-19	-	-	60	36	18	1.8	Rps1a	MS
TF6197	Topfarm	9-19	-	-	59	37	17	1.9	S	MS
T-3229	Thompson	9-20	-	-	70	36	17	2.3	S	MS
K-2125	KSC/Challenger	9-20	-	-	69	36	17	1.6	S	MS

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
CX205	DeKalb	9-20	-	61	68	36	17	2.0	Rps1c	MR
660 Brand	Latham	9-20	60	62	67	37	17	2.3	S	MS
R2098	Renze	9-20	-	-	66	38	17	2.0	S	MS
T-3227	Thompson	9-20	58	61	65	36	17	2.3	S	MS
Ex-510	Latham	9-20	-	-	65	38	17	2.1	S	MS
H-1228	Golden Harvest	9-20	-	-	65	36	17	2.2	Rps1a	MR
TF6188	Topfarm	9-20	-	-	64	36	17	1.8	Rps1a	MS
KB221	Kaltenberg	9-20	-	-	64	36	17	2.2	Rps1k	MS
K-2242	Kruger	9-20	-	-	64	36	17	2.0	S	S
K-2022	KSC/Challenger	9-20	-	-	64	36	17	--	Rps1a	MS
DST2124	Dairyland	9-20	-	-	63	36	17	2.1	S	MR
3188	Dyna Gro	9-20	-	-	63	37	17	1.8	S	MS
PB-194	Prairie Brand	9-20	-	61	62	37	17	1.9	S	MS
S-199X	Sansgaard	9-20	-	-	61	38	17	1.9	S	MS
EXP 2027	Sands	9-20	-	-	61	36	18	2.0	S	MS
TF6168	Topfarm	9-20	-	-	61	35	18	1.7	Rps1c	MS
EXP 2204	Sands	9-20	-	-	60	37	17	2.2	Rps1c	MR
Sturdy	Minn. AES	9-20	52	56	60	37	17	2.0	Rps1a	MS
Titan	Mich. AES	9-20	-	-	59	36	17	2.0	S	S
AP2329	Agripro	9-20	-	-	56	36	17	2.3	Rps1b	MS
392 Brand	Latham	9-21	-	65	71	37	17	1.9	S	MS
W3207	Wensman	9-21	-	-	71	37	17	2.0	S	MS
2180	Stine	9-21	-	66	70	37	16	2.1	S	S
9222	Dahlco	9-21	-	-	69	36	17	2.2	S	MS
2002	Northstar	9-21	-	65	68	36	17	1.9	S	MS
T-3222	Thompson	9-21	-	64	68	36	17	2.2	S	MS
KB208	Kaltenberg	9-21	-	62	68	36	17	2.0	S	MS
J-251	Mycogen	9-21	59	62	68	37	17	2.4	S	MS
X3721	GCS	9-21	-	65	68	37	17	2.1	S	MS
SOI 169	Sand	9-21	62	64	67	36	17	1.9	S	S
G2112	Midwest Seed	9-21	-	65	67	37	17	2.1	S	MS
2195	Ramy	9-21	60	64	66	37	17	2.1	S	MS
PB-197	Prairie Brand	9-21	61	63	66	37	17	1.9	S	MS
A2247	Asgrow	9-21	-	-	66	37	17	2.2	Rps1k	MR
L2126	Croplan	9-21	-	63	65	37	17	2.1	S	MS
K-2303	Kruger	9-21	-	-	65	37	17	2.1	Rps1a	MS
9233	Pioneer	9-21	59	61	65	37	17	2.3	S	MS
1970	Stine	9-21	60	63	65	37	17	1.9	S	MS
W3177	Wensman	9-21	-	-	65	37	17	1.7	S	S
H-1214	Golden Harvest	9-21	-	-	63	37	17	2.1	S	MS
TF6227	Topfarm	9-21	-	-	63	37	17	2.2	S	S
PBR-218	PBR	9-21	-	59	63	36	17	2.1	S	MS
KB169	Kaltenberg	9-21	-	-	62	36	18	1.6	Rps1a	S
CX195	DeKalb	9-21	-	-	61	37	17	1.9	Rps1k	MS
Ex8208	Garst	9-21	-	-	60	37	17	2.0	Rps1c	MR
324STS Brand	Latham	9-21	-	-	59	37	17	1.9	S	MR
K-2323STS	Yield King	9-21	-	-	59	36	17	2.1	Rps1k	MS

Variety	Brand or Originator	Mature Date	Yield Bushels/Acre			Percent		Maturity Rating	Phytophthora Gene	Chlorosis Score
			96-98	97-98	1998	Protein	Oil			
DSR-220/STS	Dairyland	9-21	55	58	59	37	17	2.4	S	S
2198	Ramy	9-22	-	-	72	36	17	2.1	S	S
S-237X	Sansgaard	9-22	-	-	72	36	17	2.4	S	MS
PBR-216	PBR	9-22	-	65	71	37	16	2.1	S	MS
K2525A	Yield King	9-22	-	-	70	36	18	2.3	S	MS
K-2625+	Kruger	9-22	-	66	70	37	17	2.4	S	S
2557	Profiseed	9-22	-	-	69	37	16	2.4	S	MS
K-2343	KSC/Challenger	9-22	61	64	69	36	17	2.1	S	MR
K-2425	Yield King	9-22	-	66	69	36	16	2.2	Rps1a	MS
K-2525+	Kruger	9-22	-	-	68	36	18	2.3	S	MS
PBR-202	PBR	9-22	61	64	68	37	17	2.0	S	MS
621Brand	Latham	9-22	-	-	67	37	17	2.3	S	MS
S-220X	Sansgaard	9-22	-	-	67	37	17	2.2	S	MR
2509	Profiseed	9-22	-	-	66	36	17	2.4	S	MR
M-2218	Mustang	9-22	-	-	66	37	16	2.1	S	MS
M-2238	Mustang	9-22	-	-	66	36	17	2.3	S	MS
PB-2120	Prairie Brand	9-22	61	64	65	36	17	2.3	S	MS
R2297	Renze	9-22	-	63	65	37	17	2.1	S	MS
IA2008R	Iowa AES	9-22	56	59	64	36	17	2.2	Rps1k	MS
CX229	DeKalb	9-22	59	60	64	36	17	2.2	Rps1c	MS
EX7331	Thompson	9-22	-	-	64	36	17	2.2	S	MS
X3823	GCS	9-22	-	-	63	36	17	2.3	S	S
IA2021	Iowa AES	9-22	55	60	61	36	18	2.2	Rps1k	MS
6212	LG Seeds	9-22	-	-	61	38	17	2.1	S	MS
M-2200	Mustang	9-22	60	61	60	37	17	2.0	S	MS
2490-1	Stine	9-23	-	-	70	36	17	2.4	S	MR
2550	Ramy	9-23	-	64	66	37	17	2.4	S	S
2498	Ramy	9-23	-	-	64	37	17	2.4	S	MS
IA2038	Iowa AES	9-23	-	-	63	37	17	2.4	S	S
EXP 2435	Sands	9-24	-	-	71	38	17	2.4	S	MS
2413	Profiseed	9-24	-	-	67	37	17	2.4	S	MS
K-2535+	Yield King	9-24	-	63	67	38	17	2.3	S	MS
PBR-213X	PBR	9-24	-	-	66	38	17	2.1	S	MS
PB-235	Prairie Brand	9-24	-	63	66	38	17	2.3	S	MS
KB248	Kaltenberg	9-24	-	-	65	37	17	2.4	S	MS
E248	Terra	9-24	-	-	65	38	16	2.4	S	MS
EX7705	Thompson	9-24	-	-	65	38	17	2.2	S	MS
GL2451	Great Lakes	9-24	-	-	65	36	16	2.4	S	MS
2499-0	Stine	9-25	-	65	67	38	17	--	S	MS
640 Brand	Latham	9-25	-	62	67	38	16	2.3	S	MS
K-2535	KSC/Challenger	9-25	-	-	65	38	17	--	S	MS
LSD 20%			1	1	2					

Table 4. Performance and characteristics of Roundup Ready soybean varieties, central zone; Morris and Rosemount, 1998.

Variety	Brand or Originator	Maturity Date	Yield Bu/A	Percent		RM	Phytophthora Gene	Chlorosis Score
				Protein	Oil			
90B93	Pioneer	9-11	58	37	17	0.9	Rps1c	MS
DSR-046/RR	Dairyland	9-11	53	36	18	0.4	S	MS

Variety	Brand or Originator	Maturity Date	Yield Bu/A	Percent		RM	Phytophthora Gene	Chlorosis Score
				Protein	Oil			
PB-0999RR	Prairie Brand	9-13	62	36	17	0.9	Rps1k	MS
E0981RR	Terra	9-13	60	36	17	0.9	S	MR
K-09RR	Yield King	9-13	59	36	17	0.8	S	MR
91B02	Pioneer	9-13	59	37	17	1.0	S	MS
980RR	Ramy	9-13	57	36	17	0.9	Rps1k	MS
BT7109RR	Ziller	9-13	56	37	17	1.0	S	MS
AG0901	Asgrow	9-13	55	36	18	0.9	Rps1k	MS
KB069RR	Kaltenberg	9-13	54	37	17	0.6	S	S
90B72	Pioneer	9-13	54	37	17	0.7	S	MR
M-090	Mustang	9-13	52	37	17	0.9	S	MS
W 2098RR	Wensman	9-14	58	36	17	0.9	Rps1c	MR
1080RR	Ramy	9-15	60	37	17	1.0	S	MS
PBR-1093RR	PBR	9-15	58	38	17	1.2	S	MR
K-10RR	KSC/Challenger	9/15	57	37	17	1.1	Rps1k	MR
W2058RR	Wensman	9-15	54	36	18	0.5	S	MR
PB-1190RR	Prairie Brand	9-16	60	37	17	1.4	Rps1K	MS
1455RR	Ramy	9-16	57	38	17	1.4	S	MS
E1181RR	Terra	9-17	62	37	17	1.1	S	MR
M-111	Mustang	9-17	61	37	17	1.1	S	MR
W2118RR	Wensman	9-17	60	37	17	1.1	Rps1a	MS
RT1557	Croplan	9-17	58	37	17	1.5	Rps1k	MR
91B52	Pioneer	9-18	59	36	18	1.5	S	S
EXP 1557RR	Sands	9-18	57	38	16	1.3	Rps1k	MS
X9712RR	NK Brand	9-18	54	37	18	1.5	Rps1c	MS
3142	Dyna Gro	9-19	55	39	16	--	S	MS
1555RR	Ramy	9-19	55	38	16	1.5	Rps1k	MS
KB099RR	Kaltenberg	9-20	64	38	17	0.9	S	MS
PB-1490RR	Prairie Brand	9-20	63	38	17	1.4	S	MS
M-144	Mustang	9-20	63	38	17	1.4	S	MS
BT7149RR	Ziller	9-20	63	38	17	1.4	S	MR
DSR-152/RR	Dairyland	9-20	61	38	17	1.5	S	MS
1496-4	Stone	9-20	58	38	17	1.4	S	MS
S14-M7RR	NK Brand	9-20	58	38	17	1.5	Rps1c	MR
PBR-1752RR	PBR	9-20	58	36	18	1.5	Rps1k	MS
PB-1790RR	Prairie Brand	9-21	63	37	17	1.7	S	MS
K-14RR	Krueger	9-21	62	38	17	1.4	S	MS
W 2148RR	Wensman	9-21	62	38	17	1.4	S	MS
E1481RR	Terra	9-21	61	38	17	1.4	S	MS
M-174	Mustang	9-21	61	37	17	1.7	S	MR
X-141RR	Golden Harvest	9-21	60	37	18	1.4	S	MS
1794	Stine	9-21	57	37	17	1.5	S	MS
DSR-182/RR	Dairyland	9-21	57	38	17	1.8	S	MS
K-191RR	Yield King	9-22	55	36	17	1.6	Rps1c	MR
S-18XRR	Sansgaard	9-23	64	37	17	1.5	Rps1k	MS
K-19CRR	KSC/Challenger	9-23	63	38	16	1.6	S	MR
K-19DRR	KSC/Challenger	9-23	62	38	17	1.6	Rps1k	MS
EXP 1882RER	Sands	9-23	62	39	16	1.5	S	MR
KB119RR	Kaltenberg	9-23	59	38	16	1.1	Rps1k	MR
E)580RER	Terra	9-23	58	38	16	0.5	S	MR
K-20RR	Kruger	9-24	69	37	17	1.9	S	MS
S-14XRR	Sansgaard	9-24	67	38	16	1.4	S	MR

Variety	Brand or Originator	Maturity Date	Yield Bu/A	Percent		RM	Phytophthora Gene	Chlorosis Score
				Protein	Oil			
K-1494RR	Kruger	9-24	67	37	17	1.7	S	S
KB 149RR	Kaltenberg	9-24	65	37	16	1.5	S	MS
PBR-1921RR	PBR	9-24	64	37	16	1.5	S	S
K-19FRR	Kruger	9-24	62	37	17	1.7	S	MS
EX-316RR	Latham	9-24	62	37	17	1.5	S	MS
K-21RR	Yield King	9-24	61	37	17	1.7	S	S
K-190RR	Yield King	9-24	56	36	17	1.6	S	MS
S-19XRR	Sansgaard	9-25	62	38	17	1.5	Rps1k	MS
S-15XRR	Sansgaard	9-25	61	37	17	1.5	S	MR
K-21ARR	KSC/Challenger	9-25	60	37	17	1.7	Rps1k	MR
LSD 20%			2					

Table 5. Performance and characteristics of Roundup Ready soybean varieties, southern zone; Lamberton and Waseca, 1998.

Variety	Brand or Originator	Maturity Date	Yield Bu/A	Percent		RM	Phytophthora Gene	Chlorosis Score
				Protein	Oil			
91B64	Pioneer	9-14	63	36	18	1.6	Rps1c	MS
816RR	Dahlman	9-14	58	37	17	1.6	S	MS
92B05	Pioneer	9-15	66	36	17	2.0	Rps1k	MS
91B91	Pioneer	9-15	62	36	17	1.9	S	MR
818RR	Dahlman	9-15	61	38	17	1.8	S	MR
DSE182RR	Dairyland	9-15	60	38	17	1.8	S	MR
T-3178RR	Thompson	9-15	58	35	18	1.7	Rps1k	MS
2172RR	High Cycle	9-16	63	37	18	1.7	S	MS
W 2178RR	Wensman	9-16	63	36	18	1.7	S	MS
AG1901	Asgrow	9-16	60	35	18	1.9	Rps1k	S
E-1481RR	Terra	9-16	60	37	17	1.4	S	MR
WQ 2148RR	Wensman	9-16	60	37	17	1.4	S	MS
S-14-M7RR	NK Brand	9-16	57	37	17	1.5	Rps1c	MR
DSR-215RR	Dairyland	9-17	63	37	17	2.2	S	MS
K-19CRR	KSC/Challenger	9-17	62	38	17	1.6	S	MR
AG2101	Asgrow	9-17	62	37	17	2.1	Rps1k	MR
406RR Brand	Latham	9-17	60	37	17	1.8	S	MR
K-19DRR	KSC/Challenger	9-18	63	36	17	1.6	Rps1k	MS
4222	Proifiseed	9-18	62	37	17	1.9	S	MS
S-2100RR	Sansgaard	9-18	61	37	17	2.1	S	MR
2023RR	Northstar	9-18	57	37	17	2.0	S	MR
K-19HRR	Yield King	9-19	68	37	17	1.7	Rps1a	MR
165RR	Golden Harvest	9-19	67	36	17	1.6	S	MR
92B21	Pioneer	9-19	65	36	17	2.2	S	S
DSR-241/RR	Dairyland	9-19	64	37	17	2.4	Rps1k	MS
AG2201	Asgrow	9-19	64	37	17	2.2	S	MS
1980-4	Stine	9-19	62	37	16	1.5	S	MS
H-1238RR	Golden Harvest	9-19	62	38	16	2.4	Rps1k	MS
PBR-200XRR	PBR	9-19	62	37	17	2.0	S	MS
K-22RR	KSC/Challenger	9-19	62	37	17	1.9	S	MS
S22-N2RR	NK Brand	9-19	61	38	17	2.2	S	MS
PBR-1920RR	PBR	9-20	68	35	17	2.1	S	MR
BT7189RR	Ziller	9-20	67	36	17	1.8	Rps1c	MR
K-24ARR	Kruger	9-20	65	36	17	2.4	Rps1a	MS
CX191RR	DeKalb	9-20	65	36	17	1.9	Rps1c	MR
K-19FRR	Yield King	9-20	65	37	17	1.7	S	MS
R1909R	Renze	9-20	64	37	16	2.1	S	MS

Variety	Brand or Originator	Maturity	Yield	Percent		RM	Phytophthora	Chlorosis
		Date	Bu/A	Protein	Oil		Gene	Score
X160RR	Kaltenberg	9-20	63	36	17	2.3	S	MS
EX-656RR	Latham	9-20	63	37	17	2.4	Rps1k	MS
EX-416RR	Latham	9-20	63	37	17	2.0	S	MS
S-245XRR	Sansgaard	9-20	62	37	17	2.4	Rps1k	MS
K-21RR	Yield King	9-20	62	37	17	1.7	S	S
KB180RR	Kaltenberg	9-20	61	37	17	1.8	Rps1k	MS
1995RR	Ramy	9-20	60	37	17	1.9	S	MS
3173RR	Dyna Gro	9-20	60	37	17	—	S	MR
E2081RR	Terra	9-20	60	37	17	2.0	S	S
PBR-2122RR	PBR	9-20	59	37	17	2.1	S	S
M-208	Mustang	9-20	59	36	17	2.0	Rps1c	MR
R2109R	Renze	9-20	57	37	17	2.1	S	MS
M-238	Mustang	9-20	55	37	17	2.2	S	MS
GL2100RR	Great Lakes	9-21	70	36	17	2.1	Rps1c	MR
EXP 9619RR	Sands	9-21	67	35	17	1.9	Rps1c	MR
4201	Profiseed	9-21	67	36	17	2.1	S	S
PB-2124R	Prairie Brand	9-21	67	37	17	2.1	S	MS
PBR-1997RR	PBR	9-21	67	37	17	1.9	S	MS
1991-4	Stine	9-21	66	37	17	1.9	S	MS
E1980RR	Terra	9-21	66	37	17	1.9	S	MS
T-3215RR	Thompson	9-21	66	35	17	2.1	Rps1c	MR
K-24RR	Kruger	9-21	65	36	17	2.4	S	S
T-3228RR	Thompson	9-21	65	37	17	2.2	S	MS
W2198RR	Wensman	9-21	65	37	17	1.9	S	S
K-191RR	KSC/Challenger	9-21	65	36	17	1.6	Rps1c	MR
BT7199RR	Ziller	9-21	65	38	17	1.9	S	MS
821RR	Dahlman	9-21	64	36	18	2.1	Rps1k	MR
3214	Dyna Gro	9-21	63	35	17	—	S	S
S-2161RR	Sansgaard	9-21	61	37	17	2.5	S	S
H-1207RR	Golden Harvest	9-21	60	36	17	2.1	Rps1c	MR
AG2301	Asgrow	9-21	60	38	17	2.3	Rps1k	MR
819RR	Dahlman	9-21	59	36	17	1.9	Rps1k	MS
K-26RR	Kruger	9-22	66	37	17	—	S	MS
KB209RR	Kaltenberg	9-22	64	37	17	2.0	S	S
M-202	Mustang	9-22	64	38	16	2.1	S	MS
2195RR	Ramy	9-22	63	38	16	2.1	S	S
5214	Mycogen	9-22	60	37	17	2.1	S	MS
E2181RR	Terra	9-22	58	38	16	2.1	S	MS
2190-R	Stone	9-22	55	37	17	2.1	S	MS
4190	Profiseed	9-23	68	37	17	1.9	S	MS
G1998RR	Midwest Seed	9-23	66	37	17	1.9	S	MR
EX-426RR	Latham	9-23	65	37	17	2.0	S	MS
2085RR	Ramy	9-23	65	37	17	2.0	S	MS
R2009R	Renze	9-23	65	38	17	2.0	S	MS
K-20RR	Yield King	9-23	64	37	17	1.9	Rps1a	MS
2003RR	Northstar	9-23	64	37	17	2.0	S	MS
PB-2197RR	Prairie Brand	9-23	64	38	16	2.1	S	S
KB159RR	Kaltenberg	9-23	63	37	17	1.5	S	S
T-3208RR	Thompson	9-23	63	37	17	2.0	S	MS
SOI245RR	Sands	9-23	63	37	16	2.4	S	MS
SOI 242RR	Sands	9-23	62	36	17	2.4	S	MS
S-233XRR	Sansgaard	9-23	62	38	17	2.3	S	S

Variety	Brand or Originator	Maturity Date	Yield Bu/A	Percent		RM	Phytophthora Gene	Chlorosis Score
				Protein	Oil			
2091-4	Stine	9-23	61	37	17	2.0	S	MS
EX-456RR	Latham	9-23	61	38	16	2.1	S	MS
G2210RR	Midwest Seed	9-23	59	38	16	2.1	S	MS
W 2218RR	Wensman	9-23	58	38	17	2.1	S	S
EXP 2121RR	Sands	9-23	57	38	16	2.1	S	MS
PB-2090RR	Prairie Brand	9-24	67	38	17	2.0	S	MS
GL2000RR	Great Lakes	9-24	64	37	17	2.0	S	MS
PB-2490RR	Prairie Brand	9-24	62	37	17	2.4	S	MS
K-24BRR	Kruger	9-24	62	37	17	2.4	S	MS
4249	Profiseed	9-24	57	38	16	2.4	S	S
2550RR	Ramy	9-25	59	37	16	2.4	S	S
M-244	Mustang	9-25	58	38	16	2.4	S	S
LSD 20%			3					

Table 6. Performance of public and private soybean varieties at soybean cyst nematode at infested (East Chain, St. James, Waseca) and non-infested (Fairmont, Lambertson, Waseca) sites, 1996-1998.

Variety	Brand or Originator	RM	Yield Bushels/Acre						Maturity Date	Phytophthora Gene	Chlorosis Score	SCN Rating	Percent	
			Infested Sites			Non-Infested Sites							Protein	Oil
			96-98	97-98	1998	96-98	97-98	1998						
Parker	Minn. AES.	1.5	40	44	45	47	46	49	9-14	Rps1a	MR	S	37	17
L1309CN	Croplan	1.3	-	-	51	-	-	55	9-15	S	MR	S	37	17
CX160C	DeKalb	1.6	-	54	59	-	50	54	9-17	S	MS	MR	36	18
Freeborn	Minn. AES	1.6	46	51	56	46	48	52	9-17	Rps1a	MR	R	39	16
Faribault	Minn. AES	1.9	43	46	46	45	47	49	9-17	Rps1c	MS	R	36	18
PB-188CN	Prairie Brand	1.8	-	55	60	-	52	54	9-19	S	MS	S	37	17
K-2212SCN	Kruger	2.0	-	-	57	-	-	57	9-19	Rps1a	MS	S	37	17
K-2444SCN	Kruger	2.2	49	52	56	50	51	54	9-19	Rps1a	MS	MR	37	17
K-2120SCN	Kruger	1.9	-	56	58	-	52	54	9-20	Rps1a	MS	S	37	17
A2069	Asgrow	-	-	-	57	-	-	61	9-20	Rps1k	MS	S	37	17
S18-11	NK Brand	1.8	-	-	52	-	-	55	9-20	S	MR	MR	40	16
T-3219CN	Thompson	2.2	-	-	59	-	-	59	9-21	S	MS	S	37	17
1802CN	Northstar	1.8	-	-	58	-	-	57	9-21	S	MS	S	37	17
352CN Brand	Latham	1.9	-	-	55	-	-	60	9-21	S	MS	S	37	17
CX202C	DeKalb	-	-	-	57	-	-	59	9-22	S	MS	MR	38	17
T-3216CN	Thompson	2.1	-	-	57	-	-	58	9-22	S	S	S	38	17
Bell	Ill. AES	2.2	44	49	53	44	46	52	9-22	S	MR	R	37	17
2397CN	Ramy	2.3	-	-	58	-	-	58	9-23	S	MS	S	37	17
AG2201	Asgrow	2.2	-	-	57	-	-	58	9-23	S	MS	MR	37	17
2123CN	Northstar	2.1	-	-	56	-	-	59	9-23	S	MS	MR	37	17
PB-215CN	Prairie Brand	2.1	-	56	53	-	53	58	9-23	S	MS	S	37	17
522CN Brand	Latham	2.1	45	50	52	47	50	55	9-23	S	MS	S	38	17
T-3236CN	Thompson	2.2	-	-	60	-	-	59	9-24	S	MR	S	36	17
CX235C	DeKalb	2.3	-	56	60	-	54	58	9-24	S	MS	MR	36	18
K-2220SCN	Kruger	2.0	50	53	58	54	56	61	9-24	Rps1k	MS	MR	36	17
IA2036	Iowa AES	2.2	-	51	54	-	51	55	9-24	S	MR	R	38	17
IA2021	Iowa AES	2.1	48	52	53	53	55	60	9-24	Rps1k	MS	S	36	18
1882-1	Stine	1.8	50	56	60	53	56	62	9-25	S	MS	MR	36	17
9234	Pioneer	2.2	49	54	56	48	52	55	9-25	Rps1a	MR	R	37	17
PB-221CN	Prairie Brand	2.1	-	-	54	-	-	57	9-25	S	MS	MR	36	17
LSD 20%			1	1	2	1	1	2						

Table 7. White mold ratings, listed alphabetically in groups; groups are in order of 1998 combined score of sensitivity to infection. Ratings 1=moderately resistant, 2=slightly resistant, 3=moderately susceptible, 4=susceptible.

Brand or Originator	Variety	Ratings		
		1998 Lewisville	1998 Olivia	1997 Combined
Moderately Resistant				
AgriPro	1394	—	1	—
DeKalb	CX195	1	1	—
Gold Country	Kinbrae	1	1	3
Golden Harvest	1147	—	1	—
Golden Harvest	1184	1	1	—
Kruger	1990	1	—	1
Kruger	2242	1	—	—
Latham	250	1	1	3
Pioneer	9132	—	1	—
Slightly Resistant				
Agri-Pro	1995	3	1	3
Asgrow	1901	2	1	—
Great Lakes	1559	1	2	—
Novartis	1811	2	1	3
Novartis	1990	2	1	3
Prairie Brand	194	1	2	3
Moderately Susceptible				
Croplan	L1849	2	3	—
Croplan	L1984	1	3	—
Dairyland	DSR-173	3	1	—
Garst	D163N	—	3	—
Garst	EX8208	2	—	—
Kruger	K1444	—	3	—
Kruger	1333	—	3	—
MWSG	G1400	3	3	—
Novartis	2091	2	3	1
Pioneer	9163	—	3	1
Pioneer	9172	3	—	—
Prairie Brand	227	2	3	—
Susceptible				
Gold Country	X3719	1	4	—
MWSG	G1885	1	4	3
Mycogen	5121	1	4	—
NC+	1A48	4	2	1
SOI	260	1	4	1
AgriPro	2220	4	—	3
Asgrow	2101	2	4	—
Dairyland	DSR-195	—	4	3
Dairyland	DSR-215RR	4	—	—
Garst	D189	4	4	—
Golden Harvest	1214	4	—	—
Latham	410	3	—	3
MPS	Sturdy	4	4	—
Mycogen	J181	4	4	3
Stine	615974	—	4	—
Stine	616474	—	4	—

Soybean Checkoff Dollars At Work

Soybean checkoff dollars are being used today at the Minnesota Agricultural Experiment Station to conduct basic and applied research studies. These studies are directed at developing greater understanding of the soybean cyst nematode (SCN) and designing more effective control strategies. Examples of current research include:

- ✓ Use of traditional breeding methods to develop adapted, high-yielding varieties with SCN resistance.
- ✓ Field studies to develop the most effective management practices, such as rotations and the use of resistant varieties, to reduce losses due to SCN infestations.
- ✓ Field studies to gain better understanding of the biology and population dynamics of the SCN organism in Minnesota
- ✓ Comparisons of biological with chemical control methods to determine the feasibility of managing effective SCN control with biological practices.
- ✓ Identification and cloning of SCN resistance genes, which can then be transferred into adapted germplasm.

Take Advantage of SCN Soil Testing!

Soybean cyst nematode (SCN) is a major pest in the North-Central Region of the United States, robbing producers of millions of bushels of yield yearly. This negative impact on profits can be greatly reduced by using management tools available today. The first step in effective SCN control is to have your soil tested for SCN so the extent of the infestation can be known.

The soybean cyst nematode does its damage underground when adult SCN females, which produce as many as 100 to 250 eggs, infect soybean roots when conditions are right. The eggs hatch to produce juveniles, which burrow into roots where they disrupt normal root development. By the time yellow and stunting symptoms appear the damage is done.

You can make a preliminary diagnosis of the problem by digging up plants with roots intact, using a shovel or small hand trowel. Carefully remove soil from the roots and look for the small, creamy white females. The best time to do this is from 6 weeks after planting until 4 to 6 weeks prior to harvest. It is best to sample areas of fields that you have noticed as being less vigorous or less productive compared to others.

The best way to determine SCN presence is by systematically testing your fields for SCN. Free soil sampling kits, which include sampling directions, a sampling bag and a coupon for \$5 off the testing fee at the University of Minnesota SCN lab, are available at county extension offices throughout Minnesota or by calling the Minnesota soybean office toll-free at 1-888-896-9678.

In addition to confirming SCN presence, this test provides an estimate of population densities. With this information you can select the most effective management strategies to reduce the impact of SCN infestation. For best results, follow this procedure:

- ✓ Use a soil probe to collect soil cores at a depth of 6 to 8 inches.
- ✓ Using a zigzag pattern, collect 10 to 20 soil cores per 10 to 20 acres of field area.
- ✓ Dump cores into a bucket or tub and mix thoroughly.

Table 8. Performance of very early maturing soybean varieties, 1994-1998.

Variety	RM	Yield			Protein	Oil	Disease	
		Grand Rapids	Roseau	Average			Phytophthora	Chlorosis
Daksoy	00.6	26	26	26	37	17	S	MS
McCall	00.7	23	26	24	36	17	S	MR
Jim	00.7	27	28	28	37	18	S	MS
Glacier	00.8	23	26	24	37	17	Rps6	MS
Agassiz	0.0	26	26	26	37	18	Rps1a	MR
Traill	0.0	22	23	23	37	17	S	MS
LSD 20%		1	1	1				

Table 9. Performance of southern zone soybean varieties, Southeast Minnesota sites, 1994-1998.

Variety	RM	Yield bushels/acre	Protein %	Oil %	Disease	
					Phytophthora	Chlorosis
Lambert	0.8	45	37	17	Rps1a	MR
Hendricks	0.9	45	36	18	Rps1a	MS
Kato	1.3	47	39	15	Rps1a	MR
Bert	1.8	50	35	18	Rps1a	MR
Freeborn	1.6	48	36	17	Rps1a	MR
Parker	1.5	48	35	18	Rps1a	MS
Hardin 91	2.0	53	37	17	Rps1k	S
Granite	1.8	49	36	17	Rps1a	MS
Faribault	1.9	47	35	18	Rps1c	MS
Sturdy	2.0	54	37	16	Rps1a	MR
Archer	1.9	46	36	17	Rps1k + 6	MR
IA2021	2.1	55	35	18	Rps1k	S
IA2008R	2.2	48	35	17	Rps1k	MS
LSD 20%		1				

- ✓ Place 2 cups (1 pint) of the mixed soil in a plastic bag and seal.
- ✓ Label and send to Nematology Laboratory, Southern Experiment Station, 35423 120th Street, Waseca, MN 56093. Include field information and your return address.
- ✓ If you cannot ship the sample to the laboratory immediately, refrigerate or store it in a cool, dark place until you can send it.

The SCN Coalition, a partnership of land grant universities and state soybean checkoff boards from 10 North Central states, also offers soil test kits and information on SCN management. The Coalition's toll-free number is 1-877-726-8378.



**Take the Test.
Beat the Pest.**

Table 10 a. Performance of special use soybean varieties, 1996-1998. Results for Danatto, Minnatto, Lambert, Toyopro and Kato from Morris and Rosemount. Results for all other varieties from Lamberton and Waseca.

Variety	Brand or Originator	Mature date	Yield, Bushel/Acre			Percent	
			1996-98	1997-98	1998	Protein	Oil
Danatto	N.D. AES	9-13	29	28	33	37	17
Minnatto	Minn. AES	9-13	26	26	25	39	16
Lambert	Minn. AES	9-13	40	42	47	39	17
Toyopro	Minn. AES	9-16	35	36	38	42	15
Kato	Minn. AES	9-17	40	44	48	39	17
IA1005	Iowa AES	9-18	-	-	55	38	17
IA1007	Iowa AES	9-18	-	-	53	39	16
IA1006	Iowa AES	9-18	-	-	53	36	17
HP204	Iowa AES	9-20	-	-	48	39	17
Vinton 81	Iowa AES	9-20	38	38	44	39	17
IA2021	Iowa AES	9-20	49	54	63	36	17
IA2011	Iowa AES	9-21	-	-	59	38	17
IA2019	Iowa AES	9-21	-	-	57	38	17
IA2012	Iowa AES	9-21	-	-	54	39	17
IA2017	Iowa AES	9-21	-	-	49	39	17
IA2016	Iowa AES	9-21	-	-	48	39	16
IA2020	Iowa AES	9-22	-	-	51	39	16
IA2025	Iowa AES	9-22	-	-	49	40	16
IA2030	Iowa AES	9-22	-	-	49	39	16
IA2028	Iowa AES	9-23	-	-	52	38	17
IA2027	Iowa AES	9-23	-	-	47	38	17
IA2033	Iowa AES	9-23	-	-	46	39	16
IA2029	Iowa AES	9-23	-	-	44	39	16
IA2035	Iowa AES	9-23	-	-	42	39	16
IA2023	Iowa AES	9-23	-	-	41	40	15
IA2034	Iowa AES	9-24	-	-	59	39	16
IA2032	Iowa AES	9-24	-	-	50	39	16
IA2024	Iowa AES	9-24	-	-	37	38	16
LSD 20%			2	3	4		

Table 10 b. Characteristics of special-use soybean varieties, 1998.

Variety	Releasing Institution	RM	Special Characteristics	Hilum Color	Phytophthora Gene	Chlorosis Score	Seeds/lb.
Danatto	N.D. AES	0.4	Small Seed	Yellow	S	MR	4,365
Lambert	Minn. AES	0.8	General Purpose	Buff	Rps1a	MR	2,873
Minnatto	Minn. AES	0.7	Small Seed	Yellow	Rps1a	MR	4,365
Toyopro	Minn. AES	0.8	High Protein	Yellow	S	S	2,802
Kato	Minn. AES	1.3	High Protein	Black	Rps1a	MR	2,112
IA1005	Iowa AES	1.9	Large Seed, High Protein	-	-	-	2,259
IA1007	Iowa AES	1.9	Large Seed	-	-	-	1,610
IA1006	Iowa AES	1.6	General Purpose	Black	S	MS	2,719
HP204	Iowa AES	2.0	Large Seed, High Protein	Yellow	-	-	2,000
VINTON 81	Iowa AES	2.0	Large Seed, High Protein	Yellow	Rps1a	-	1,948
IA2021	Iowa AES	2.1	General Purpose	Black	Rps1k	MS	2,580
IA2016	Iowa AES	2.2	Large Seed, High Protein	Yellow	-	-	1,948
IA2011	Iowa AES	2.2	Lacks Lipoxygenase 2	-	-	-	2,162
IA2012	Iowa AES	2.2	Large Seed	-	-	-	1,503
IA2017	Iowa AES	2.2	Large Seed, High Protein	-	-	-	1,991
IA2019	Iowa AES	2.2	Large Seed	-	-	-	1,593
IA2020	Iowa AES	2.3	Large Seed, High Protein	-	-	-	1,802
IA2030	Iowa AES	2.3	Lipoxygenase Free	-	-	-	1,908
IA2025	Iowa AES	2.4	Lipoxygenase Free	-	-	-	1,908
IA2028	Iowa AES	2.4	Lipoxygenase Free	-	-	-	1,846
IA2023	Iowa AES	2.4	Small Seed	-	-	-	5,974
IA2027	Iowa AES	2.4	Lipoxygenase Free	-	-	-	1,846
IA2033	Iowa AES	2.4	Lipoxygenase Free	-	-	-	1,900
IA2029	Iowa AES	2.4	Lipoxygenase Free	-	-	-	1,948
IA2035	Iowa AES	2.4	Small Seed	-	-	-	5,896
IA2032	Iowa AES	2.5	Lipoxygenase Free	-	-	-	1,726
IA2024	Iowa AES	2.5	Small Seed	-	-	-	6,053
IA2034	Iowa AES	2.5	Large Seed, High Protein	-	-	-	1,900

Minnesota Seed Producers and Promotion Association (MSPPA)

For nearly a quarter of a century a large group of Minnesota seed growers has identified and marketed certified public varieties of barley, oats, soybeans and wheat developed at the Minnesota Agricultural Experiment Station and other land-grant universities as MPS Seed. For the past 10 years their promotion efforts have included production of *The Seed Book*, a catalogue of public barley, oat, soybean and wheat varieties, which they have distributed without charge to Minnesota farmers, usually as an insert in *The Farmer* magazine.

These seed growers have now made a generous contribution to help support the Minnesota Agricultural Experiment Station's pro-

duction and widespread distribution of this Varietal Trials publication, and will no longer publish their Seed Book.

The Minnesota Agricultural Experiment Station appreciates the long-time support of the seedsmen members of MSPPA and their dedication to the production, conditioning and marketing of quality public varieties of farm crops developed

here and by other Agricultural Experiment Stations. You will know them by the MPS brand label on their certified barley, oat, soybean and wheat seed.

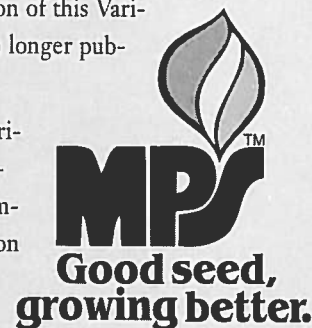


Table 11. Publicly developed varieties entered in 1998 tests.

Variety	Releasing Institution	Relative Maturity	Phytophthora Gene	BSR Reaction	SCN Reaction	Chlorosis Rating
Daksoy	N.D. AES	00.6	S	S	S	MS
McCall	Minn. AES	00.7	S	S	S	MR
Jim	N.D. AES	00.7	S	S	S	MS
Glacier	Minn. AES	00.8	Rps6	S	S	MS
Agassiz	Minn. AES	0.0	Rps1	S	S	MR
Traill	N.D. AES	0.0	S	S	S	MS
Ozzie	Minn. AES	0.3	Rps1	S	S	MR
MNO301	Minn. AES	0.3	Rps1	S	S	MS
Council	N.D. AES	0.5	Rps1	S	S	MR
Evans	Minn. AES	0.6	Rps1	S	S	MS
Dawson	Minn. AES	0.6	Rps1	S	S	R
Lambert	Minn. AES	0.8	Rps1	S	S	MR
Hendricks	Minn. + S.D. AES	0.9	Rps1	S	S	MS
Surge	Minn. + S.D. AES	0.9	Rps1	S	S	MS
Kato	Minn. AES	1.3	Rps1	S	S	MR
MN1301	Minn. AES	1.3	Rps1c	S	S	MR
Stride	Minn. + S.D. AES	1.3	Rps1	S	S	MS
MN1401	Minn. AES	1.4	Rps1	S	S	MS
Parker	Minn. AES	1.5	Rps1	S	S	S
IA1006	Iowa AES	1.6	S	R	S	MS
Freeborn	Minn. AES	1.6	Rps1	R	R	MR
Bert	Minn. AES	1.8	Rps1	S	S	MS
Granite	Minn. AES	1.8	Rps1	R	S	MS
Faribault	Minn. AES	1.9	Rps1	R	R	MS
Archer	Iowa AES	1.9	Rps1k+Rps6	R	S	MR
Hardin 91	Iowa AES	2.0	Rps1k	S	S	S
Sturdy	Minn. AES	2.1	Rps1	S	S	MR
IA2021	Iowa AES	2.1	Rps1k	S	S	S
Titan	Mich. AES	2.1	S	S	S	MS
IA2008R	Iowa AES	2.2	Rps1k	R	S	MS
Bell	Ill. AES	2.2	S	S	R	MS
IA2036	Iowa AES	2.2	S	S	R	MS
IA2038	Iowa AES	2.3	S	S	S	MS

Table 12. Special-use publicly developed varieties entered in 1998 tests.

Variety	Releasing Institutions/ Licensees	Approximate Relative Maturity	Special Traits	Other Characteristics
Dannatto	N.D. AES	0.4	Small	
Proto	Minn. AES	0.6	High Protein	
Minnatto	Minn. AES/Sigco Sun Products	0.7	Small	Rps1 Phytophthora Gene
Toyopro	Minn. AES/Northland Organic Foods	0.8	High Protein	
Kato	Minn. AES	1.3	High Protein	
Black Kato	Minn. AES/Seed America Inc.	1.3	High Protein	Black Seed Coat
IA1005	Iowa AES/ISURF	1.9	Large, High Protein	
IA1007	Iowa AES/ISURF	1.9	Large	
Vinton81	Iowa AES	2.0	Large, High Protein	Rps1 Phytophthora Gene
HP204	Iowa AES/ISURF	2.0	Large, High Protein	
IA2011	Iowa AES/ISURF	2.2	Lacks Lipoxygenase 2	
IA2012	Iowa AES/ISURF	2.2	Large	
IA2016	Iowa AES/ISURF	2.2	Large, High Protein	
IA2017	Iowa AES/ISURF	2.2	Large, High Protein	
IA2019	Iowa AES/ISURF	2.2	Large	
IA2020	Iowa AES/ISURF	2.3	Large, High Protein	
IA2025	Iowa AES/ISURF	2.3	Lipoxygenase Free	
IA2030	Iowa AES/ISURF	2.3	Lipoxygenase Free	
IA2023	Iowa AES/ISURF	2.4	Small	
IA2027	Iowa AES/ISURF	2.4	Lipoxygenase Free	
IA2028	Iowa AES/ISURF	2.4	Lipoxygenase Free	
IA2029	Iowa AES/ISURF	2.4	Lipoxygenase Free	
IA2033	Iowa AES/ISURF	2.4	Lipoxygenase Free	
IA2035	Iowa AES/ISURF	2.4	Small	
IA2024	Iowa AES/ISURF	2.5	Small	
IA2032	Iowa AES/ISURF	2.5	Lipoxygenase Free	
IA2034	Iowa AES/ISURF	2.5	Large, High Protein	

Locations of Releasing Institutions/Licensees

Sigco Sun Products
Breckenridge, MN 56520

Northland Organic Foods Corp.
462 Holly Ave., St. Paul, MN 55102

Seed America, Inc., P.O. Box 226,
Breckenridge, MN 56520

ISURF:

Iowa State University Research Foundation
310 Lab of Mechanics,
Ames, Iowa 50011

Iowa AES:

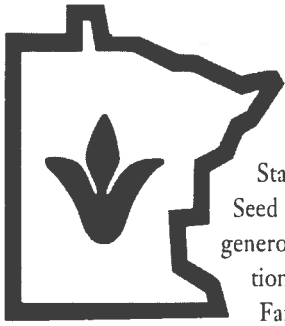
Iowa Agricultural Experiment Station
Iowa State University
Ames, Iowa 50011

N.D. AES:

North Dakota Agricultural
Experiment Station,
North Dakota State University,
Fargo, ND 58105

Minn. AES:

Minnesota Agricultural Experiment Station
University of Minnesota
St. Paul, MN 55108



Minnesota Approved Seed Conditioners and Marketing Association

The Minnesota Agricultural Experiment Station appreciates the Minnesota Approved Seed Conditioners and Marketing Association's generous financial contribution toward publication of the 1999 edition of Varietal Trials of Farm Crops.

The member plants of this association, identified by the symbol shown, are approved for conditioning certified seed by the Minnesota Crop Im-

provement Association (MCI). These plants play a significant role in distributing seed of varieties developed by the Agricultural Experiment Station and in enhancing the quality of seed planted in the state. They are designed specifically for the proper conditioning of seed, are properly built and equipped, meet specific seed-handling standards, and are inspected at least annually by MCI to assure that all requirements for approved plant status are met. They are a wise choice for quality seed conditioning services.

Adams Seed	Wendell	218-458-2151	Krabbenhoft Seed & Supply	Sabin	218-789-7219
Albert Lea Seed House	Albert Lea	507-373-3161	L.B. Grain	Lake Bronson	218-754-4200
Angell Seed Farm	Blooming Prairie	507-583-7581	Lee Seed Farm	Borup	218-494-3330
Backman Seeds	Herman	320-677-2231	Lee's Seed Farm	Benson	320-843-2857
Behm Seed Company	Atwater	320-974-3003			
Beyer Seed Farm	Kent	218-643-5126	Lincoln County Feed & Seed	Ivanhoe	507-694-1243
Bloomquist Farms	Drayton, N.D.	218-455-3863	Madison Farmers Mill & Elevator	Madison	320-598-7351
Borg Seed Farm	Cokato	320-286-2222	Marvin's	Warroad	218-386-1333
Busch Agricultural Resources	Moorhead	218-236-7472	McFarlane Seeds	Greenbush	218-782-2261
Busse Seeds	Appleton	320-394-2315			
Byron Farm Store	Waseca	507-835-1120	Meyer's Seed	Elgin	507-876-2482
Capistran Seed Company	Crookston	218-281-7840	Mid-Valley Grain Cooperative	Crookston	218-281-2881
Circle C Seeds	Gary	218-356-8214	Nietfeld Farm	Melrose	320-987-3442
Clinton Ag Service	Clinton	320-325-5203	Petermann Seeds	Hawley	218-483-3302
Corning Seed & Supply	Austin	507-433-9002	Red River Marketing Company	Elbow Lake	218-685-6100
Crop Production Services	Perham	218-346-2355	Rivard's Quality Seeds	Argyle	218-437-6638
Dahlco Seeds	Cokato	320-286-5982	Ron Petersen Seeds	Lake Bronson	218-754-4631
Dahlman Seed Company	Dassel	320-275-2527	Ross Seed Company	Fisher	218-891-2211
Dammann Seed Company	Plato	320-864-3004	Rossbach Lakeside Seeds	Hanska	507-794-7698
Del Lynn Farms	Gully	218-784-4743	Sawwell's Seed	Clements	507-692-2240
Enestvedt Brothers	Sacred Heart	320-765-2728	Schaefer Brothers	Hancock	320-392-5380
Falk Seed Farm	Murdock	320-875-4341	Spronk & Sons Seed Farm	Edgerton	507-442-5334
Farmers Co-op Grain & Seed	Thief River Falls	218-681-6281	St. Hilaire Seed Company	St. Hilaire	218-964-5407
Galler Seeds	Elysian	507-267-4328	Stevens Seed Farms	Amboy	507-674-3535
Haas Seed Farm	Le Sueur	507-665-3683	Storden Seed & Chemical Service	Storden	507-445-3217
Haberer Seed Farm	Morris	320-795-2468	Swenson Seed Farm	Brooks	218-796-5285
Habstritt Farms	Roseau	218-463-1193	Thiel Seed Service	Wendell	218-458-2415
Hapka Seed Farm	Argyle	218-437-6603	Tobolt Seed	Moorhead	218-287-2904
Haugrud Seed Plant	Rothsay	218-493-4275	Tracy-Garvin Cooperative	Tracy	507-629-3780
Heartland Seeds	Moorhead	218-585-4621	Unity Seeds	Cassleton, N.D.	701-347-5355
Hermanson Seed Plant	Boyd	320-855-2527	Watowan Farm Service	Kiester	507-294-3697
Howard Seed Farms	Warren	218-745-4610	Weinlaeder Seed Company	Drayton, N.D.	701-454-6427
Jackson Farmers Cooperative Assn.	Jackson	507-847-4160	Wendlandt Brothers	Garden City	507-546-3847
Jensen Seed Company	Stephen	218-478-3397	Werner Farm Seeds	Dundas	507-645-7995
Johnson Seeds of Dassel	Dassel	20-275-2430	Wigen Seed Farm	Litchfield	320-693-8182
JSF, Inc.(Johnson Seed Farm)	Sacred Heart	320-765-2225	Willette Seed Farm	Delavan	507-854-3595
Knapp Seed Farm	Foxhome	218-739-3366	Wright Seed Service	West Concord	507-527-2737
			Zabel Seeds	Plainview	507-534-2487
			Ziller Seed Company	Bird Island	320-365-3674
			Zimmerman Seeds	Racine	507-378-207

Sources of Registered and Certified Seed

Following are sources of Registered and Certified seed of crop varieties grown for certification in Minnesota in 1998. Many of these varieties were developed by the Minnesota Agricultural Experiment Station, some by experiment stations of other land-grant universities of the Upper Midwest, a few by commercial seed companies.

Fields of these seed growers were inspected by Minnesota Crop Improvement Association (MCIA). To be eligible for final certification the seed produced on these fields must be sampled, tested and inspected by MCIA after conditioning. The term "certified" is broadly applied to three classes of seed: Foundation, Registered and Certified. Registered seed is grown from Foundation seed and Certified seed is usually grown from Registered seed, though Certified seed of some varieties is grown directly from the Foundation seed class.

Certified seed transported across state lines must comply with the stipulations of the Fed-

eral Seed Act and with seed laws and regulations of the state into which it is transported. Seed tagged with MCIA certification tags or for which an MCIA bulk certification certificate has been issued has been grown, conditioned, sampled and tested according to MCIA regulations and meets applicable requirements of the Minnesota Department of Agriculture.

Prospective buyers of seed from growers in the list that follows should contact growers directly for information about seed quantity and price. If misrepresentation, mislabeling or violation of regulations under which certified seed classes are produced and marketed is suspected, contact Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108.

This listing is provided 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 the sale of seed.

Notice to Buyers

MCIA cannot assume financial responsibility for the performance of seed listed in this directory or for disagreements over sales that may arise from this list; however, any complaint about certified seed addressed to MCIA will be investigated. Should a claim over seed performance involving MCIA arise, it must be addressed as provided in Minnesota Department of Agriculture Rules for Arbitration of Seed Performance Disputes. It is the responsibility of the seller of certified seed to supply seed representative of the samples submitted and approved for certification by MCIA. Purchasers of seed should insist on certification being complete, with certified seed tags attached to bags or a bulk sale certificate issued for bulk seed lots.

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

BARLEY

County	Grower	Town	Phone Number	Class
Excel				
Clay	Beedy Farms, Inc.	Moorhead	218-236-8082	C
Clay	Hurner, Craig	Glyndon	218-236-6790	C
Kittson	Weinlaeder Seed Company	Drayton	701-454-6427	R
Marshall	Backstrom Farms, Inc.	Warren	218-745-5113	C
Marshall	Bring, Wesley	Strandquist	218-874-3713	R
Marshall	Szepanski, Thomas	Stephen	218-478-2462	R
Polk	Novacek, Ronald	East Grand Forks	218-773-2293	C
Roseau	Habstritt Farms, Inc.	Roseau	218-463-1193	R
Todd	Brekke, Floyd	Eagle Bend	218-738-2672	C
Foster				
Clay	Arneson Farms	Hawley	218-483-4165	R
Clay	Gemar, Timothy	Felton	218-236-5223	C
Clay	Olsgaard, Daniel J.	Moorhead	218-585-4436	C
Douglas	Sward Seed Farm	Nelson	320-762-0143	R
Kittson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R C
Mahnomen	Flaugo, David	Waubun	218-473-2254	C
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	C
Hazen				
Todd	Faust, Kevin	Long Prairie	320-732-3361	R
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
MNBrite				
Clay	Wetterlin, Jerry	Glyndon	218-494-3339	C
Clay	Zimmerman, Wayne	Ulen	218-596-8628	R
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Kandiyohi	Loge, Alan	Willmar	320-235-4178	C
Kittson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R
Kittson	Carlson, James A.	Hallock	218-843-3483	C
Kittson	Hunt, Hugh	Hallock	218-843-2327	R
Kittson	Jensen, A. Gay Farms Co.	Drayton	701-454-6294	C
Kittson	Kowalski, Francis L.	Drayton	701-352-3691	R
Kittson	Nelson, Merle L.	Drayton	218-455-3508	R
Kittson	Olsonawski, Jerry	Hallock	218-379-3235	C
Kittson	Petersen, Ronald L.	Lake Bronson	218-754-4631	R C
Kittson	Rickenberg, Jeff	Kennedy	218-674-4231	R
Kittson	Sedenquist Farms, Inc.	Kennedy	218-674-4218	C
Kittson	Weinlaeder Seed Company	Drayton	701-454-6427	R C
Mahnomen	Haugo, David	Waubun	218-473-2254	R
Mahnomen	Pazdernik Farms, Inc.	Waubun	218-473-2232	R C
Marshall	Backstrom Farms, Inc.	Warren	218-745-5113	R C
Marshall	Gryskiewicz, Donald & Jeff	Stephen	218-437-8164	R C
Marshall	Jensen Farms	Stephen	218-478-2476	R C
Marshall	Kowalski, James	Stephen	218-455-3894	R
Marshall	Rivard's Quality Seeds, Inc.	Argyle	218-437-6638	R C
Marshall	Robertson Brothers	Argyle	218-437-6411	R
Marshall	Szepanski, Thomas	Stephen	218-478-2462	C
Marshall	Widner, Neil	Stephen	218-478-3616	C
Marshall	Yutzenka, Kevin & Leonard	Argyle	218-437-6468	R
Norman	Brandt, Robert	Ada	218-784-4093	R
Norman	Brandt, Robert Jr.	Ada	218-784-4093	C
Norman	Brandt, Wayne & John	Ada	218-784-4774	R
Norman	Chisholm, Keith P.	Gary	218-356-8674	R
Norman	Circle C Seeds	Gary	218-356-8214	C
Norman	Malme, Cecil	Shelly	218-886-8488	R
Otter Tail	Brenden, Bruce L.	Rothsay	218-867-2410	C
Otter Tail	Brenden, Selvin C.	Rothsay	218-867-2134	R
Pennington	Engelstad Farms of Rocksbury	Thief River Falls	218-681-1000	R C
Pennington	Scholin Farms	Thief River Falls	218-964-5268	R C
Pipestone	Skyline Production System	Woodstock	507-777-4262	C
Pipestone	Spronk, Art & Sons Seed Farm	Edgerton	507-442-5334	R
Polk	Anderson Farms, Inc., J D	East Grand Forks	218-773-2280	R
Polk	Capistran Seed Company	Crookston	218-281-7840	R
Polk	Danielson, Ellsworth	Fosston	218-435-1729	R
Polk	Gunvalson & Imle	Gonvick	218-268-4415	R
Polk	Larson Farms, Inc., Ralph	East Grand Forks	218-773-1463	R C
Polk	Larson, Ray H., Inc.	Angus	218-745-5923	R
Polk	Mat - Co., Inc.	Fosston	218-435-6667	R
Polk	Peterson, Douglas	East Grand Forks	218-773-9120	R

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

Polk	Ross Seed Co.	Fisher	218-891-2211	R	Grant	Adams Seed	Wendell	218-458-2151	C
Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	R C	Grant	Lacey Company, Gerald A.	Wendell	218-458-2595	R
Polk	Tiedemann, Gene R.	Euclid	218-281-6723	R C	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R
Polk	Vig Farms Inc.	Fosston	218-435-1316	C	Kitson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R C
Polk	Wentzel, Walton Farms, Inc.	Fisher	218-281-2207	R	Kitson	Johnson Farms, Inc., Lloyd	Karlstad	218-436-2817	R
Red Lake	Myhre Farms	Red Lake Falls	218-698-4485	R	Marshall	Bring, Wesley	Strandquist	218-874-3713	C
Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R C	Marshall	Gryskiewicz, Donald & Jeff	Stephen	218-437-8164	C
Roseau	Habstritt Farms, Inc.	Roseau	218-463-1193	R C	Marshall	Hannes Farms, Inc.	Stephen	218-478-3382	C
Wilkin	Friederichs Farm	Foxhome	218-643-2363	R	Marshall	Jensen Farms	Stephen	218-478-2476	C
Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	R C	Marshall	Kowalski, James	Stephen	218-455-3894	C
Robust					Marshall	Kuznia, Kenneth J.	Argyle	218-437-8203	R
Becker	Hein Farms, Inc.	Audubon	218-439-6621	C	Marshall	Peterson, Maynard	Stephen	218-478-3859	R
Carlton	Korhonen, Art	Kettle River	218-273-4931	C	Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R
Clay	Kuehl Bros. Farms	Glyndon	218-498-2141	C	Marshall	Rivard Farms, G.A.	Argyle	218-437-6638	R
Clay	Olek, Bradley	Felton	218-494-3440	C	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	C
Clay	Olek, Vernard	Felton	218-494-3440	C	Marshall	Tulibaski Brothers	Argyle	218-437-8415	C
Clay	Swanson, Arthur & Dirk	Moorhead	218-233-5996	C	Mower	Grass & Sons Seed Service	Leroy	507-324-5820	R
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C	Pennington	Scholin Farms	Thief River Falls	218-964-5268	R C
Grant	Adams Seed	Wendell	218-458-2151	R C	Pipestone	Spronk, Art & Sons Seed Farm	Edgerton	507-442-5334	R
Kitson	Grundstrom, Gary	Donaldson	218-466-2755	C	Polk	Barrett, Glenn R.	Angus	218-475-4782	R
Kitson	Petersen, Ronald L.	Lake Bronson	218-754-4631	C	Polk	Bergman Farms, James	Oslo	218-965-4913	C
Mahnomen	Greenhills, Inc.	Fargo	701-277-0708	C	Polk	Brule, David A.	Crookston	218-281-2944	C
Mahnomen	Pazdermik Farms, Inc.	Waubun	218-473-2232	C	Polk	Caillier, Daniel	Crookston	218-281-2840	C
Marshall	Anderson, Harvey & Luther	Stephen	218-455-3305	R	Polk	Capistran, Kevin	Crookston	218-281-5705	C
Marshall	Backstrom Farms, Inc.	Warren	218-745-5113	C	Polk	Kovar, Frank & Duane	East Grand Forks	218-773-9238	C
Marshall	Double A Farms	Viking	218-523-4246	C	Polk	McWalter Farms, Inc.	East Grand Forks	218-773-1473	C
Marshall	Erickson, Paul	Thief River Falls	218-449-3331	C	Polk	Peterson, D.W., Inc.	Warren	218-745-4507	R
Marshall	Farmers Elevator Company	Alvarado	218-965-4812	C	Red Lake	Myhre Farms	Red Lake Falls	218-698-4485	C
Marshall	Martin, Doyle A.	Thief River Falls	218-449-3635	C	Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R C
Marshall	Rivard Farms, Inc.	Argyle	218-437-6479	C	Red Lake	Vatthauer Farm	Red Lake Falls	218-253-2490	C
Marshall	Robertson Brothers	Argyle	218-437-6411	R	Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C
Marshall	Sczepanski, Thomas	Stephen	218-478-2462	R	Wabasha	Zabel Seeds	Plainview	507-534-2487	C
Meecker	Peterson, Melvin	Atwater	320-877-7585	R	Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	C
Meecker	Peterson, Russell M.	Grove City	320-877-7793	C	Wright	Hopkins, Joseph	Buffalo	612-682-1868	C
Meecker	Wigen Seed Farm	Litchfield	320-693-8182	C	BEANS				
Norman	Chisholm, Keith P.	Gary	218-356-8674	C	Arapaho pinto beans				
Norman	Nelson, Kenneth R.	Halstad	218-456-2578	C	Pennington	Scholin Farms	Thief River Falls	218-964-5268	C
Norman	Sirjord Farms	Bejou	218-356-8285	C	Frontier Pinto				
Otter Tail	Crop Production Services	Perham	218-346-2355	C	Grant	Kapphahn, John M.	Elbow Lake	218-685-4604	C
Otter Tail	Huwe, Larry	Perham	218-346-3101	C	Maverick Pinto				
Pennington	Mehrkens, Kyle	Thief River Falls	218-681-4611	C	Grant	Kapphahn, John M.	Elbow Lake	218-685-4604	R
Polk	Abrams, Gary	Crookston	218-926-5744	C	Pennington	Scholin Farms	Thief River Falls	218-964-5268	C
Polk	Brule, David A.	Crookston	218-281-2944	C	Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	R
Polk	Caillier, Daniel	Crookston	218-281-2840	C	Montcalm Red Kidney				
Polk	Clementson, Jon	Erskine	218-687-2345	C	Stearns	Herickhoff Farms	Belgrade	320-254-3636	R
Polk	Gullekson, Ray, Brent & Brian	Beltrami	218-926-5642	C	Norstar Navy				
Polk	Kovar, Frank & Duane	East Grand Forks	218-773-9238	C	Grant	Kapphahn, John M.	Elbow Lake	218-685-4604	R
Polk	Larson Farms, Jerry Larson	Climax	218-857-3345	C	Grant	Thiel Seed Service	Wendell	218-458-2415	C
Polk	Mat - Co., Inc.	Fosston	218-435-6667	R C	BIG BLUESTEM				
Polk	Novak, James	Angus	218-745-5048	C	Bison				
Polk	Ostenaa, Sidney & DeWayne	Mc Intosh	218-563-7395	C	Polk	Gullickson, Mark & Russell	Fertile	218-945-6894	C
Red Lake	Payment, Darrell	Red Lake Falls	218-253-2254	C	Polk	Kaste, Inc.	Fertile	218-945-6738	C
Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R C	Roseau	Baumgartner Farms, Inc.	Roseau	218-463-1332	C
Roseau	Cenex Harvest States Elevators	Badger	218-528-3205	C	BIRDSFOOT TREFOIL				
Roseau	Kilen, Jerel	Greenbush	218-782-2883	C	Norcen				
Roseau	Svoboda - Transgrud	Badger	218-528-3692	C	Lake of Woods	Pieper, Danny	Williams	218-783-4352	R
Stearns	Jokeland Farms	Holdingsford	320-746-2147	C	Lake of Woods	Pieper, Robert	Williams	218-783-4352	R C
Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C	Roseau	Solberg, Richard	Greenhush	218-782-2107	R
Stearns	Nietfeld Farm, Inc.	Melrose	320-987-3442	C	Roseau	Svoboda - Transgrud	Badger	218-528-3692	C
Todd	Brekke, Floyd	Eagle Bend	218-738-2672	C	CANADA WILD RYE				
Todd	Faust, Kevin	Long Prairie	320-732-3361	C	Mandan				
Washington	Wagner, W.V.	Hastings	651-437-5718	C	Polk	Kaste, Inc.	Fertile	218-945-6738	C
Wilkin	Haugrud Seed Plant	Rothsay	218-493-4275	R	Roseau	Baumgartner Farms, Inc.	Roseau	218-463-1332	C
Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	C	Royal				
Pipestone					Zeinstra, Michael	Holland	507-347-3342	C	
Rice					Werner Farm Seeds	Dundas	507-645-7995	C	
Wabasha					Zabel Seeds	Plainview	507-534-2487	R C	
Stander									
Douglas	Sward Seed Farm	Nelson	320-762-0143	C					
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C					
Goodhue	Ag Partners Co-op	Goodhue	651-923-4496	C					
Goodhue	Buck, Don	Zumbrota	507-732-5186	C					

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

CANOLA

Golden Boy	Wilkin	Seeds 2000	Breckenridge	218-643-2410	C
Quantum	Meeker	Interstate Payco	Dassel	320-286-5511	C

CICER MILKVETCH

Windsor	Kittson	Carlson, Oscar T.	Lake Bronson	218-754-4475	R
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CORN

E570 Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E580 Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E605 Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E606 Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E650A Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E660A Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E670A Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E690 Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
E800A Hybrid	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C

CROWN VETCH

Penngift	Lake of Woods	Tveit Farms	Roosevelt	218-442-5281	C
	Polk	Kaste, Inc.	Fertile	218-945-6738	C

DURUM WHEAT

Belzer	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	R
Ben	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	R
	Norman	Madson & Anderson	Halstad	218-456-2215	C
Munich	Clay	Olek, Bradley	Felton	218-494-3440	C
	Polk	Novak, James	Angus	218-745-5048	C

FIELD PEAS

Carneval	Pipestone	Skyline Production System	Woodstock	507-777-4262	C
Profi	Pipestone	Skyline Production System	Woodstock	507-777-4262	C
Trapper	Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R

FLAX

AC Emerson	Kittson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R
	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	R
Neche	Kittson	Petersen, Ronald L.	Lake Bronson	218-754-4631	R C
	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	C
Webster	Kittson	Petersen, Ronald L.	Lake Bronson	218-754-4631	R

INDIANGRASS

Tomahawk	Polk	Gullickson, Mark & Russell	Fertile	218-945-6894	C
	Polk	Kaste, Inc.	Fertile	218-945-6738	C
	Roseau	Baumgartner Farms, Inc.	Roseau	218-463-1332	C

KENTUCKY BLUEGRASS

Minnfine	Roseau	Habstritt Farms, Inc.	Roseau	218-463-1193	C
	Roseau	Marvin's	Warroad	218-386-1333	C
Newport	Roseau	Marvin's	Warroad	218-386-1333	C
Park	Lake of Woods	Pieper Farms, Jerry	Williams	218-783-6610	C
	Lake of Woods	Pieper, Robert	Williams	218-783-4352	C
	Roseau	Dahl, Stephen Ray	Roseau	218-463-1569	C
	Roseau	Eastman, Bob	Roseau	218-463-2873	C
	Roseau	Evergreen Farms	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	Grahn, Greg R.	Warroad	218-463-3570	C
	Roseau	Habstritt Farms, Inc.	Roseau	218-463-1193	R C
	Roseau	Hagen, L & L Farms, Inc.	Badger	218-528-3523	C
	Roseau	Hagen, William	Warroad	218-386-1400	C
	Roseau	Johnson Seed Farms, Inc.	Salol	218-424-7269	C
	Roseau	Johnson, Rodney	Alexandria	320-589-1003	C
	Roseau	Johnson, Steve	Roseau	218-424-7070	C
	Roseau	Lund, Ludvig	Roseau	218-463-1029	C
	Roseau	Magnusson Farms	Roseau	218-463-2374	C
	Roseau	Marvin's	Warroad	218-386-1333	C
	Roseau	Miller, Scott	Warroad	218-386-1739	C
	Roseau	Millner Farms, Gene Millner	Roseau	218-463-2164	C
	Roseau	Northern Minnesota Bluegrass	Roseau	218-463-1179	R C
	Roseau	Olafson, Mark	Roseau	218-463-3958	C
	Roseau	Santl Farms	Roseau	218-463-2686	C
	Roseau	Scott-Kveen Seed Company	Roseau	218-463-2073	C
	Roseau	Slater, Gary	Roseau	218-463-1064	C
	Roseau	Swanson, Leslie	Roseau	218-463-2702	C
	Roseau	Wahlberg, John	Roseau	218-386-2453	C

OATS

Belle	Brown	Rosbach Lakeside Seeds, Inc.	Hanska	507-794-7698	C
	Dodge	Wright Seed Service	West Concord	507-527-2737	C
	Douglas	Thompson Farms	Kensington	320-965-2486	C
	Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	C
	Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C
	Goodhue	Tri, Robert R.	Zumbrota	507-732-7153	C
	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	C
	Le Sueur	Cannon Valley Cooperative	Le Center	507-357-6841	C
	Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	C
	Lincoln	Buhl, Don	Tyler	507-247-3838	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
	Olmsted	Meyer's Seeds, Inc.	Elgin	507-876-2482	C
	Otter Tail	Crop Production Services	Perham	218-346-2355	C
	Otter Tail	Peeters, John	Menahga	218-385-2609	C
	Polk	Sundrud Farms, O.	Fosston	218-435-6915	C
	Redwood	Sawvell's Seed, Inc.	Clements	507-692-2240	C
	Rice	Werner Farm Seeds	Dundas	507-645-7995	C
	Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C
	Swift	Falk Seed Farm	Murdock	320-875-4341	C
	Wabasha	Zabel Seeds	Plainview	507-534-2487	C
	Wright	Hopkins, Joseph	Buffalo	612-682-1868	C
	Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C

Dane

	Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C
	Goodhue	Tri, Robert R.	Zumbrota	507-732-7153	C
	Houston	Troendle Farms	Spring Grove	507-724-2211	C
	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	C
	Kandiyohi	Bredeson Seed Farm	Willmar	320-235-7315	C

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

Kandiyohi	Loge, Alan	Willmar	320-235-4178	C	McLeod	Dannmann Seed Farms	Plato	320-864-3004	C
Le Sueur	Cannon Valley Cooperative	Le Center	507-357-6841	C	Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	C	Mower	Corning Seed & Supply Inc.	Austin	507-433-9002	C
Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C	Mower	Grass & Sons Seed Service	Leroy	507-324-5820	R C
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	C	Mower	Zimmerman Seeds	Racine	507-378-2077	C
Mower	Corning Seed & Supply Inc.	Austin	507-433-9002	C	Nobles	Spieker, William	Kenneth	507-472-8406	C
Mower	Grass & Sons Seed Service	Leroy	507-324-5820	C	Olmsted	Meyer's Seeds, Inc.	Elgin	507-876-2482	C
Nicollet	Anderson & Sons	St. Peter	507-246-5032	C	Otter Tail	Crop Production Services	Perham	218-346-2355	C
Olmsted	Meyer's Seeds, Inc.	Elgin	507-876-2482	C	Otter Tail	Double C Seeds	Henning	218-583-2584	C
Otter Tail	Peeters, John	Menahga	218-385-2609	C	Otter Tail	Kunza, Ted	Perham	218-346-3926	C
Pipestone	Spronk, Art & Sons Seed Farm	Edgerton	507-442-5334	C	Pine	Cabak, Daniel C.	Hinckley	320-384-7377	C
Redwood	Sawvells Seed, Inc.	Clements	507-692-2240	C	Pipestone	Nielsen, Virgil	Lake Benton	507-658-3517	C
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C	Pipestone	Spronk, Art & Sons Seed Farm	Edgerton	507-442-5334	R C
Stearns	Krippner, Joe	Kimball	320-685-8256	C	Polk	Capistran Seed Company	Crookston	218-281-7840	C
Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C	Polk	Fosston Co-op Seed House	Fosston	218-435-6222	R C
Stearns	Schoenborn, Dave	Melrose	320-987-3415	C	Polk	Pulkraabek Farms, Inc. Gary	Angus	218-745-5891	R
Swift	Falk Seed Farm	Murdock	320-875-4341	C	Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R
Wabasha	Dill Company, John M. Evers	Wabasha	651-565-2611	C	Redwood	Sawvells Seed, Inc.	Clements	507-692-2240	C
Wabasha	Zabel Seeds	Plainview	507-534-2487	C	Rice	Salaba, Larry	Faribault	507-334-2603	C
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C	Rice	Werner Farm Seeds	Dundas	507-645-7995	C
Don					Stearns	Kane, Tom	Sauk Centre	320-352-5373	C
Faribault	Watowan Farm Service	Kiester	507-294-3697	C	Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C
Gem					Stearns	Schoenborn, Dave	Melrose	320-987-3415	C
Brown	Cunningham Seed Farms	Sleepy Eye	507-794-7323	C	Swift	Falk Seed Farm	Murdock	320-875-4341	R C
Dodge	Wright Seed Service	West Concord	507-527-2737	C	Wabasha	Dill Company, John M. Evers	Wabasha	651-565-2611	C
Douglas	Thompson Farms	Kensington	320-965-2486	C	Wabasha	Zabel Seeds	Plainview	507-534-2487	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C	Washington	Wagner, W.V.	Hastings	651-437-5718	C
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	C	Washington	Welander, Arthur	Stillwater	651-439-2598	C
Kandiyohi	Loge, Alan	Willmar	320-235-4178	C	Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	C	Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C
Lincoln	Jerzak, William W.	Ivanhoe	507-694-1736	C	Jim				
Lyon	Tholen Seeds	Tracy	507-629-3505	C	Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C	Goodhue	Ag Partners Co-op	Goodhue	651-923-4496	C
Meeker	Smith, Steven	Darwin	320-693-6769	C	Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R C
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	C	Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	R C
Mower	Corning Seed & Supply Inc.	Austin	507-433-9002	C	Mower	Grass & Sons Seed Service	Leroy	507-324-5820	R
Mower	Grass & Sons Seed Service	Leroy	507-324-5820	C	Otter Tail	Peeters, John	Menahga	218-385-2609	C
Mower	Zimmerman Seeds	Racine	507-378-2077	C	Polk	Gunvalson & Imle	Gonvick	218-268-4415	C
Norman	Kveno, Harry	Gary	218-356-8278	C	Red Lake	Braaten, Edward E	Red Lake Falls	218-253-2293	C
Olmsted	Meyer's Seeds, Inc.	Elgin	507-876-2482	C	Renville	Kiecker Seed Company	Hector	507-426-8167	C
Otter Tail	Huwe, Janice	New York Mills	218-385-3865	C	Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Otter Tail	Piekarski, Jonathan C.	Fergus Falls	218-739-2908	C	Todd	Faust, Kevin	Long Prairie	320-732-3361	C
Pipestone	Spronk, Art & Sons Seed Farm	Edgerton	507-442-5334	C	Wabasha	Dill Company, John M. Evers	Wabasha	651-565-2611	C
Redwood	Sawvells Seed, Inc.	Clements	507-692-2240	C	Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C
Renville	Hanson Seeds	Fairfax	507-426-7320	C	Milton				
Renville	Kiecker Seed Company	Hector	507-426-8167	C	Carlton	Korhonen, Art	Kettle River	218-273-4931	C
Stearns	Klaphake, Maurice	Melrose	320-256-3151	C	Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	R C
Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C	Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C
Stearns	Nietfeld Farm, Inc.	Melrose	320-987-3442	C	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C
Swift	Falk Seed Farm	Murdock	320-875-4341	C	Kandiyohi	Bredeson Seed Farm	Willmar	320-235-7315	C
Todd	Buchholz Farms	Grey Eagle	320-285-5401	C	Kandiyohi	Loge, Alan	Willmar	320-235-4178	C
Todd	Schwanke, Lloyd	Grey Eagle	320-285-5417	C	Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R C
Wabasha	Zabel Seeds	Plainview	507-534-2487	C	Meeker	Anderson Seeds	Dassel	320-286-2700	C
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C	Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C
Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C	Meeker	Smith, Steven	Darwin	320-693-6769	C
Jerry					Meeker	Wigen Seed Farm	Litchfield	320-693-8182	R C
Brown	Cunningham Seed Farms	Sleepy Eye	507-794-7323	R	Norman	Malme, Cecil	Shelly	218-886-8488	R
Chippewa	Milan Farmers Elevator	Milan	320-734-4435	C	Otter Tail	Crop Production Services	Perham	218-346-2355	C
Clearwater	Fredrickson Farms, Donald	Bagley	218-694-2732	C	Pine	Cabak, Daniel C.	Hinckley	320-384-7377	C
Clearwater	Godtland, John	Gonvick	218-487-5672	C	Renville	Hanson Seeds	Fairfax	507-426-7320	C
Clearwater	Holm, Duane	Shevlin	218-785-2786	C	Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Dakota	May, Jr., William	Farmingington	612-463-8541	C	Stearns	Klaphake, Maurice	Melrose	320-256-3151	C
Faribault	Watowan Farm Service	Kiester	507-294-3697	C	Stearns	Krippner, Joe	Kimball	320-685-8256	C
Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	C	Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C	Stearns	Nietfeld Farm, Inc.	Melrose	320-987-3442	C
Freeborn	Angell Seed Farm	Blooming Prairie	507-583-7581	R	Todd	Faust, Kevin	Long Prairie	320-732-3361	C
Goodhue	Ag Partners Co-op	Goodhue	651-923-4496	C	Todd	Schwanke, Lloyd	Grey Eagle	320-285-5417	R C
Goodhue	Tri, Robert R.	Zumbrota	507-732-7153	R	Wabasha	Dill Company, John M. Evers	Wabasha	651-565-2611	C
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C	Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R C	Ogle				
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	C	Faribault	Watowan Farm Service	Kiester	507-294-3697	C
Lincoln	Popowski, John	Ivanhoe	507-694-1593	C	Premier				
Mahnomen	Seeger, John	Mahnomen	218-935-5705	C	Faribault	Watowan Farm Service	Kiester	507-294-3697	C
Marshall	Newfolden Co-op Elev. Assn.	Newfolden	218-874-7465	C					

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

Riser									
Clay	Anderson, Lynn	Moorhead	218-287-1765	R	Norman	Hanson, Corey, M.	Gary	218-356-8678	R
Dodge	Wright Seed Service	West Concord	507-527-2737	R	Norman	Peppel Bros. Donald & Dennis	Borup	218-582-3242	C
Douglas	Sward Seed Farm	Nelson	320-762-0143	R	Norman	Ramstad Brothers	Ada	218-784-7190	C
Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	R	Polk	Barrett, John M.	East Grand Forks	218-773-0338	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R	Polk	Bauer Farms	Erskine	218-687-5356	C
Goodhue	Stenlund, Arne H. & Son	Goodhue	651-923-4107	R	Polk	Brule, David A.	Crookston	218-281-2944	C
Goodhue	Stenlund, Neal	Goodhue	651-923-4379	R	Polk	Clementson, Jon	Erskine	218-687-2345	C
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R	Polk	Fosston Co-op Seed House	Fosston	218-435-6222	C
Lac qui Parle	Harwick, Harlien & Kenneth	Dawson	320-752-4455	R	Polk	Holy, Mark	East Grand Forks	218-773-8832	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R	Polk	Kovar, Frank & Duane	East Grand Forks	218-773-9238	C
Lincoln	Lincoln County Feed & Seed	Ivanhoe	507-694-1243	R	Polk	Larson Farms, Inc., Owen	Grand Forks	701-775-3546	C
Norman	Chisholm, Mark M.	Gary	218-356-8507	R	Polk	Larson Farms, Jerry Larson	Climax	218-857-3345	R
Olmsted	Meyer's Seeds, Inc.	Elgin	507-876-2482	R	Polk	Larson, Arlan Farms, Inc.	Climax	218-857-2535	R
Redwood	Sawvell, Ronald	Clements	507-692-2240	R	Polk	Larson, Roger O.	Euclid	218-281-5697	C
Stearns	Nietfeld Farm, Inc.	Melrose	320-987-3442	R	Polk	Mid-Valley Grain Cooperative	Climax	218-857-2275	C
Swift	Falk Seed Farm	Murdock	320-875-4341	R	Polk	Novak, James	Angus	218-745-5048	C
Traverse	Johnson, Robert & Richard	Wheaton	320-563-4490	R	Polk	Ostenaar, Sidney & DeWayne	Mc Intosh	218-563-7395	R C
Wabasha	Zabel Seeds	Plainview	507-534-2487	R	Polk	Peterson, D.W., Inc.	Warren	218-745-4507	R C
Rodney					Polk	Ross Seed Co.	Fisher	218-891-2211	C
Hubbard	Kruff, Frank	Park Rapids	218-732-4909	R C	Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	R C
Troy					Polk	Vig Farms Inc.	Fosston	218-435-1316	R C
Carlton	Korhonen, Art	Kettle River	218-273-4931	C	Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R C
Clay	Toholt Seed	Moorhead	218-287-2904	R	Wilkin	Nelson, Bradley	Wolverton	218-995-2299	C
Clearwater	Fredrickson Farms, Donald	Bagley	218-694-2732	C	Wilkin	Steenblock Farms, Dale	Campbell	218-630-5500	R C
Faribault	Watowan Farm Service	Kiester	507-294-3697	C	BSR 101				
Kandiyohi	Loge, Alan	Willmar	320-235-4178	C	Faribault	Watowan Farm Service	Kiester	507-294-3697	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R 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	Bert				
Lyon	Blomme, Bill	Marshall	507-532-6092	C	Kandiyohi	Loge, Alan	Willmar	320-235-4178	C
Marshall	Newfolden Co-op Elev. Assn.	Newfolden	218-874-7465	C	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	R C
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	C	Corsoy 79				
Norman	Chisholm, Michael	Gary	218-356-8507	R	Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	C
Norman	Chisholm, Tim	Gary	218-356-8507	C	Council				
Otter Tail	Crop Production Services	Perham	218-346-2355	C	Becker	Hein Farms, Inc.	Audubon	218-439-6621	C
Otter Tail	Miller, Donald	Henning	218-583-2451	R C	Becker	Steffl, William D.	Callaway	218-375-2283	C
Polk	Fosston Co-op Seed House	Fosston	218-435-6222	R	Chippewa	Milan Farmers Elevator	Milan	320-734-4435	C
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C	Chippewa	Ruiter Seed Farm	Clara City	320-847-3536	C
Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C	Clay	Fuglie, Duane	Ulen	218-596-8528	C
Swift	Nelson Seed Company	Benson	320-843-3610	C	Clay	Johnson, Brian M.	Hawley	218-962-3316	C
Todd	Muellner, Ralph A.	Grey Eagle	320-285-8282	C	Clay	Lee Seed Farm	Borup	218-494-3330	C
Todd	Schwanke, Lloyd	Grey Eagle	320-285-5417	R C	Clay	Nord, Donald & John	Hawley	218-937-5783	C
Whitestone					Clay	Petermann Seeds, Inc.	Hawley	218-483-3302	R
Polk	Tilden Farms, Inc.	Mentor	218-637-8186	C	Clay	Peterson Farm, Sherwood E.	Baker	218-789-7378	R C
PERENNIAL RYEGRASS					Clay	Wagner, Robert T.	Barnesville	218-789-7212	C
Citation III					Clay	Zimmerman, Wayne	Ulen	218-596-8628	C
Roseau	Swoboda - Transgrud	Badger	218-528-3692	C	Douglas	Sward Seed Farm	Nelson	320-762-0143	C
RYE					Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C
Rymin					Grant	Adams Seed	Wendell	218-458-2151	R C
Hennepin	Coleman, Craig	Edina	612-924-9161	R	Grant	Thiel Seed Service	Wendell	218-458-2415	C
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	R C	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R
Swift	Falk Seed Farm	Murdock	320-875-4341	C	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	C
SIDE-OATS GRAMA					Norman	Chisholm, Keith P.	Gary	218-356-8674	R
Pierre					Norman	Ellingson Farms	Borup	218-861-6605	R
Polk	Gullickson, Mark & Russell	Fertile	218-945-6894	C	Otter Tail	Brenden, Selvin C.	Rothsay	218-867-2134	R
Polk	Kaste, Inc.	Fertile	218-945-6738	C	Polk	Barrett, John M.	East Grand Forks	218-773-0338	C
SOYBEANS					Renville	Kiecker Seed, Lanny	Fairfax	507-426-7534	C
Agassiz					Stevens	Haberer Seed Farm	Morris	320-795-2468	C
Clay	Anderson, Edmund L.	Ulen	218-596-8605	C	Swift	Nelson Seed Company	Benson	320-843-3610	C
Clay	Heartland Seeds	Moorhead	218-585-4621	R C	Todd	Faust, Kevin	Long Prairie	320-732-3361	C
Clay	Johnson, Brian M.	Hawley	218-962-3316	C	Wilkin	Haugrud Seed Plant	Rothsay	218-493-4275	R C
Clay	Oberg Farms	Moorhead	218-236-9856	C	Wilkin	Nelson, Bradley	Wolverton	218-995-2299	C
Clay	Petermann Seed Farms	Hawley	218-483-3302	R C	Wilkin	Nordick, J & R	Rothsay	218-867-2605	C
Mahnomen	Bursch Farms, Inc.	Mahnomen	218-935-5353	R	Wilkin	Torkelson, Dennis & Brent	Foxhome	218-736-4607	R
Mahnomen	Pazdernik Farms, Inc.	Waubun	218-473-2232	R C	DSR 133				
Marshall	Sczepanski, Thomas	Stephen	218-478-2462	C	Le Sueur	Dairyland/Cannon Val. Coop	LeCenter	507-357-6841	C
Norman	Chisholm, Keith P.	Gary	218-356-8674	R	DSR 178				
					Brown	Dairyland/Rossbach Seed	Hanska	507-794-7698	C
					DSR 180/STS				
					Le Sueur	Dairyland/Cannon Val. Coop	LeCenter	507-357-6841	C
					Daksoy				
					MCIA	St. Paul	800-510-6242	-	

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Evans				
Becker	Hein Farms, Inc.	Audubon	218-439-6621	C
Brown	Rosbach Lakeside Seeds, Inc.	Hanska	507-794-7698	R C
Clay	Johnson, Brian M.	Hawley	218-962-3316	C
Clay	Nord, Donald & John	Hawley	218-937-5783	C
Clay	Petermann Seeds, Inc.	Hawley	218-483-3302	R
Douglas	Sward Seed Farm	Nelson	320-762-0143	C
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C
Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	R C
Norman	Circle C Seeds	Gary	218-356-8214	C
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Freeborn				
Big Stone	Olson, Wesley E.	Clinton	320-325-5565	C
Faribault	Ehrich Seed Farm	Elmore	507-943-3762	C
Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	R C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Glacier				
Kittson	Petersen, Ronald L.	Lake Bronson	218-754-4631	C
Marshall	Kowalski, James	Stephen	218-455-3894	R
Marshall	Sczepanski, Thomas	Stephen	218-478-2462	R C
Otter Tail	Brenden, Bruce L.	Rothsay	218-867-2410	R
Polk	McIntosh Farm Services	McIntosh	218-563-3735	C
Granite				
Dodge	Wright Seed Service	West Concord	507-527-2737	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Lac qui Parle	Buer, Reid	Canby	507-223-7946	R C
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	C
Lincoln	Deutz, Daniel	Lake Benton	507-368-9234	R C
Lincoln	Popowski, John	Ivanhoe	507-694-1593	R C
Lyon	Olson, Jonathan	Cottonwood	507-423-5338	R C
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C
HP204				
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R
Waseca	Galler Seeds	Elysian	507-267-4328	R
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	R
Hardin				
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C
Hardin 91				
Blue Earth	Wendlandt, Gene	Garden City	507-549-3191	C
Blue Earth	Wendlandt, Tim	Garden City	507-546-3843	C
Dakota	Hoffman, Paul D.	Hampton	612-463-4394	C
Dakota	May, Jr., William	Farmington	612-463-8541	C
Dodge	Wright Seed Service	West Concord	507-527-2737	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Freeborn	Angell Seed Farm	Blooming Prairie	507-583-7581	R C
Le Sueur	Braun Farms	Le Sueur	507-665-3095	C
Le Sueur	Cannon Valley Cooperative	Le Center	507-357-6841	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	C
Le Sueur	Goedt Farms	Le Center	507-357-6509	R C
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	R C
Meeker	Anderson Seeds	Dassel	320-286-2700	C
Meeker	Miller Seed Farm	Dassel	320-275-2463	R C
Meeker	Smith, Steven	Darwin	320-693-6769	C
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	C
Mower	Grass & Sons Seed Service	Leroy	507-324-5820	C
Renville	Fredrickson, Lester	Hector	320-848-2601	R
Renville	Kiecker Seed Company	Hector	507-426-8167	R C
Rice	Werner Farm Seeds	Dundas	507-645-7995	C
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Waseca	Byron Farm Store, Inc.	Waseca	507-835-1120	C
Wright	Borg, Loren Seed Farms	Cokato	320-286-2222	C
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C
Hendricks				
Chippewa	Ruiter Seed Farm	Clara City	320-847-3536	C
Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	R C
Hodgson 78				
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C
IA1006				
Blue Earth	Wendlandt, William	Garden City	507-546-3847	C
Cottonwood	Bondhus, Barry N.	Storden	507-445-3226	R C
Dakota	Hoffman, Paul D.	Hampton	612-463-4394	C
Dakota	May, Jr., William	Farmington	612-463-8541	C
Dodge	Koss, William	Dodge Center	507-374-6786	R
Dodge	Wright Seed Service	West Concord	507-527-2737	C
Faribault	Watowan Farm Service	Kiester	507-294-3697	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Freeborn	Kuiters, Keith S.	Clarks Grove	507-256-4300	R C
Jackson	Brunk Bros., Gene or William	Brewster	507-842-5471	C
Jackson	Pietz Farms, Inc.	Lakefield	507-662-6309	C
Kandiyohi	Bredeson Seed Farm	Willmar	320-235-7315	C
Kandiyohi	Loge, Alan	Willmar	320-235-4178	C
Le Sueur	Cannon Valley Cooperative	Le Center	507-357-6841	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R C
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	R C
Lincoln	Jerzak, Jerome	Ivanhoe	507-694-1582	R
Lincoln	Jerzak, John	Ivanhoe	507-694-1834	R C
Lincoln	Jerzak, William W.	Ivanhoe	507-694-1736	C
Lincoln	Oerter, Donald	Tyler	507-247-3839	C
Lyon	Huso, Elroy & Howard	Minneota	507-876-6821	R
McLeod	Dammann Seed Farms	Plato	320-864-3004	C
Meeker	Anderson Seeds	Dassel	320-286-2700	R
Meeker	Miller Seed Farm	Dassel	320-275-2463	R C
Meeker	Smith, Steven	Darwin	320-693-6769	C
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	R C
Mower	Zimmerman Seeds	Racine	507-378-2077	C
Murray	Zienke Farms	Walnut Grove	507-629-3285	C
Nicollet	Anderson & Sons	St. Peter	507-246-5032	R C
Pipestone	Spronk, Art & Sons Seed Farm	Edgerton	507-442-5334	R
Redwood	Lange, Robert A.	Windom	507-831-4065	C
Redwood	Petersen, Rick D.	Redwood Falls	507-644-5440	C
Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	R
Renville	Kiecker Seed Company	Hector	507-426-8167	R C
Rice	Werner Farm Seeds	Dundas	507-645-7995	C
Wabasha	Zabel Seeds	Plainview	507-534-2487	C
Waseca	Byron Farm Store, Inc.	Waseca	507-835-1120	C
Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C
Yellow Med.	Rosetter, Richard D.	Granite Falls	320-564-3620	C
IA2008				
Brown	Rosbach Lakeside Seeds, Inc.	Hanska	507-794-7698	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Le Sueur	Birr Brothers, Mark & Gene	Kasota	507-931-2218	R C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R
Nicollet	Anderson & Sons	St. Peter	507-246-5032	R C
Waseca	Byron Farm Store, Inc.	Waseca	507-835-1120	C
IA2008R				
Faribault	Ehrich Seed Farm	Elmore	507-943-3762	C
Faribault	Watowan Farm Service	Kiester	507-294-3697	C
Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	C
Jackson	Tusa, Bill & Jim	Jackson	507-847-3746	C
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	R C
Lincoln	Deutz, Daniel	Lake Benton	507-368-9234	R C
Mower	Zimmerman Seeds	Racine	507-378-2077	C
Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
Renville	Kiecker Seed, Lanny	Fairfax	507-426-7534	R
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
IA2011				
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	R
IA2012				
Cottonwood	Bondhus, Barry N.	Storden	507-445-3226	R
Dodge	Frontier Commodities	Byron	507-634-6060	R
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R
IA2016				
Blue Earth	Ramy Seed Co.	Mankato	507-387-4091	R
Cottonwood	Bondhus, Barry N.	Storden	507-445-3226	R
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R
Waseca	Galler Seeds	Elysian	507-267-4328	R
IA2020				
Cottonwood	Bondhus, Barry N.	Storden	507-445-3226	R
Dodge	Frontier Commodities	Byron	507-634-6060	R
Waseca	Galler Seeds	Elysian	507-267-4328	R

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

IA2021									
Blue Earth	Knewton Seed Co.	Good Thunder	507-278-4087	C	Grant	Thiel Seed Service	Wendell	218-458-2415	C
Brown	Roszbach Lakeside Seeds, Inc.	Hanska	507-794-7698	R C	Hennepin	Coleman, Craig	Edina	612-924-9161	R
Cottonwood	Bondhus, Barry N.	Storden	507-445-3226	R C	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C
Dakota	May, Jr., William	Farmington	612-463-8541	C	Kandiyohi	Bredeson Seed Farm	Willmar	320-235-7315	R C
Dodge	Koss, William	Dodge Center	507-374-6786	R	Kandiyohi	Loge, Alan	Willmar	320-235-4178	C
Dodge	Wright Seed Service	West Concord	507-527-2737	C	Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	R C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C	Meeker	Anderson Seeds	Dassel	320-286-2700	C
Freeborn	Kuiters, Keith S.	Clarks Grove	507-256-4300	R C	Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C
Jackson	Brunk Bros., Gene or William	Brewster	507-842-5471	C	Meeker	Miller Seed Farm	Dassel	320-275-2463	C
Jackson	Pietz Farms, Inc.	Lakefield	507-662-6309	R C	Meeker	Wigen Seed Farm	Litchfield	320-693-8182	R C
Jackson	Tusa, Bill & Jim	Jackson	507-847-3746	C	Renville	Kiecker Seed Company	Hector	507-426-8167	R C
Le Sueur	Birr Brothers, Mark & Gene	Kasota	507-931-2218	R C	Renville	Kiecker Seed, Lanny	Fairfax	507-426-7534	C
Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R	Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Le Sueur	Goetl Farms	Le Center	507-357-6509	R C	Stevens	Haberer Seed Farm	Morris	320-795-2468	C
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	R C	Swift	Falk Seed Farm	Murdock	320-875-4341	C
Lincoln	Oertter, Donald	Tyler	507-247-3839	C	Wabasha	Zabel Seeds	Plainview	507-534-2487	C
Lyon	Huso, Elroy & Howard	Minneota	507-872-6821	R	Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	C
Lyon	Olson, Jonathan	Cottonwood	507-423-5338	C	Wilkin	Nordick, J & R	Rothsay	218-867-2605	C
Mower	Zimmerman Seeds	Racine	507-378-2077	C	Wright	Borg, Loren Seed Farms	Cokato	320-286-2222	C
Nicollet	Anderson & Sons	St. Peter	507-246-5032	R C	Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Nobles	Haberman, F. Anthony	Brewster	507-842-5312	R	Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C
Pipestone	Spronk, Art & Sons	Edgerton	507-442-5334	R C	MN0301				
Redwood	Sawvell's Seed, Inc.	Clements	507-692-2240	R	Becker	Enget, Larry	Audubon	218-439-6179	C
Renville	Kiecker Seed, Lanny	Fairfax	507-426-7534	R C	Clay	Heartland Seeds	Moorhead	218-585-4621	C
Rice	Werner Farm Seeds	Dundas	507-645-7995	C	Clay	Lee Seed Farm	Borup	218-494-3330	C
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C	Clay	Petermann Seeds, Inc.	Hawley	218-483-3302	C
Wabasha	Zabel Seeds	Plainview	507-534-2487	C	Clay	Peterson Farm, Sherwood E.	Baker	218-789-7378	C
Waseca	Byron, Mark	Waseca	507-835-7194	C	Clay	Tobolt Seed	Moorhead	218-287-2904	C
IA2034					Clay	Zimmerman, Wayne	Ulen	218-596-8628	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R	Clay	Sward Seed Farm	Nelson	320-762-0143	C
Lyon	Olson, Jonathan	Cottonwood	507-423-5338	R	Grant	Thiel Seed Service	Wendell	218-458-2415	C
Waseca	Galler Seeds	Elysian	507-267-4328	R	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	C
IA2035					Mahnomen	Pazdernik Farms, Inc.	Waubun	218-473-2232	C
Waseca	Galler Seeds	Elysian	507-267-4328	R	Marshall	Peterson, Maynard	Stephen	218-478-3859	C
IA2036					Marshall	Sczepanski, Thomas	Stephen	218-478-2462	C
Brown	Gluth, William	Morgan	507-249-3970	R	Norman	Chisholm, Keith P.	Gary	218-356-8674	C
Fairbault	Willette Seed Farm, Inc.	Delavan	507-854-3595	R	Norman	Ellingson Farms	Borup	218-861-6605	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R	Norman	Kraft, John	Gary	218-584-8521	C
Goodhue	Stenlund, Neal	Goodhue	651-923-4379	R	Norman	Kveno, Harry	Gary	218-356-8278	C
Jackson	Brunk Bros., Gene or William	Brewster	507-842-5471	R	Otter Tail	Brenden, Bruce L.	Rothsay	218-867-2410	C
Jackson	Hartman Bros.	Okabena	507-853-4702	R	Otter Tail	Brenden, Selvin C.	Rothsay	218-867-2134	C
Jackson	Pietz Farms, Inc.	Lakefield	507-662-6309	R	Out of State	Anderson, Gerald D	Grand Forks	701-775-8766	C
Jackson	Rubis, Craig	Lakefield	507-662-6494	R	Polk	Ostenaar, Sidney & DeWayne	Mc Intosh	218-563-7395	C
Lac qui Parle	Buer, Reid	Canby	507-223-7946	R	Polk	Skaug, M.R. Farm, Inc.	Beltrami	218-926-5545	C
Mower	Zimmerman Seeds	Racine	507-378-2077	R	Polk	Vig Farms Inc.	Fosston	218-435-1316	C
Nobles	Haberman, F. Anthony	Brewster	507-842-5312	R	Wilkin	Haugrud Seed Plant	Rothsay	218-493-4275	C
Jim					MN1301				
	MCIA	St. Paul	800-510-6242		Cottonwood	Bondhus, Barry N.	Storden	507-445-3226	C
Kato					Dodge	Koss, William	Dodge Center	507-374-6786	C
Blue Earth	Knewton Seed Co.	Good Thunder	507-278-4087	R C	Douglas	Sward Seed Farm	Nelson	320-762-0143	C
Blue Earth	Ramy Seed Co., Michael Ramy	Mankato	507-387-4091	C	Grant	Jennen, Richard J. & Sons	Elbow Lake	218-685-4903	C
Chippewa	Milan Farmers Elevator	Milan	320-734-4435	C	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	C
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C	Kandiyohi	Bredeson Seed Farm	Willmar	320-235-7315	C
Kandiyohi	Loge, Alan	Willmar	320-235-4178	C	Kandiyohi	Loge, Alan	Willmar	320-235-4178	C
Lyon	Olson, Jonathan	Cottonwood	507-423-5338	R C	Lac qui Parle	Hermanson Seed Plant	Boyd	320-855-2527	C
Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C	Lac qui Parle	Madison Farmers Mill & Elev.	Madison	320-598-7351	C
Meeker	Wigen, Marlow E.	Litchfield	320-693-8182	C	Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	C
Renville	Wertish, Thomas R.	Hector	320-848-2453	C	Lyon	Olson, Jonathan	Cottonwood	507-423-5338	C
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C	Meeker	Wigen Seed Farm	Litchfield	320-693-8182	C
Swift	Falk Seed Farm	Murdock	320-875-4341	R C	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
Swift	Gordon Farms, Inc.	Murdock	320-875-3132	C	Renville	Kiecker Seed Company	Hector	507-426-8167	C
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C	Stevens	Haberer Seed Farm	Morris	320-795-2468	C
Lambert					Swift	Falk Seed Farm	Murdock	320-875-4341	C
Clay	Arneson Farms	Hawley	218-483-4165	R C	MN1401				
Clay	Heartland Seeds	Moorhead	218-585-4621	C	Brown	Roszbach Lakeside Seeds, Inc.	Hanska	507-794-7698	C
Clay	Oberg Farms	Moorhead	218-236-9856	C	Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Dakota	May, Jr., William	Farmington	612-463-8541	C	Freeborn	Angell Seed Farm	Blooming Prairie	507-583-7581	R
Douglas	Sward Seed Farm	Nelson	320-762-0143	C	Goodhue	Stenlund, Arne H. & Son	Goodhue	651-923-4107	R
Douglas	Thompson Farms	Kensington	320-965-2486	C	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C	Kandiyohi	Bredeson Seed Farm	Willmar	320-235-7315	C
Grant	Adams Seed	Wendell	218-458-2151	R C	Kandiyohi	Loge, Alan	Willmar	320-235-4178	R
Grant	Backman Seeds	Herman	320-677-2231	C	Lac qui Parle	Buer, Reid	Canby	507-223-7946	R
					Lac qui Parle	Hermanson Seed Plant	Boyd	320-855-2527	R
					Lac qui Parle	Kemen, Robert & Sons	Madison	320-769-4413	R

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Lac qui Parle	Madison Farmers Mill & Elev.	Madison	320-598-7351	R	Redwood	Tauer, Dennis	Springfield	507-723-5866	R C
Le Sueur	Goettl Farms	Le Center	507-357-6509	R	Redwood	Zeug Farm Seeds	Lucan	507-747-2731	C
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	R C	Renville	Kiecker Seed Company	Hector	507-426-8167	R C
Lincoln	Anderson, Merv	Porter	507-223-7981	R	Renville	Nelson, Kenneth B.	Fairfax	507-426-7853	C
Lincoln	Oerter, Donald	Tyler	507-247-3839	C	Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Meeker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C	Yellow Med.	Antony, David N.	Porter	507-223-7144	C
Meeker	Miller Seed Farm	Dassel	320-275-2463	R	Yellow Med.	Rosetter, Richard D.	Granite Falls	320-564-3620	R
Meeker	Smith, Steven	Darwin	320-693-6769	R	Surge				
Meeker	Wigen Seed Farm	Litchfield	320-693-8182	R	Big Stone	Clinton Ag Service, Inc.	Clinton	320-325-5203	R
Nicollet	Anderson & Sons	St. Peter	507-246-5032	R	Chippewa	Caspers, Bryan	Raymond	320-847-3539	C
Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	R	Clay	Heartland Seeds	Moorhead	218-585-4621	C
Renville	JSF, Inc.	Sacred Heart	320-765-2225	C	Dakota	Hoffman, Paul D.	Hampton	612-463-4394	C
Renville	Kiecker Seed Company	Hector	507-426-8167	R	Douglas	Sward Seed Farm	Nelson	320-762-0143	R
Stevens	Schaefer Bros.	Hancock	320-392-5380	R	Goodhue	Stenlund, Arne H. & Son	Goodhue	651-923-4107	C
Swift	Busse Seeds	Appleton	320-394-2315	R C	Grant	Adams Seed	Wendell	218-458-2151	R C
Swift	Falk Seed Farm	Murdock	320-875-4341	R	Grant	Biss, Larry	Wendell	218-458-2205	R C
Swift	Lee's Seed Farm	Benson	320-843-2857	R C	Kandiyohi	Loge, Alan	Willmar	320-235-4178	C
Traverse	Johnson, David A.	Wheaton	320-563-4533	R	Lac qui Parle	Buer, Reid	Canby	507-223-7946	R
Yellow Med.	Brusven, Mitcheal V.	Clarkfield	320-669-4654	R C	Lac qui Parle	Kemen, Robert & Sons	Madison	320-769-4413	R C
McCall					Lincoln	Deutz, Daniel	Lake Benton	507-368-9234	R C
Clay	Fuglie, Duane	Ulen	218-596-8528	C	Lincoln	Popowski, John	Ivanhoe	507-694-1593	C
Clay	Olek, Vernard	Felton	218-494-3440	C	Lyon	Huso, Elroy & Howard	Minneota	507-872-6821	C
Clay	Petermann Seeds, Inc.	Hawley	218-483-3302	R	Meeker	Wigen Seed Farm	Litchfield	320-693-8182	C
Clay	Wetterlin, Jerry	Glyndon	218-494-3339	C	Otter Tail	Walkup, John	Campbell	218-739-2580	C
Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R	Redwood	Tauer, Dennis	Springfield	507-723-5866	R
Marshall	Robertson Farms, Inc.	Argyle	218-437-6300	C	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	R C
Marshall	Sczepanski, Thomas	Stephen	218-478-2462	C	Renville	Kiecker Seed, Lanny	Fairfax	507-426-7534	R
Red Lake	Swenson Seed Farm	Brooks	218-796-5285	C	Rice	Werner Farm Seeds	Dundas	507-645-7995	C
Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	R	Stevens	Haberer Seed Farm	Morris	320-795-2468	C
Minnatto					Stevens	Schaefer Bros.	Hancock	320-392-5380	C
Wilkin	Friederichs Farm	Foxhome	218-643-2363	C	Stevens	Sperr, Duane & Rollie	Donnelly	320-246-3496	C
Norpro					Swift	Busse Seeds	Appleton	320-394-2315	C
Clay	Petermann Seed Farms	Hawley	218-483-3302	R	Swift	Lee's Seed Farm	Benson	320-843-2857	C
Ozzie					Swift	Nelson Seed Company	Benson	320-843-3610	C
Becker	Steffl, William D.	Callaway	218-375-2283	C	Traverse	Rinke, David	Wheaton	320-563-4864	R
Clay	Fischer, Wilbert & Dale	Glyndon	218/98-2741	C	Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	C
Clay	Zimmerman, Wayne	Ulen	218-596-8628	R C	Yellow Med.	Kuehn, Daryl	Echo	507-925-4236	C
Parker					Swift				
Chippewa	Milan Farmers Elevator	Milan	320-734-4435	C	Douglas	Sward Seed Farm	Nelson	320-762-0143	R
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C	Trail				
Jackson	Hartman Bros.	Okabena	507-853-4702	C	Becker	Enget, Larry	Audubon	218-439-6179	C
Jackson	Pietz Farms, Inc.	Lakefield	507-662-6309	C	Becker	Hein Farms, Inc.	Audubon	218-439-6621	R
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C	Clay	Anderson, Lynn	Moorhead	218-287-1765	R
Lac qui Parle	Hermanson Seed Plant	Boyd	320-855-2527	C	Clay	Arneson Farms	Hawley	218-483-4165	R
Lac qui Parle	Madison Farmers Mill & Elev.	Madison	320-598-7351	C	Clay	Heartland Seeds	Moorhead	218-585-4621	C
Le Sueur	Birr Brothers, Mark & Gene	Kasota	507-931-2218	R C	Clay	Lee Seed Farm	Borup	218-494-3330	R C
Lincoln	Anderson, Merv	Porter	507-223-7981	C	Clay	Olsgaard, Inc., Harold	Moorhead	218-585-4535	R
Lincoln	Jerzak, John	Ivanhoe	507-694-1834	R C	Clay	Peterson Farm, Sherwood E.	Baker	218-789-7378	R
Lincoln	Jerzak, William W.	Ivanhoe	507-694-1736	C	Clay	Zimmerman, Wayne	Ulen	218-596-8628	C
Lincoln	Oerter, Donald	Tyler	507-247-3839	C	Clay	Weinlaeder Seed Company	Drayton	701-454-6427	R C
Lincoln	Popowski, John	Ivanhoe	507-694-1593	R C	Mahnommen	Haugo, David	Waubun	218-473-2254	R
Nobles	Haberman, F. Anthony	Brewster	507-842-5312	R	Marshall	Gostanzik, Stan	Argyle	218-437-8149	C
Pipestone	Spronk, Art & Sons Seed Farm	Edgerton	507-442-5334	R	Marshall	Kowalski, James	Stephen	218-455-3894	R
Redwood	Tauer, Dennis	Springfield	507-723-5866	R C	Marshall	Riopelle, Earl & Brent	Argyle	218-437-8291	C
Redwood	Zeug Farm Seeds	Lucan	507-747-2731	C	Marshall	Rivard's Quality Seeds, Inc.	Argyle	218-437-6638	R C
Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	R
Rice	Werner Farm Seeds	Dundas	507-645-7995	C	Marshall	Widner, Neil	Stephen	218-478-3616	R
Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C	Marshall	Yutzzenka, Don and Mark	Argyle	218-437-8428	C
Yellow Med.	Antony, David N.	Porter	507-223-7144	C	Norman	Brandt, Robert	Ada	218-784-4093	R
Yellow Med.	Rosetter, Richard D.	Granite Falls	320-564-3620	R	Norman	Brandt, Robert Jr.	Ada	218-784-4093	C
Sturdy					Norman	Brandt, Wayne & John	Ada	218-784-4774	R
Brown	Krueger, Matthew	Springfield	507-723-4484	C	Norman	Chisholm, Joseph R.	Gary	218-356-8282	C
Brown	Rosbach Lakeside Seeds, Inc.	Hanska	507-794-7698	C	Norman	Chisholm, Keith P.	Gary	218-356-8674	R C
Cottonwood	Imker, Brent	Lamberton	507-752-7697	C	Otter Tail	Brenden, Bruce L.	Rothsay	218-867-2410	C
Dakota	Hoffman, Paul D.	Hampton	612-463-4394	C	Otter Tail	Brenden, Selvin C.	Rothsay	218-867-2134	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C	Out of state	Anderson, Gerald D	Grand Forks	701-775-8766	C
Lac qui Parle	Buer, Reid	Canby	507-223-7946	R C	Polk	Balstad, Scott	Fosston	218-435-6311	R
Lac qui Parle	Hermanson Seed Plant	Boyd	320-855-2527	C	Polk	H & J Farms, Inc.	Warren	218-745-5018	R
Lac qui Parle	Kemen, Robert & Sons	Madison	320-769-4413	R C	Polk	Mid-Valley Grain Cooperative	Crookston	218-281-2881	C
Lac qui Parle	Madison Farmers Mill & Elev.	Madison	320-598-7351	C	Polk	Peterson, D.W., Inc.	Warren	218-745-4507	R
Le Sueur	Birr Brothers, Mark & Gene	Kasota	507-931-2218	R C	Polk	Peterson, Douglas	East Grand Forks	218-773-9120	R
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	C	Polk	Ross Seed Co.	Fisher	218-891-2211	R C
Redwood	Sawvell's Seed, Inc.	Clements	507-692-2240	R	Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	R C

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

Polk	Vig Farms Inc.	Fosston	218-435-1316	C	Marshall	Jensen Farms	Stephen	218-478-2476	C
Polk	Wentzel, Walton Farms, Inc.	Fisher	218-281-2207	R	Marshall	Kowalski, James	Stephen	218-455-3894	C
Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R	Marshall	Peterson, Maynard	Stephen	218-478-3859	C
Red Lake	Whalen, Greg	Oklee	218-796-5379	C	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	C
Wilkin	Blilie, Steve	Wolverton	218-995-2815	R	McLeod	Dammann Seed Farms	Plato	320-864-3004	C
Wilkin	Larson Farms/Eldon	Rothsay	218-867-2674	R	McLeod	Schulz, Nolan E.	Stewart	320-562-2396	C
Wilkin	Nelson, Bradley	Wolverton	218-995-2299	C	Meeker	Dahlman Seed Co.	Dassel	320-275-2527	C
Vinton 81					Norman	Brandt, Robert Jr.	Ada	218-784-4093	C
Blue Earth	Ramy Seed Co., Michael Ramy	Mankato	507-387-4091	C	Norman	Chisholm, Keith P.	Gary	218-356-8674	C
Cottonwood	Bondhus, Barry N.	Storden	507-445-3226	R	Norman	Circle C Seeds	Gary	218-356-8214	C
Dodge	Frontier Commodities	Byron	507-634-6060	R	Norman	Kraft, Roger	Gary	218-584-8451	C
Faribault	Willette Seed Farm, Inc.	Delavan	507-854-3595	R C	Norman	Malmé, Cecil	Shelly	218-886-8488	C
Fillmore	Moeller, Virgil	Spring Valley	507-346-2057	C	Polk	Balstad, Scott	Fosston	218-435-6311	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C	Polk	Brule, David A.	Crookston	218-281-2944	C
Lyon	Olson, Jonathan	Cottonwood	507-423-5338	C	Polk	Caillier, Daniel	Crookston	218-281-2840	C
Mower	Grass & Sons Seed Service	Leroy	507-324-5820	R C	Polk	Christian Farms	Fertile	218-945-6021	C
Waseca	Galler Seeds	Elysian	507-267-4328	R	Polk	Larson Farms	Climax	218-857-3345	C
Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	R	Polk	Mat - Co., Inc.	Fosston	218-435-6667	C
SWITCHGRASS					Polk	Peterson, Douglas	East Grand Forks	218-773-9120	C
Dacotah					Red Lake	Vatthauer Farm	Red Lake Falls	218-253-2490	C
Polk	Gullickson, Mark & Russell	Fertile	218-945-6894	C	Redwood	Hagen, Don	Belview	507-641-5327	C
Polk	Kaste, Inc.	Fertile	218-945-6738	C	Redwood	Sawvell's Seed, Inc.	Clements	507-692-2240	C
Forestburg					Renville	Hanson Seeds	Fairfax	507-426-7320	C
Polk	Kaste, Inc.	Fertile	218-945-6738	C	Renville	Toreen, Douglas	Bird Island	320-365-4777	C
TIMOTHY					Roseau	Kukowski, Jim	Strathcona	218-781-2478	C
Clair					Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Marshall	Klamar Farms	Gatzke	218-459-3338	C	Stevens	Haberer Seed Farm	Morris	320-795-2468	C
Roseau	Grahn Farms	Roseau	218-463-1765	R C	Stevens	Sperr, Duane & Rollie	Donnelly	320-246-3496	C
Roseau	Marvin's	Warroad	218-386-1333	C	Swift	Falk Seed Farm	Murdock	320-875-4341	C
Roseau	McFarlane Seeds, Inc.	Greenbush	218-782-2700	C	Swift	Nelson Seed Company	Benson	320-843-3610	C
Roseau	Wahlberg, John	Roseau	218-386-2453	C	Traverse	Johnson, Merton	Wheaton	320-563-8025	C
Climax					Wilkin	Beyer Seed Farm	Kent	218-643-5126	C
Lake of Woods	Bergan Farms, Randall Bergan	Williams	218-783-2345	C	Wilkin	Haugrud Seed Plant	Rothsay	218-493-4275	C
Roseau	McFarlane Seeds, Inc.	Greenbush	218-782-2700	C	Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	C
HARD RED SPRING WHEAT					Wilkin	Nordick, J & R	Rothsay	218-867-2605	C
2375					Wilkin	Torkelson, Dennis & Brent	Foxhome	218-736-4607	C
Clay	Fuglie, Duane	Ulen	218-596-8528	C	Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Clay	Lee Seed Farm	Borup	218-494-3330	C	Wright	Hopkins, Joseph	Buffalo	612-682-1868	C
Clay	Peterson Farm, Sherwood E.	Baker	218-789-7378	C	Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C
Clay	Swanson, Arthur & Dirk	Moorhead	218-233-5996	C	2398				
Clay	Swenson, Clifford	Ulen	218-596-8882	C	Lyon	Olson, Jonathan	Cottonwood	507-423-5338	C
Clay	Thompson, Richard	Barnesville	218-789-7208	C	AC Barrie				
Clay	Tri-County Co-op Assn.	Ulen	218-596-8821	C	Clay	Kuehl Bros. Farms	Glyndon	218-498-2141	C
Clay	Valan, Orlen Jr.	Moorhead	218-236-9479	C	Clay	Bloomquist Farms, Inc.	Drayton	218-455-3863	R
Clay	Zimmerman, Wayne	Ulen	218-596-8628	C	Marshall	Bring, Wesley	Strandquist	218-874-3713	C
Douglas	Sward Seed Farm	Nelson	320-762-0143	C	Marshall	Erickson, Paul	Thief River Falls	218-449-3331	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C	Marshall	Farmers Elevator Company	Alvarado	218-965-4812	C
Grant	Adams Seed	Wendell	218-458-2151	C	Marshall	Hammerlund Farms	Oslo	218-695-3481	C
Grant	Backman Seeds	Herman	320-677-2231	C	Marshall	Jensen Farms	Stephen	218-478-2476	C
Grant	Kappahn, John M.	Elbow Lake	218-685-4604	C	Marshall	Kowalski, James	Stephen	218-455-3894	C
Grant	Red River Marketing Co.	Elbow Lake	218-685-6100	C	Marshall	McGlynn, Neil	Stephen	218-478-2777	C
Grant	Thiel Seed Service	Wendell	218-458-2415	C	Marshall	Sczepanski, Thomas	Stephen	218-478-2462	R
Grant	Vipond Farm, Inc.	Herman	320-677-2535	C	Marshall	Widner, Neil	Stephen	218-478-3616	C
Kandiyohi	Behm Seed Company	Atwater	320-974-3003	C	Polk	Johnson, Myron J.	East Grand Forks	218-773-1791	C
Kandiyohi	Loge, Alan	Willmar	320-235-4178	C	Polk	Kovar, Frank & Duane	East Grand Forks	218-773-9238	C
Kittson	Petersen, Ronald L.	Lake Bronson	218-754-4631	C	Polk	Ross Seed Co.	Fisher	218-891-2211	C
Kittson	Sugden, William	Hallock	218-843-2593	C	Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	R C
Kittson	Younggren, Dan	Hallock	218-843-3318	C	Roseau	Kukowski, Jim	Strathcona	218-781-2478	R
Lac qui Parle	Hermanson Seed Plant	Boyd	320-855-2527	C	AC Domain				
Lac qui Parle	Kemen, Robert & Sons	Madison	320-769-4413	C	Clay	Kuehl Bros. Farms	Glyndon	218-498-2141	C
Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	C	BacUp				
Lincoln	Jerzak, John	Ivanhoe	507-694-1834	C	Kittson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R C
Lincoln	Popowski, John	Ivanhoe	507-694-1593	C	Mahnomen	Spaeth, Douglas M.	Mahnomen	218-935-5830	C
Lyon	Olson, Jonathan	Cottonwood	507-423-5338	C	Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R
Mahnomen	Bursch Farms, Inc.	Mahnomen	218-935-5353	C	Butte 86				
Mahnomen	Pazdernik Farms, Inc.	Waubun	218-473-2232	C	Clay	Oberg Farms	Moorhead	218-236-9856	C
Marshall	Bring, Wesley	Strandquist	218-874-3713	C	Clay	Thompson, Richard	Barnesville	218-789-7208	C
Marshall	Green, Carl M.	Strandquist	218-597-2861	C	Lake of Woods	Pieper Farms, Jerry	Williams	218-783-6610	R
Marshall	Gryskiewicz, Donald & Jeff	Stephen	218-437-8164	C	Forge				
					Becker	Hein Farms, Inc.	Audubon	218-439-6621	C
					Becker	Steffl, William D.	Callaway	218-375-2283	R C
					Big Stone	Clinton Ag Service, Inc.	Clinton	320-325-5203	C
					Brown	Rosbach Lakeside Seeds, Inc.	Hanska	507-794-7698	R

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Clay	Arneson Farms	Hawley	218-483-4165	C	Polk	Anderson Farms, Inc., J D	East Grand Forks	218-773-2280	R
Clay	Baker, Jim & Kurt	Sabin	218-789-7360	C	Polk	Bauer Farms	Erskine	218-687-5356	C
Clay	Fuglie, Duane	Ulen	218-596-8528	C	Polk	Brule, David A.	Crookston	218-281-2944	C
Clay	Johnson, Brian M.	Hawley	218-962-3316	C	Polk	Caillier, Daniel	Crookston	218-281-2840	C
Clay	Jossund, Mark A.	Moorhead	218-233-1561	C	Polk	Capistran Seed Company	Crookston	218-281-7840	C
Clay	Kragnes, David	Felton	218-236-0857	C	Polk	Hanson, Paul M	Crookston	218-281-5898	C
Clay	Kuehl Bros. Farms	Glyndon	218-498-2141	C	Polk	Kovar, Frank & Duane	East Grand Forks	218-773-9238	C
Clay	Lee Seed Farm	Borup	218-494-3330	C	Polk	Larson Farms, Inc., Ralph	East Grand Forks	218-773-1463	RC
Clay	Ness, Larry	Moorhead	218-585-4179	C	Polk	Larson, Ray H., Inc.	Angus	218-745-5923	C
Clay	Nord, Donald & John	Hawley	218-937-5783	C	Polk	Larson, Roger O.	Euclid	218-281-5697	C
Clay	Sillers Farm	Moorhead	218-233-7841	RC	Polk	LeMar Farms, Inc.	Crookston	218-281-5608	C
Clay	Tang, Gordon & Sons	Felton	218-494-3643	C	Polk	Mack Farms, Inc., Ron	East Grand Forks	218-773-2601	C
Clay	Thompson, Richard	Barnesville	218-789-7208	C	Polk	Mat - Co., Inc.	Fosston	218-435-6667	RC
Clay	Tonsfeldt Farms, Inc.	Barnesville	701-238-2323	C	Polk	Mid-Valley Grain Cooperative	Crookston	218-281-2881	RC
Clay	Tri-County Co-op Assn.	Ulen	218-596-8821	C	Polk	Novak, James	Angus	218-745-5048	C
Clay	Wetterlin, Jerry	Glyndon	218-494-3339	C	Polk	Ostenaar, Sidney & DeWayne	Mc Intosh	218-563-7395	R
Clay	Zimmerman, Wayne	Ulen	218-596-8628	C	Polk	Peterson, Douglas	East Grand Forks	218-773-9120	RC
Freehorn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	RC	Polk	Quern, Miles	Oslo	218-695-3878	RC
Grant	Adams Seed	Wendell	218-458-2151	RC	Polk	Sonstelie, Gordon & Gary	Winger	218-938-4189	R
Grant	Kapphahn, John M.	Elbow Lake	218-685-4604	C	Polk	Thompson, Ordean H.	East Grand Forks	218-773-2251	C
Grant	Thiel Seed Service	Wendell	218-458-2415	R	Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	RC
Kandiyohi	Kallevig Seeds Inc	Willmar	320-235-6619	RC	Polk	Tiedemann, Gene R.	Euclid	218-281-6723	RC
Kandiyohi	Loge, Alan	Willmar	320-235-4178	R	Polk	Wentzel, Walton Farms, Inc.	Fisher	218-281-2207	C
Kittson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R	Pope	Langlois, William	Crookston	218-281-6881	C
Kittson	Nelson, Merle L.	Drayton	218-455-3508	RC	Red Lake	Baird, Richard	Red Lake Falls	218-253-2399	C
Kittson	Olsonawski, Jerry	Hallock	218-379-3235	R	Red Lake	Myhre Farms	Red Lake Falls	218-698-4485	R
Kittson	Osowski, Terry	Hallock	218-843-3371	R	Red Lake	Swenson Seed Farm	Brooks	218-796-5285	RC
Kittson	Rickenberg, Jeff	Kennedy	218-674-4231	R	Red Lake	Varthauer Farm	Red Lake Falls	218-253-2490	R
Kittson	Sedenquist Farms, Inc.	Kennedy	218-674-4218	R	Roseau	Habstrit Farms, Inc.	Roseau	218-463-1193	RC
Kittson	Stewart, H. Shane	St. Vincent	218-379-3282	R	Roseau	K & L Farms	Wannaska	218-425-7719	C
Kittson	Stewart, Hilson L.	St. Vincent	218-379-3282	R	Roseau	Kukowski, Jim	Strathcona	218-781-2478	R
Kittson	Webster Farms, Inc. J & N	Kennedy	218-674-4497	C	Swift	Falk Seed Farm	Murdock	320-875-4341	R
Lac qui Parle	Harwick, Harlien & Kenneth	Dawson	320-752-4455	R	Traverse	Johnson, David A.	Wheaton	320-563-4533	C
Lake of Woods	Helmstetter Farm	Roosevelt	218-442-7285	R	Traverse	Johnson, Robert & Richard	Wheaton	320-563-4490	R
Lake of Woods	Olson, Emil A.	Roosevelt	218-442-5465	R	Traverse	Lundquist, Gene	Wheaton	320-563-8644	C
Lake of Woods	Tveit Farms	Roosevelt	218-442-5281	R	Traverse	Raguse, William	Tintah	320-563-4865	C
Lake of Woods	Dick Stangler Farm Seed	Kilkenny	507-595-2883	C	Wilkin	Beyer Seed Farm	Kent	218-643-5126	R
Lincoln	Anderson, Merv	Porter	507-223-7981	R	Wilkin	Blilie, Steve	Wolverton	218-995-2815	R
Mahnomen	Pazdernik Farms, Inc.	Waubun	218-473-2232	C	Wilkin	Friederichs Farm	Foxhome	218-643-2363	R
Marshall	Backstrom Farms, Inc.	Warren	218-745-5113	RC	Wilkin	Haugrud Seed Plant	Rothsay	218-493-4275	RC
Marshall	Baird Farms, Inc.	Warren	218-745-5330	RC	Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	RC
Marshall	Farmers Elevator Company	Alvarado	218-965-4812	C	Wilkin	Kruse & Tischer Farms	Breckenridge	218-643-1100	R
Marshall	Gostanzik, Stan	Argyle	218-437-8149	R	Wilkin	Larson Farms/Eldon	Rothsay	218-867-2674	R
Marshall	Gryskiewicz, Donald & Jeff	Stephen	218-437-8164	RC	Wilkin	Nelson, Bradley	Wolverton	218-995-2299	C
Marshall	Hammerlund Farms	Oslo	218-695-3481	C	Wilkin	Steenblock Farms, Dale	Campbell	218-630-5500	C
Marshall	Jensen Farms	Stephen	218-478-2476	RC	Wilkin	Torkelson, Dennis & Brent	Foxhome	218-736-4607	R
Marshall	Kowalski, James	Stephen	218-455-3894	RC	Yellow Med.	Antony, David N.	Porter	507-223-7144	R
Marshall	Kuznia, Kenneth J.	Argyle	218-437-8203	R	Grandin				
Marshall	Omdahl Ridge Farms	Grand Forks	218-745-5595	R	Clay	Krabbenhof & Sons, Inc.	Sabin	218-789-7206	C
Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R	Clearwater	Fredrickson Farms, Donald	Bagley	218-694-2732	C
Marshall	Rivard Farms, Inc.	Argyle	218-437-6479	R	Polk	Ostenaar, Sidney & DeWayne	Mc Intosh	218-563-7395	C
Marshall	Robertson Brothers	Argyle	218-437-6411	R	Red Lake	Varthauer Farm	Red Lake Falls	218-253-2490	C
Marshall	Sczepanski, Thomas	Stephen	218-478-2462	RC	Gunner				
Marshall	St. Germain, David L.	Argyle	218-437-8583	C	Kittson	Hunter, Daniel	Lancaster	218-762-5331	C
Marshall	Widner, Neil	Stephen	218-478-3616	R	Kittson	Petersen, Ronald L.	Lake Bronson	218-754-4631	C
Marshall	Yutzenka, Don and Mark	Argyle	218-437-8428	C	Polk	Capistran Seed Company	Crookston	218-281-7840	C
Marshall	Yutzenka, Kevin & Leonard	Argyle	218-437-6468	R	Polk	Danielson, Ellsworth	Fosston	218-435-1729	C
McLeod	Thalman Seeds Inc.	Plato	320-238-2185	C	Polk	Ostenaar, Sidney & DeWayne	Mc Intosh	218-563-7395	C
Meecker	Wigen Seed Farm	Litchfield	320-693-8182	RC	Polk	Ross Seed Co.	Fisher	218-891-2211	C
Norman	Bernhardson, Charles E.	Shelly	218-886-7335	RC	HJ98				
Norman	Brandt, Robert	Ada	218-784-4093	R	Clay	Heartland Seeds	Moorhead	218-585-4621	R
Norman	Brandt, Robert Jr.	Ada	218-784-4093	C	Clay	Petermann Seed Farms	Hawley	218-483-3302	R
Norman	Brandt, Wayne & John	Ada	218-784-4774	R	Clay	Tobolt Seed	Moorhead	218-287-2904	R
Norman	Chisholm, Joseph R.	Gary	218-356-8282	R	Clay	Zimmerman, Wayne	Ulen	218-596-8628	R
Norman	Chisholm, Mark M.	Gary	218-356-8507	R	Grant	Red River Marketing Co.	Elbow Lake	218-685-6100	R
Norman	Hellerud, Philip	Halstad	218-456-2662	C	Kittson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R
Norman	Peppel Bros. Donald & Dennis	Borup	218-582-3242	C	Kittson	Carlson, James A.	Hallock	218-843-3483	R
Norman	Steen Farms, Peter	Halstad	218-456-2665	C	Kittson	Nelson, Merle L.	Drayton	218-455-3508	R
Otter Tail	Brenden, Bruce L.	Rothsay	218-867-2410	C	Kittson	Olsonawski, Jerry	Hallock	218-379-3235	R
Otter Tail	Brenden, Selvin C.	Rothsay	218-867-2134	R	Kittson	Petersen, Ronald L.	Lake Bronson	218-754-4631	R
Otter Tail	Keller, Clifford L.	Fergus Falls	218-736-4664	C	Kittson	Rickenberg, Jeff	Kennedy	218-674-4231	R
Otter Tail	Walkup, John	Campbell	218-739-2580	C	Kittson	Stewart, H. Shane	St. Vincent	218-379-3282	R
Out of State	Anderson, Gerald D	Grand Forks	701-775-8766	C	Kittson	Stewart, Hilson L.	St. Vincent	218-379-3282	R
Pennington	Scholin Farms	Thief River Falls	218-964-5268	RC	Mahnomen	Pazdernik Farms, Inc.	Waubun	218-473-2232	R
Pennington	Swanson, Curtis W.	Thief River Falls	218-964-5619	RC					

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

Marshall	Jensen Farms	Stephen	218-478-2476	R	Clay	Valan, Orlen Jr.	Moorhead	218-236-9479	C
Marshall	Kowalski, James	Stephen	218-455-3894	R	Clay	Wetterlin, Jerry	Glyndon	218-494-3339	C
Marshall	Kruger Bros. Farms, Inc.	Warren	218-437-8435	R	Clay	Zimmerman, Wayne	Ulen	218-596-8628	C
Marshall	Riopelle, Earl & Brent	Argyle	218-437-8291	R	Dakota	May, Jr., William	Farmington	612-463-8541	C
Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R	Douglas	Sward Seed Farm	Nelson	320-762-0143	C
Marshall	Rivard Farms, Inc.	Argyle	218-437-6479	R	Douglas	Thompson Farms	Kensington	320-965-2486	C
Marshall	Rivard's Quality Seeds, Inc.	Argyle	218-437-6638	R	Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C
Marshall	Yutzenka, Kevin & Leonard	Argyle	218-437-6468	R	Grant	Adams Seed	Wendell	218-458-2151	C
Norman	Brandt, Wayne & John	Ada	218-784-4774	R	Grant	Backman, Tim	Herman	320-677-2785	C
Norman	Chisholm, Keith P.	Gary	218-356-8674	R	Grant	Biss, Larry	Wendell	218-458-2205	R
Norman	Circle C Seeds	Gary	218-356-8214	R	Grant	Coleman, Gerald	Elbow Lake	218-685-4707	C
Norman	Ellingson Farms	Borup	218-861-6605	R	Grant	Jennen, Richard J. & Sons	Elbow Lake	218-685-4903	R
Otter Tail	Walkup, John	Campbell	218-739-2580	R	Grant	Kramer	Herman	320-677-2680	C
Pennington	Engelstad Farms of Rocksbury	Thief River Falls	218-681-1000	R	Grant	Red River Marketing Co.	Elbow Lake	218-685-6100	R C
Polk	Danielson, Ellsworth	Fosston	218-435-1729	R	Grant	Thiel Seed Service	Wendell	218-458-2415	C
Polk	Holy, Donald J.	East Grand Forks	218-773-1468	R	Grant	Westrom, Myron L.	Elbow Lake	218-685-4232	R C
Polk	Larson, Ray H., Inc.	Angus	218-745-5923	R	Kandiyohi	Behm Seed Company	Atwater	320-974-3003	R C
Polk	Peterson, D.W., Inc.	Warren	218-745-4507	R	Kitson	Johnson Farms, Inc., Lloyd	Karlstad	218-458-2817	C
Polk	Peterson, Douglas	East Grand Forks	218-773-9120	R	Kitson	Olsonawski, Jerry	Hallock	218-379-3235	C
Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	R	Kitson	Schwenzfeier Bros.	Hallock	218-754-6891	C
Red Lake	Vathauer Farm	Red Lake Falls	218-253-2490	R	Lac qui Parle	Buer's Seeds	Canby	507-223-5100	C
Roseau	Kukowski, Jim	Strathcona	218-781-2478	R	Lac qui Parle	Hermanson Seed Plant	Boyd	320-855-2527	C
Wilkin	Friederichs Farm	Foxhome	218-643-2363	R	Lac qui Parle	Kemen, Robert & Sons	Madison	320-769-4413	R C
Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	R	Lac qui Parle	Madison Farmers Mill & Elev.	Madison	320-598-7351	C
Ingot					Lake of Woods	Helmstetter Farm	Roosevelt	218-442-7285	R C
Clay	Evert Farms Ltd Partnership	Sabin	218-789-7338	R	Lake of Woods	Pieper Farms, Jerry	Williams	507-595-6610	C
Clay	Wetterlin, Jerry	Glyndon	218-494-3339	R	Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	R C
Grant	Kapphahn, John M.	Elbow Lake	218-685-4604	R	Lincoln	Anderson, Merv	Porter	507-223-7981	R
Grant	Red River Marketing Co.	Elbow Lake	218-685-6100	R	Lincoln	Dumke, Allen C.	Hendricks	507-275-3056	C
Grant	Thiel Seed Service	Wendell	218-458-2415	R	Lincoln	Jerzak, Jerome	Ivanhoe	507-694-1582	R
Marshall	Anderson, Harvey & Luther	Stephen	218-455-3305	R	Lincoln	Jerzak, John	Ivanhoe	507-694-1834	C
Marshall	Gryskiewicz, Donald & Jeff	Stephen	218-437-8164	R	Lincoln	Jerzak, William W.	Ivanhoe	507-694-1736	R
Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R	Lyon	Tracy-Garvin Cooperative	Tracy	507-629-3780	C
Marshall	Rivard Farms, G.A.	Argyle	218-437-6638	R	Mahnomen	Bursch Farms, Inc.	Mahnomen	218-935-5353	R C
Polk	Peterson, Douglas	East Grand Forks	218-773-9120	R	Mahnomen	Pazdernik Farms, Inc.	Waubun	218-478-2232	C
Polk	Thorson Farm, Inc., J. O.	East Grand Forks	218-893-2285	R	Marshall	Anderson, Brian C.	Stephen	218-455-3495	C
Polk	Wentzel, Walton Farms, Inc.	Fisher	218-281-2207	R	Marshall	Erickson, Paul	Thief River Falls	218-449-3331	C
Wilkin	Friederichs Farm	Foxhome	218-643-2363	R	Marshall	Jensen Farms	Stephen	218-478-2476	R C
Wilkin	Nelson, Bradley	Wolverton	218-995-2299	R	Marshall	Kowalski, James	Stephen	218-455-3894	R
Kulm					Marshall	Peterson, Maynard	Stephen	218-478-3859	C
Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	R C	Marshall	Riopelle, Jack L.	Argyle	218-437-8147	R
Lincoln	Jerzak, William W.	Ivanhoe	507-694-1736	C	Marshall	Szczepanski, Thomas	Stephen	218-478-2462	C
Marshall	Anderson, Harvey & Luther	Stephen	218-455-3305	R	Marshall	Sinclair, Peter M.	Stephen	218-478-3594	C
Lars					McLeod	Dammann Seed Farms	Plato	320-864-3004	C
Clay	Lee Seed Farm	Borup	218-494-3330	C	McLeod	Thalman Seeds Inc.	Plato	320-238-2185	C
Polk	Capistran Seed Company	Crookston	218-281-7840	C	Meecker	Anderson Seeds	Dassel	320-286-2700	C
Renville	Ziller Seed Company, Inc.	Bird Island	320-365-3674	C	Meecker	Johnson Seeds of Dassel, Inc.	Dassel	320-275-2430	C
Marshall					Meecker	Miller Seed Farm	Dassel	320-275-2463	R C
Kitson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R C	Meecker	Wigen Seed Farm	Litchfield	320-693-8182	C
Lake of Woods	Helmstetter Farm	Roosevelt	218-442-7285	C	Norman	Chisholm, Keith P.	Gary	218-356-8674	R
Marshall	Philipp, D. Joe	Goodridge	218-681-5574	C	Norman	Ellingson Farms	Borup	218-861-6605	C
Polk	Sonstelie, Gordon & Gary	Winger	218-938-4189	C	Norman	Halland, Barry	Gary	218-356-8791	C
Roseau	Kilen, Jerel	Greenbush	218-782-2883	C	Norman	Kveno, Harry	Gary	218-356-8278	R
Roseau	Kukowski, Jim	Strathcona	218-781-2478	C	Norman	Nelson, Kenneth R.	Halstad	218-456-2578	C
McKenzie					Norman	Peppel Bros. Donald & Dennis	Borup	218-582-3242	C
Out Of State	Terra International	Grand Forks	701-775-8183	R	Norman	Ramstad Brothers	Ada	218-784-7190	C
Nora					Otter Tail	Walkup, John	Campbell	218-739-2580	C
Polk	Capistran Seed Company	Crookston	218-281-7840	C	Polk	Bauer Farms	Erskine	218-687-5356	C
Oxen					Polk	Brule, David A.	Crookston	218-281-2944	C
Becker	Larson, David G.	Lake Park	218-238-5824	C	Polk	Mat - Co., Inc.	Fosston	218-435-6667	R C
Becker	Steffl, William D.	Callaway	218-375-2283	C	Polk	Novak, James	Angus	218-745-5048	C
Big Stone	Clinton Ag Service, Inc.	Clinton	320-325-5203	R C	Polk	Peterson, D.W., Inc.	Warren	218-745-4507	R
Big Stone	Jahnke Farms	Johnson	320-748-7687	C	Polk	Vig Farms Inc.	Fosston	218-435-1316	R C
Brown	Cunningham Seed Farms	Sleepy Eye	507-794-7323	C	Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R C
Brown	Rossbach Lakeside Seeds, Inc.	Hanska	507-794-7698	C	Redwood	Sawvell's Seed, Inc.	Clements	507-692-2240	C
Clay	Anderson, Lynn	Moorhead	218-287-1765	R	Renville	Enestvedt Bros.	Sacred Heart	320-765-2728	C
Clay	Arneson Farms	Hawley	218-483-4165	C	Renville	JSF, Inc.	Sacred Heart	320-765-2225	C
Clay	Brendemuhl, Inc., M-D	Moorhead	218-233-5192	C	Roseau	Habstritt Farms, Inc.	Roseau	218-463-1193	R C
Clay	Johnson, Brian M.	Hawley	218-962-3316	C	Roseau	Kukowski, Jim	Strathcona	218-781-2478	C
Clay	Krabbenhoft & Sons, Inc.	Sabin	218-789-7206	C	Stearns	Middendorf Seed Farm	Sauk Centre	320-352-6053	C
Clay	Petermann Seed Farms	Hawley	218-483-3302	R C	Stevens	Bruer, Michael C.	Alberta	320-324-7577	C
Clay	Peterson Farm, Sherwood E.	Baker	218-789-7378	R C	Stevens	Haberer Seed Farm	Morris	320-795-2468	C
Clay	Tri-County Co-op Assn.	Ulen	218-596-8821	C	Swift	Busse Seeds	Appleton	320-394-2315	C
					Swift	Falk Seed Farm	Murdock	320-875-4341	R C

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Swift	Gordon Farms, Inc.	Murdock	320-875-3132	C	Clay	Oberg Farms	Moorhead	218-236-9856	C
Swift	Lee's Seed Farm	Benson	320-843-2857	C	Clay	Petermann Seed Farms	Hawley	218-483-3302	R C
Swift	Nelson Seed Company	Benson	320-843-3610	C	Clay	Valan, Orlen Jr.	Moorhead	218-236-9479	C
Traverse	Lundquist Seed, Inc.	Wheaton	320-563-8622	C	Clay	Wagner, Robert T.	Barnesville	218-789-7212	C
Traverse	Lundquist, Steven	Wheaton	320-563-8644	C	Kitson	Olsonawski, Jerry	Hallock	218-379-3235	C
Traverse	Rinke, David	Wheaton	320-563-4864	C	Polk	Larson Farms, Jerry Larson	Climax	218-857-3345	C
Wilkin	Beyer Seed Farm	Kent	218-643-5126	R C	Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Wilkin	Friederichs Farm	Foxhome	218-643-2363	R	Wilkin	Nelson, Bradley	Wolverton	218-995-2299	C
Wilkin	Haugrud Seed Plant	Rothsay	218-493-4275	R C	Wilkin	Nordick, J & R	Rothsay	218-867-2605	C
Wilkin	Knapp Seed Farm, Inc.	Foxhome	218-739-3366	C	Yellow Med.	Rosetter, Richard D.	Granite Falls	320-564-3620	R
Wilkin	Steenblock Farms, Dale	Campbell	218-630-5500	C	Sharpshooter				
Wilkin	Torkelson, Dennis & Brent	Foxhome	218-736-4607	C	Clay	Lee Seed Farm	Borup	218-494-3330	C
Wright	Terning Seeds, Inc.	Cokato	320-286-2168	C	Polk	Capistran, Wayne	Crookston	218-281-5705	C
Yellow Med.	Antony, David N.	Porter	507-223-7144	R C	Polk	Ross Seed Co.	Fisher	218-891-2211	R C
Russ					Redwood	Sawwell's Seed, Inc.	Clements	507-692-2240	C
Becker	Hein Farms, Inc.	Audubon	218-439-6621	C	Redwood	Sawwell, Ronald	Clements	507-692-2240	C
Becker	Lockhart, Michael	Ulen	218-596-8500	C	Traverse	Lundquist Seed, Inc.	Wheaton	320-563-8622	C
Clay	Baker, Jim & Kurt	Sabin	218-789-7360	C	Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Clay	Fuglie, Duane	Ulen	218-596-8528	C	Verde				
Clay	Heartland Seeds	Moorhead	218-585-4621	C	Kitson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R C
Clay	Johnson, Brian M.	Hawley	218-962-3316	C	Kitson	Petersen, Ronald L.	Lake Bronson	218-754-4631	C
Clay	Krabbenhoft & Sons, Inc.	Sabin	218-789-7206	C	Kitson	Rynning Farms	Kennedy	218-674-4425	C
Clay	Petermann Seed Farms	Hawley	218-483-3302	R C	Kitson	Sorenson, David	Hallock	218-843-3436	R
Clay	Peterson Farm, Sherwood E.	Baker	218-789-7378	R C	Lake o.t. Woods	Helmstetter Farm	Roosevelt	218-442-7285	R C
Clay	Zimmerman, Wayne	Ulen	218-596-8628	C	Mahnomen	Bursch Farms, Inc.	Mahnomen	218-935-5353	C
Grant	Jennen, Richard J. & Sons	Elbow Lake	218-685-4903	R	Marshall	Holte, Steven	Grygla	218-294-6537	C
Kitson	Bloomquist Farms, Inc.	Drayton	218-455-3863	R C	Marshall	Jensen Farms	Stephen	218-478-2476	C
Kitson	Gillie Grain	Hallock	218-754-4931	C	Marshall	Kuznia, Kenneth J.	Argyle	218-437-8203	R
Kitson	Johnson Farms, Inc., Lloyd	Karlstad	218-436-2817	C	Marshall	Nelson Farm % Doyle	Goodridge	218-681-6972	C
Lake of Woods	Helmstetter Farm	Roosevelt	218-442-7285	C	Marshall	Robertson Brothers	Argyle	218-437-6411	R
Mahnomen	Bursch Farms, Inc.	Mahnomen	218-935-5353	R C	Norman	Chisholm, Keith P.	Gary	218-356-8674	C
Mahnomen	Pazdernik Farms, Inc.	Waubun	218-473-2232	C	Pennington	Asp, Kenneth	Thief River Falls	218-681-3272	C
Marshall	Bring, Wesley	Strandquist	218-874-3713	C	Pennington	Swanson, Curtis W.	Thief River Falls	218-964-5619	C
Marshall	Farmers Elevator Company	Alvarado	218-965-4812	C	Polk	Bergman Farms, James	Oslo	218-965-4913	C
Marshall	Jensen Farms	Stephen	218-478-2476	R C	Polk	Larson Farms, Inc., Ralph	East Grand Forks	218-773-1463	C
Marshall	Martin, Doyle A.	Thief River Falls	218-449-3635	C	Red Lake	Swenson Seed Farm	Brooks	218-796-5285	C
Marshall	Peterson, Maynard	Stephen	218-478-3859	R	Red Lake	Vatthauer Farm	Red Lake Falls	218-253-2490	C
Norman	Black Bros.	Fertile	218-945-6343	C	Roseau	Kukowski, Jim	Strathcona	218-781-2478	R
Norman	Chisholm, Keith P.	Gary	218-356-8674	R C	HARD RED WINTER WHEAT				
Norman	Ellingson Farms	Borup	218-861-6605	C	Arapahoe				
Norman	Kveno, Harry	Gary	218-356-8278	C	Le Sueur	Dick Stangler Farm Seed	Kilkenny	507-595-2883	C
Norman	Peppel Bros. Donald & Dennis	Borup	218-582-3242	C	McLeod	Dammann Seed Farms	Plato	320-864-3004	C
Otter Tail	Brenden, Bruce L.	Rothsay	218-867-2410	R	McLeod	Thalmann Seeds Inc.	Plato	320-238-2185	C
Pennington	Scholin Farms	Thief River Falls	218-964-5268	R C	Polk	Vig Farms Inc.	Fosston	218-435-1316	C
Polk	Balstad, Scott	Fosston	218-435-6311	C	Elkhorn				
Polk	Caillier, Daniel	Crookston	218-281-2840	C	Clay	Petermann Seed Farms	Hawley	218-483-3302	C
Polk	Clementson, Jon	Erskine	218-687-2345	C	McLeod	Dammann Seed Farms	Plato	320-864-3004	C
Polk	H & J Farms, Inc.	Warren	218-745-5018	C	Norman	Chisholm, Keith P.	Gary	218-356-8674	R C
Polk	J.E.P. Farm	Euclid	218-745-5915	R	Roseau	K & L Farms	Wannaska	218-425-7719	C
Polk	Kovar, Frank & Duane	East Grand Forks	218-773-9238	C	Seward				
Polk	Mat - Co., Inc.	Fosston	218-435-6667	R C	Dakota	May, Jr., William	Farmington	612-463-8541	C
Polk	Ostenaar, Sidney & DeWayne	Mc Intosh	218-563-7395	R	Freeborn	Albert Lea Seed House, Inc.	Albert Lea	507-373-3161	C
Polk	Peterson, D.W., Inc.	Warren	218-745-4507	R	Le Sueur	Haas Seed Farm	Le Sueur	507-665-3683	R C
Polk	Peterson, Douglas	East Grand Forks	218-773-9120	R C	Meeker	Thissen, Ben	Litchfield	320-693-7382	R
Polk	Pulkrabek, Anthony H.	Angus	218-745-5053	C	Norman	Chisholm, Keith P.	Gary	218-356-8674	R
Polk	Sonsteli, Gordon & Gary	Winger	218-938-4189	C	Scott	Hauer Farms, Inc.	Shakopee	612-445-7554	C
Red Lake	Myhre Farms	Red Lake Falls	218-698-4485	C	Swift	Falk Seed Farm	Murdock	320-875-4341	C
Red Lake	Swenson Seed Farm	Brooks	218-796-5285	R C	Todd	Brekke, Floyd	Eagle Bend	218-738-2672	C
Red Lake	Vatthauer Farm	Red Lake Falls	218-253-2490	C	Wright	Dahlco Seeds, Inc.	Cokato	320-286-5982	C
Roseau	Kukowski, Jim	Strathcona	218-781-2478	C					
Wilkin	Beyer Seed Farm	Kent	218-643-5126	R C					
Wilkin	Friederichs Farm	Foxhome	218-643-2363	R					
Sharp									
Becker	Hein Farms, Inc.	Audubon	218-439-6621	C					
Clay	Evert Farms Ltd Partnership	Sabin	218-789-7338	C					
Clay	Heartland Seeds	Moorhead	218-585-4621	C					
Clay	Krabbenhoft & Sons, Inc.	Sabin	218-789-7206	C					

Wheat and Barley Fusarium Head Blight (Scab) Research Initiative

From a modest beginning, funded by a mid-biennium appropriation by the Minnesota Legislature for 1995, the Minnesota Agricultural Experiment Station's fusarium head blight (FHB) research program has evolved into the largest and most comprehensive effort among agricultural experiment stations in the nation.

The FHB, or scab, research initiative in Minnesota is a coordinated effort of the University of Minnesota, the Minnesota Barley Research and Promotion Council, and Minnesota Wheat Research and Promotion Council

The initiative involves 20 principal investigators and 75 research support staff in four departments at three University of Minnesota campuses – St. Paul, Morris and Crookston. University of Minnesota researchers have formed strategic regional partnerships with North Dakota State University, South Dakota State University, and Agriculture Canada, Manitoba, to share plant-breeding material, conduct common screening nurseries and share research results.

The FHB research initiative has two key components:

1. A long-term strategy of whole-plant breeding and plant gene mapping to identify FHB resistance and incorporate that genetic material into regionally adapted varieties.

2. A short-term management strategy to minimize the effect of FHB until long-term solutions are developed.

Objectives

The FHB initiative has three key objectives:

1. Developing FHB-resistant varieties of wheat and barley through whole plant breeding and molecular approaches
2. Improving knowledge of the FHB-organisms and disease spread.
3. Developing field management strategies to permit profitable small-grain production until FHB-resistant varieties are developed.

Accomplishments since 1995

As a part of its FHB initiative over the past three years, the Minnesota Agricultural Experiment Station has:

- ✓ Released two new spring wheat varieties, BackUp and HJ98, with improved FHB resistance from Asian sources.
- ✓ Released a new barley variety, Mnbrite, with improved FHB resistance.
- ✓ Screened more than 6,000 spring wheat and barley genotypes per year in the greenhouse in search of FHB resistance.
- ✓ Developed improved greenhouse screening techniques to reduce the time required to assess a genotype's FHB resistance.

- ✓ Developed valid field-screening methods that simulate varied levels of FHB pressure to permit germplasm evaluation.
- ✓ Identified a morphological indicator trait in growing plants for quick assessment of FHB resistance.
- ✓ Determined that chemical treatments can be used to restrict FHB infection and development.
- ✓ Validated that easily determined indirect plant measurements can be used to assess FHB resistance.
- ✓ Determined the deoxynivalenol (DON) mycotoxin content of more than 3,000 grain samples annually to support plant breeding and management research.
- ✓ Developed neural network computing methodologies to permit visual estimates of scab incidence in wheat with 95-percent accuracy.
- ✓ Determined that beef steer feedlot performance and carcass characteristics were unaffected by a diet high in FHB-infected barley and the meat did not have unsafe mycotoxin levels.

The Future

Varieties of spring wheat and barley with high tolerance to FHB must be developed if small grains are to be grown profitably in Minnesota. Resistant varieties and improved agronomic management can help to minimize fluctuations in the Minnesota rural economy and reduce the risk of farming in the northern plains.

Development of FHB barley is necessary to retain the malting barley industry in Minnesota, which raises the value of Minnesota barley above feed-grade grain prices.

Regional working relations among academic institutions and peers established by the FHB initiative will be maintained as FHB is solved and the group focus moves to address other small-grain issues.

The partnership forged among small-grain growers, agribusiness and the University of Minnesota has formed lasting relations that enable the University of Minnesota to be a positive force in helping active citizens shape the future of rural Minnesota.

FHB Initiative Contact Persons

Dr. Gary Lemme, *University of Minnesota Coordinator*

Mr. Tom Anderson, *Small Grains Research Committee Chair*

FHB Research Project Leaders

Dr. Robert Buseh, *Development of Disease-Resistant Wheat Varieties*

Dr. Gary Muchbauer, *Molecular Approaches to Identification and Development of Genetic Resistance to Fusarium Head Blight (FHB) of Wheat and Barley*

Dr. Weiping Xie, *Mycotoxin Detection and Analysis*

Dr. Albert Sims, *Residue Management and Inoculum Potential of Fusarium*

Dr. Roger Rueh, *Scabby Wheat Assessment Using Machine Vision and Neural Networks*

Dr. Don Rasmuson, *Development of Disease-Resistant Barley Varieties*

Dr. Ruth Dill-Macky, *Biology, Epidemiology and Management of Scab*

Dr. John Wiersma, *FHB Resistance in Spring Wheat and Barley Effective Screening Nurseries*

Mr. George Nelson, *Scab Research at the West Central Experiment Station, Morris*



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