Minnesota Agricultural Experiment Station

VARIETY TRIALS

OF SELECTED FARM CROPS

CROP DATA REPORTS FOR 1998 PRODUCTION

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VARIETY TRIALS

OF SELECTED FARM CROPS

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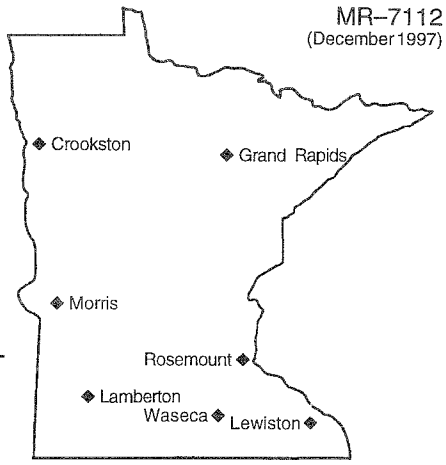
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Alfalfa



Locations of alfalfa trials.

Successful production of alfalfa depends on selecting the best varieties for a particular farm. Varieties are compared for yield in trial plots on Minnesota Agricultural Experiment Station fields at Rosemount, Waseca, Lewiston, Lamberton, Morris, Crookston and Grand Rapids. These plots are handled so that factors affecting yield, winter survival and forage quality are as nearly the same for all varieties as is possible.

Test results for varieties available in Minnesota, old or new, are published as accumulated performance years averaged as a percent of Vernal or other check varieties over locations representative of risk of winter injury in specific regions of Minnesota: Rosemount and Waseca (Lewiston replaces Waseca beginning 1997), southeastern Minnesota; Lamberton, southwest Minnesota; Morris and Crookston, west central, central, and northwestern Minnesota; and Grand Rapids, northeastern Minnesota (see test locations map). Varieties of alfalfa are tested for winter survival and forage quality at selective experiment station fields of the Universities of Minnesota and Wisconsin-Madison.

Variety Classifications

Alfalfa varieties are classified as dormant, varieties developed to overwinter in Minnesota conditions, or nondormant, varieties not expected to overwinter in Minnesota. Disease resistance and fall dormancy information as classified by the variety developer and published in Certified Alfalfa Seed Council Publication "Fall Dormancy & Pest Resistance Ratings for Alfalfa" is listed alphabetically in table 1A.

Performance information for variety's approved for Seed Certification and available in Minnesota is published in this report. Developers and marketers of alfalfa varieties are listed in Table 1B. Contact information for these distributors, address and telephone number, is provided in Table 5. Only varieties with yield, winter survival or forage quality performance information are listed in Tables 2 through 4.

Interpreting the Tables

Yield information is expressed as a percent of the average of four check varieties (Vernal, Onedia, Onedia VR and Spredor 3). Forage quality information is expressed as a percent of Vernal, a winter-hardy, national check variety. Yield and forage quality are also reported by locations and averaged over test sites and production years. Performance of a variety is best determined by using test data from three test sites and three production years. Test data within a test site-region of the state is less reliable than performance over several sites.

The LSD (Least Significant Difference) figures listed for forage quality performance in table 4, under columns of tests, are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two numbers is due to genetic difference in the varieties. If the difference between two varieties equals or exceeds the LSD value listed at the bottom of each test column, you can conclude that the higher quality variety was superior. If the difference is less, greater attention should be given to other traits important in making your variety choices.

Authors/Researchers

Authors of this alfalfa report are: Neal P. Martin and Craig C. Sheaffer. Data summary was compiled by Duane A. Schriever. Laboratory work for forage quality was supervised by James L. Halgerson. Field work of varietal trials at Rosemount, Waseca, Lewiston, Lamberton, Morris, Crookston and Grand Rapids was supervised by Douglas Swanson, Thomas R. Hoverstad, Steven R. Quiring, Gregory J. Cuomo, John V. Wiersma and Russell D. Mathison.

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For Crop Production 1998

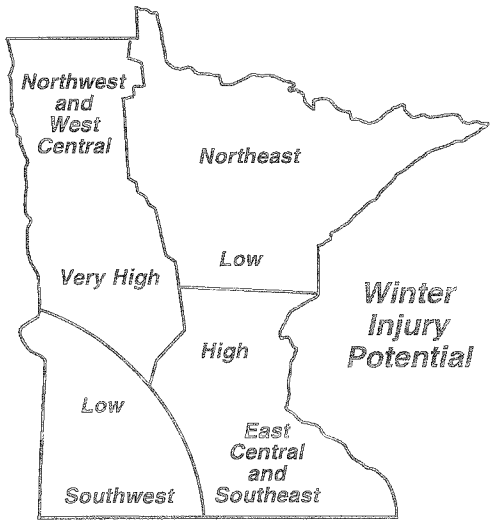
ALFALFA VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of public and private alfalfa tests conducted by the Minnesota Agricultural Experiment Station. Prepared by Neal P. Martin, extension agronomist-forages (612/625-3747; e-mail: <marti007@.tc.umn.edu>), and Craig C. Sheaffer, agronomist (612/625-7224; e-mail: <sheaf001@.tc.umn.edu>), Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108.

Winter Hardiness

Severe winters make winter hardiness a prime consideration in variety selection for most of Minnesota. The 1989-90, 1991-92 and 1994-95 winters were very damaging to alfalfa stands over wide areas of the state. These winters confirmed previous observations about areas most subject to winter injury (see "Winter Injury Potential" map). Several ice sheet events last winter, 1996-97, and cold temperatures in April following limited green-up of alfalfa, combined to reduce older stands at Lamberton and Grand Rapids.



The greatest winter hardiness is needed in the northwest and west central Minnesota area. Because of the high frequency of severe winters in this area, only winter-hardy varieties should be selected. The east central and southeast area also experiences frequent severe winters. Winter-hardy varieties with high levels of disease resistances 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 also seldom experiences severe winter injury because of dependable snow cover.

Winter Survival

Winter hardiness of varieties is extremely difficult to determine because winter injury can occur as a result of many different weather events, interacting with how alfalfa plants

of differing ages respond differently to various weather events. A new test called "Winter Survival" is used to determine winter hardiness of varieties. This standardized test, North American Alfalfa Conference Winter Survival Test, measures the survival of a variety after a severe winter. Tests are conducted annually at four or five locations, Arlington, Marshfield and Lancaster, Wisconsin and Rosemount and Morris, Minnesota, to provide a winter survival index (WSI). Table 3.

The WSI was pooled over all tests to provide an estimate of winter hardiness. This is presented with yield data in Table 2A. Varieties are rated from 'superior' to 'adequate' in winter survivability. Vernal, a traditional winter-hardy variety to which other varieties are often compared, is rated superior. Varieties rated 'adequate' in winter survivability are expected to be injured the most after a severe winter. Varieties not tested for winter survival are listed in Tables 2B-1 and 2B-2 and are listed alphabetically. If a variety does not have a WSI, the fall dormancy index is the next best indicator of winter hardiness (1 = very winter-hardy; 2 = winter-hardy; 3 and 4 = moderately winter-hardy).

Fall Dormancy and Yield

Fall dormancy ratings of varieties are listed alphabetically in table 1A. Varieties that are very fall dormant 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. Nevertheless, 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 winter hardiness and disease resistance. Three or four years of consistent production can be expected from fall dormant varieties with high levels of winter hardiness.

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 winter hardy, fall dormant varieties for year two, and reduced yields in years three and four. The reduced yields in years three and four are usually associated with winter injury.

Alfalfa yield of a given variety is predicted best after three test sites have been measured over four years of stand life (three years after seeding). Variety yield performance is not significantly different the first two years after seeding. Thus, to choose a variety for short term stands, use the 'all location' yield for '1-2 years' after seeding. For long-term stands, choose varieties based on their performance over all locations three years after seeding. Varieties with less than three-test years are not accurately characterized for yield performance (Tables 2C-1 and 2C-2).

Annual Alfalfa

Non-dormant varieties, annual varieties under normal Minnesota winters, are characterized by extremely 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 non-dormant non-winter hardy 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 was the first alfalfa variety developed with specialized nitrogen accumulation attributes.

Other non-winter hardy varieties, dormancy 8 and 9, not listed in the tables include 5715, 5888, 13R Supreme, ABT 805, 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, Westar, WL 516, WL 525 HQ, Yolo, 5939, Baralfa 92, Beacon, Coronado, CUF 101, Magna 9, Mecca, Mecca II, Sundor, SW 9301, SW 14, UC Cibola, WL 605 and WL 612.

Forage Quality

Alfalfa varieties differ in forage quality or feeding value. Alfalfa varieties have been evaluated for forage quality at Rosemount on a fee basis since 1991(Table 4). A standardized forage quality test has been performed at Arlington, Wisconsin and Rosemount, Minnesota 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 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 1. Moderate resistance (MR) to a disease will provide protection to a variety under most Conditions. Under severe disease conditions, however, either resistance (R) or high resistance (HR) are required for protection.

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. All varieties can benefit from improved disease resistance. However, 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 per season) in the east central and southeast area of Minnesota.

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

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

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

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 two- or three-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 1.

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, but if Phytophthora root rot resistant varieties fail to persist, then consider planting a variety with Aphanomyces resistance.

Table 1A. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Note Key:

1] Varieties includes those marketed in Minnesota for which disease resistance ratings were provided. Varieties which are not seeded in a Minnesota yield trial are excluded from Table 2.

[2] Fall Dormancy and Pest Resistance Ratings as reported in CASC publication, or provided by a developer (^). Dormancy is based on fall growth in mid-October after cutting 1st week of September. 9=tallest (tend to be least winterhardy), 1=shortest.

[3] Diseases: BW=Bacterial Wilt, PRR=Phytopthora Root Rot, FW=Fusarium Wilt, AN=Anthracnose, VW=Verticillium Wilt, APH=Aphanomyces Root Rot.

[4] CASC 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).

Variety[1]	FD [2]	Disease Resistance Ratings [3,4] BW	PRR	FW	AN	VW	APH
Dormant							
120	3	HR	R	R	LR	—	—
2555ML	2	HR	HR	HR	HR	R	R
3324	3^	HR	HR	HR	HR	R	R
3452-ML	3	HR	HR	HR	HR	R	R
5246	3	HR	HR	HR	HR	R	MR
5262	2	HR	R	MR	—	LR	—
5312	3	HR	HR	HR	HR	HR	R
5347LH	3^	HR	HR	HR	HR	MR	R
5454	4	R	HR	HR	HR	MR	LR
620	2	HR	HR	HR	HR	R	R
630	4	HR	R	R	MR	MR	—
631	4	HR	HR	HR	R	R	MR
8498	3^	HR	HR	HR	HR	R	R
9326	3	HR	HR	HR	R	R	R
A-295	2	HR	HR	HR	R	R	R
A-395	3	HR	HR	HR	HR	R	R
ABT 205	2	HR	HR	HR	R	R	R
ABT 227LH	2^	HR	HR	R	HR	R	R
ABT 405	4	HR	HR	HR	R	HR	R
Ace	4	HR	HR	HR	HR	R	R
Achieva	3	R	HR	HR	HR	R	R
Affinity+Z	4	HR	HR	HR	HR	HR	R
Agate	2	HR	R	HR	MR	—	—
Aggressor	4	HR	HR	HR	HR	R	MR
Alfagraze	2	R	LR	R	MR	—	—
AlfaStar	4	HR	HR	HR	HR	R	R
Allegro	4	HR	HR	HR	HR	R	R
ALPHA 2001	4	HR	HR	HR	HR	HR	R
Alpine	2	R	R	R	R	R	—
AmeriGraze 401+Z	4	HR	HR	HR	HR	HR	R
AmeriGuard 301	3^	HR	HR	HR	HR	R	R
Apollo Supreme	4	HR	R	HR	HR	R	—
Arrest	3^	HR	HR	R	HR	R	R
Arrow	3	HR	HR	HR	MR	R	—
Aspen	4	HR	HR	HR	HR	R	R

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD [2]	Disease Resistance Ratings [3,4]					
		BW	PRR	FW	AN	VW	APH
Avalanche +Z	2	HR	HR	HR	HR	HR	R
Award	4	HR	HR	HR	HR	HR	R
Banquet	4	HR	HR	HR	HR	HR	R
Baralfa 32 IQ	3	HR	HR	HR	HR	R	HR
Baralfa 54	5	R	HR	HR	HR	R	—
Big Horn	4	HR	HR	HR	HR	R	HR
Blazer XL	3	R	HR	HR	HR	R	R
Bolt ML	3	R	HR	HR	HR	R	HR
Bountiful Plus	3^	HR	HR	HR	R	HR	—
Bounty	2	HR	HR	HR	HR	R	R
Break-Thru	3	HR	HR	HR	MR	R	—
Breakout	4^	HR	HR	HR	HR	R	HR
Champion LH	3^	HR	HR	Hr	HR	R	R
Ciba 2444	3	HR	HR	HR	HR	R	R
Ciba 2888	3	HR	HR	HR	HR	HR	R
Columbia 2000	2^	R	MR	R	MR	MR	—
Complete	3	HR	HR	HR	HR	HR	R
Crown II	3	HR	HR	HR	HR	R	—
Crystal	4	HR	HR	HR	R	R	LR
Cut 'N' Graze	3	R	R	HR	MR	LR	LR
Dart	3	HR	HR	HR	R	R	—
Dawn	3^	HR	HR	HR	R	R	MR
Defiant	2	HR	HR	HR	R	HR	R
Demand	3	HR	HR	HR	HR	HR	R
Depend+EV	4	HR	HR	HR	HR	HR	R
Dividend	2	HR	HR	HR	HR	R	R
DK 122	2	HR	HR	R	HR	R	—
DK 127	3	HR	HR	R	HR	R	HR
DK 133	4	HR	HR	HR	HR	R	R
DK 140	4	HR	HR	HR	HR	R	HR
DK 141	4	HR	HR	HR	HR	HR	HR
DK 142	4	HR	HR	HR	R	R	HR
Dominator	4	HR	HR	HR	HR	R	R
Eliminator	3^	HR	HR	HR	R	R	MR
Empire	2	HR	HR	HR	HR	R	R
Enhancer	4	HR	HR	HR	R	R	MR
Envy	3	HR	R	HR	HR	R	—
Evolution	2	HR	HR	HR	HR	R	R
Exceed	3^	HR	HR	HR	HR	R	R
Extend	4	HR	HR	R	HR	R	R
Feast	3^	HR	HR	HR	HR	R	R
Forecast 1000	3	HR	HR	HR	R	R	R
Forecast 3000	4	HR	R	HR	R	R	MR
Forerunner	2	HR	HR	HR	HR	HR	HR
Fortress	4	R	HR	R	—	R	—

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD [2]	Disease Resistance Ratings [3,4]					
		BW	PRR	FW	AN	VW	APH
Garst 636	2	HR	R	R	MR	R	—
Garst 645	3	HR	HR	R	HR	R	MR
Gateway	4^	HR	HR	HR	HR	R	R
GH 755	4	HR	HR	HR	HR	R	R
GH 757	4^	HR	HR	HR	HR	HR	HR
GH 766 QP	3	HR	HR	HR	HR	R	R
GH 767	2	HR	HR	HR	HR	R	R
GH 777	3	HR	HR	HR	R	R	R
GH 787	3	HR	HR	R	HR	R	R
GH 797	3	HR	HR	HR	HR	HR	—
Good as Gold	4	HR	HR	HR	R	R	LR
Green Field	3	HR	HR	HR	HR	R	R
Guardian	3	HR	HR	HR	HR	HR	R
HayGrazer	4	HR	R	HR	R	R	MR
Imperial	3	HR	HR	HR	HR	R	R
Innovator +Z	3	HR	HR	HR	HR	HR	R
Interceptor	3^	HR	HR	HR	HR	R	R
Iroquois	2	HR	S	MR	S	S	—
Jade	4	HR	HR	R	R	R	—
Jade II	4	HR	HR	HR	R	R	MR
Lactator	2	HR	R	HR	HR	HR	R
Laser	4	HR	HR	HR	R	R	MR
Legend	4	HR	HR	HR	HR	R	—
LegenDairy	2	HR	HR	HR	HR	HR	R
LegenDairy 2.0	3	HR	HR	HR	HR	R	R
Lightning	3	HR	HR	HR	HR	R	HR
MagnaGraze	3	HR	HR	HR	R	R	R
Magnum III	4	R	R	R	MR	MR	LR
Magnum III-Wet	3	R	R	R	MR	MR	MR
Magnum IV	4	HR	HR	HR	R	R	MR
Max 329	3	HR	HR	HR	HR	HR	R
Maxi-Graze GT	2^	HR	HR	HR	R	R	R
MP2000	3	HR	HR	HR	HR	R	HR
Muiti-plier	3	HR	HR	HR	HR	R	—
MultiKing 1	3	HR	R	HR	R	R	—
MultiMist	3	HR	HR	HR	HR	R	R
MultiQueen	4	HR	HR	HR	HR	R	R
Nemesis	3^	R	HR	HR	HR	HR	HR
Notice	3	HR	HR	HR	HR	R	R
Oneida	3	HR	HR	HR	S	—	—
Oneida VR	3	R	MR	HR	MR	HR	—
Ovation	4	HR	HR	HR	HR	HR	R
Pacesetter	2	HR	HR	R	HR	R	—
Persist	4	HR	HR	HR	R	R	MR
Profit	2	HR	R	HR	MR	R	—

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD [2]	Disease Resistance Ratings [3,4]					
		BW	PRR	FW	AN	VW	APH
Proof	3	HR	HR	HR	HR	R	R
Quantum	2	HR	HR	HR	HR	HR	R
Rainier	3	HR	HR	HR	HR	R	HR
Ranger	3	MR	S	MR	S	S	—
RFV-2000	3	HR	HR	HR	HR	R	LR
Rhino	3	HR	R	R	R	R	R
Rushmore	4	HR	HR	HR	HR	R	HR
Rustler II	4	HR	HR	HR	HR	HR	R
Saranac	4	R	S	R	S	S	—
Sierra	3	HR	HR	HR	R	R	MR
Spartan	3	HR	HR	HR	HR	R	—
Spirit	3	HR	HR	HR	R	R	MR
Spredor 3	1	HR	MR	HR	R	MR	S
Stampede	3	HR	HR	R	—	R	R
Sterling	2	HR	HR	HR	HR	R	R
SuperCuts	4	HR	HR	HR	HR	HR	R
Surpass	3	HR	R	HR	MR	R	—
Synergy	3	HR	HR	HR	HR	R	R
Target	4^	HR	R	HR	MR	—	—
Target II	4	HR	HR	HR	R	R	S
Target II +	3^	HR	HR	HR	R	R	MR
Teton	1	LR	LR	MR	S	—	—
TMF 421	2^	HR	HR	R	HR	HR	HR
TMF Generation	4	HR	HR	HR	HR	HR	R
TMF Multi-plier II	3^	HR	HR	HR	HR	HR	R
Total+Z	3	HR	HR	HR	HR	HR	R
Trailblazer	2^	HR	HR	R	HR	HR	R
Travois	1	R	S	MR	S	—	—
Treasure	3	HR	R	HR	HR	R	—
Trident II	3	HR	HR	R	R	R	MR
UltraLeaf 87	3	HR	HR	HR	HR	R	R
Venture	4	HR	R	R	HR	R	R
Vernal	2	R	—	MR	—	—	—
Viking 1	2	R	R	HR	R	HR	—
Vitro	3	HR	HR	HR	HR	HR	R
Voyager II	4	HR	HR	HR	R	R	MR
Webfoot MPR	4	HR	HR	HR	HR	HR	R
WetLand	3	R	HR	R	R	MR	MR
Wintergreen	3	HR	HR	HR	HR	HR	R
Winterking	3	HR	HR	HR	HR	HR	R
Winterstar	2	HR	HR	HR	HR	HR	R
WL 226	3	HR	HR	HR	HR	R	MR
WL 252 HQ	2	HR	HR	HR	HR	R	LR
WL 320	4	R	R	R	MR	MR	—
WL 322 HQ	4	HR	R	HR	MR	R	—

Table 1A continued. Fall dormancy and disease resistance of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	FD [2]	Disease Resistance Ratings [3,4]					
		BW	PRR	FW	AN	VW	APH
WL 323	4	HR	HR	HR	HR	R	R
WL 324	3	HR	HR	HR	HR	R	HR
WL 325 HQ	3	HR	HR	HR	HR	R	R
Wrangler	2	R	HR	R	LR	LR	—
X-Grazer	2^	HR	HR	HR	HR	HR	R
Zenith	3	HR	HR	HR	HR	R	R
Non-dormant							
Nitro	8	—	MR	—	R	—	—

Table 1B. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Note Key:

[1] Varieties includes those marketed in Minnesota for which disease resistance ratings were provided. Varieties which are not seeded in a Minnesota yield trial are excluded from Table 2.

[2] Developers list generally follows Certified Alfalfa Seed Council publication "Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties" (CASC 1997/98 Edition).

[3] Seed source numbers refer to the "key" number in Table 5, "1998 Forage Seed Sources."

Variety[1]	Developer or Marketer[2]	Seed Source[3]
Dormant		
120	DEKALB Genetics	22
2555ML	L.L. Olds/Interstate Payco/Garst Seed	37, 40
3324	L.G. Seeds	43
3452-ML	L. L. Olds/Interstate/Payco	37, 40
5246	Pioneer Hi-Bred Int'l.	53
5262	Pioneer Hi-Bred Int'l.	53
5312	Pioneer Hi-Bred Int'l.	53
5347LH	Pioneer Hi-Bred Int'l.	53
5454	Pioneer Hi-Bred Int'l.	53
620	ICI Seeds/Garst Seeds	28, 37
630	ICI Seeds/Garst Seeds	28
631	ICI Seeds/Garst Seeds	28
8498	Mallard Seeds	44
9326	L.G. Seeds	43
A-295	PGI/MBS	45
A-395	PGI/MBS	45
ABT 205	AgriBioTech	58
ABT 227LH	AgriBioTech	41
ABT 405	AgriBioTech	58
Ace	W-L Research/UAP Seeds	49, 66

Table 1B continued. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	Developer or Marketer[2]	Seed Source[3]
Achieva	Agway/Allied Seed	7, 8
Affinity+Z	America's Alfalfa	9, 37, 61, 63, 66
Agate	USDA/Minn.AES	1, 24, 54, 69
Aggressor	America's Alfalfa	63
Alfagraze	America's Alfalfa	9, 37, 61, 63, 66
AlfaStar	Hoffman Seed/Sexauer	35
Allegro	Mycogen Seeds	47
ALPHA 2001	Great Lakes Hybrids	31
Alpine	Oasis/Spangler/Bio-Plant Research	13
AmeriGraze 401+Z	America's Alfalfa	9, 37
AmeriGuard 301	America's Alfalfa	9, 37
Apollo Supreme	America's Alfalfa	9, 63
Arrest	Northrup King	50
Arrow	America's Alfalfa	63
Aspen	SeedTec/Brown Seed Farms	14
Avalanche +Z	America's Alfalfa	9, 37, 63
Award	Asgrow Seed	11
Banquet	Tri-State Seed & Ag	64
Baralfa 32 IQ	Barenbrug USA	12
Baralfa 54	Barenbrug USA	12
Big Horn	Cargill Hybrid Seeds	17
Blazer XL	Croplan Genetics/Cenex LOL	18
Bolt ML	Research Seeds/Jung Seed Genetics	38
Bountiful Plus	Tri-State Seed & Ag	64
Bounty	PGI/MBS	45, 62
Break-Thru	Custom Farm Seed	23
Breakout	Research Seeds/Brown Seed Farms	14
Champion LH	Kaltenberg Seed Farms	39
Ciba 2444	Novartis Seeds	50
Ciba 2888	Novartis Seeds	50
Columbia 2000	Kaltenberg Seed Farms	1, 7, 8, 39
Complete	Arrow Seed/Fontanelle Hybrids	26
Crown II	Cargill Hybrid Seeds	17
Crystal	PGI/MBS	45
Cut 'N' Graze	AgriPro Seeds	3
Dart	AgriPro Seeds	3
Dawn	AgriPro Seeds	3
Defiant	AgriPro Seeds	3
Demand	AgriPro Seeds	3
Depend+EV	AgriPro Seeds	3
Dividend	Agway/Allied Seed	8
DK 122	DEKALB Genetics	22
DK 127	DEKALB Genetics	22
DK 133	DEKALB Genetics	22
DK 140	DEKALB Genetics	22
DK 141	DEKALB Genetics	22
DK 142	DEKALB Genetics	22
Dominator	AgriPro Seeds	3
Eliminator	La Crosse Seed	41
Empire	Brunner Seed Farm	15, 56

Table 1B continued. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	Developer or Marketer[2]	Seed Source[3]
Enhancer	Rosen's/Bio-Plant Research	13
Envy	Peterson Seed	52
Evolution	Mycogen Seeds	47
Exceed	Specialty Seeds	60
Extend	Spangler/Grassland West	59
Feast	AgriPro Seeds	3
Forecast 1000	Dairyland Seed	21
Forecast 3000	Dairyland Seed	21
Forerunner	Research Seeds/Brown Seed Farms	14
Fortress	Novartis Seeds	50
Garst 636	Garst Seeds	28
Garst 645	Garst Seeds	28
Gateway	Jung Seed Genetics	38
GH 755	Golden Harvest Seeds	30
GH 757	Golden Harvest Seeds	30
GH 766 QP	Golden Harvest Seeds	30
GH 767	Golden Harvest Seeds	30
GH 777	Golden Harvest Seeds	30
GH 787	Golden Harvest Seeds	30
GH 797	Peterson Seed/Golden Harvest	17, 30
Good as Gold	Top Farm Hybrids/Hoegemeyer Hybrids	45, 62
Green Field	Hoegemeyer Hybrids	34, 54
Guardian	AgVenture	4, 5, 6
HayGrazer	Great Plains Research	32, 39
Imperial	Top Farm Hybrids/Cole Growers	62
Innovator +Z	America's Alfalfa	9, 37, 61, 63, 66
Interceptor	AgriPro Seeds	3
Iroquois	Cornell Univ.	1, 7
Jade	NC+ Hybrids	48
Jade II	NC+ Hybrids	48
Lactator	Elk Mound Feed & Farm Supply	25
Laser	J-V Seeds/Patriot Seeds/Rainier	51
Legend	Cenex/Land O'Lakes	18
LegenDairy	Croplan Genetics/Cenex LOL	18
LegenDairy 2.0	Croplan Genetics/Cenex LOL	18
Lightning	Jung Seed Genetics	38
MagnaGraze	Dairyland Seed	21
Magnum III	Dairyland Seed	21
Magnum III-Wet	Dairyland Seed	21
Magnum IV	Dairyland Seed	21
Max 329	AgriBioTech/L & H Seeds	41, 58
Maxi-Graze GT	Croplan Genetics/Cenex LOL	18
MP2000	Croplan Genetics/Cenex LOL	18
Muiti-plier	Mycogen Seeds	47
MultiKing 1	Novartis Seeds	50
MultiMist	Lemke Seeds	42
MultiQueen	Fred Gutwein & Sons	27, 64
Nemesis	Renk Seed	57
Notice	Midwest Seed Genetics	46
Oneida	Cornell Univ.	check

Table 1B continued. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	Developer or Marketer[2]	Seed Source[3]
Oneida VR	N.Y.S.I.P./Public	check
Ovation	Callahan Enterprises	16
Pacesetter	Research Seeds/Brown Seed Farms	14
Persist	Kaltenberg Seed Farms/Doeblers Seed	39
Profit	Ciba Seeds/Wensman Seed	68
Proof	Mycogen Seeds	47
Quantum	Renk Seed	57
Rainier	Novartis Seeds	50
Ranger	USDA/Nebr.AES	1
RFV-2000	Custom Farm Seed	23
Rhino	Geertson Seed Farms	29
Rushmore	Novartis Seeds	50
Rustler II	Andrews Seed	10
Saranac	Cornell Univ.	24, 54
Sierra	NC+ Hybrids	48
Spartan	Kinder Seed/Allied Seed	8
Spirit	Fontanelle Hybrids	26
Spredor 3	Novartis Seeds	50
Stampede	Agway/Allied Seed	8, 52
Sterling	Cargill Hybrid Seeds	17
SuperCuts	AgriBioTech	2, 58
Surpass	Andrews Seed	7, 10, 56
Synergy	Crow's Hybrids	19, 20
Target	Ziller Seed	55
Target II	Bio-Plant Research	55
Target II +	Bio-Plant Research	55
Teton	S.Dakota Agr.Exp.Sta.	1, 24
TMF 421	Mycogen Seeds	47
TMF Generation	Mycogen Seeds	47
TMF Multi-plier II	Mycogen Seeds	47
Total+Z	America's Alfalfa	9, 37, 61, 63, 66
Trailblazer	Croplan Genetics/Cenex LOL	18
Travois	S.Dakota Agr.Exp.Sta.	1, 7, 24
Treasure	Clark Seeds/AgriBioTech	1
Trident II	Cargill Hybrid Seeds	17
UltraLeaf 87	La Crosse Seed	41
Venture	Top Farm/Halsey/Cole Growers	62
Vernal	USDA/Wisc.AES	1, 7, 24, 54, 56
Viking 1	Novartis Seeds	50
Vitro	North-Gro Seed	49
Voyager II	Lemke Seeds/Bio-Plant Research	70
Webfoot MPR	Great Lakes Hybrids	31
WetLand	Bio-Plant Research	70
Wintergreen	Renk Seed	57
Winterking	Wensman Seed	68
Winterstar	Wensman Seed	68
WL 226	W-L Research	6, 33, 67
WL 252 HQ	W-L Research	6, 33, 67
WL 320	W-L Research	6, 33, 67
WL 322 HQ	W-L Research	6, 33, 67

Table 1B continued. Sources of alfalfa varieties eligible for certification and marketed in Minnesota.

Variety[1]	Developer or Marketer[2]	Seed Source[3]
WL 323	W-L Research	6, 33, 67
WL 324	W-L Research	6, 33, 67
WL 325 HQ	W-L Research	6, 33, 67
Wrangler	USDA/Nebr.AES	1,7,24,54,56,69
X-Grazer	Cargill Hybrid Seeds	30
Zenith	ICI Seeds/Garst Seeds	28
Non-dormant		
Nitro	USDA/Minn.AES	54

Table 2A-1. Average yields of alfalfa varieties tested for Winter Survival Index (WSI) expressed as percentage of check varieties for all seedings (tests) with one or more harvest years (1967-97). Average yield is for years 1-2 after seeding and year 3 per test location. Sorted by yield for "ALL YR1-2" within each WSI category.

Note Key:

[1] Winter Survival Index from joint Minnesota-Wisconsin trials 1996-97 (Table 3 is 1997).

[2] Each seeding year in any location counts as one Test Site.

[3] Total production years (after seeding year) for any location with reliable data. Two production years needed for YR1-2 data. (Seed years or production years that winterkilled or otherwise developed unacceptably variable stands are excluded.)

Locations: R-W-LEW=Rosemount-Waseca-Lewiston, ...ALL test sites.

Variety	WSI [1]	R-W-LEW YR1-2	R-W-LEW YR3	ALL YR1-2	ALL YR3	Test Sites [2]	Production Yrs1-3 [3]
Checks (T/Ac 15%mc Hay)	—	6.12	5.42	5.60	5.04	108	226
Superior Winter Survival							
ABT 205	1.6	107	—	102	—	7	9
Vernal (ck)	1.8	100	100	100	100	78	195
Very Good Winter Survival							
5454	2.3	111	—	111	101	20	29
620	2.6	111	—	110	—	11	16
Wintergreen	2.5	115	—	109	139	3	6
Defiant	2.3	108	—	108	—	7	12
Avalanche+Z	2.4	111	—	108	—	9	12
Extend	2.9	107	—	107	—	4	5
5262	2.3	109	105	106	110	18	41
Notice	2.6	106	—	106	—	3	6
MP 2000	2.7	112	—	106	—	4	8
Garst 645	2.8	106	102	106	127	13	24

Table 2A-1 continued. Average yields of alfalfa varieties tested for Winter Survival Index (WSI) expressed as percentage of check varieties for all seedings (tests) with one or more harvest years (1967-97). Average yield is for years 1-2 after seeding and year 3 per test location. Sorted by yield for "ALL YR1-2" within each WSI category.

Variety	WSI [1]	R-W-LEW YR1-2	R-W-LEW YR3	ALL YR1-2	ALL YR3	Test Sites [2]	Production Yrs1-3 [3]
ABT 405	2.6	106	—	104	—	3	6
DK 127	2.6	104	—	102	—	13	14
Rushmore	2.7	104	—	102	100	5	11
Ranger	2.9	100	101	102	102	8	24
Complete	2.7	108	—	101	—	3	5
Innovator+Z	2.3	103	—	100	—	8	10
LegenDairy 2.0	2.8	99	—	99	—	3	4
MultiMist	2.7	—	—	—	—	0	0
Forerunner	2.7	—	—	—	—	4	4
Exceed	2.8	—	—	—	—	3	3
Rainier	2.9	—	—	—	—	5	3
Good Winter Survival							
Aspen	3.2	108	—	109	—	4	5
Ciba 2888	3.2	104	—	109	—	6	9
5312	3.0	111	—	108	116	13	15
GH 767	3.0	114	—	107	115	5	8
UltraLeaf 87	3.2	108	—	107	90	6	14
Dart	3.2	108	108	106	111	13	34
Viking 1	3.0	108	95	104	100	9	19
Lightning	3.3	103	—	101	—	5	10
Guardian	3.0	111	—	99	—	3	6
SuperCuts	3.4	—-	—	97	—	3	5
Fortress	3.8	102	84	97	90	8	24
8498	3.1	—	—	—	—	3	3
Ace	3.1	—	—	—	—	1	0
Columbia 2000	3.1	—	—	—	—	3	3

Table 2B-1. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1997) NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Note Key:

[1] Each seeding year in any location counts as one Test Site.

[2] Total production years (after seeding year) for any location with reliable data. Two production years needed for YR1-2 data. (Seed years or production years that winterkilled or otherwise developed unacceptably variable stands are excluded.)

Locations: R-W-LEW=Rosemount-Waseca-Lewiston, ...ALL test sites.

Variety	R-W-LEW YR1-2	R-W-LEW YR3	ALL YR1-2	ALL YR3	Test Sites [1]	Production Yrs1-3 [2]
120	111	115	109	112	10	29
2555ML	107	—	107	—	7	11
3452ML	101	—	104	—	5	9
5246	109	98	108	112	14	29
630	110	113	107	109	11	29
631	110	—	109	—	11	17
A-295	109	95	109	95	3	5
A-395	106	—	106	—	3	5
Achieva	107	91	108	91	4	9
Affinity+Z	103	—	104	—	7	11
Agate	101	110	99	106	20	56
Aggressor	101	95	101	109	10	23
Alfagraze	102	85	100	99	7	19
AlfaStar	106	—	107	—	3	5
ALPHA 2001	—	—	103	—	4	6
Alpine	110	108	105	118	5	15
Apollo Supreme	107	108	101	105	7	20
Arrow	108	105	107	107	11	31
Award	—	—	—	—	4	3
BANQUET	99	—	99	—	4	5
Blazer XL	101	—	103	101	3	8
Bounty	107	—	113	—	5	10
Break-Thru	104	95	99	95	8	22
Ciba 2444	114	—	114	—	5	5
Crown II	112	—	106	116	6	15
Crystal	101	95	105	112	6	16
Dawn	101	98	102	101	8	19
Demand	104	—	101	—	4	7
Depend+EV	103	—	103	130	4	7
Dividend	102	—	104	101	9	16
DK 122	104	60	104	103	18	43
DK 133	107	96	108	103	14	29
Dominator	108	108	106	108	4	9
Eliminator	103	84	103	92	5	13
Empire	96	—	98	—	3	6
Enhancer	108	—	107	—	6	10
Envy	111	92	105	107	7	18
Evolution	109	99	106	102	7	12
Garst 636	108	107	106	106	8	23
GH 755	109	91	111	91	4	9

Table 2B-1 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1997) NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	R-W-LEW YR1-2	R-W-LEW YR3	ALL YR1-2	ALL YR3	Test Sites [1]	Production Yrs1-3 [2]
GH 766QP	98	—	97	—	5	4
GH 787	105	—	106	98	5	10
Good as Gold	107	99	110	117	7	17
Green Field	103	100	104	100	3	6
Imperial	112	103	112	103	5	8
Iroquois	104	98	106	99	10	26
Jade	116	109	113	118	6	16
Lactator	106	97	106	97	3	5
aser	115	102	112	102	3	7
Legend	98	102	96	99	6	18
LegenDairy	114	—	111	100	4	9
Magnum III	110	110	110	114	9	25
Magnum III-Wet	111	—	111	—	5	10
Magnum IV	108	107	109	107	6	13
Max 329	101	—	103	—	7	10
Multi-plier	109	99	103	101	16	37
MultiKing 1	101	—	105	116	5	13
MultiQueen	—	—	111	—	3	5
Oneida (ck)	103	—	103	—	8	12
Oneida VR (ck)	102	—	101	—	12	12
Ovation	103	98	107	98	3	7
Pacesetter	104	—	107	93	3	7
Persist	113	—	113	—	5	9
Profit	107	111	105	107	13	32
Proof	116	—	98	105	5	10
Quantum	107	99	110	99	4	9
RFV-2000	106	—	105	—	4	8
Rustler II	112	—	112	—	4	6
Saranac	104	98	104	99	23	64
Spredor 3 (ck)	94	—	95	—	13	11
Sterling	106	—	104	104	6	13
Surpass	112	108	110	107	7	19
Target	107	108	106	106	7	21
Target II	110	84	109	96	4	10
TMF Generation	109	—	100	—	5	6
TMF Multi-plier II	—	—	—	—	3	3
Total+Z	112	—	100	—	3	6
Trident II	105	94	106	112	8	20
Venture	103	98	103	98	3	7
Voyager II	110	—	109	—	7	11
Webfoot MPR	102	—	103	—	5	9
Wetland	104	—	104	—	4	6
Winterstar	110	—	107	128	8	9
WL 226	100	99	108	116	3	9
WL 252 HQ	107	—	104	—	6	9

Table 2B-1 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1997) NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	R-W-LEW YR1-2	R-W-LEW YR3	ALL YR1-2	ALL YR3	Test Sites [1]	Production Yrs1-3 [2]
WL 320	109	110	109	105	6	18
WL 322 HQ	94	104	99	112	3	9
WL 323	105	97	107	97	6	12
WL 324	111	—	111	—	5	4
Wrangler	106	107	103	101	8	23
Zenith	107	—	107	111	8	17

Table 2C-1. Average yields of alfalfa varieties with less than three seedings with one or more harvest years data (1967-1997) and NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Note Key:

[1] Each seeding year in any location counts as one Test Site.

[2] Total production years (after seeding year) for any location with reliable data. Two production years needed for YR1-2 data. (Seed years or production years that winterkilled or otherwise developed unacceptably variable stands are excluded.)

Locations: R-W-LEW=Rosemount-Waseca-Lewiston, ...ALL test sites.

Varieties in this table have fewer tests and CANNOT be reliably compared with those in Table 2B.

Variety	R-W-LEW YR1-2	R-W-LEW YR3	ALL YR1-2	ALL YR3	Test Sites [1]	Production Yrs1-3 [2]
3324	—	—	—	—	1	1
9326	—	—	—	—	2	2
Allegro	109	98	95	98	2	5
AmeriGraze 401+Z	—	—	—	—	1	1
AmeriGuard 301	—	—	—	—	3	0
Baralfa 32 IQ	—	—	—	—	1	0
Big Horn	101	—	101	—	2	3
Bolt ML	111	94	111	94	1	3
Cut 'N' Graze	—	—	—	—	1	1
DK 140	—	—	—	—	4	0
DK 141	—	—	—	—	4	0
DK 142	109	—	109	—	2	2
FEAST	—	—	—	—	1	0
Gateway	—	—	—	—	2	0
GH 757	—	—	—	—	1	0
GH 777	110	99	110	99	1	3
GH 797	94	—	96	142	2	5
Jade II	—	—	—	—	2	1
MagnaGraze	109	—	109	—	2	4
Nemesis	—	—	—	—	4	1

Table 2C-1 continued. Average yields of alfalfa varieties with less than three seedings with one or more harvest years data (1967-1997) and NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	R-W-LEW YR1-2	R-W-LEW YR3	ALL YR1-2	ALL YR3	Test Sites [1]	Production Yrs1-3 [2]
Rhino	—	—	—	—	3	1
Sierra	112	—	112	—	1	2
Spirit	—	—	—	—	2	2
Stampede	—	—	—	—	2	2
Synergy	103	--	103	--	1	2
Teton	--	--	102	102	1	3
TMF 421	—	—	—	—	2	0
Travois	--	--	94	96	1	3
Treasure	105	104	105	104	1	3
Vitro	—	—	—	—	3	1
Winterking	102	--	102	--	1	2
WL 325HQ	—	—	—	—	4	2

Table 2A-2. Average yields of alfalfa varieties tested for Winter Survival Index (WSI) expressed as percentage of check varieties for all seedings (tests) with one or more harvest years (1967-1997). Average yield is years 1-2 after seeding and year 3 per test site. Sorted to match order in Table 2A-1.

Note Key:
[1] Winter Survival Index from joint Minnesota-Wisconsin trials (see Table 3).

Locations: M-C=Morris-Crookston, LAM=Lamberton, GR=Grand Rapids.

Variety	WSI [1]	M-C YR1-2	M-C YR3	LAM YR1-2	LAM YR3	GR YR1-2	GR YR3
Checks (T/Ac 15%mc Hay)	—	5.19	4.82	5.38	4.79	4.10	3.97
Superior Winter Survival							
ABT 205	1.6	112	—	87	—	—	—
Vernal (ck)	1.8	100	100	100	100	100	100
Very Good Winter Survival							
5454	2.3	118	—	100	—	110	101
620	2.6	114	—	94	—	—	—
Wintergreen	2.5	—	—	--	—	102	139
Defiant	2.3	111	—	98	—	—	—
Avalanche+Z	2.4	116	—	88	—	—	—
Extend	2.9	—	—	--	—	—	—
5262	2.3	107	107	98	113	105	116
Notice	2.6	119	—	94	—	—	—
MP 2000	2.7	114	—	87	—	—	—
Garst 645	2.8	110	129	103	151	—	—

Table 2A-2 continued. Average yields of alfalfa varieties tested for Winter Survival Index (WSI) expressed as percentage of check varieties for all seedings (tests) with one or more harvest years (1967-1997). Average yield is years 1-2 after seeding and year 3 per test site. Sorted to match order in Table 2A-1.

Variety	WSI [1]	M-C YR1-2	M-C YR3	LAM YR1-2	LAM YR3	GR YR1-2	GR YR3
ABT 405	2.6	115	—	92	—	—	—
DK 127	2.6	110	—	88	—	—	—
Rushmore	2.7	117	—	93	—	94	100
Ranger	2.9	125	117	97	99	—	—
Complete	2.7	—	—	91	—	—	—
Innovator+Z	2.3	—	—	87	—	—	—
LegenDairy 2.0	2.8	—	—	—	—	—	—
MultiMist	2.7	—	—	—	—	—	—
Forerunner	2.7	—	—	—	—	—	—
Exceed	2.8	—	—	—	—	—	—
Rainier	2.9	—	—	—	—	—	—
Good Winter Survival							
Aspen	3.2	—	—	—	—	—	—
Ciba 2888	3.2	128	—	104	—	—	—
5312	3.0	112	—	99	—	103	116
GH 767	3.0	—	—	—	—	93	115
UltraLeaf 87	3.2	—	—	—	—	106	90
Dart	3.2	104	113	104	112	109	108
Viking 1	3.0	107	—	90	—	112	106
Lightning	3.3	121	—	77	—	—	—
Guardian	3.0	105	—	80	—	—	—
SuperCuts	3.4	112	—	76	—	—	—
Fortress	3.8	80	98	106	89	103	98
8498	3.1	—	—	—	—	—	—
Ace	3.1	—	—	—	—	—	—
Columbia 2000	3.1	—	—	—	—	—	—

Table 2B-2. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1997) NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Notes:

Locations: M-C=Morris-Crookston, LAM=Lamberton, GR=Grand Rapids.

Variety	M-C YR1-2	M-C YR3	LAM YR1-2	LAM YR3	GR YR1-2	GR YR3
120	103	107	103	—	112	107
2555ML	104	—	110	—	—	—
3452ML	105	—	107	—	—	—
5246	114	—	99	—	102	119
630	102	100	107	107	99	112

Table 2B-2 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1997) NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	M-C YR1-2	M-C YR3	LAM YR1-2	LAM YR3	GR YR1-2	GR YR3
631	119	—	97	—	—	—
A-295	—	—	—	—	—	—
A-395	—	—	—	—	—	—
Achieva	111	—	—	—	—	—
Affinity+Z	111	—	98	—	—	—
Agate	97	101	100	100	89	96
Aggressor	103	109	102	126	99	107
Alfagraze	97	106	101	117	103	94
AlfaStar	—	—	99	—	—	—
ALPHA 2001	122	—	81	—	—	—
Alpine	95	120	112	123	—	—
Apollo Supreme	90	103	100	99	107	112
Arrow	105	107	108	114	110	103
Award	—	—	—	—	—	—
BANQUET	—	—	—	—	—	—
Blazer XL	101	98	105	103	—	—
Bounty	118	—	—	—	—	—
Break-Thru	88	97	102	93	103	93
Ciba 2444	—	—	—	—	—	—
Crown II	96	107	110	124	—	—
Crystal	104	112	117	144	—	—
Dawn	107	112	—	—	94	98
Demand	—	—	94	—	—	—
Depend+EV	—	—	—	—	103	130
Dividend	114	--	88	--	113	101
DK 122	102	108	107	120	104	102
DK 133	108	115	109	--	110	101
Dominator	—	—	99	—	—	—
Eliminator	99	98	—	—	102	102
Empire	112	--	87	—	—	—
Enhancer	116	—	102	—	—	—
Envy	101	112	102	110	—	—
Evolution	104	—	—	—	98	105
Garst 636	105	108	101	105	103	102
GH 755	117	—	—	—	—	—
GH 766QP	—	—	—	—	—	—
GH 787	—	—	—	—	109	98
Good as Gold	113	117	104	135	108	115
Green Field	—	—	106	—	—	—
Imperial	—	—	—	—	—	—
Iroquois	105	103	100	99	111	96
Jade	116	121	107	131	109	108
Lactator	—	—	—	—	—	—
Laser	117	—	103	—	—	—
Legend	89	98	101	91	101	103

Table 2B-2 continued. Average yields of alfalfa varieties with three or more seedings with one or more harvest years data (1967-1997) NOT tested for Winter Survival Index, expressed as percentage of check varieties. Average yield is years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Variety	M-C YR1-2	M-C YR3	LAM YR1-2	LAM YR3	GR YR1-2	GR YR3
LegenDairy	—	—	—	—	104	100
Magnum III	106	103	116	132	104	108
Magnum III-Wet	111	—	—	—	—	—
Magnum IV	114	—	107	—	—	—
Max 329	108	—	107	—	—	—
Multi-plier	101	109	98	83	100	100
MultiKing 1	109	119	117	141	96	87
MultiQueen	127	—	102	—	—	—
Oneida (ck)	111	—	91	—	—	—
Oneida VR (ck)	110	—	85	—	—	—
Ovation	113	—	—	—	—	—
Pacesetter	—	—	—	—	112	93
Persist	121	—	105	—	—	—
Profit	104	93	106	112	101	114
Proof	100	—	83	—	90	105
Quantum	118	—	—	—	—	—
RFV-2000	107	—	101	—	—	—
Rustler II	—	—	—	—	—	—
Saranac	106	109	102	96	—	—
Spredor 3 (ck)	—	—	—	—	—	—
Sterling	119	—	91	—	94	104
Surpass	104	105	108	105	108	110
Target	108	102	108	114	100	99
Target II	111	106	—	—	105	97
TMF Generation	108	—	84	—	—	—
TMF Multi-plier II	—	—	—	—	—	—
Total+Z	—	—	94	—	—	—
Trident II	106	113	108	134	104	106
Venture	—	—	—	—	—	—
Voyager II	116	—	100	—	—	—
Webfoot MPR	108	—	100	—	—	—
Wetland	—	—	—	—	—	—
Winterstar	—	—	—	—	100	128
WL 226	112	123	111	127	—	—
WL 252 HQ	99	—	107	—	—	—
WL 320	106	102	112	105	112	102
WL 322 HQ	110	121	92	113	—	—
WL 323	113	—	101	—	—	—
WL 324	—	—	—	—	—	—
Wrangler	106	103	98	106	100	91
Zenith	108	105	107	117	—	—

Table 2C-2. Average yields of alfalfa varieties with less than three seedings with one or more harvest years data (1967-1996) and NOT tested for Winter Survival Index, expressed as percentage of Vernal. Average Yield: years 1-2 after seeding and year 3 per test site. Sorted alphabetically.

Note Key:

Locations: C-M=Crookston-Morris, LAM=Lamberton, GR=Grand Rapids

Varieties below have fewer tests and ***cannot*** be reliably compared with those in Table 2B.

Variety	C-M YR1-2	C-M YR3	LAM YR1-2	LAM YR3	GR YR1-2	GR YR3
3324	—	—	—	—	—	—
9326	—	—	—	—	—	—
Allegro	—	—	80	—	—	—
AmeriGraze 401+Z	—	—	—	—	—	—
AmeriGuard 301	—	—	—	—	—	—
Baralfa 32 IQ	—	—	—	—	—	—
Big Horn	—	—	—	—	—	—
Bolt ML	—	—	—	—	—	—
Cut 'N' Graze	—	—	—	—	—	—
DK 140	—	—	—	—	—	—
DK 141	—	—	—	—	—	—
DK 142	—	—	—	—	—	—
FEAST	—	—	—	—	—	—
Gateway	—	—	—	—	—	—
GH 757	—	—	—	—	—	—
GH 777	—	—	—	—	—	—
GH 797	—	—	—	—	99	142
Jade II	—	—	—	—	—	—
MagnaGraze	—	—	—	—	—	—
Nemesis	—	—	—	—	—	—
Rhino	—	—	—	—	—	—
Sierra	—	—	—	—	—	—
Spirit	—	—	—	—	—	—
Stampede	—	—	—	—	—	—
Synergy	—	—	—	—	—	—
Teton	102	102	—	—	—	—
TMF 421	—	—	—	—	—	—
Travois	94	96	—	—	—	—
Treasure	—	—	—	—	—	—
Vitro	—	—	—	—	—	—
Winterking	—	—	—	—	—	—
WL 325HQ	—	—	—	—	—	—

Table 3. Winter Survival Index (WSI): 1997 winter survival results (joint Minnesota / Wisconsin trials).

Locations: A=Arlington, WI; LAN=Lancaster, WI; MA=Marshfield, WI; MO=Morris, MN; R=Rosemount, MN.

Winter Survival Index categories: 1=superior; 2=very good; 3=good; 4=adequate; 5=low; 6=none.

Planted in 1995. Rated during May, 1996. Check varieties: (ck).

Variety	A	LAN	MA	MO	R	Mean
Maverick (ck)	—	—	—	1.0	1.0	1.0
Norseman (ck)	1.0	1.0	1.0	—	—	1.0
Vernal (ck)	1.9	1.7	2.0	1.8	1.9	1.9
ZN 9531	1.8	2.4	1.5	2.6	2.3	2.1
526 (ck)	2.1	2.4	2.1	2.1	2.0	2.2
ZN 9530	1.9	2.0	1.9	3.1	2.0	2.2
3G61	1.8	2.3	2.0	2.6	2.0	2.3
3G54	2.1	2.7	3.0	2.9	2.2	2.3
ZC 9525	2.2	2.9	1.8	2.9	2.3	2.4
ZC 9524	2.0	2.8	1.9	3.0	2.3	2.4
4G66	2.0	3.3	2.1	2.9	1.9	2.4
ZC 9348	2.1	2.9	2.6	3.0	2.0	2.4
ZC 9420	2.4	2.9	1.9	2.8	2.4	2.5
C/W-3304	2.4	2.9	2.0	3.0	2.0	2.5
ZC 9538	2.3	3.0	2.2	2.9	2.2	2.5
3G56	2.3	3.2	1.9	2.9	2.5	2.6
ZN 9533	2.2	3.0	3.6	2.5	2.5	2.6
C/W-4429	2.4	2.9	2.0	3.0	2.3	2.6
620	2.6	2.9	2.0	3.2	2.3	2.6
Forerunner	2.8	3.0	2.0	3.0	2.8	2.7
Complete	2.3	3.3	2.2	3.1	2.3	2.7
3L22	2.2	2.9	2.2	3.2	2.3	2.7
4G75	2.7	3.0	1.8	3.3	2.5	2.7
ZM 9421	2.2	2.8	4.1	2.9	2.7	2.7
ZM 9322	2.1	3.6	3.4	3.0	2.7	2.8
Exceed	2.6	2.9	2.1	3.2	2.8	2.8
LegenDairy 2.0	2.7	3.6	2.0	2.7	2.5	2.8
DK 127	2.5	3.2	3.5	3.1	2.4	2.8
Extend	2.6	3.3	3.4	3.1	2.6	2.9
ZM 9539	2.7	3.3	3.3	2.9	2.7	2.9
Rainier	2.5	3.4	3.3	3.2	2.6	2.9
Ranger (ck)	2.9	2.7	2.3	2.8	3.2	2.9
GH 767	2.8	3.3	2.2	3.2	3.0	3.0
Ace	3.5	3.6	2.7	3.0	2.5	3.1
8498	3.0	3.9	2.9	3.3	2.4	3.1
Dart (ck)	3.2	3.3	3.4	3.2	2.7	3.1
Aspen	2.9	3.6	2.6	3.4	2.9	3.2
WL 92-28	3.1	3.1	4.1	3.6	2.5	3.2
Fortress (ck)	3.4	3.7	4.9	3.9	2.9	3.8
Archer (ck)	5.0	4.4	2.8	4.3	4.8	4.3
G-2852 (ck)	4.1	4.7	4.9	4.0	4.4	4.4
Southern Special (ck)	5.5	5.3	5.0	5.2	5.2	5.2
Moapa 69 (ck)	6.0	6.0	5.7	6.0	6.0	5.9
Cuf 101 (ck)	6.0	6.0	6.0	6.0	6.0	6.0

Table 4. Forage quality and milk per acre of alfalfa varieties, as percent of check entry. Sorted alphabetically.

Note Key:

[1] Varieties listed include joint Minnesota-Wisconsin quality trials (1995-97), plus varieties from prior Minnesota quality trials that are currently marketed in Minnesota.

[2] RFV = Relative Feed Value index (calculated from NDF and ADF).

[3] Milk per acre uses season average quality and yield at Rosemount, MN.

[4] Milk per acre uses season average quality and yield at Arlington, WI.

[5] Checks: Vernal until 1994; Vernal and WL322HQ for 1995-97 seed years.

[6] CV = Coefficient of Variation. Smaller number indicates less variation between replicates.

* Not significantly different from highest variety in trial.

SY=Seed Year; PY=Production Year.

	Minnesota/Wisconsin SY 1991-95 PY 1992-96			Minnesota SY 1996 PY 1997		Wisconsin SY 1996 PY 1997		Wisconsin SY 1997 PY 1997	
Variety [1]	RFV [2]	Milk/Ac	N	RFV	Milk/Ac [3]	RFV	Milk/Ac [4]	RFV	Milk/Ac
5246	104	106	2	—	—	—	—	—	—
5312	—	—	0	—	—	—	—	—	—
5454	102	105	1	—	—	—	—	—	—
630	107	109	1	—	—	—	—	—	—
8498	—	—	0	104*	109*	100	126*	—	—
9326	—	—	0	106*	107*	103 *	119*	—	—
ABT 205	—	—	0	102	103*	101	116*	—	—
Agate	108	104	2	—	—	—	—	—	—
Avalanche+Z	—	—	0	—	—	—	—	—	—
Award	—	—	0	—	—	—	—	108	108
Baralfa 32 IQ	—	—	0	—	—	—	—	110*	112
Bounty	—	—	0	—	—	—	—	—	—
Ciba 2888	102	112	2	—	—	—	—	—	—
Dart	106	99	1	—	—	—	—	—	—
Dawn	102	110	1	—	—	—	—	—	—
Dividend	108	104	1	—	—	—	—	—	—
DK 122	104	106	3	—	—	—	—	—	—
DK 127	105	115	3	108*	105*	103*	116*	108	122*
DK 133	105	106	3	100	96	103*	120*	—	—
DK 140	—	—	0	—	—	—	—	106	116*
DK 141	—	—	0	—	—	—	—	102	119*
Dominator	105	98	1	—	—	—	—		
Exceed	—	—	0	102*	107*	102	121*	—	—
Extend	—	—	0	103*	100*	102	121*	—	—
Garst 645	106	105	1	—	—	—	—	—	—
GH 755	108	102	1	—	—	—	—	—	—
GH 766QP	102	100	1	—	—	—	—	104	118*
GH 767	103	111	2	108*	99	106*	115*	101	115*
GH 787	103	110	2	106*	98	108*	118*	—	—
Good As Gold	105	102	1	—	—	—	—	—	—

Table 4 continued. Forage quality and milk per acre of alfalfa varieties, as percent of check entry. Sorted alphabetically.

Variety [1]	Minnesota/Wisconsin SY 1991-95 PY 1992-96 RFV [2]	Milk/Ac	N	Minnesota SY 1996 PY 1997 RFV	Milk/Ac [3]	Wisconsin SY 1996 PY 1997 RFV	Milk/Ac [4]	Wisconsin SY 1997 PY 1997 RFV	Milk/Ac
Imperial	102	109	1	—	—	—	—	—	—
Innovator +Z	103	105	2	—	—	—	—	—	—
LegenDairy	110	104	1	—	—	—	—	—	—
Lightning	101	112	2	—	—	—	—	—	—
Magnum III	102	105	1	—	—	—	—	—	—
Magnum III-Wet	111	102	1	—	—	—	—	—	—
Magnum IV	99	102	1	—	—	—	—	—	—
Max 329	—	—	0	104*	100*	104*	120*	—	—
Multiking 1	109	102	3	—	—	—	—	—	—
Nemesis	—	—	0	—	—	—	—	104	117*
Oneida	104	106	2	—	—	—	—	—	—
Profit	109	103	1	—	—	—	—	—	—
Rainier	—	—	0	104	104*	103*	116*	—	—
RFV-2000	108	106	1	—	—	—	—	—	—
Rushmore	98	105	1	—	—	—	—	—	—
Saranac	—	—	0	—	—	—	—	—	—
Sierra	103	109	1	—	—	—	—	—	—
Spirit	—	--	0	101	104*	96	124*	—	—
Sterling	102	106	1	—	—	—	—	—	—
Ultraleaf 87	102	108	2	—	—	—	—	—	—
Vernal	99	98	6	98	100	100	100	98	102
Viking 1	106	103	1	—	—	—	—	—	—
Winterstar	—	—	0	—	—	—	—	104	111
WL 252 HQ	104	109	3	—	—	—	—	—	—
WL 322 HQ	105	105	5	102	100	—	—	102	99
Vernal /Checks [5]	148	11782	6	139	8567	179	8129	189	5015
Test Mean	153	12404	6	142	8826	184	9635	198	5833
LSD .05	5	9	5	15	7	13			
CV% [6]	3.4	6.1	3.2	8.7	4.4	7.9			

Table 5. Forage seed sources for 1998 production. Listed alphabetically; numbers keyed to Table 1.

1 Agassiz Seed & Supply, 445 7th St. NW, West Fargo ND 58078; 701-282-8118

2 AgriBioTech, 2700 Sunset, Las Vegas NV 89012; 702-798-1969

3 AgriPro Seed Co., Inc., 824 2nd St. South, Brookings SD 57006;800-658-5526
AgriPro Seed Co., Inc., PO Box 2962, Shawnee Mission KS 66201; 913-384-4940

4 AgServices, 1395 Roberts Road, Hutchinson MN 55350; 320-587-8972

5 AgVenture Central, Box 296, Madison Lake MN 56063; 507-243-3232
AgVenture West, Box 184, Jeffers MN 56145; 507-628-4929
AgVenture West Central, Rt. 2 Box 134, Olivia MN 56277; 320-523-2250

6 AgVenture East, Rte 2, Box 58, Kasson MN 55944; 800-657-4890

7 Albert Lea Seedhouse, 1414 West Main/PO Box 127, Albert Lea MN 56007; 507-373-3161

Table 5 continued. Forage seed sources for 1998 production. Listed alphabetically; numbers keyed to Table 1.

8 Allied Seed Cooperative, PO Box 945, Angola IN 46703; 800-813-5025

9 America's Alfalfa, PO Box 2962, Shawnee Mission KS 66201; 913-384-4940

10 Andrews Seed Co., 580 S. Oregon, Ontario OR 97914; 541-889-9109

11 Asgrow Seed Company, 2605 East Kiligore Rd., Kalamazoo MI 49009; 616-384-5500

12 Barenbrug Midwest, 1506 W. 3rd. St., Vinton IA 52349; 888-470-5569, 319-472-5569
Barenbrug USA, P.O. Box 239, Tangent OR 97389; 541-926-5801

13 Bio Plant Research, P.O. Box 320, Camp Point IL 62320; 800-593-7708

14 Brown Seed Farms, P.O. Box 186/720 St. Croix St., Prescott WI 54021; 715-262-4331

15 Brunner Seed , W3850 U.S. Hwy 10, Durand WI 54736; 715-672-5887

16 Callahan Seeds, 1122 E 169th St., Westfield IN 46074; 317-896-5551

17 Cargill Hybrid Seeds, Rte 1, Box 56. Plainfield MN 55964; 612-742-6743

18 Croplan Genetics, PO Box 64089, Cenex/Land O' Lakes, St. Paul MN 55164; 612-451-5490

19 Crow's Hybrids, PO Box 306 Hwy 1 N., Milford IL 60953; 815-889-4151

20 Dahlman Seed Co., Rte 1 Box 116, Dassel MN 55325; 320-275-2527

21 Dairyland Seed Co., PO Box 958, West Bend WI 53095; 800-236-0163

22 DEKALB Genetics Corp., 7665 Commerce Way, Suite 101, Eden Prairie MN 55344; 612-934-0134

23 DEKALB Genetics Corp., 3100 Sycamore Rd., Dekalb IL 60115; 815-758-9323

24 Discount Farm Center, PO Box 84, West Hwy 212, Watertown SD 57201; 605-886-5888

25 Elk Mound Seed, PO Box 187, 308 Railroad Ave, Elk Mound WI 54739; 715-879-5556

26 Fontanelle Hybrids, 10981 8th St, Fontanelle NE 68044; 402-721-1410

27 Fred Gutwein & Sons, RR 1, Box 40, Francesville IN 47946; 219-567-9141

28 Garst Seed Co., P.O. Box 7790, Madison WI 53707; 608-249-8977

29 Geertson Seed Farm, 1665 Burrough Rd, Adrian OR 97901; 541-339-3768

30 Golden Harvest Seeds, 27420 137th Ave. North, Cordova IL 61242; 309-654-2234
Golden Harvest Seeds, PO Box A, 100 J.C. Robinson Blvd., Waterloo NE 68069; 402-779-2531
Golden Harvest Seeds, 220 N. Eldorado Rd, Ste E, Bloomington IL 61704; 800-610-7333

31 Great Lakes Hybrids, RR. 6 Box 6600, Mankato MN 56001; 507-625-1103

32 Great Plains Research Co. Inc., 3624 Kildaire Farm Rd, Apex NC 27502; 919-362-1583

33 Harvest States Coop/GTA Feeds, 2401 Hardison Dr. PO Box 1624, Norfolk NE 68702; 402-371-2040

34 Hoegemeyer Hybrids, Rte 2, Box 126, Hooper NE 68031; 402-654-3399

35 Hoffman Seeds, 144 Main St., Landisville PA 17538; 717-898-2261

36 International Seeds Inc., P.O. Box 168, Halsey OR 97348; 541-369-2251

37 Interstate Payco Seed Co., Box 338, West Fargo ND 58078; 701-282-7338

38 Jung Seed Genetics, 1229 NW 41st St, Rochester MN 55901; 507-288-1930
Jung Seed Genetics, 335 South High St., Randolph WI 53956; 800-242-1855

39 Kaltenberg Seed Farms Inc., 20155 Biscayne Ave. West, Farmington MN 55024; 612-463-8997
Kaltenberg Seed Farms Inc., PO Box 278, Waunakee WI 53597; 800-383-3276

40 L.L. Olds Seed Co., Box 7790, Madison WI 53707; 800-356-7333, 608-249-9291

41 La Crosse Seed Corp., PO Box 187, LaCrosse WI 54601; 608-781-4848

42 Lemke Seeds, 10220 N. Granville Rd., Mequon WI 53092; 414-242-2647

43 LG Seeds, PO Box 216, 925 Dexter, Prescott WI 54021; 800-637-2887

Table 5 continued. Forage seed sources for 1998 production. Listed alphabetically; numbers keyed to Table 1.

44 Mallard Seed, PO Box 637, Plainview MN 55964; 507-534-2300

45 MBS Inc., 225 West 1st St., Story City IA 52101; 515-733-5274

46 Midwest Seed Genetics, PO Box 518, 23751 Hwy 30 E., Carroll IA 51401; 712-792-6691

47 Mycogen Seeds, P.O. Box 21428, 1340 Corp. Cntr. Curve, St Paul MN 55121; 612-405-5973

48 NC+ Hybrids, RR 2, Box 52, Sanborn MN 56083; 507-648-3378
NC+ Hybrids, Box 4408, Lincoln NE 68504; 402-467-2517

49 North-Gro Seeds, 613 N. Randolph St., Cuba City WI 53807; 608-744-7333

50 Novartis Seeds, PO Box 959, Minneapolis MN 55440; 612-593-7261

51 Patriot Seed, Inc., PO Box 97, 208 South Warrell, Bowen IL 62316; 800-643-1518

52 Peterson Seed Co., Inc., Box 346, Savage MN 55436; 800-328-5898

53 Pioneer Hi-Bred Int'l, Inc., 130 Willmar Ave. SE, Willmar MN 56201; 320-235-7420

54 Premium Seed Co., Inc., 7800 E. State Hwy 101, Shakopee MN 55379; 612-496-1783

55 Producers Hybrids, Inc., 12125 Mississippi Dr., Champlin MN 55316; 800-323-8605

56 R.J. Hunt Seed Co., RR 1, Box 112, Wadena MN 56482; 218-631-4190

57 Renk Seed Company, 6800 Wilburn Rd., Sun Prairie WI 53590; 608-837-7351

58 Seed Mart, Inc., PO Box 126, 925 Dexter St., Prescott WI 54021; 715-282-4430

59 Spangler Seeds, 803 W. Racine St., Jefferson WI 53549; 414-674-4606

60 Specialty Seeds, 26787 Hillhaven Drive, Cold Spring MN 56320; 612-685-4520

61 Terning Seeds, Inc., 15385-60th St. NW, Cokato MN 55321; 320-286-2168

62 Top Farm Hybrids, 17177 60th St SW, Cokato MN 55321; 320-286-5516

63 Trelay, Inc., 11623 Hwy 80 N, Livingston WI 53554; 800-421-0397

64 Tri-State Seed, Rte 1 Box 354, Sleepy Eye MN 56085; 507-794-3078

65 Twin Cities Seeds, 7265 Washington Ave South, Edina MN 55439; 612-944-7105

66 United Ag Products/MN IA Seed Div., PO Box 55 Kasota, MN 56050; 800-722-2274

67 W-L Research, Inc., 349 1/2 Duck Lake Ave., Madison Lake MN 56063; 507-243-3660

68 Wensman Seed Co., 102 Aldrich Ave. S.E. Box 190, Wadena MN 56482; 218-631-2954

69 Werner Farm Seeds, 3104 Millersburg Blvd., Dundas MN 55019; 507-645-7995

70 Ziller Seed Co., Inc., RR 1, Box 122, Bird Island MN 55310; 320-365-3674

Alfalfa Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

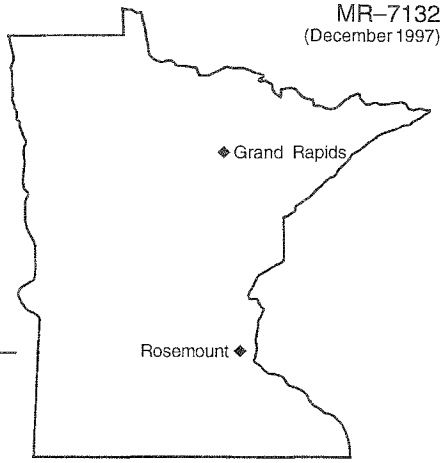
Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
Alone	60	199,000	11	50/square foot	Early spring to August 10
With grass			7	32/square foot	

MR–7132
(December 1997)

Minnesota Agricultural Experiment Station

VARIETY TRIALS

Birdsfoot Trefoil



Locations of birdsfoot trefoil trials.

Successful birdsfoot trefoil production depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Grand Rapids and Rosemount. Varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Because of the limited number of varieties being tested, birdsfoot trefoil varieties are not classed into any subgroups. Variety descriptions are arranged alphabetically.

The seed of tested varieties may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation.

Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1998 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices. The information is also available on-line at:

<http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed for forage yield are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two quality tests are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

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

Authors/Researchers

The author of this birdsfoot trefoil report is Nancy J. Ehlke. Fieldwork for these trials was supervised by Gregory Cuomo and Russell Mathison.

Publication Chair ..... Deon Stuthman
EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota ExtensionService.

For Crop Production 1998

BIRDSFOOT TREFOIL VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of birdsfoot trefoil variety performance tests Conducted by the Minnesota Agricultural Experiment Station. This report was prepared by Nancy J. Ehlke, agronomist, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. [phone: 612/625-1791; e-mail: <ehlke001@maroon.tc.umn.edu>].

Crop Background

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 and timothy.

Eight birdsfoot trefoil varieties were established in pure stands in August, 1989 on Minnesota Agricultural Experiment Station fields at Rosemount and Grand Rapids. Severe winter injury at Grand Rapids destroyed the trial at that location. The trial was harvested twice in 1990 and three times in 1991 and 1992. The trial was discontinued in 1992.

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 Rosemount due to less favorable growing conditions.

Winter-hardy 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.

Table 1. Dry matter yield, in tons per acre, of birdsfoot trefoil varieties seeded at Grand Rapids and Rosemount (1994-97). [1]

Note Key:

[1] Trials were established in 1993 and 1994 at Rosemount and Grand Rapids.

[2] Severe winter injury in 1995.

Variety	Rosemount				Grand Rapids			
	1994	1995 [2]	1995	1996	1994	1995	1995	1996
AU-Dewey	3.8	0.9	—	—	2.6	2.3	—	—
Carroll	4.3	3.8	—	—	2.7	3.2	—	—
Dawn	—	—	—	—	2.5	2.5	—	—
Empire	—	—	4.8	2.4	2.7	2.8	2.4	1.9
Fergus	3.9	4.0	—	—	2.8	2.9	—	—
Leo	—	—	4.7	2.2	—	—	2.5	2.1
Norcen	3.9	3.7	4.9	2.2	2.9	2.7	2.3	2.0
Viking	—	—	4.6	2.6	—	—	2.4	2.0
LSD 5%	NS	0.5	NS	NS	0.4	0.2	0.2	0.2

Table 2. Birdsfoot trefoil seed sources for 1998 production. Alphabetical listing, with marketed variety noted with each entry.

Marketer	*Variety*
Agassiz Seed & Supply	*Empire, Norcen*
445 7th St. NW ... West Fargo, ND 58078 ... 701-282-8118	
Albert Lea Seedhouse	*Empire, Norcen*
1414 West Main/PO Box 127, Albert Lea, MN 56007; 507-373-3161	
Croplan Genetics	*Empire, Norcen*
PO Box 64089, Cenex/Land O'Lakes ... St. Paul, MN 55164 ... 612-451-5490	
Kaltenberg Seed Farms Inc.	*Empire*
20155 Biscayne Ave. W ... Farmington, MN 55024 ... 612-463-8997	
PO Box 278 ... Waunakee, WI 53597 ... 608-849-5021	
Peterson Seed Co., Inc.	*Norcen*
Box 346 ... Savage, MN 55436 ... 612-445-2606	
Premium Seed Co., Inc.	*Empire, Norcen*
7800 E State Hwy 101 ... Shakopee, MN 55379 ... 612-496-1783	
R.J. Hunt Seed Co.	*Empire, Norcen*
RR 1, Box 112 ... Wadena, MN 56482 ... 218-631-4190	
Twin Cities Seed	*AU-Dewey*
7265 Washington Ave. S ... Edina, MN 55439 ... 612-944-7105	
Werner Farm Seeds	*Leo, Norcen*
3104 Millersburg Blvd. ... Dundas, MN 55019 ... 507-645-7995	

Birdsfoot Trefoil Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
Alone	60	372,000	7	60/square foot	Early spring or summer
With grass			4	34/square foot	

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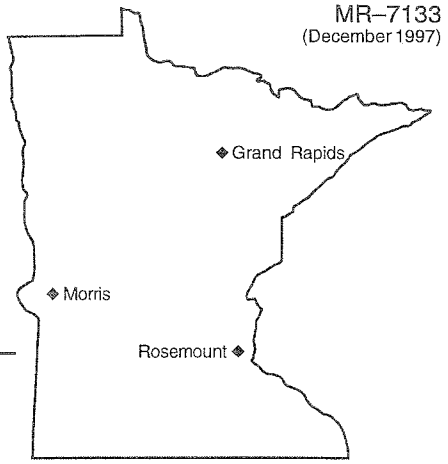
(December 1997)

Minnesota Agricultural Experiment Station

VARIETY TRIALS

Red Clover



Locations of red clovertrials.

Successful production of red clover depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Grand Rapids and Rosemount. Varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Because of the limited number of varieties being tested, red clover varieties are not classed into any subgroups. Variety descriptions are arranged alphabetically.

The seed of tested varieties may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation.

Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1998 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices. The information is also available on-line at:

<http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed for forage yield are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two quality tests are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

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

Authors/Researchers

The author of this report is Nancy J. Ehlke. Fieldwork for these trials was supervised by Gregory Cuomo and Russell Mathison.

Publication Chair ..... Deon Stuthman
EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota ExtensionService.

For Crop Production 1998

RED CLOVER VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of red clover variety performance tests conducted by the Minnesota Agricultural Experiment Station. This report was prepared by Nancy J. Ehlke, agronomist, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. [phone: 612/625-1791; e-mail: <ehlke001@maroon.tc.umn.edu>].

Crop Background

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

Historically, the winter-hardy varieties of red clover have not persisted beyond two crop years in Minnesota because they are susceptible to diseases. However, most of the improved varieties currently sold for use in Minnesota can 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 1991 and 1995. Stands from the 1991 trials were sufficient for data collection only at Grand Rapids in 1992 and 1993, and at Rosemount from 1992 to 1994. The trials established in 1995 were harvested at Grand Rapids, Morris and Rosemount from 1992 to 1994. The trials established in 1995 were harvested at Grand Rapids, Morris and Rosemount in 1996.

No differences in dry matter yield were found in the 1991 trial between the varieties harvested at either trial location during either 1992 or 1993, though yields and stands were better at Rosemount than Grand Rapids in both years. Marathon produced the highest forage yield during the third production year at Rosemount.

In the 1995 trials, varietal differences for forage yield were found at Grand Rapids and Rosemount. Yields were highest at Grand Rapids due to favorable environmental conditions, and lowest at Rosemount due to winter injury.

Table 1. Percent stand and vigor of red clover varieties seeded at three locations (Grand Rapids, Morris and Rosemount) in 1991 and 1995. [1]

Note Key:

[1] Trials established in 1991 and 1995 were harvested three times per year.

[2] Percent stand rated at Rosemount on May 20, 1996.

[3] Vigor rated at Rosemount on May 20, 1996: 1=least vigorous, 5=most vigorous.

Variety	Stand [2]	Vigor [3]
Acclaim	—	—
Arlington	94	3.8
Astrid	68	3.3
Cinnamon	92	4.3
Concord	—	—
Marathon	91	3.9
Randolph	85	3.8
Redland III	—	—
Red Star	—	—
Scarlett	90	4.0
LSD 5%	26	0.5

Table 2. Dry matter yield of red clover varieties, tons per acre, seeded at three locations (1992-94; 1996-97). [1]

Note Key:

[1] Trials established in 1991 and 1995 were harvested three times per year.

[2] Residual harvest taken at Rosemount on June 3, 1994.

Variety	Grand Rapids			Rosemount					Morris	
	1992	1993	1996	1992	1993	1994	1996	1997	1996 [2]	1997
Acclaim	3.2	3.0	—	5.4	4.5	1.3	—	—	—	—
Arlington	2.9	3.0	3.7	5.1	4.4	1.2	2.6	3.3	3.2	2.0
Astrid	—	—	3.3	—	—	—	2.2	2.2	2.5	1.8
Cinnamon	—	—	4.0	—	—	—	3.1	3.7	3.4	2.1
Concord	—	—	4.3	—	—	—	—	—	—	—
Marathon	2.9	3.2	4.3	5.1	4.7	1.5	3.2	3.5	3.4	1.7
Randolph	—	—	3.8	—	—	—	3.7	3.5	3.8	2.0
Redland III	—	—	—	—	—	—	—	—	3.3	1.9
Red Star	3.1	3.4	—	5.3	4.8	1.0	—	—	—	—
Scarlett	—	—	3.0	—	—	—	3.0	3.5	3.7	1.8
LSD 5%	NS	NS	0.9	NS	NS	0.3	0.9	0.5	NS	0.3

Table 3. Red clover seed sources for 1998 production. Alphabetical listing, with marketed variety noted with each entry.

Marketer	*Variety*
Agassiz Seed & Supply 445 7th St. NW, West Fargo, ND 58078;701-282-8118	*Marathon*
Albert Lea Seedhouse 1414 West Main/PO Box 127, Albert Lea, MN 56007; 507-373-3161	*Arlington, Marathon*
Allied Seed Cooperative PO Box 945,Angola, IN 46703; 800-813-5025 12 Hilldale Drive, Macon, MO 63552; 800-624-8904	*Cinnamon*
Jung Seed Genetic 1229 NW 41st St., Rochester, MN 55901; 507-288-1930 335 South High St., Randolph, WI 53957; 800-242-1855	*Randolph*
Premium Seed Co., Inc. 7800 E State Hwy 101, Shakopee, MN 55379; 612-496-1783	*Arlington, Marathon*
R.J. Hunt Seed Co. RR 1, Box 112, Wadena, MN 56482; 218-631-4190	*Arlington, Marathon*
Top Farm Hybrids 17177 60th St. SW, Cokato, MN 55321; 320-286-5516	*Arlington*
Werner Farm Seeds 3104 Millersburg Blvd., Dundas, MN 55019; 507-645-7995	*Arlington, Marathon*

Red Clover Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
Alone	60	252,000	9	50/square foot	Early spring to August 10
With Grass			5	30/square foot	

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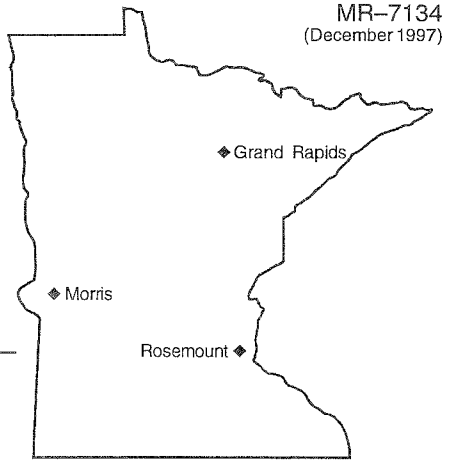
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Reed Canarygrass



Locations of reed canarygrass trials.

Successful production of reed canarygrass depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Grand Rapids and Rosemount. Varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Because of the limited number of varieties being tested, reed canarygrass varieties are not classed into any subgroups. Variety descriptions are arranged alphabetically.

The seed of tested varieties may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation.

Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1998 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices. The information is also available on-line at:

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Interpreting the Tables

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If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

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

Authors/Researchers

The author of this report is Nancy J. Ehlke. Fieldwork for these trials was supervised by Gregory Cuomo and Russell Mathison.

Publication Chair ..... Deon Stuthman
EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota ExtensionService.

For Crop Production 1998

REED CANARYGRASS VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of reed canarygrass variety performance tests conducted by the Minnesota Agricultural Experiment Station. This report was prepared by Nancy J. Ehlke, agronomist, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. [phone: 612/625-1791; e-mail: <ehlke001@maroon.tc.umn.edu>].

Crop Background

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 it was between 6 and 24 inches tall.

The most recent developments in reed canarygrass breeding have been the release of varieties low in indole alkaloid concentration. This dramatically improves animal performance and palatability. Alkaloids are bitter, complex, nitrogen containing compounds.

In grazing trials, lams and steers gained more weight and sheep had less diarrhea on low alkaloid varieties than on common reed canarygrass. Hay should be harvested between heading and early bloom 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, and these trials were harvested twice at Grand Rapids and Rosemount in 1994, and three times at Morris. In 1995 and 1996, the trials were harvested three times per. 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 are winter-hardy and persistent in Minnesota. High yielding, low alkaloid varieties Palaton and Venture are currently marketed here.

Table 1A. Dry matter yields, in tons per acre, of reed canarygrass varieties seeded at Morris and Grand Rapids (1990-92; 1994-96). [1]

Note Key:

[1] Trials were established in 1993.

[2] Harvested three times in 1994.

[3] Harvested two times in 1994 due to slow establishment.

Variety	Morris [2]				Grand Rapids [3]		
	1990-92	1994	1995	1996	1994	1995	1996
Lara	—	—	—	—	—	—	—
Palaton	3.8	5.8	7.2	5.2	3.0	3.7	3.7
Rise	4.0	—	—	—	—	—	—
Vantage	4.0	5.7	7.1	4.4	2.7	3.8	3.4
Venture	4.3	5.6	6.7	4.1	2.7	4.0	3.7
LSD 5%	NS	NS	0.5	1.0	NS	NS	NS

Table 1B. Dry matter yields, in tons per acre, of reed canarygrass varieties seeded at Rosemount (1990-92; 1994-96). [1]

Note Key:

[1] Trials were established in 1993.

[2] Harvested two times in 1994 due to slow establishment.

Variety	Rosemount [2]			
	1990-92	1994	1995	1996
Lara	—	3.0	3.7	2.3
Palaton	6.9	3.2	3.8	2.4
Rise	6.2	—	—	—
Vantage	6.3	3.3	4.0	2.6
Venture	7.1	3.2	3.9	2.2
LSD 5%	0.8	NS	NS	0.3

Table 2. Reed canarygrass seed sources for 1998 production. Alphabetical listing, with marketed variety noted with each entry.

Marketer	*Variety*
Agassiz Seed & Supply 445 7th St. NW, West Fargo, ND 58078; 701-282-8118	*Palaton*
Albert Lea Seedhouse 1414 West Main/PO Box 127, Albert Lea, MN 56007; 507-373-3161	*Palaton, Venture*
Brown Seed Farms N 1279 530th St., Bay City, WI 54723; 715-594-3003	*Palaton*
Kaltenberg Seed Farms Inc. 20155 Biscayne Ave. W, Farmington, MN 55024; 612-463-8997 PO Box 278, Waunakee, WI 53597; 608-849-5021	*Venture*
L.L. Olds Seed Co. Box 7790, Madison, WI 53707; 800-356-7333, 608-249-9291	*Venture*
Peterson Seed Co., Inc. Box 346, Savage, MN 55436; 612-445-2606	*Palaton, Venture*
Premium Seed Co., Inc. 7800 E State Hwy 101, Shakopee, MN 55379; 612-496-1783	*Palaton, Venture*
R.J. Hunt Seed Co. RR 1, Box 112, Wadena, MN 56482; 218-631-4190	*Palaton*
Seed Mart, Inc. PO Box 126, 925 Dexter St., Prescott, WI 54021; 715-282-4430	*Palaton*
Werner Farm Seeds 3104 Millersburg Blvd., Dundas, MN 55019; 507-645-7995	*Palaton*

Reed Canarygrass Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
Alone	46	526,000	7	85/square foot	Early spring or summer
In Mixtures			5	60/square foot	

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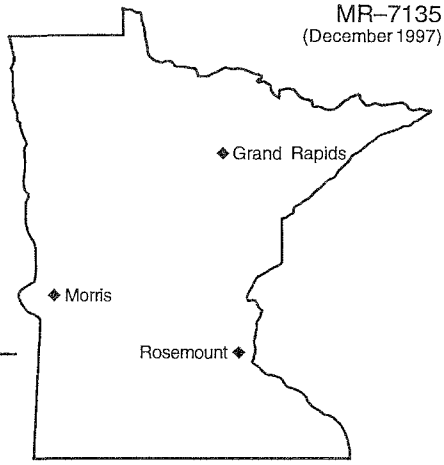
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Tall Fescue, Wheatgrass



Locations of tall fescue and wheatgrass trials.

Successful production of tall fescue or wheatgrass depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Grand Rapids and Rosemount. Varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Because of the limited number of varieties being tested, tall fescue and wheatgrass varieties are not classed into any subgroups. Variety descriptions are arranged alphabetically.

The seed of tested varieties may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation.

Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1998 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices.

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Interpreting the Tables

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If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

These tall fescue and wheatgrass trials are not designed for crop (species) comparisons, because the various crops are grown on different fields or with different management. The data should only be used to compare varieties within a table.

Authors/Researchers

The author of this report is Nancy J. Ehlke. Fieldwork for these trials was supervised by Gregory Cuomo and Russell Mathison.

Publication Chair ..... Deon Stuthman
EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota ExtensionService.

For Crop Production 1998

TALL FESCUE, WHEATGRASS VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of tall fescue variety tests conducted by the Minnesota Agricultural Experiment Station. This report was prepared by Nancy J. Ehlke, agronomist, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. [phone: 612/625-1791; e-mail: <ehlke001@maroon.tc.umn.edu>].

Crop Background

Tall fescue is a bunchgrass and may be planted in mixtures with other grasses and legumes. It establishes rapidly, withstands trampling, tolerates summer drought and produces fall season pasture when other grasses become dormant. Tall fescue is subject to winter injury, but may remain productive in areas with reliable snow cover.

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

The wheatgrasses are valuable, native forage species. They are especially suitable for growing in the northern Great Plains area of the United States. Wheatgrasses can produce excellent forage yields and sustained productivity under hay and pasture management systems either in monoculture or in mixtures with alfalfa or other suitable legumes. Recent releases of improved varieties have prompted interest in these species, especially in western areas of Minnesota.

Minnesota Agricultural Experiment Station scientists initiated performance trials of tall fescue and the wheatgrasses in 1992. The trials were harvested three times per year, and Nitrogen was applied in the early spring and after each harvest at rates of 40 to 50 pounds per acre.

Yields were high in 1993 and 1994 probably due to a mild winter, abundant rainfall and cool temperatures during the growing season. Severe winter injury in 1995 reduced forage yields significantly at Rosemount. The wheatgrasses did yield less forage than the tall fescue varieties, however the wheatgrasses are better adapted to environments drier than the previous growing seasons.

Table 1. Maturity rating and dry matter yields, tons per acre, of tall fescue and wheatgrass varieties seeded at Rosemount (1993-1997). [1]

Note Key:

[1] Trials established in 1992 at Rosemount.

[2] Scored June 3, 1994 at Rosemount: 0=no panicle emergence, 9=complete panicle emergence.

[3] Endophytes: fungi that invade plant tissues. Reduces forage palatability, animal performance.

[4] Winter injury severe at Rosemount resulting in low yields and stand loss of Newhy.

Variety	Maturity Rating [2]	Yield 1993	1994	1995 [4]
Tall Fescue				
Barcel	1	6.1	6.1	3.8
Fawn	8	5.2	5.5	3.9
Ky 31 - endophyte infected [3]	2	6.6	6.4	4.4
Ky 31 - endophyte-free	4	6.6	5.8	4.4
Martin	7	5.9	5.8	4.3
Mozark	7	6.2	5.7	4.2
Mustang	—	5.3	5.3	3.6
Stef	0	5.5	6.0	4.5
Wheatgrass				
Manska	0	4.2	4.0	3.7
Newhy	—	4.1	3.6	—
Reliant	0	4.5	4.1	3.9
LSD 5%	1	0.8	0.6	0.6

Table 2. Dry matter yields, tons per acre, of tall fescue and wheatgrass varieties seeded at Grand Rapids and Morris (1993-1997). [1]

Note Key:

[1] Trials established in 1992 at Morris and 1993 at Grand Rapids.

[2] Endophytes: fungi that invade plant tissues, reducing forage palatability and animal performance.

Variety	Grand Rapids 1994	1995	1996	Morris 1993	1994	1995	1996
Tall Fescue							
Barcel	4.4	2.7	1.8	6.6	5.6	4.4	1.5
Fawn	4.2	3.2	2.4	7.7	5.5	4.8	1.8
Ky 31 - endophyte infected [2]	5.1	3.2	2.3	7.0	5.4	4.8	1.6
Ky 31 - endophyte-free	4.6	3.0	2.2	7.2	5.4	5.0	1.8
Martin	4.8	3.5	2.5	6.7	5.3	5.1	1.9
Mozark	4.8	3.4	2.4	6.8	5.8	4.9	1.7
Mustang	3.7	2.5	1.8	—	—	—	—
Stef	4.5	3.3	2.2	6.8	5.5	4.8	2.2
Wheatgrass							
Manska	3.4	3.1	2.2	5.6	6.0	5.0	2.7
Newhy	3.5	2.6	2.1	—	—	—	—
Reliant	3.5	3.1	2.4	5.6	6.1	5.4	2.7
LSD 5%	0.6	0.5	0.3	0.7	NS	0.7	0.4

Table 3. Tall fescue seed sources for 1998 production. Alphabetical listing, with marketed variety noted with each entry.

Marketer	*Variety*
Albert Lea Seedhouse	*Ky 31, Fawn*
1414 West Main/PO Box 127, Albert Lea, MN 56007; 507-373-3161	
Barenbrug Midwest	*Barcel*
1506 W. 3rd. St., Vinton, IA 52349; 888-470-5569, 319-472-5569	
Kaltenberg Seed Farms Inc.	*Ky 31*
20155 Biscayne Ave. W., Farmington, MN 55024; 612-463-8997	
PO Box 278, Waunakee, WI 53597; 608-849-5021	
Premium Seed Co., Inc.	*Barcel, Fawn, Ky 31*
7800 E. State Hwy 101, Shakopee, MN 55379; 612-496-1783	

Tall Fescue Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
In Mixtures	25	229,000	4	21/square foot	Early spring or summer

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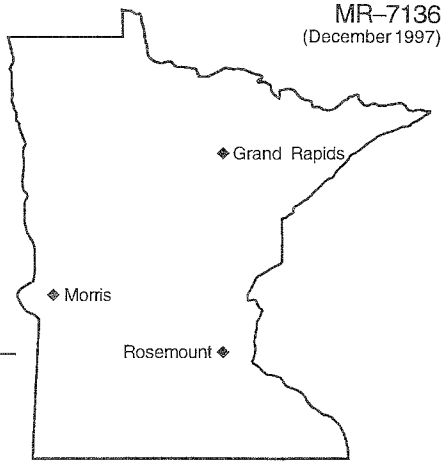
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Timothy



Locations of timothy trials.

Successful production of timothy depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Grand Rapids and Rosemount. Timothy varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Timothy varieties are classed into the groups "early-intermediate" and "late" maturity. Because only a limited number of varieties are being tested, varieties descriptions are arranged alphabetically within these maturity groups in the tables of this report.

The seed of tested varieties may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation.

Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1998 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices. The information is also available on-line at:

<http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed for forage yield are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two quality tests are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

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

Authors/Researchers

The author of this report is Nancy J. Ehlke. Fieldwork for these trials was supervised by Gregory Cuomo and Russell Mathison.

Publication Chair ..... Deon Stuthman
EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota Extension Service.

For Crop Production 1998

TIMOTHY VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of timothy performance variety tests conducted by the Minnesota Agricultural Experiment Station. This report was prepared by Nancy J. Ehlke, agronomist, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. [phone: 612/625-1791; e-mail: <ehlke001@maroon.tc.umn.edu>].

Crop Background

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 it's 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 locations in the early spring and after each harvest at a rate of 40 to 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. At Morris and Rosemount, the yields of timothy were exceptionally high in 1993 and 1994. These results may be partially attributed to mild winters, and abundant rainfall and cool temperatures during the growing seasons. Timothy is normally less persistent than other cool-season grasses such as reed canarygrass.

Table 1A. Dry matter yields, in tons per acre, of timothy varieties seeded at Grand Rapids and Rosemount (1993-97). [1]

Note Key:

[1] Trials established in 1992 at Rosemount, and in 1993 at Grand Rapids.

[2] One harvest at Rosemount in 1995.

Variety	Grand Rapids			Rosemount		
	1994	1995	1996	1993	1994	1995 [2]
Early - Intermediate Maturity						
Climax	3.8	3.9	3.1	4.8	4.7	1.9
Comtal	3.9	3.6	2.7	4.6	5.1	1.5
Goliath	3.8	3.7	2.8	4.3	4.5	1.5
Timfor	4.0	3.6	2.8	4.5	4.8	2.0
Toro	4.2	3.9	3.0	4.8	5.0	2.0
Late Maturity						
Heidemij	3.7	3.8	2.9	4.1	3.6	1.3
Hokusen	3.6	3.5	2.7	4.0	4.4	1.8
LSD 5%	0.6	0.3	0.3	0.6	0.4	0.4

Table 1B. Dry matter yields, in tons per acre, of timothy varieties seeded at Morris (1993-97), and the mean for yields at three locations (Grand Rapids, Morris and Rosemount). [1]

Note Key:

[1] Trials established in 1992 at Morris.

[2] Mean excludes Rosemount, 1995 data.

Variety	Morris				3-location
	1993	1994	1995	1996	mean [2]
Early - Intermediate Maturity					
Climax	5.5	4.0	4.0	2.5	4.3
Comtal	—	—	—	—	4.0
Goliath	—	—	—	—	3.8
Timfor	—	—	—	—	4.0
Toro	—	—	—	—	4.2
Late Maturity					
Heidemij	4.1	3.9	3.7	2.2	3.5
Hokusen	4.7	3.7	3.6	2.2	3.6
LSD 5%	0.5	NS	NS	NS	

Table 2. Timothy seed sources for 1998 production. Alphabetical listing, with marketed variety noted with each entry.

Marketer	*Variety*
Agassiz Seed & Supply 445 7th St. NW, West Fargo, ND 58078; 701-282-8118	*Climax*
Albert Lea Seedhouse 1414 West Main/PO Box 127, Albert Lea, MN 56007; 507-373-3161	*Climax*
Discount Farm Center PO Box 84, West Hwy 212, Watertown, SD 57201; 605-886-5888	*Climax*
Kaltenberg Seed Farms Inc. 20155 Biscayne Ave. W., Farmington, MN 55024; 612-463-8997 PO Box 278, Waunakee, WI 53597; 608-849-5021	*Climax*
L.L. Olds Seed Co., Box 7790, Madison, WI 53707; 800-356-7333, 608-249-9291	*Climax*
Premium Seed Co., Inc. 7800 E State Hwy 101, Shakopee, MN 55379; 612-496-1783	*Climax*
Seed Mart, Inc. PO Box 126, 925 Dexter St., Prescott, WI 54021; 715-262-4430	*Climax*
Top Farm Hybrids 17177 60th St. SW, Cokato, MN 55321; 320-286-5516	*Climax*
Werner Farm Seeds 3104 Millersburg Blvd., Dundas, MN 55019; 507-645-7995	*Climax*

Timothy Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
In Mixtures	45	1,234,000	3	85/square foot	Early spring or summer

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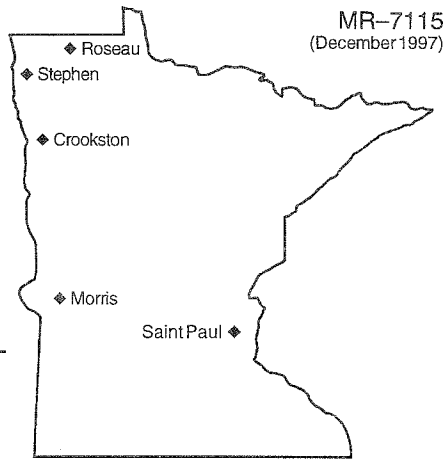
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Barley



Locations of barley trials.

Successful barley production depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at St. Paul, Morris and Crookston, and on farmers' fields. Important old varieties and new varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are nearly the same for all varieties at each location.

Variety Classifications

Barley varieties are classed into groups under the headings "recommended public varieties," "special purpose variety," and "other varieties." Variety descriptions are arranged alphabetically within groups.

Classifications of barley varieties as "recommended," "other" and "special purpose" are determined each year by the Experiment Station Crop Variety Review Committee. A variety is usually not eligible for the "recommended" group unless it has out performed other varieties in important characteristics in three years of testing.

Listings in an "other varieties" category are usually inferior in one or more characteristics, as demonstrated in comparative tests.

Seed of varieties in all these groups may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation. Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1997 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices. The information is also available on-line at <http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed for forage quality performance under columns of tests at Rosemount and Arlington, are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two quality tests are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

Protection Act Changes

Varieties receiving their U.S. Plant Variety Protection Act registration beginning in 1995 are identified by the code "PVP(94)." These varieties may *not* be sold by a producer, not even to a relative or neighbor, without the express permission of the variety's developer/owner.

Authors/Researchers

The authors of this barley report are Donald Rasmusson and Edward Schiefelbein. Assistance was provided by Ruth Dill-Macky, David LeGare, John Wiersma at Crookston, and staff at Morris.

Information on the reaction of varieties to specific pathogens was largely obtained by Ruth Dill-Macky, Department of Pathology.

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EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota Extension Service.

For Crop Production 1998

BARLEY VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of Barley Variety Tests Conducted by the Minnesota Agricultural Experiment Station. This report was prepared by Donald Rasmusson, agronomist, and Edward Schiefelbein, scientist, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. [phone: 612/625-7278; e-mail: <rasmu002@maroon.tc.umn.edu>].

Fusarium Head Blight

Fusarium head blight (scab) again caused serious losses in barley via reductions in yield and quality, and the production of vomitoxin. Until it reemerged and attacked Minnesota's barley crop in 1993, scab had not been a significant problem on barley since the 1940s. Currently recommended varieties appear to be equally susceptible to scab.

Classification Changes

Foster, a North Dakota developed barley, was added to the recommended list last year. It was recently classified as a malting variety by the American Malting Barley Association (AMBA). Excel was recently dropped from the list of varieties recommended by the University. Royal continues to be recommended as a forage companion crop and feed-grain variety.

Recommended Public Varieties

Foster—Medium yield. Maturity similar to Robust. Kernel plumpness good, similar to Stander. 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 AMBA. Developed by North Dakota Agricultural Experiment Station from a cross involving Robust, ND 5570, Glenn and Karl. Released 1995. Seed sales regulated by the U.S. Plant Variety Protection Act, PVP(94).

Robust—Medium yield and medium maturity. Good lodging resistance and kernel plumpness. Six-rowed, semi-smooth awn, short rachilla hairs, colorless aleurone. Classified as a malting variety by AMBA. Resistant to spot blotch. Developed by Minnesota Agricultural

Experiment Station from cross of Morex and Manker. Released 1983. Seed sale regulated by U.S. Plant Variety Protection Act.

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. Classified as a malting variety by AMBA. Resistant to spot blotch. Developed by Minnesota Agricultural Experiment Station from crosses involving Excel, Robust and Bumper. Released 1993. Seed sale regulated by U.S. Plant Variety Protection Act.

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 Minnesota Agricultural Experiment Station from crosses involving Robust, Azure and semidwarf Minn. M32. Released 1994. Seed sale regulated by U.S. Plant Variety Protection Act.

Other Varieties

Azure—Medium yield. Medium maturity. Six-rowed, semi-smooth awn, long rachilla hairs, blue aleurone. Classified as a malting variety by AMBA. Resistant to spot blotch. Grain yield similar to Robust in Minnesota trials, but is not recommended because of limited Minnesota demand for a blue aleurone malting variety. Developed by North Dakota Agricultural Experiment Station from a cross involving Bonanza, Nordic, and ND B130. Released 1982.

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 North Dakota Agricultural Experiment Station from cross involving several parents. Released 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 Minnesota Agricultural Experiment Station from cross involving Robust, Manker, and a sister-line of Morex. Released 1990. Seed sale regulated by U.S. Plant Variety Protection Act.

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 Minnesota Agricultural Experiment Station from cross of Cree and Bonanza. Released 1978.

Table 1. Grain yield of selected barley varieties in bushels per acre, 1992-1997.

Note Key:

Locations: C=Crookston, M=Morris, S=Stephen, SP=St. Paul, R=Roseau, AVG=average for all five locations.

Variety	C	M	S	SP	R	AVG
Number of Trials	10	6	2	4	2	24
Robust	93	94	102	84	91	93
Stander	105	103	107	97	105	103
Foster	100	95	100	94	93	97
LSD 0.05	3	5	10	5	10	2

Table 2. Agronomic traits of selected barley varieties, 1992-1997.

Note Key:

[1] Heading expressed as date in June.

[2] Height expressed in centimeters.

[3] Lodging expressed as a percentage representing the extent to which plants fall over in a test plot: 0=no plants down, 100=all plants down.

[4] Plump Kernals expressed as the percentage of kernals which remain on the top of a sieve representing industry standard of desirability.

Variety	Heading [1]	Height [2]	Lodging [3]	Plump Kernals [4]
Number of Trials	17	22	8	10
Robust	23	82	40	87
Stander	24	75	33	88
Foster	23	79	43	88

Barley Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
48	14,300	85	28/square foot	Early spring

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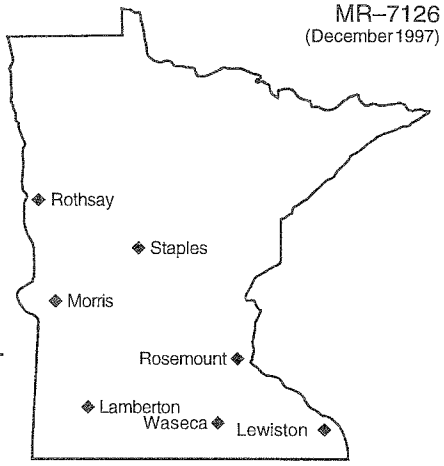
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Corn



Locations of corn trials.

Successful production of corn depends on selecting the best yielding hybrids. The hybrids entered in these trials are compared for yield in test plots on Minnesota Agricultural Experiment Station fields at Rosemount, Waseca, Lewiston, Lamberton, Morris, Rothay and Staples. These plots are handled so that factors affecting yield are as nearly the same for all hybrids being tested as is possible.

Test results are organized by and reported for three Minnesota growing zones (classified as southern, central and northern), and a variety of relative maturity groupings within each zone.

The companies participating in the 1997 Minnesota Corn Hybrid Evaluation Program, the results of which are communicated in this report, are listed in Table 1. Entry fees paid by those companies partly finance the testing program.

Interpreting the Tables

The LSD (Least Significant Difference) figures at the bottom of the yield columns in the tables are statistical measures of variability in the trials. This value may be used to determine if the difference between any two hybrids is likely to be a real difference rather than just natural variation.

LSD values of 20 percent are given in several tables. When the diference between the yields of two hybrids is equal to or greater than the LSD, the conclusion is that there is an 80 percent chance that the yield difference is real and the higher yielding hybrid should be considered the better hybrid from the yield standpoint.

If the yield difference between two hybrids is less than the LSD, the two hybrids probably do not differ in yield potential, and greater attention should be given to other traits important in making your hybrid choices.

Authors/Researchers

Authors of this alfalfa report are: Dale Hicks, Tom Hoverstad, Abdul Kamanzi, George Nelson, and Paul Porter.

Publication Chair ..... Deon Stuthman
EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota Extension Service.

For Crop Production 1998

CORN VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of the Minnesota Corn Hybrid Evaluation Program, conducted by the Minnesota Agricultural Experiment Station to provide unbiased information for use by corn growers evaluating which varieties to buy and grow. Compiled by agronomist Dale R. Hicks (phone: 612/625-1796; e-mail: <hicks004@maroon.tc.umn.edu>), Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108. The program was financed in part by entry fees from private seed companies that chose to enter their hybrids for testing.

Test Parameters

Evaluations of corn hybrids submitted for testing were conducted at sites across three Minnesota growing zones (southern, central and northern),and in a variety of relative maturity (RM) groups. The test locations and maturity groupings were:

Southern Zone: Lamberton, Waseca, and Lewiston
- Early Maturity Trial — 105 Maturity and earlier
- Late Maturity Trial — 110 and 115 RM

Central Zone: Morris and Rosemount
- Early Maturity Trial — 95 RM and earlier
- Late Maturity Trial — 100 and 105 RM

Northern Zone: Staples and Rothsay
- All entries 90 RM and earlier

Result tables within this report are organized in concordance with these testing groups.

Each participating corn seed company was allowed to submit up to six hybrids per zone for testing. The appropriateness of any entry for a specific trial zone was based on the Relative Maturity (RM) provided by the company. The University of Minnesota Corn Testing Committee was also allowed to choose and enter additional hybrids in each test. For this reason, there may be more than six hybrids for a company in a test.

Presentation and Use of Data

Yields are given for individual locations, and yields and harvest moisture contents are averaged across locations for 1997. Hybrids are ranked within a maturity group by moisture

content averaged across locations for 1997. For hybrids that were tested for the past two years, yields and harvest moisture contents are averaged across years and locations.

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 performance next year at any given location.

Table 1. Companies participating in the 1997 corn variety trials.

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., P.O. Box 7570, Des Moines, IA 50322
Brown Seed Farms, Inc., 279 530th St., Bay City, WI 54723
Brunner Seed Farm, Rt. 1, Box 34, Durand, WI 54736

Cargill Hybrid Seeds, Box 5645, Minneapolis, MN 55440
Curry Seed Co., 701 N Walnut, Elk Point, SD 57025
Dahlman Seed Co., 73504-200th St., Dassel, MN 55325
Dairyland Seed Co., Inc. Box 958, West Bend, WI 53095
DeKalb Genetics Corp., 3100 Sycamore Rd., DeKalb, IL 60115

Epley Bros. Hybrids, Inc., 2494 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 50244
Hyland Seeds, Blenheim, Ontario, Canada NOP 1A0
Interstate/Payco, PO Box 338, West Fargo, ND 58078

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
Mycogen Plant Sciences, 720 St. Croix St., Prescott, WI 54021
NC+, PO Box 4408, Lincoln, NE 68504
Novartis, PO Box 959, Minneapolis, MN 55440
Pioneer Hi-Bred Int'l., Inc., 130 SE Willmar Ave, Willmar, MN 56201

Producers Hybrids, Box C, Battle Creek, NE 68715
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
Shelby Farms, 2836 Cty F, Blue Mounds, WI 53517

Terning Seeds, 15365 60th St. SW, Cokato, MN 55321
Terra Industries, Inc., 600 4th St., PO Box 6000, Souix 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

Table 2A. Site production management information, 1997 corn variety trials.

Note Key:

[1] Data not available.

Location	Cooperators	Previous Crop	Planting Date	Harvest Dates	Target Population
Lamberton	Steve Quiring Paul Porter	Soybean	May 1	Oct 10-11	30,000
Waseca	Tom Hoverstad	Soybean	April 25	Oct 23-24	30,000
Lewiston	Dave Ruprecht	Soybean	May 9	Oct 29-30	30,000
Morris	George Nelson	Soybean	May 12-13	Oct 21-22	30,000
Rosemount	Jerry Holz	Soybean	May 5	Oct 20-21	30,000
Staples	Mel Wiens	Edible beans	May 8	Oct 14	30,000
Rothsay	Troy Larson	[1]	May 5	Oct 16	30,000

Table 2B. Additional site production management information, 1997 corn variety trials.

Note Key:

[1] Data not available.

[2] Pounds of N, P and K, respectively.

Location	Tillage	Soil Tests PH	P	K	Fertilizer Applied Amount and Time [2]	
Lamberton	Chisel	5.9	45	145	125+0+0	Fall
Waseca	Chisel	6.3	15	144	0+125+75 160+0+0	Fall Spring
Lewiston	Chisel	6.6	32	234	160+0+0	Spring
Morris	Chisel	8.1	18	154	130+46+60	Fall
Rosemount	Chisel	[1]	[1]	[1]	125+0+60	Spring
Staples	Plow	6.7	18	882	13+22+90	Spring
Rothsay	[1]	[1]	[1]	[1]	[1]	[1]

Table 3. Performance of early maturity corn hybrids in 1997 in the Southern Zone (Lamberton, Waseca, Lewiston).

Locations: LAM=Lamberton; WAS=Waseca; LEW=Lewiston; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	LAM bu/a	WAS bu/a	LEW bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
95 Relative Maturity Hybrids								
Anderson	7525	—	—	123	167	150	17.9	147
DeKalb	DK449	—	—	134	165	157	17.9	152
Dahlman	1599	—	—	124	172	160	18.0	152
Renk	RK546	—	—	127	173	155	18.7	152
Renk	RK552	—	—	137	193	182	19.3	171
KSC/Challenger	K-9801	—	—	133	175	173	20.8	160
RM Averages				130	174	163	18.8	155
100 Relative Maturity Hybrids								
Curry	2102	—	—	117	169	163	17.8	150
Renze	6068	—	—	148	185	184	18.3	172
Golden Harvest	H-2315	—	—	129	188	156	18.4	158
DeKalb	DK477	19.1	166	140	202	180	18.5	174
Dairyland	Stealth 1496	—	—	132	183	179	18.5	164
Top Farm	TFSX2201	—	—	133	177	171	18.5	160
Renze	6078	—	—	138	188	179	18.6	168
Dahlman	1699	—	—	134	196	163	18.7	164
NC+	1487	—	—	121	181	166	18.7	156
Viking	6801	—	—	149	181	178	18.7	169
DeKalb	DK471	19.5	165	146	176	175	18.7	166
Kruger	K-9800	—	—	144	187	169	18.8	167
Fontanelle	3946	—	—	125	188	164	18.9	159
Kaltenberg	K4807	—	—	134	191	183	18.9	169
Fontanelle	3977	—	—	150	181	170	19.0	167
Anderson	6076	—	—	139	182	160	19.0	160
Dahlman	1640	19.6	151	129	169	164	19.1	154
Payco	635	20.3	159	140	170	168	19.1	159
Sands	SOI 9998	—	—	135	194	167	19.1	165
Payco	607	—	—	129	179	169	19.1	159
Curry	2101	—	—	135	172	150	19.2	152
DeKalb	DK493	19.8	166	149	215	165	19.3	177
NK	N4242	—	—	136	169	166	19.4	157
Mycogen	2500	—	—	136	176	162	19.5	158
Cargill	3677	20.3	159	144	168	172	19.6	161
Cargill	3911	—	—	132	198	157	19.7	162
Mycogen	2545	—	—	141	184	183	19.9	169
Dairyland	Stealth 1401	—	—	146	190	165	20.0	167
Viking	6799	—	—	137	181	177	20.1	165
Cargill	4111	—	—	163	214	187	20.4	188
Kaltenberg	K5009	21.0	167	146	190	171	20.5	169
Kruger	K-9802	21.2	169	158	201	171	20.5	177
Trelay	5003	—	—	142	198	178	20.6	173
Top Farm	TFSX2100	—	—	138	193	165	20.8	165
Sands	SOI 9991	21.6	157	132	171	169	20.8	157

Table 3 continued. Performance of early maturity corn hybrids in 1997 in the Southern Zone (Lamberton, Waseca, Lewiston).

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	LAM bu/a	WAS bu/a	LEW bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
LG Seeds	LG2487	—	—	133	184	151	20.9	156
Brown	5180	—	—	129	171	149	21.0	150
NC+	2395	—	—	146	170	160	21.1	159
Kruger	K-9801	—	—	127	179	159	21.1	155
Golden Harvest	H-2359	—	—	121	157	142	21.2	140
Asgrow	RX490	—	—	146	193	173	21.4	171
Dairyland	Stealth 1500	—	—	138	178	163	21.4	160
Pioneer	3730	21.9	161	130	183	156	21.4	156
Sands	SOI 9027	21.5	154	138	161	153	21.5	151
Trelay	5004	—	—	136	169	169	21.5	158
Trelay	5500	22.5	153	128	190	157	22.2	158
Garst	N4673	—	—	171	200	187	23.2	186
LG Seeds	LG2499	23.5	164	149	200	166	23.5	172
NK	N4146	—	—	156	199	183	23.8	179
Pioneer	36K27	—	—	184	218	204	25.1	202
100 RM Averages				140	185	168	20.1	164
105 Relative Maturity Hybrids								
Curry	2105	—	—	125	194	171	18.7	163
Wilson	1098	—	—	139	186	177	18.9	167
Golden Harvest	H-2377	21.3	155	135	190	156	20.5	160
Terra	TR1026	—	—	142	203	161	20.5	168
Curry	2135	—	—	144	203	165	20.7	171
DeKalb	DK521	—	—	149	190	166	20.7	168
Garst	8640	—	—	151	202	178	21.0	177
Dahlman	1702	21.8	155	147	165	159	21.0	157
Renze	6167	21.2	164	143	192	145	21.0	160
Pioneer	3559	22.5	155	133	186	164	21.0	161
Cargill	4127	21.6	161	154	189	164	21.1	169
Brown	5140	—	—	135	195	182	21.1	170
KSC/Challenger	K-9704	21.3	162	137	183	168	21.3	163
DeKalb	DK512	22.3	158	156	182	184	21.4	174
NK	N4640	21.5	159	136	188	182	21.5	169
Asgrow	RX530	—	—	157	189	191	21.7	179
Renk	RK671	—	—	119	167	162	21.8	149
Producer's	588	—	—	134	175	148	21.8	152
Jung	2510	22.0	153	134	176	155	22.0	155
KSC/Challenger	K-9804	—	—	120	191	156	22.1	156
Renk	RK641	22.4	156	138	191	126	22.1	152
Cargill	4811	—	—	143	186	164	22.1	164
Payco	646	22.6	153	134	187	169	22.1	163
Mycogen	2620	—	—	158	163	169	22.4	163
Renk	RK672	22.8	156	128	191	159	22.5	159
Pioneer	3563	23.1	157	146	199	165	22.5	170
Dairyland	Stealth 1407	24.0	159	146	200	181	22.7	176
Epley	EX1500	23.4	163	145	190	173	22.7	169
Epley	EX2400	—	—	144	174	176	22.8	165
Garst	8605	—	—	128	197	174	23.2	166

Table 3 continued. Performance of early maturity corn hybrids in 1997 in the Southern Zone (Lamberton, Waseca, Lewiston).

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	LAM bu/a	WAS bu/a	LEW bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
Fontanelle	4426	—	—	129	195	170	23.2	165
Mycogen	2598	—	—	163	208	174	23.3	182
Fontanelle	4567	—	—	141	187	171	23.4	166
Pioneer	35R57	—	—	156	222	165	23.5	181
Sands	SOI 9067	—	—	146	176	172	23.5	165
Anderson	4028	—	—	148	198	153	23.6	166
Pioneer	3522	24.5	151	141	200	160	23.8	167
KSC/Challenger	K-9705	—	—	137	183	166	23.9	162
Anderson	6800	23.8	156	144	175	168	23.9	162
Viking	4420	24.1	162	139	192	178	24.0	169
Asgrow	RX601	—	—	155	164	176	24.4	165
Anderson	4000A	24.0	156	130	188	146	24.4	155
Garst	8660	—	—	131	189	160	24.4	160
Dairyland	Stealth 1108	24.3	157	135	205	174	24.5	172
Dairyland	Stealth 1406	—	—	157	188	170	24.5	172
Top Farm	TFSX2103	24.6	156	136	193	179	24.5	170
Brunner	Exp-105	—	—	144	193	191	24.6	176
KSC/Challenger	K-9906	—	—	157	195	178	24.6	177
Top Farm	TFSX2104	24.6	152	128	183	164	24.6	158
KSC/Challenger	K-9904	—	—	153	193	162	24.9	169
Terra	E1047	—	—	146	190	177	25.1	171
Brown	6850	—	—	146	195	177	25.1	173
Dairyland	DST 10408	—	—	158	187	164	25.1	170
Dairyland	Stealth 1409	—	—	125	173	158	25.3	152
Brunner	S5474	—	—	149	182	177	25.3	169
Kruger	K-9806	—	—	146	179	187	25.4	171
Renze	6227	—	—	140	193	172	25.7	169
Kaltenberg	K6301	—	—	147	185	175	25.9	169
Pioneer	35M02	—	—	198	193	201	26.6	198
105 RM Averages				143	189	169	23.0	167
Trial Averages				141	186	168	21.5	165
LSD 20%				11	16	17	0.6	9

Table 4. Performance of late maturity corn hybrids in 1997 in the Southern Zone (Lamberton, Waseca, Lewiston).

Locations: LAM=Lamberton; WAS=Waseca; LEW=Lewiston; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	LAM bu/a	WAS bu/a	LEW bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
110 Relative Maturity Hybrids								
Shelby Farms	VM72xVM2	—	—	109	165	138	21.3	137
DeKalb	DK566	24.2	163	163	197	177	23.1	179
Jung	2656	24.3	165	136	185	146	24.3	156
Kruger	K-9706	—	—	149	188	178	24.4	172
Golden Harvest	H-2478	25.0	144	147	160	163	24.7	156
Garst	8570IT	—	—	136	172	142	24.7	150
Renk	RK728	—	—	156	190	156	24.8	167
Renk	RK696	24.4	162	137	173	168	25.1	159
Jung	2668	—	—	166	194	180	25.3	180
Top Farm	TFSX2111	—	—	157	188	151	25.4	165
Renk	RK775	—	—	160	192	173	25.4	175
Curry	2151	—	—	138	184	134	25.5	152
Sands	SOI 9074	25.5	147	119	180	136	25.7	145
Terning	EXP 110	—	—	167	176	193	26.3	179
Trelay	7005	—	—	138	186	178	26.3	167
Cargill	6303	26.2	151	155	191	143	26.4	163
Renze	6287	26.7	158	163	179	174	26.6	172
Kruger	K-9407+	—	—	142	190	150	26.7	160
Epley	EX3242	26.9	157	146	174	188	26.9	169
Brown	7050	28.5	161	169	203	169	27.1	181
Mycogen	2677	26.4	146	130	176	149	27.2	152
Terra	TR1087	—	—	161	204	161	27.4	175
Renze	6327	—	—	162	167	177	28.9	169
Dairyland Stealth	1412	28.3	154	179	186	179	29.1	181
Terra	E1088	—	—	151	179	167	29.1	166
Terra	TR1106	—	—	172	186	194	31.9	184
110 RM Averages				150	183	164	26.1	166
Trial Averages				150	183	164	26.1	166
LSD 20%				16	18	21	0.9	11

Table 5. Performance of early maturity corn hybrids in 1997 in the Central Zone (Rosemount, Morris).

Locations: ROS=Rosemount; MOR=Morris; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	ROS bu/a	MOR bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
85 Relative Maturity Hybrids							
Dairyland	Stealth 1183	—	—	159	146	17.6	152
Brown	2080	—	—	148	157	18.1	152
NK	NX2105	—	—	158	149	18.8	153
85 RM Averages				155	151	18.1	153
90 Relative Maturity Hybrids							
DeKalb	DK385B	—	—	177	175	17.3	176
Jung	2406	19.7	160	150	164	17.5	157
Dairyland	Stealth 1289	—	—	176	173	17.5	174
Asgrow	RX355	—	—	161	164	17.6	163
Renk	RK376	—	—	161	150	17.9	156
Top Farm	TFSX2191	18.8	156	152	138	18.1	145
Pioneer	3893	19.1	166	162	171	18.3	166
Pioneer	38R21	—	—	159	172	18.5	166
Cargill	2777	—	—	167	152	18.8	160
Cargill	2427	—	—	153	143	18.8	148
Payco	3X417	—	—	146	122	19.3	134
Wensman	Max 78	—	—	187	179	19.4	183
Wensman	Max 357	—	—	178	179	19.4	178
Wensman	Max 007	—	—	170	171	19.6	170
90 RM Averages				164	161	18.4	163
95 Relative Maturity Hybrids							
DeKalb	DK431	—	—	189	175	17.5	182
Mycogen	2458	—	—	156	150	18.1	153
Mycogen	2420	19.7	167	156	157	18.1	157
Dairyland	Stealth 1495	19.7	167	174	155	18.2	165
Dahlman	1599	—	—	171	179	18.6	175
DeKalb	DK449	—	—	176	192	18.8	184
Producer's	526	—	—	160	165	18.9	162
Payco	516	20.1	170	168	169	19.1	169
Garst	8814	20.4	170	163	175	19.1	169
Brown	3680	—	—	169	162	19.1	165
Renk	RK546	19.9	160	181	177	19.2	179
Jung	2460	—	—	170	160	19.2	165
NK	N3030	20.3	166	162	171	19.3	167
Pioneer	37M81	—	—	185	174	19.3	179
Jung	2430	—	—	176	173	19.4	174
Kaltenberg	K4501	—	—	188	164	19.4	176
Renk	RK450	—	—	163	170	19.4	167
Payco	457	—	—	157	175	19.5	166
Kruger	K-9895	—	—	168	165	19.6	167
Top Farm	TFSX2196	—	—	168	154	19.6	161

Table 5. Performance of early maturity corn hybrids in 1997 in the Central Zone (Rosemount, Morris).

Locations: ROS=Rosemount; MOR=Morris; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	ROS bu/a	MOR bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
Mycogen	2395	21.2	164	151	163	19.7	157
Dairyland	Stealth 1595	—	—	163	175	19.7	169
Anderson	7525	—	—	159	178	19.7	169
Garst	8830	—	—	164	167	19.8	165
Trelay	4002	—	—	173	168	19.9	170
Trelay	4600	—	—	166	176	19.9	171
Dairyland	Stealth 1297	21.6	168	153	179	19.9	166
LG Seeds	LG2442	—	—	172	182	20.0	177
KSC/Challenger	K-9893	—	—	174	175	20.0	175
Terning	TS 8250	—	—	163	156	20.1	159
Epley	EX1160	—	—	161	158	20.1	159
Renk	RK552	—	—	167	164	20.2	165
Brown	4680	20.4	174	169	174	20.2	172
Kruger	K-9898	20.9	182	161	182	20.3	172
Hyland	HLX705	—	—	157	170	20.5	163
Brunner	Exp-95	20.8	163	174	160	20.5	167
Garst	8751	21.6	173	193	157	20.9	175
Wensman	Max 127	—	—	171	180	21.6	175
Wensman	Max 747	—	—	175	189	21.7	182
Hyland	HL2521	—	—	167	176	22.1	171
Terra	E987	—	—	178	168	23.3	173
95 RM Averages				168	170	19.7	169
Trial Averages				167	167	19.3	167
LSD 20%				16	14	0.6	10

Table 6. Performance of late maturity corn hybrids in 1997 in the Central Zone (Rosemount, Morris).

Locations: ROS=Rosemount; MOR=Morris; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	ROS bu/a	MOR bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
100 Relative Maturity Hybrids							
Kruger	K-9800	—	—	163	165	19.1	164
Kaltenberg	K4807	—	—	192	159	19.2	175
Pioneer	3751	20.6	167	170	157	19.2	163
Golden Harvest	H-2315	—	—	168	162	19.2	165
Terning	TS 8301	—	—	158	156	19.2	157
DeKalb	DK477	20.6	180	164	199	19.2	181
Jung	2488	20.8	154	169	140	19.4	154
Dahlman	1640	21.5	170	176	173	19.5	174
Mycogen	2500	22.5	180	166	155	19.6	161
Dahlman	1699	20.4	176	161	172	19.7	166
Dairyland Stealth	1496	—	—	175	157	19.7	166
DeKalb	DK471	20.9	192	199	188	19.8	194
Anderson	6076	—	—	151	154	20.0	152
Payco	607	—	—	165	151	20.0	158
Cargill	4111	—	—	189	193	20.2	191
LG Seeds	LG2473	—	—	170	153	20.4	161
Top Farm	TFSX2201	—	—	171	144	20.4	157
Pioneer	3730	22.3	171	181	159	20.4	170
Payco	635	—	—	166	170	20.5	168
Cargill	3677	21.3	185	179	179	20.5	179
Top Farm	TFSX2101	20.8	165	162	160	20.5	161
DeKalb	DK493	22.3	190	188	190	20.9	189
LG Seeds	LG2483	—	—	162	172	21.0	167
Golden Harvest	H-2359	—	—	156	148	21.0	152
Kruger	K-9899	—	—	169	181	21.0	175
Dairyland Stealth	1401	23.9	162	158	163	21.1	160
Jung	2544	22.4	169	167	153	21.3	160
Cargill	3911	—	—	178	185	21.3	181
Mycogen	2545	—	—	175	169	21.3	172
Hyland	HL2614	—	—	174	190	21.6	182
Dairyland Stealth	1402	—	—	175	159	21.8	167
Kruger	K-9801	—	—	186	168	21.8	177
Trelay	5003	—	—	175	174	22.1	174
Epley	EX1460	—	—	164	168	22.1	166
Kaltenberg	K5009	—	—	153	170	22.1	161
KSC/Challenger	K-9501	—	—	194	174	22.2	184
Asgrow	RX490	—	—	171	171	22.2	171
Terning	TS 8311	23.7	158	155	171	22.4	163
Jung	2540	24.0	158	151	167	22.5	159
Kruger	K-9802	—	—	172	155	22.6	164
Dairyland	Stealth 1500	—	—	171	164	22.6	167
Brown	5180	24.3	167	175	168	22.8	172
Hyland	HL2626	—	—	194	173	22.9	184
Wensman	Max 88	—	—	171	168	23.0	169
LG Seeds	LG2499	25.1	171	185	178	23.7	181

Table 6 continued. Performance of late maturity corn hybrids in 1997 in the Central Zone (Rosemount, Morris).

Locations: ROS=Rosemount; MOR=Morris; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	ROS bu/a	MOR bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
NK	N4146	—	—	201	202	24.2	202
Pioneer	36K27	—	—	222	214	25.4	218
100 RM Averages				173	169	21.1	171
105 Relative Maturity Hybrids							
Golden Harvest	H-2377	—	—	168	154	19.8	161
Brown	5140	—	—	195	173	21.6	184
Dairyland	DST 10212	—	—	176	171	21.7	174
Renk	RK671	—	—	170	151	21.8	161
Terra	TR1026	—	—	168	166	22.3	167
Dahlman	1702	—	—	172	172	22.4	172
Renk	RK672	25.1	164	157	175	23.2	166
Terra	E1047	—	—	186	191	23.4	188
Renk	RK641	25.5	161	163	157	23.5	160
Asgrow	RX530	—	—	178	184	24.0	181
Dairyland	Stealth 1407	27.0	167	171	172	24.2	172
Jung	2577	24.8	164	179	166	24.5	172
105 RM Averages				173	169	22.7	171
Trial Averages				173	169	21.4	171
LSD 20%				20	15	0.8	13

Table 7. Performance of corn hybrids (all maturities) in 1997 in the Northern Zone (Rothsay, Staples).

Locations: ROT=Rothsay; STA=Staples; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	ROT bu/a	STA bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
70 Relative Maturity Hybrids							
Hyland	HL2017	—	—	108	112	25.2	110
75 Relative Maturity Hybrids							
Hyland	HL2161	—	—	144	131	22.0	137
Brunner	B-1030	22.6	139	147	110	22.4	129
Mycogen	1376	23.3	130	111	124	23.4	118
Hyland	HL2262	—	—	132	118	23.5	125
Hyland	HLX701	—	—	124	122	23.7	123
Brown	1680	—	—	145	124	27.1	135
Brunner	Exp-75	—	—	156	126	27.1	141
75 RM Averages				137	122	24.2	130
80 Relative Maturity Hybrids							
Mycogen	2110	22.6	142	140	124	22.3	132
Hyland	HL2241	22.7	141	150	132	22.4	141
Cargill	1527	—	—	126	116	22.5	121
Payco	155	23.3	135	149	133	24.0	141
Pioneer	3941	23.2	132	136	112	24.1	124
Top Farm	TFSX2179	—	—	137	123	24.2	130
Hyland	HL2202	—	—	154	131	24.3	142
Payco	148	—	—	127	113	25.6	120
Top Farm	TFSX2182	24.5	139	131	124	25.9	128
Hyland	HL2184	24.2	134	142	118	26.1	130
Brown	1967	—	—	127	116	26.4	122
Brown	1880	—	—	128	108	27.7	118
Dairyland	Stealth 1280	—	—	146	124	27.8	135
NK	N15-B4	—	—	139	112	28.0	125
LG Seeds	LG2378	27.0	142	156	131	29.1	144
80 RM Averages				139	121	25.3	130
85 Relative Maturity Hybrids							
Cargill	1877	23.1	148	149	124	23.1	137
DeKalb	DK345	—	—	124	125	24.3	124
DeKalb	DK343	23.8	137	125	126	24.4	126
Golden Harvest	H-2226	—	—	119	132	25.2	125
Payco	237	—	—	148	128	25.6	138
Dahlman	1300	—	—	152	124	26.4	138
Cargill	1907	25.5	148	137	141	26.5	139
Hyland	HL2297	26.4	154	157	130	27.3	143
Pioneer	3914	25.1	147	150	120	27.3	135
Renk	RK276	25.6	127	128	98	27.5	113

Table 7 continued. Performance of corn hybrids (all maturities) in 1997 in the Northern Zone (Rothsay, Staples).

Locations: ROT=Rothsay; STA=Staples; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	ROT bu/a	STA bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
DeKalb	DK365	—	—	153	135	28.0	144
Payco	326	25.6	142	152	110	28.0	131
Pioneer	3905	25.6	156	157	123	28.2	140
Trelay	1003	—	—	147	109	28.5	128
Jung	2232	26.2	137	133	120	28.9	126
Renk	RK272	26.6	127	123	105	29.0	114
Dahlman	1085	27.0	130	127	111	29.1	119
Payco	307	—	—	122	110	29.2	116
Top Farm	TFSX2184	26.9	134	132	117	29.4	124
Brown	2267	26.9	163	161	130	29.9	146
Hyland	HL2240	—	—	161	131	30.0	146
Brunner	B-2495	—	—	157	104	30.4	130
Terning	TS 8170	28.2	140	141	100	31.5	120
Trelay	2006	—	—	166	114	31.7	140
Dairyland Stealth	1183	29.3	131	147	115	32.7	131
Brown	2080	29.7	147	151	112	33.4	132
85 RM Averages				143	119	28.3	131
90 Relative Maturity Hybrids							
Cargill	2427	—	—	145	120	27.2	133
Pioneer	38R21	—	—	185	121	27.7	153
Golden Harvest	H-2274	25.6	152	155	125	27.7	140
Pioneer	3893	27.1	161	181	134	28.2	157
DeKalb	DK385B	—	—	184	127	28.2	155
Jung	2340	—	—	145	109	28.9	127
Golden Harvest	H-2265	—	—	150	114	29.7	132
Wensman	Max 78	—	—	143	135	29.7	139
Mycogen	2250	28.1	154	160	109	30.4	134
Dahlman	1499	28.0	137	122	120	30.4	121
NK	N2555	27.9	164	161	124	30.6	143
Wensman	W 4123	—	—	174	141	30.8	158
Terning	TS 8210	27.5	152	150	98	31.1	124
Cargill	2777	—	—	134	123	31.6	128
Dahlman	1488	—	—	138	129	32.0	134
Top Farm	TFSX2191	28.3	155	144	109	32.1	126
Jung	2406	29.6	143	160	124	32.2	142
Renk	RK376	—	—	156	106	32.5	131
Wensman	Max 357	—	—	161	112	32.5	136
Terra	TR906	—	—	153	116	32.5	135
Jung	2380	30.0	139	129	118	32.7	124
Wensman	Max 007	—	—	186	119	33.6	153
Payco	3X417	—	—	99	103	36.7	101
LG Seeds	LG2408	—	—	155	127	38.2	141
90 RM Averages				153	119	31.1	136

Table 7 continued. Performance of corn hybrids (all maturities) in 1997 in the Northern Zone (Rothsay, Staples).

Locations: ROT=Rothsay; STA=Staples; AVG=average across all locations.

Brand Name	Hybrid	1996-97 AVG Moisture %	1996-97 AVG Yield bu/a	ROT bu/a	STA bu/a	1997 AVG Moisture %	1997 AVG Yield bu/a
95 Relative Maturity Hybrids							
DeKalb	DK417	—	—	157	139	26.2	148
Mycogen	2382	—	—	161	130	30.3	146
Mycogen	2362	—	—	166	131	30.8	148
Wensman	W1120X	—	—	158	162	32.6	160
Dahlman	1599	—	—	158	117	33.3	137
Pioneer	37M81	—	—	183	110	34.8	147
Jung	2430	—	—	152	106	35.3	129
Jung	2460	—	—	120	115	36.6	118
Wensman	Max 127	—	—	155	122	38.3	138
Terra	E957	—	—	155	104	38.8	130
95 RM Averages				157	124	33.7	140
Trial Averages				146	120	28.8	133
LSD 20%				15	17	1.9	11

Corn Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
56	1,400	17	24,000/acre	Late April/Early May

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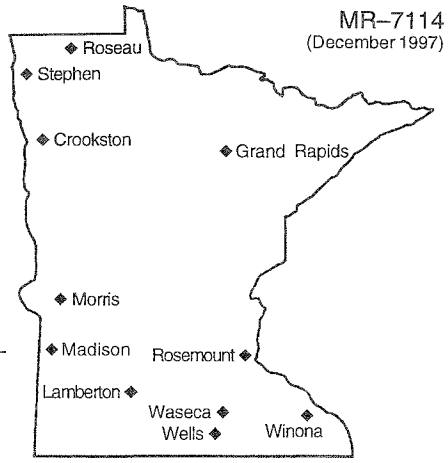
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Oat



Locations of oat trials.

Successful oat production depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Rosemount, Waseca, Lamberton, Morris, Crookston and Grand Rapids, and on farmers' fields. Important old varieties and new varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Oat varieties are classed into groups under the headings "recommended," "not adequately tested," "special purpose," "other," etc. Variety descriptions are arranged alphabetically within groups.

Classifications of oat varieties as "recommended," "other" and "special purpose" are determined each year by the Experiment Station Crop Variety Review Committee. A variety is usually not eligible for the "recommended" group unless it has been better than other varieties in important characteristics in three years of testing.

Varieties from other public experiment stations, but not sufficiently evaluated here, are listed as "not adequately tested." Available information is presented for these varieties, but no conclusions are drawn regarding their suitability for Minnesota conditions. Listings in an "other varieties" category are usually inferior in one or more characteristics, as demonstrated in comparative tests.

Seed of varieties in all these groups may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation. Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1997 Planting*. This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices. The information is also available on-line at <http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed for forage quality performance in Table 4, under columns of tests at Rosemount and Arlington, are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two quality tests are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the higher quality variety was superior in quality. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

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

Plant Protection Act

Varieties receiving their U.S. Plant Variety Protection Act registration beginning in 1995 are identified by the code "PVP(94)." These varieties may *not* be sold by a producer, not even to a relative or neighbor, without the express permission of the variety's developer/owner.

Authors/Researchers

The author of this oat report is Deon Stuthman. Information on variety reactions to specific pathogens was provided by Ruth Dill-Macky, Department of Plant Pathology; to smut by Kurt Leonard; to crown rust by Gerald Ochocki, USDA-ARS Cereal Rust Lab; and to BYDV by Fred Kolb, University of Illinois, Urbana. Field work at various sites was supervised by Steven Quiring, Gregory Cuomo, John Wiersma, and Russell Mathison.

Publication Chair ..... Deon Stuthman
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Produced in the Educational Development System of the University of Minnesota Extension Service.

For Crop Production 1998

OAT VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of Oat Variety Tests Conducted by the Minnesota Agricultural Experiment Station. This report was prepared by Deon D. Stuthman, agronomist, University of Minnesota, St. Paul, MN 55108. [phone: 612/625-3709; e-mail: <stuth001@maroon.tc.umn.edu>]

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 limited 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 the Wisconsin Agricultural Experiment Station. Released 1995. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. Application for Plant Variety Protection Certificate has been submitted.

Dane—Early maturity, high yield, short, good lodging resistance, fair test weight, high groat percentage, yellow seed. Moderately resistant to crown rust and smut, susceptible to red leaf. Selected at the Wisconsin Agricultural Experiment Station. Released 1990. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. Seed sale regulated by U.S. Plant Variety Protection Act.

Jim—Early maturity, high 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 Minnesota Agricultural Experiment Station. Released 1996. Application for Plant Variety Protection Certificate has been submitted.

Milton—Medium-late maturity, very 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 Minnesota Agricultural Experiment Station. Released 1994. Application for Plant Variety Protection Certificate has been submitted.

Jerry—Medium maturity, very high yield, tall, good lodging resistance, very high test weight, high groat percentage, ivory seed. Moderately resistant to crown rust, susceptible to smut, tolerant to red leaf. Selected at North Dakota Agricultural Experiment Station. Released 1994. Seed sales regulated by the U.S. Plant Variety Protection Act, PVP(94). *Because of smut susceptibility, planting only treated seed is recommended.*

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 resistant to crown rust, susceptible to red leaf, resistant to smut. Selected at the Minnesota Agricultural Experiment Station and released in 1994 as a special purpose forage oat variety. It has good forage yield with high levels of crude protein and good relative feed value, although no forage data for Pal is 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. Resistant to crown rust, smut, and moderately susceptible to red leaf. Selected at North Dakota Agricultural Experiment Station. Released 1994. Seed sales regulated by the U.S. Plant Variety Protection Act, 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 Illinois Agricultural Experiment Station. Released 1997.

Chaps—Medium maturity and yield, good lodging resistance, high test weight and groat percentage. Yellow seed. Susceptible to crown rust and smut, tolerant to red leaf. Selected at Illinois Agricultural Experiment Station. Released 1997.

Gem—Medium-late maturity, very 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 Wisconsin Agricultural Experiment Station. Released 1995. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. Application for Plant Variety Protection Certificate has been submitted.

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 the Michigan Agricultural Experiment Station. Released 1997.

Rodeo—Medium-late maturity, very 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 Illinois Agricultural Experiment Station. Released 1996.

Whitestone—Late maturity, medium 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 North Dakota Agricultural Experiment Station. Released 1994. Application for Plant Variety Protection Certificate has been submitted. *Because of smut susceptibility, planting only treated seed is recommended.*

Other Varieties

Armor—Early-medium maturity, poor yield, medium height, fair lodging resistance, poor test weight and groat percentage, yellow seed. Susceptible to crown rust, resistant to smut, tolerant to red leaf. Selected at the Ohio Agricultural Experiment Station. Released 1992.

Bay—Late maturity, medium yield, short, very good lodging resistance, poor test weight, fair groat percentage, ivory seed. Moderately susceptible to crown rust and smut, tolerant to red leaf. Selected at the Wisconsin Agricultural Experiment Station. Released in 1993. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. Application for Plant Variety Protection Certificate has been submitted.

Brawn—Medium maturity, medium yield and height, good lodging resistance, poor test weight, fair groat percentage, dark ivory seed. Susceptible to crown rust, some resistance to smut and little tolerance to red leaf. Selected at the Illinois Agricultural Experiment Station. Released 1993.

Burton—Medium-late maturity, medium yield, short, fair lodging resistance, medium test weight and groat percentage. Yellow seed. Susceptible to crown rust, smut and red leaf. Selected at Ohio Agricultural Experiment Station. Released 1997.

Chairman—Early maturity, low yield, short, fair lodging resistance, test weight, and groat percentage. Yellow seed. Susceptible to crown rust, smut and red leaf. Selected at Ohio Agricultural Experiment Station. Released 1997.

Classic—Medium maturity, high yield, medium height, very good lodging resistance, medium test weight and groat percentage, yellow seed, moderately susceptible to crown rust, good resistance to smut, very tolerant to red leaf. Selected at the Purdue Agricultural Experiment Station. Released 1995. Foundation Seed available to Certified Seed Producers only under a license/fee collection agreement. Application for Plant Variety Protection Certificate has been submitted.

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 the Illinois Agricultural Experiment Station. Released 1985.

Hazel—Medium maturity and yield, short, good lodging resistance, high test weight, very high groat percentage, medium protein percentage, ivory seed. Susceptible to crown rust and smut, tolerant to red leaf. Selected at the Illinois Agricultural Experiment Station from a cross involving Clintford and Portal. Released 1985. *Because of smut susceptibility, planting only treated seed is recommended.*

INO 9201—Early maturity, high yield, short, good lodging resistance, medium test weight and groat percentage, yellow seed. Moderately susceptible to crown rust, tolerant to red leaf, susceptible to smut. Selected at the Purdue Agricultural Experiment Station. Released 1994. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. Application for Plant Variety Protection Certificate has been submitted. *Because of smut susceptibility, planting only treated seed is recommended.*

INO 9212—Medium maturity and yield, short, good lodging resistance, medium test weight, fair groat percentage, yellow seed. Susceptible to crown rust, smut and red leaf. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. Application for Plant Variety Protection Certificate has been submitted. *Because of smut susceptibility, planting only treated seed is recommended.*

Premier—Medium maturity, yield and height, good lodging resistance, medium test weight, groat percentage and protein percentage, yellow seed. Susceptible to crown rust, resistant to smut, some tolerance to red leaf. Selected at the Minnesota Agricultural Experiment Station from a cross between Noble and an unreleased Wisconsin line. Released 1990. Seed sale regulated by U.S. Plant Variety Protection Act.

Prairie—Medium-late maturity, medium yield and height, fair lodging resistance, medium test weight and groat percentage, white seed. Susceptible to crown rust and smut, very tolerant to red leaf. Selected at the Wisconsin Agricultural Experiment Station. Released 1992. Foundation Seed available to Certified Seed producers only under a license/fee collection agreement. Seed sale also regulated by U.S. Plant Variety Protection Act. *Because of smut susceptibility, planting only treated seed is recommended.*

Starter—Early maturity, medium 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 the Minnesota Agricultural Experiment Station from a cross of Noble and a Pal derivative. Released 1986. Seed sale regulated by U.S. Plant Variety Protection Act. *Well suited for companion cropping.*

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 South Dakota Agricultural Experiment Station. Released 1991.

Valley—Late maturity, medium yield, short, fair lodging resistance, medium test weight and groat percentage, medium protein percentage, ivory seed. Susceptible to crown rust and smut, some tolerance to red leaf. Selected at the North Dakota Agricultural Experiment Station. Released 1988. *Because of smut susceptibility, planting only treated seed is recommended.*

Table 1. Oat yield in bushels per acre, by test location (1995-97). Sorted by days to heading after planting, as ordered in Table 2.

Note Key:

[1] 1997 data only, adjusted.

[2] 1996-97 data only, adjusted.

Locations: ROS=Rosemount, W=Waseca, L=Lamberton, MO=Morris, C=Crookston, GR=Grand Rapids, AVG=average for all six locations.

Variety	ROS	W	L	MO	C	GR	AVG
Dane	84.3	62.4	52.8	69.6	80.0	92.4	73.6
Chairman [1]	61.8	80.3	42.7	19.9	77.2	41.2	53.9
Jim	79.0	64.6	44.4	56.9	97.4	75.7	69.7
Gem [2]	84.7	90.7	91.2	76.3	107.1	96.5	91.1
Jerry	96.0	86.7	64.7	80.6	87.5	92.0	84.6
Pal	62.4	68.5	54.9	51.6	75.6	64.8	63.0
Rodeo [2]	78.5	85.8	88.7	58.3	107.3	96.7	85.9
Milton	90.1	88.9	65.8	69.4	108.8	104.8	88.0
Ida [2]	78.6	76.9	67.0	41.0	95.8	79.1	73.1
Burton [1]	67.5	77.2	32.4	19.4	81.2	46.2	54.0
Whitestone	90.8	86.5	83.9	62.7	98.2	110.2	88.7
Belle	89.1	86.5	76.6	69.6	114.4	89.2	87.6
LSD 5%	9.4	8.9	6.7	7.6	8.6	11.5	3.6

Table 2. Characteristics of oat varieties, 1995-97. Sorted by days to heading after planting.

Note Key:

[1] DAP=heading; expressed as days after planting.

[2] HT=height in inches.

[3] LD=lodging; 1= erect and 5=flat.

[4] TW=test weight; expressed as pounds per bushel.

[5] GT%=groat percentage.

[6] CR=crown rust score; R=resistant, M=medium, S=susceptible.

[7] SMUT=smut score; R=resistant, M=medium S=susceptible.

[8] BYD=Barley yellow dwarf virus score; 1=no symptoms, 9=dead.

[9] 1997 data only.

Variety	DAP [1]	HT [2]	LD [3]	TW [4]	GT% [5]	CR* [6,9]	Smut* [7,9]	BYD* [8,9]
Dane	52.3	30	2.0	36.6	72.2	S-MS	MR	7.5
Chairman	53.8	29	2.5	34.3	66.5	S	S	6.5
Jim	54.4	32	2.0	37.7	70.2	S	R	5.5
Gem	55.9	35	2.3	37.0	69.2	MR	R	5.0
Jerry	56.5	35	2.3	38.9	69.1	MS-MR	MS	5.5
Pal	57.2	27	2.2	33.5	68.2	S-MS	R	7.0
Rodeo	57.3	31	1.8	35.4	72.0	S-MS	S	3.5
Milton	57.7	32	2.1	36.3	68.5	S-MS	R	9.0
Ida	57.8	32	2.1	35.3	68.0	S	MS	3.5
Burton	59.6	30.9	2.9	38.8	71.6	S	S	6.0
Whitestone	60.7	34	2.8	36.8	68.6	MR	MS	5.0
Belle	61.7	35	2.3	37.9	74.1	MR	R	6.0
Average	57.5	32.1	2.3	36.5	69.6			

Table 3. Oat yield in bushels per acre, at off-station test locations for 1997 only. Sorted by days to heading after planting.

Locations: ROU=Roseau, ST=Stephen, WIN=Winona, WE=Wells, MAD=Madison. Winona, Wells and Madison are pesticide free/or organic farmer fields.

Variety	ROU	ST	WIN	WE	MAD
Dane	131.0	112.0	72.0	79.5	31.0
Chairman	90.7	88.0	—	—	—
Jim	127.0	115.0	85.0	82.0	54.5
Chaps	143.3	131.7	—	—	—
Gem	126.3	114.0	95.0	81.5	58.8
Jerry	116.3	126.7	97.0	84.5	61.0
Rodeo	131.3	125.0	—	—	—
Blaze	130.3	118.7	—	—	—
Pal	113.7	79.3	80.5	57.0	38.0
Ida	122.0	133.0	—	—	—
Burton	106.7	105.7	—	—	—
Milton	121.7	113.0	92.5	95.0	50.0
Belle	127.3	126.3	79.0	69.0	52.5
Whitestone	125.0	145.0	86.5	72.5	43.5
Paul (hulless)	—	—	63.0	55.5	42.0
LSD 5%	27.0	13.0	19.9	10.5	15.7

Oat Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
32	16,200	80	28/square foot	Early spring

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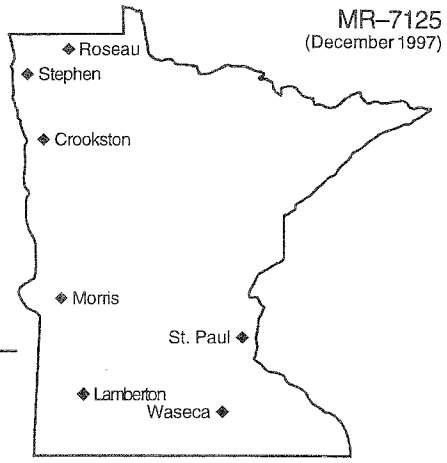
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Hard Red Spring Wheat



Locations of hard red spring wheat trials.

Successful production of hard red spring wheat depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Waseca, Lamberton, Morris, Crookston, Stephen, Roseau, and St. Paul. Wheat varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Tested hard red spring wheat 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. Variety descriptions are arranged in order of maturity within both the text and tables of this report.

Seed of tested varieties may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation. Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the Minnesota Registered and Certified Seed Directory for 1997 Planting This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension offices of the University of Minnesota Extension Service. The information is also available on-line at:

<http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed for grain yield are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two measures are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each quality test column, you can conclude that the variety with the higher score was superior. If the difference is less, greater attention should be given to other traits that are also important in making your variety choices.

These hard red spring wheat trials are not designed for crop (species) comparisons, because the various crops are grown on different fields or with different management. The data should only be used to compare varieties within a table.

Authors/Researchers

The authors of this report are Robert H. Busch and Gary L. Linkert. Information on the reactions of varieties to rust was obtained by Donald V. McVey, USDA-ARS. Information on scab and other pathogens was largely obtained by Ruth Dill-Macky, Department of Plant Pathology.

Fieldwork for wheat trials was supervised by Gary Linkert, John Wiersma, Jochum Wiersma, Paul Porter, George Nelson, and Greg Johnson.

Publication Chair ..... Deon Stuthman
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Produced in the Educational Development System of the University of Minnesota Extension Service.

For Crop Production 1997

HARD RED SPRING WHEAT VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1996

Results of hard red spring wheat variety tests conducted by the Minnesota Agricultural Experiment Station. This report was prepared by research geneticist Robert H. Busch [phone: 612/625-1975; e-mail: <busch005@maroon.tc.umn.edu>] and scientist Gary L. Linkert [phone: 612/625-5263; e-mail: linke002@maroon.tc.umn.edu], Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108.

Crop Background

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

Scab epidemics in hard red spring wheat growing areas 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 observations of spread of the disease on the spike, and tolerance scores, reflecting the variety's ability to maintain plump seed. These ratings should be considered together to reduce risk of loss. Use of more than one variety and/or different seeding dates are highly recommended to provide differing days to heading to reduce risk of scab.

Variety descriptions do not provide information on scab resistance. Table information should be used for that purpose. Varieties are listed in maturity order in both text and tables.

Publicly Developed Varieties

BacUp—Awned, very early, normal 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 content. Specialty variety release for scab tolerance with recommendation that it not be used on over

15-20% of acreage. Released by USDA-ARS and Minnesota Agricultural Experiment Station in 1996.

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 percentage. Released by North Dakota Agricultural Experiment Station in 1994. Seed sales regulated by the U. S. Plant Variety Protection Act, PVP(94).

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 percent protein. Released by South Dakota Agricultural Experiment Station in 1997. Seed sale regulated by U.S. Plant Protection Act 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. Best adapted south of I-94. Released by South Dakota Agricultural Experiment Station in 1990.

Sharpshooter—Awned, early, normal height. Resistant to stem rust and leaf rust. Medium to high yield and high test weight. Moderately susceptible to foliar disease complex and lodging. Similar to Sharp, selected from for possibly enhanced scab tolerance. Released by Western Plant Breeders in 1996. Seed sale regulated by U. S. Plant Variety Protection Act.

Butte 86—Awned, early, medium height. Resistant to stem rust and moderately resistant to leaf rust. High yield and test weight. Moderately susceptible to lodging, foliar disease, and black chaff. Medium percent protein. Released by North Dakota Agricultural Experiment Station in 1986.

Oxen—Awned, early-midseason, semidwarf. Moderately resistant to stem rust and leaf rust. Very high yield and medium test weight. Medium percent protein. Moderately susceptible to foliar diseases. Released by South Dakota Agricultural Experiment Station in 1996. Seed sale regulated by the U.S. Plant Protection Act 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 South Dakota Agricultural Experiment Station in 1995.

2375—Awned, early, medium height. Resistant to stem rest and moderately susceptible to leaf rust. Very high yield and test weight. Tolerant to loose smut. Moderately susceptible to lodging, shattering and foliar diseases. Medium protein percent. Best adapted south of I-94. Released by Pioneer Hi-Bred in 1988. Sold by North Dakota State University Research Foundation 1990. Seed sale regulated by U. S. Plant Variety Protection Act.

Grandin—Awned, early, semidwarf. Resistant to stem rust and moderately susceptible to leaf rust. High yield and test weight. Moderate lodging resistance. Moderately tolerant to

loose smut. Moderately susceptible to foliar diseases. High protein percent. Released by North Dakota Agricultural Experiment Station in 1989.

Hamer—Awned, early-midseason maturity, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. High yield and medium test weight. Good lodging resistance. Moderately resistant to foliar diseases. Medium to low protein percent. Released by AgriPro 1995. Seed sale regulated by the U. S. Plant Variety Protection Act, PVP(94).

2370—Awned, early, semidwarf. Moderately resistant to stem rust and moderately susceptible to leaf rust. High yield and medium test weight. Moderate lodging resistance. Medium protein percent. Released by Pioneer Hi-Bred in 1989. Sold by North Dakota State University Research Foundation in 1990. Seed sale regulated by U. S. Plant Variety Protection Act.

Nora—Awned, midseason, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. Medium to high yield. Moderately susceptible to lodging. Medium percent protein. Released by AgriPro in 1996. Seed sale regulated by U.S. Plant Variety Protection Act, PVP(94)

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

Trenton—Awned, midseason, medium height. Moderately resistant to stem rust and moderately susceptible to leaf rust. High yield and test weight. Moderately susceptible to lodging. Moderately susceptible to foliar diseases. Medium-high protein percent. Recommended by North Dakota State University for western and central North Dakota. Released by North Dakota Agricultural Experiment Station in 1995. Seed sale regulated by the U. S. Plant Variety Protection Act, PVP(94).

Verde—Awned, midseason-late maturity, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. High yield and medium test weight. Good lodging resistance. Moderately resistant to foliar diseases. Medium to low protein percent. Released by Minnesota Agricultural Experiment Station and USDA-ARS 1995. Seed sale regulated by the U. S. Plant Variety Protection Act, PVP(94).

Lars—Awned, midseason, semidwarf. Resistant to stem rust and moderately resistant to leaf rust. High yield and low test weight. Good lodging resistance. Moderately resistant to foliar diseases. Low-medium protein percent. Released by AgriPro in 1995. Seed sale regulated by the U. S. Plant Variety Protection Act, 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 percent protein. Released by North Dakota Agricultural Experiment Station in 1997. Seed sale regulated by the U.S. Plant Protection Act, PVP(94).

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

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. Released by Agriculture and Agri-Food, Manitoba, Canada to Cargill in 1996. Seed sale regulated by the U.S. Plant Protection Act. PVP(94).

Gunner—Awned, late, normal 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 content. Released by AgriPro in 1996.

Table 1. Growth and yield characteristics of hard red spring wheat varieties (1995-97; only new varieties and older varieties with scab ratings better than susceptible are included in trials). Sorted by heading date.

Note Key:

[1] Heading date.

[2] Height expressed in inches.

[3] Lodging score: 1=erect, 9=flat.

[4] Test weight expressed as pounds per bushel.

[5] Protein expressed as a percentage, calculated at 12% moisture.

[6] Two year data adjusted to 1995-97.

[7] Norm is included as a scab susceptible check.

Variety	Heading [1]	Height [2]	Lodging [3]	Test Weight [4]	Wheat Protein [5]	Milling/Baking Quality
BacUp	6-27	33	4.4	60.6	17.1	High
Kulm	6-28	35	3.5	59.1	15.8	High-Medium
Forge	6-28	32	3.5	59.7	15.4	Medium
Sharp	6-28	33	3.7	59.9	15.2	Medium-High
Sharpshooter [6]	6-28	33	3 6	59 8	15 2	Medium-High
Butte 86	6-28	33	3.5	58.6	15 3	Medium-High
Oxen	6-29	31	3.6	58.3	15.2	Medium
Russ	6-29	33	3.9	58.2	14.9	Medium
2375	6-29	32	4.5	59.5	15.0	Medium
Grandin	6-29	33	3.2	59.3	15.4	High
Hamer	6-30	31	2.5	58.4	15.3	Medium-Low
2370	6-30	32	3.2	58.7	15.0	Medium
Nora [6]	6-30	28	3.5	57.8	15.5	
AC Domain	6-30	34	3.7	58.4	15.7	Medium
Trenton	6-30	37	4.0	59.0	15.7	High-Medium
Verde	7-1	32	2.8	58.2	14.4	Medium
Lars	7-1	28	2.9	57.3	14.2	Medium-Low
Norm [7]	7-1	31	2.6	56.2	14 1	Medium-High
Keene [6]	7-1	37	3.7	59.4	15.4	Medium-High
AC Cora	7-2	37	4.3	57.8	16.0	Medium-High
I AC Majestic	7-2	35	3.7	57.4	15.6	Medium
Marshall	7-3	30	2.3	57.8	14.1	Medium-Low
Gunner	7-3	34	3.0	59.8	16.0	Medium

Table 2. Disease susceptibility and tolerances of hard red spring wheat varieties (1995-1997, only new varieties and older varieties with scab ratings better than susceptible are included in trials). Sorted by heading date.

Note Key:

[1] Resistance to rust: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

[2] Rated based on NDSU data from 1995-1997.

[3] Tolerance to maintain plump kernels under scab epidemics: 1=very well, 2=well, 3=moderate, 4=fair, 5=poor.

[4] Two year data adjusted to 1995-1997.

[5] Norm is included as a scab susceptible check.

Variety	Leaf Rust [1]	Stem Rust [1]	Foliar Disease [1] [2]	Scab Severity [3]	Scab Tolerance [3]
BacUp	MR	R	S	MR	1.5
Kulm	MR	R	S	MS-S	3
Forge	MR	R	MS	MR-MS	2
Sharp	MR	R	MS	MS-MR	2.5-3
Sharpshooter [4]	MR	R	MS	MS-MR	2.5-3
Butte 86	MR	R	S	MS-MR	2.5
Oxen	MR	MR	MS	MS	2.5
Russ	MR	MR	S	MS-S	3
2375	MS	R	S	MS	2.5
Grandin	MS	R	S	MS	3
Hamer	MR	R	MR	MS	3.5
2370	MS	MR	S	MS	3.5
Nora [4]	MR	R	S	4	
AC Domain	MR	R	MS	MS	3
Trenton	MS	MR	MS	MS-S	3
Verde	MR	R	MR	MS-S	2.5
Lars	MR	R	MR	S	4.5
Norm [5]	R	R	MR	S	5
Keene [4]	MR	R	—	MS	2.5
AC Cora	MR	R	MR	S-MS	2.5-3
AC Majestic	MR	R	MR	S-MS	3
Marshall	MS R	MS	MS-S	3.5	
Gunner	MR	R	~	MR-MS	2

Table 3. Yields, in bushels per acre, of hard red spring wheat varieties in Minnesota (1995-1997; only new varieties and older varieties with scab ratings better than susceptible are included in trials). Sorted by heading date.

Note Key:

[1] 2-year average 1996-1997.

[2] 1997 only.

[3] 2-year average 1995 and 1997.

[4] Norm is included as a scab susceptible check.

Locations: C=Crookston; L=Lamberton; M=Morris; R=Roseau; SP=Saint Paul; S=Stephen; W=Waseca; N.AVG=average for northern sites (C-S-R); S.AVG=average for southern sites (SP-M-W-L); AVG=average for all seven sites.

Variety	C	S [1]	R	N.AVG	SP	M [2]	W	L	S.AVG	AVG
BacUp	32	40	41	37	38	43	37	50	41	40
Kulm	42	36	52	45	45	56	52	61	52	49
Forge	48	47	52	48	49	50	53	64	55	52
Sharp	45	43	50	46	45	55	51	58	51	49
Sharpshooter [2]	43	43	50	46	47	53	51	50	51	49
Butte 86	45	38	53	46	46	53	50	53	50	48
Oxen	48	47	52	50	57	65	54	64	59	55
Russ	43	46	51	47	48	61	56	58	55	51
2375	44	49	52	48	51	59	51	57	54	51
Grandin	48	38	49	46	56	53	49	58	53	50
Hamer	48	46	54	50	55	60	53	58	56	55
2370	46	45	54	49	54	60	46	64	55	52
Nora [2]	46	42	49	46	43	49	40	53	46	46
AC Domain	40	42	47	43	43	51	44	53	48	44
Trenton	43	41	48	44	44	59	52	62	53	49
Verde	47	49	57	51	59	55	51	60	56	54
Lars	53	49	53	52	56	58	51	58	55	54
Norm [4]	40	38	50	43	55	51	52	59	54	49
Keene [3]	42	46	48	46	46	52	50	58	47	47
AC Cora	40	48	47	45	40	49	42	57	45	45
AC Majestic	37	49	42	42	38	47	39	53	44	42
Marshall	49	47	47	48	54	52	44	55	51	50
Gunner	43	48	49	46	45	53	44	49	47	45
LSD 5%	9.2	8.8	7.4	5.0	7.5	7.4	7.0	9.5	4.0	3.0

Hard Red Spring Wheat Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
60	15,200	90-120	28/square foot	Early Spring

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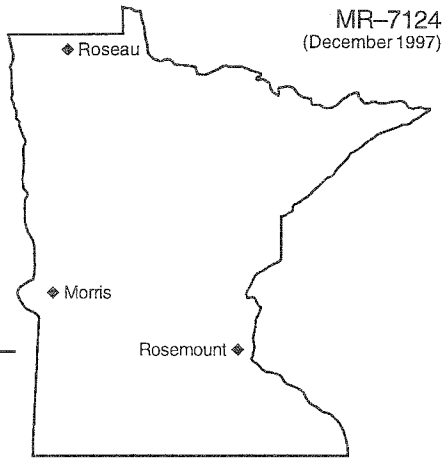
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Winter Wheat



Locations of winter wheat trials.

Successful production of winter wheats depend to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on Minnesota Agricultural Experiment Station fields at Morris, Rosemount and Roseau. Wheat varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Only a limited number of winter wheat varieties are available. Variety descriptions are arranged alphabetically in the text but are orderedaccording to maturity in the tables of this report.

Seed of tested varieties may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation. Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1998 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county offices of the University of Minnesota Extension Service. The information is also available on-line at:
<http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed for grain yield are statistical measures of variability within the trials. This statistic is used to determine whether any difference between two measures is likely due primarily to genetic difference in the varieties.

If the difference between two varieties equals or exceeds the LSD value listed at the bottom of each trait column, you can conclude that the variety with the higher number was superior. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

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

Authors/Researchers

The authors of this report are Robert Busch and Gary Linkert. Information on the reactions of varieties of winter wheat to rust was obtained by Donald V. McVey, USDA-Cereal Rust Laboratory.

Fieldwork for these wheat trials was supervised by Gary Linkert, George Nelson and Greg Johnson.

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For Crop Production 1998

WINTER WHEAT VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of winter wheat variety tests conducted by the Minnesota Agricultural Experiment Station. This report was prepared by research geneticist Robert H. Busch [phone: 612/625-1975; e-mail: <busch005@maroon.tc.umn.edu>] and scientist Gary L. Linkert [phone: 612/625-5263; e-mail: linke002@maroon.tc.umn.edu], Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108.

Crop Background

Varieties are listed in maturity order. A minimum of two years testing is required before any data is presented. Cultural practices have a major effect on winter survival of all winter wheats. Planting into a firm seedbed with at least some stubble remaining to retain snow cover can reduce winterkill.

Publicly Developed Varieties

Arapahoe—Awned, semidwarf, early and good lodging resistance. Winter-hardy. Resistant to leaf rust and stem rust. High yield and medium test weight. Satisfactory quality. Released by the Nebraska Agricultural Experiment Station and USDA-ARS 1988. Seed sale regulated by U.S. Plant Variety Protection Act.

Elkhorn—Awned, tall, medium-late, and fair lodging resistance. Winter-hardy to very winter-hardy. Moderately susceptible to leaf rust and resistant to stem rust. High yield and medium test weight. Medium protein percent. Satisfactory quality. Released by the North Dakota Agricultural Experiment Station 1995.

Roughrider—Awned, tall, medium maturity and fair lodging resistance. Very winter-hardy. Susceptible to leaf rust but moderately resistant to stem rust. Medium yield and high test weight. Satisfactory quality. Released by the North Dakota Agricultural Experiment Station 1975.

Seward—Awned, tall, medium-late, and fair lodging resistance. Very winter-hardy. Moderately resistant to leaf rust and resistant to stem rust. Very high yield and high test weight. Low protein percent. Satisfactory quality. Released by the North Dakota Agricultural Experiment Station 1987.

Table 1. Growth characteristics of publicly developed winter wheat varieties (1994-97).

Note Key:

[1] Heading date. Data does not include Roseau.

[2] Height expressed in inches.

[3] Winter survival rating: VH=very hardy, H=hardy, MH=moderately hardy, NH=not hardy.

[4] Lodging score: 1=erect, 9=flat.

[5] Resistance to rust: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

[6] 1995-97 data.

Variety	Heading [1]	Height [2]	Hardiness [3]	Lodging [4]	Leaf Rust Reaction [5]	Stem Rust Reaction [5]
Arapahoe	6-12	37	H	1.1	R	R
Roughrider	6-14	40	VH	2.0	S	MR
Seward	6-15	40	VH	1.4	MR	R
Elkhorn [6]	6-15	41	VH	1.4	MS	R

Table 2. Yield, in bushels per acre, and yield characteristics of publicly developed winter wheat varieties (1994-97).

Note Key:

[1] Test weight expressed as pounds per bushel; 1994 and 1995 data.

[2] Protein expressed as a percentage, calculated at 12% moisture.

[3] 1994-96 data.

[4] 1994 data only.

Locations: ROS=Rosemount; M=Morris; ROU=Roseau; AVG=average for all three sites.

Variety	Test Weight [1]	Protein [2]	Yield			
			ROS [3]	M	ROU [4]	AVG
Arapahoe	58.1	13.0	69	49	57	58
Roughrider	59.1	12.1	54	48	49	50
Seward	58.7	12,1	70	53	59	60
Elkhorn	58.1	12.9	63	50	—	55
LSD 5%			8	NS	7	8

Winter Wheat Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment. Weight given is the most widely accepted in the U.S.

Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
60	14,500	75+	25/square foot	August 20 to September 20

MR–7113
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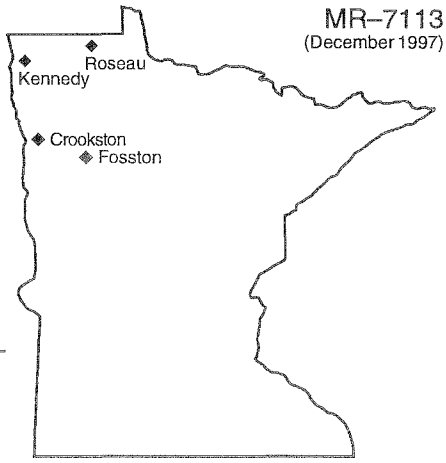
Minnesota Agricultural Experiment Station

VARIETY TRIALS

Canola



Locations of canola trials.

Successful canola crop production depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, canola varieties are currently in trials on farmers' fields near Crookston, Roseau, Fosston and Kennedy. Important old varieties and new varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Canola varieties are not classified into "recommended" or other groupings. The varieties are listed alphabetically. The majority of the varieties are either privately developed or from Agriculture Canada. The developer of each variety is designated by the letter "D" and the marketer by the letter "M" in this report's tables. Seed of the varieties tested should be available from the designated marketer.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed under the yield columns in the tables are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two variety's values are due primarily to genetic difference in the varieties.

If the yield difference between two varieties equals or exceeds the LSD value listed at the bottom of each yield column, one can conclude that the higher yielding variety was superior in yield. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

Authors/Researchers

Authors of this canola report are: Ervin A. Oelke, and David G. LeGare. General assistance for field work was provided by county extension educators Herman J. Kandel, Russell K. Severson, Vincent W. Crary, Troy M. Salzer, and Curtis W. Nyegaard. Karen Andol, Erik Levorson and Donn J. Vellekson also provided assistance.

The Crookston testing site was on the Monte Casavan farm, at Roseau the testing site was on the Steve Dahl farm, at Kennedy the testing site was on the Rob and Tim Ryanning farm, and at Foston the testing site was on the Darryl Rinkenberger farm.

Publication Chair ..... Deon Stuthman
EDS Product Manager ..... Larry A. Etkin

Produced in the Educational Development System of the University of Minnesota Extension Service.

For Crop Production 1998

CANOLA VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

Results of canola variety performance tests conducted by the Minnesota Agricultural Experiment Station on publicly and privately developed canola varieties. This report was prepared by extension agronomist Ervin A. Oelke [phone: 612/625-1211; e-mail: <oelke002@maroon.tc.umn.edu>] and assistant scientist David G. LeGare [phone: 612/625-1784; e-mail: <legar001@maroon.tc.umn.edu>], Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108.

Spring Canola Variety Trials

Canola *(Brassica napus or B. rapa)* 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. In 1990 there were about 8,000 acres grown in Minnesota while acreage planted to canola grew to about 100,000 acres in 1997.

Canola is a crop developed from oilseed rape by Canadian plant breeders. The first canola variety was licensed in 1974.

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. Therefore, 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, less than 30 percent of the trials successfully overwintered, making current varieties too risky for Minnesota's growing conditions.

Production information is provided in the canola chapter of the *Alternative Field Crops Manual.* The cost of the manual is $45. Contact your county extension educa-

tor or the Center for Alternative Plant & Animal Products, 352 Alderman Hall, University of Minnesota, St. Paul, MN 55108 for more information about this publication.

A more complete *Canola Growers Manual* on canola production is available from the Canola Council of Canada, 400-167 Lombard Ave, Winnipeg, Manitoba R3B 0T6 (phone: 204-982-2100). It contains detailed information on canola production practices and costs $68 (U.S.). The Canola Council also provides free annual updates to keep the information in the manual current. Please keep in mind while 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.

Variety/Test Line Name Changes Since Last Year

Variety Name	Test Line
Battleford	SW02568
Beacon	SW02536
Cavalier	CN 509
Dakini	PR3413
DMS-100	EXP 94-06
Eagle	SW02530
Figaro	SWLM9701
Golden Boy	SWLM02579
Hybrid 007	SCH 007
HyC 606	SCH 006
IMC 137	CID 44223
IMC 140	JA 594
OAC Dynamite	BC 94-123
ProMark 220	SWLM02578

Table 1. Seed yield of canola (*Brassica napus*) varieties, in pounds per acre, at Roseau, Crookston, Fosston and Kennedy, Minnesota, in 1997. [1]

Note Key:

[1] Pounds per acre is measured at 10% moisture.

[2] Variety Information includes Source Codes (D#=developer; M#=marketer) keyed to listings in Table 6, and these supplemental codes:

'98 ..... Available in 1998
'99 ..... Available in 1999
Exp ..... Experimental Lne
HE ..... High Eurisic Acid Rapeseed
Hy ..... Hybrid Canola
L ..... Laurate Canola
PS ..... Pursuit Smart
SP ..... Specialty Oil
Syn ..... Synthetic

[3] Yield for 1997. Average column is for Roseau and Crookston only.

[4] Average yield for Roseau and Crookston only,1996-97.

[5] Long term averages for Global (1991-93,95-97) and Hyola 401(1991-97) are 1,575 and 1,985 lbs/A respectively.

Locations: R=Roseau; C=Crookston; F=Fooston; K=Kennedy; AVG=average.

Variety	Variety Information [2]	R [3]	C [3]	R-C AVG [3]	F [3]	K [3]	1996-97 R-C AVG [4]
44A89	D15/M18/'98	1591	981	1286	1564	1305	—
45A71	D15/M18/'98/PS	2010	1143	1577	1746	1364	1593
46A65	D15/M18/'98	1811	1325	1568	1704	1466	1878
97060	D3/M5/L	1481	953	1217	1347	1334	—
97080	D3/M5/L	1611	1227	1419	1699	1391	—
97170	D3/M5/L	1502	1186	1344	1637	1441	—
Battleford	D16/M3	1819	—	—	—	—	—
Beacon	D16/M8	1906	—	—	—	—	—
BNS 94043	D8/M4/'99	1750	1405	1578	1643	1443	—
Brigade	D16/M12	1789	—	—	—	—	—
Castor	D18/M15/HE	1492	—	—	—	—	—
Cavalier	D10/M10	1637	1001	1319	—	—	1452
CL EX57	D5/M7/Exp	1878	—	—	—	—	—
CL2020	D5/M7/Hy	1578	1171	1375	1544	—	—
CL2070	D5/M7/Hy	1725	1506	1615	1730	—	—
Coronet	D16/M3	1570	—	—	—	—	—
Crusher	D16/M12	1694	1528	1611	1717	1586	1700
D1-9124	D6/M1	2017	1346	1681	1751	—	—
Dakini	D6/M1	1785	1245	1515	1756	—	—
Defender	D16/M12	1902	—	—	—	—	—
DMS-100	D12/M16/'98	1502	1187	1345	—	—	—
Eagle	D16/M11	1659	—	—	—	—	—
Ebony	D11/M14	1776	1310	1543	1698	1625	1609
Figaro	D16/M3/Hy	1825	—	—	—	—	—
Garnet	D17/M6/HE	1535	1141	1338	1409	1289	—

Table 1 continued. Seed yield of canola (*Brassica napus*) varieties, in pounds per acre, at Roseau, Crookston, Fosston and Kennedy, Minnesota, in 1997.

Variety	Variety Information [2]	R [3]	C [3]	R-C AVG [3]	F [3]	K [3]	1996-97 R-C AVG [4]
Global [5]	D16/M17	1683	1519	1601	1715	1577	1683
GOH 18	D8/M4/'98	1901	1452	1677	1634	1612	—
Golden Boy	D16/M20/Syn	2002	—	—	—	—	—
HN-9466	D9/M9/Hy/'98	1652	1274	1463	1389	1528	—
Hudson	D5/M7	1596	1218	1407	1660	—	1631
Hybrid 007	D4/M10/Hy	1844	1542	1693	—	—	1908
HyC 606	D4/M10/Hy	1604	1587	1595	—	—	1806
Hyola 308	D19/M12/Hy	1644	1098	1371	1686	1602	—
Hyola 330	D19/M12/Hy	1848	1313	1580	1597	1634	—
Hyola 401 [5]	D19/M12/Hy	1861	1239	1550	1635	1825	1846
Hyola 420	D19/M12/Hy	1832	1471	1652	1716	1592	1858
IMC 03	D10/M10/SP	1798	1126	1462	—	—	1703
IMC 130	D10/M10/SP	1698	1114	1406	—	—	1486
IMC 137	D10/M10/SP	1133	1014	1074	—	—	—
IMC 140	D10/M10/SP	1739	1083	1411	—	—	—
Impulse	D16/M12	1790	1431	1610	1676	1334	1639
KC-701	D13/M13/Hy/Exp/'98	2000	—	—	—	—	—
KC-X702	D13/M13/Hy/Exp	1713	—	—	—	—	—
KC-X703	D13/M13/Hy/Exp	1622	—	—	—	—	—
LG 3260	D11/M14	1659	1263	1461	1446	1588	1568
LG 3310	D11/M14	1723	1444	1584	1704	1399	1707
OAC Dynamite	D14/M12/'98	1797	1311	1554	1565	1310	—
OAC Summit	D14/M2	1862	—	—	—	—	—
Optimum 500	D19/M15	1795	1325	1560	1902	1933	—
Oscar	D5/M7	1520	1451	1485	1462	—	1605
ProMark 220	D16/M19/Syn	1803	—	—	—	—	—
Proseed Exp 2	D7/M19/Exp	1973	1723	1848	—	—	—
Proseed Exp 3	D7/M19/Exp	1736	1428	1582	—	—	—
Proseed Exp 4	D7/M19/Exp	1719	1353	1536	—	—	—
Quantum	D1/M15	1931	1288	1610	1744	1621	1853
Sponsor	D16/M2	1907	1501	1704	1726	1463	1895
Sterling	D17/M6/HE	1145	1119	1132	1629	1244	—
SW02582	D16/M3	1672	—	—	—	—	—
SW H 02606	D16/M3/Hy	1890	—	—	—	—	—
SWLM9702	D16/M3/Hy	1855	—	—	—	—	—
Topscore	D7/M19	1715	1448	1582	1539	1189	1767
UI 47.2.1	D17/M6/HE	1590	929	1259	1210	1309	—
X 710	D11/M14	1816	1481	1648	1606	1642	—
X 801	D11/M14	1713	1503	1608	1754	1542	—
Mean		1728	1298	1501	1627	1489	—
LSD 5%		265	233	169	238	413	—

Table 2. Bloom and maturity characteristics , expressed as days after planting (DAP) of canola varieties at Roseau, Crookston, Fosston and Kennedy, Minnesota (1997).

Locations: R=Roseau; C=Crookston; F=Fooston; K=Kennedy.

Variety	10% Bloom			90% Bloom			Physiological Maturity			
	R	C	F	R	C	F	R	C	F	K
44A89	43	41	42	64	61	61	88	82	83	91
45A71	42	42	44	65	63	64	91	84	90	101
46A65	42	43	44	64	64	63	91	88	92	98
97060	47	44	51	75	65	67	95	87	99	104
97080	47	45	50	69	68	67	95	90	97	112
97170	47	46	50	68	68	67	97	90	98	110
Battleford	42	—	—	64	—	—	91	—	—	—
Beacon	42	—	—	65	—	—	90	—	—	—
BNS 94043	43	43	46	65	65	65	90	88	98	100
Brigade	42	—	—	66	—	—	90	—	—	—
Castor	43	—	—	61	—	—	90	—	—	—
Cavalier	42	41	—	62	60	—	90	83	—	—
CL EX57	44	—	—	65	—	—	92	—	—	—
CL2020	40	40	40	57	58	59	89	82	88	—
CL2070	44	44	46	68	66	66	92	89	98	—
Coronet	43	—	—	66	—	—	90	—	—	—
Crusher	45	46	49	68	67	67	90	88	99	105
D1-9124	41	41	42	60	61	61	91	89	90	—
Dakini	46	47	49	66	67	67	92	90	99	—
Defender	42	—	—	62	—	—	90	—	—	—
DMS-100	45	43	—	66	65	—	93	89	—	—
Eagle	42	—	—	65	—	—	90	—	—	—
Ebony	45	44	48	65	64	66	92	89	98	108
SWLM 9701	41	—	—	66	—	—	89	—	—	—
Garnet	43	42	44	64	63	64	91	83	95	97
Global	46	46	51	69	68	67	95	89	99	108
GOH 18	44	43	45	66	67	66	90	89	98	103
Golden Boy	44	—	—	65	—	—	90	—	—	—
HN-9466	44	41	46	70	67	66	90	89	100	104
Hudson	40	41	41	65	62	62	87	81	84	—
Hybrid 007	43	43	—	65	51	—	91	86	—	—
HyC 606	42	42	—	66	65	—	90	88	—	—
Hyola 308	36	40	40	55	60	57	78	79	77	89
Hyola 330	36	40	39	54	57	57	89	80	81	93
Hyola 401	38	39	39	56	57	58	87	80	83	102
Hyola 420	42	41	41	60	59	60	91	85	87	93
IMC 03	44	44	—	63	60	—	91	85	—	—
IMC 130	45	44	—	63	63	—	91	88	—	—
IMC 137	43	42	—	63	60	—	91	85	—	—
IMC 140	44	42	—	64	63	—	91	87	—	—
Impulse	45	47	50	68	68	67	90	88	99	97
KC-701	43	—	—	67	—	—	91	—	—	—
KC-X702	47	—	—	72	—	—	103	—	—	—
KC-X703	46	—	—	71	—	—	105	—	—	—
LG 3260	41	41	41	63	61	62	88	83	82	95

Table 2 continued. Bloom and maturity characteristics , expressed as days after planting (DAP) of canola varieties at Roseau, Crookston, Fosston and Kennedy, Minnesota (1997).

Variety	10% Bloom			90% Bloom			Physiological Maturity			
	R	C	F	R	C	F	R	C	F	K
LG 3310	43	43	46	65	57	65	90	88	96	100
OAC Dynamite	43	42	44	65	63	64	91	84	89	91
OAC Summit	44	—	—	65	—	—	93	—	—	—
Optimum 500	43	43	45	65	66	64	90	89	95	107
Oscar	45	43	49	70	64	67	95	87	98	—
ProMark 220	44	—	—	67	—	—	90	—	—	—
Proseed Exp 2	46	47	—	70	67	—	98	89	—	—
Proseed Exp 3	45	43	—	66	68	—	92	89	—	—
Proseed Exp 4	44	44	—	66	67	—	90	88	—	—
Quantum	43	42	44	66	64	64	90	86	92	104
Sponsor	45	46	49	68	67	66	90	87	97	98
Sterling	43	43	45	64	65	65	91	88	96	96
SW02582	43	—	—	67	—	—	93	—	—	—
SW H 02606	44	—	—	68	—	—	90	—	—	—
SWLM9702	43	—	—	66	—	—	91	—	—	—
Topscore	44	43	46	66	65	65	90	87	97	103
UI 47.2.1	41	42	44	64	63	64	89	83	91	91
X 710	42	42	43	64	63	64	91	88	93	105
X 801	44	43	46	65	64	65	90	88	96	105
Mean	43	43	45	65	63	64	91	86	93	100
LSD (0.05)	1	1	2	2	6	1	4	3	4	9

Table 3. Disease, canopy closure, and test weight information for canola varieties at Roseau, Crookston, Fosston and Kennedy, Minnesota (1997).

Note Key:

[1] Blackleg resistance rating provided by the seed companies. R=Resistant, MR=Moderately Resistant, MS=Moderately Susceptible, S=Susceptible, na=Ratings not available.

[2] White mold: *Sclerotinia* infection ratings based on a visual estimate of percent incidence.

[3] Canopy: Days from planting to canopy closure.

[4] Test weight expressed in pounds per bushel, based on 5% moisture.

Locations: R=Roseau; C=Crookston; F=Fosston; K=Kennedy.

Variety	Blackleg [1]	White Mold [2]			Canopy [3]		Test weight [4]			
		R	C	F	R	C	R	C	F	K
44A89	MR	3	0	9	24	31	51.3	51.8	51.4	52.3
45A71	MR	1	1	5	24	32	50.9	51.3	51.3	51.8
46A65	MR	2	1	6	22	30	51.1	51.7	51.4	52.1
97060	MS	0	1	0	25	31	51.8	53.0	51.9	53.0
97080	MR	0	0	0	25	30	51.3	53.2	52.3	52.2
97170	MS	0	0	0	24	32	50.8	52.3	51.8	51.8
Battleford	MR	2	—	—	24	—	51.2	—	—	—
Beacon	MR	1	—	—	25	—	50.3	—	—	—
BNS 94043	MR	0	0	0	24	28	50.3	51.3	50.1	51.4
Brigade	MR	0	—	—	24	—	51.1	—	—	—
Castor	R	3	—	—	24	—	51.2	—	—	—
Cavalier	MR	1	1	—	24	30	51.4	52.4	—	—
CL EX57	na	1	—	—	24	—	50.2	—	—	—
CL2020	MS	2	0	4	24	28	51.1	52.2	51.2	—
CL2070	MR	0	0	1	24	29	49.8	50.7	49.6	—
Coronet	MR	0	—	—	25	—	51.4	—	—	—
Crusher	MS	1	0	0	25	31	51.5	51.4	51.8	52.3
D1-9124	MS	1	0	3	25	30	50.6	51.1	51.1	—
Dakini	MS	0	1	0	25	32	50.8	51.9	50.9	—
Defender	MR	1	—	—	24	—	51.5	—	—	—
DMS-100	MS	1	0	—	25	30	51.3	51.1	—	—
Eagle	MR	1	—	—	24	—	51.5	—	—	—
Ebony	MR	0	0	0	24	30	50.1	51.3	50.6	50.8
SWLM 9701	MR	1	—	—	24	—	49.9	—	—	—
Garnet	MR	2	0	3	25	30	50.5	51.7	50.8	52.0
Global	na	1	0	0	24	30	50.4	51.7	51.1	51.6
GOH 18	MS	0	0	0	24	29	50.5	51.3	50.7	51.5
Golden Boy	MR	1	—	—	23	—	50.7	—	—	—
HN-9466	na	0	1	1	24	31	50.8	51.4	50.9	51.5
Hudson	MS	1	0	6	24	30	50.6	51.9	51.3	—
Hybrid 007	MR	1	2	—	24	31	51.1	52.1	—	—
HyC 606	MR	0	1	—	24	29	50.7	51.8	—	—
Hyola 308	MS	5	0	11	24	30	51.7	52.8	51.6	52.5
Hyola 330	MS	4	1	12	22	28	50.9	52.2	51.7	52.0
Hyola 401	S	2	0	9	23	28	51.2	52.2	51.9	51.7

Table 3 continued. Disease, canopy closure, and test weight information for canola varieties at Roseau, Crookston, Fosston and Kennedy, Minnesota (1997).

Variety	Blackleg [1]	White Mold [2] R	C	F	Canopy [3] R	C	Test weight [4] R	C	F	K
Hyola 420	MR	0	0	6	22	29	50.5	51.5	51.2	51.8
IMC 03	MR	1	1	—	24	31	50.9	51.6	—	—
IMC 130	MS	1	1	—	25	31	51.0	51.7	—	—
IMC 137	MS	0	1	—	25	31	50.3	51.4	—	—
IMC 140	MS	1	1	—	23	29	50.3	51.2	—	—
Impulse	R	0	0	0	24	30	51.3	51.8	51.6	52.6
KC-701	MR	0	—	—	24	—	49.8	—	—	—
KC-X702	na	0	—	—	25	—	50.5	—	—	—
KC-X703	na	0	—	—	24	—	51.2	—	—	—
LG 3260	S	6	1	9	24	30	51.4	51.7	51.9	52.5
LG 3310	R	1	1	1	24	30	50.5	51.3	50.6	51.7
OAC Dynamite	R	0	0	3	24	31	50.6	51.1	51.0	52.6
OAC Summit	MS	0	—	—	24	—	51.2	—	—	—
Optimum 500	MR	0	0	2	24	31	50.1	50.8	50.7	51.2
Oscar	MR	0	0	1	25	30	52.0	52.6	52.5	—
ProMark 220	MR	0	—	—	24	—	50.8	—	—	—
Proseed Exp 2	MR	0	2	—	24	32	51.3	52.1	—	—
Proseed Exp 3	MR	0	1	—	24	31	50.6	51.8	—	—
Proseed Exp 4	MR	1	1	—	24	30	50.5	51.0	—	—
Quantum	R	1	0	2	24	32	52.0	52.5	52.3	52.6
Sponsor	na	0	0	3	24	31	51.8	52.2	52.2	52.9
Sterling	MR	8	0	5	26	31	50.0	50.3	50.6	50.6
SW02582	MS	0	—	—	23	—	51.3	—	—	—
SW H 02606	na	0	—	—	24	—	51.0	—	—	—
SWLM9702	na	1	—	—	24	—	50.2	—	—	—
Topscore	MR	1	2	3	24	31	50.8	51.9	51.1	52.3
UI 47.2.1	MR	3	0	5	25	31	51.2	52.2	51.4	53.2
X 710	MR	1	0	3	24	30	50.5	51.3	51.1	51.6
X 801	R	1	1	2	24	30	49.6	50.7	49.8	49.9
Mean		1	1	3	24	30	50.9	51.7	51.2	51.9
LSD 5%		2	2	4	1	2	0.6	0.4	0.5	0.8

Table 4. Canola seed oil and protein content, expressed as a percent of seed weight at 10 percent moisture (1997).

Locations: R=Roseau; C=Crookston; F=Fosston; K=Kennedy.

Variety	Oil Content				Protein Content			
	R	C	F	K	R	C	F	K
44A89	41.4	40.3	39.1	37.9	24.3	23.8	24.1	24.6
45A71	38.7	40.7	38.7	37.6	23.3	20.9	22.7	25.2
46A65	37.5	40.1	38.5	36.7	23.8	20.7	22.3	23.9
97060	34.6	32.7	35.5	32.1	25.3	23.4	23.2	25.6
97080	36.7	38.4	38.4	36.0	24.2	21.4	22.9	24.3
97170	36.3	37.9	35.6	36.4	23.9	21.5	24.2	24.2
Battleford	39.7	—	—	—	23.7	—	—	—
Beacon	38.8	—	—	—	25.0	—	—	—
BNS 94043	37.8	39.4	40.0	37.5	24.1	22.1	23.1	24.2
Brigade	39.0	—	—	—	24.6	—	—	—
Castor	39.7	—	—	—	23.4	—	—	—
Cavalier	41.6	41.7	—	—	25.1	23.9	—	—
CL EX57	39.7	—	—	—	23.9	—	—	—
CL2020	38.3	38.6	38.0	—	24.2	23.8	23.7	—
CL2070	37.3	39.9	39.1	—	25.4	22.7	23.9	—
Coronet	38.3	—	—	—	25.4	—	—	—
Crusher	40.0	40.9	41.0	40.5	24.3	21.7	23.9	24.8
D1-9124	40.1	40.7	41.2	—	23.5	22.2	21.7	—
Dakini	40.0	41.2	41.5	—	22.5	21.8	20.9	—
Defender	39.0	—	—	—	24.2	—	—	—
DMS-100	37.4	39.6	—	—	23.9	19.9	—	—
Eagle	38.2	—	—	—	26.2	—	—	—
Ebony	39.8	42.4	40.4	41.5	24.3	20.6	22.8	24.1
SWLM 9701	39.9	—	—	—	23.9	—	—	—
Garnet	37.9	39.9	38.9	38.5	24.9	23.5	23.7	25.2
Global	38.4	40.7	38.7	38.5	24.5	20.4	22.7	23.8
GOH 18	38.1	40.1	38.8	36.9	23.4	21.0	23.8	24.6
Golden Boy	39.1	—	—	—	23.7	—	—	—
HN-9466	38.6	40.7	39.5	39.4	24.6	22.0	23.6	23.4
Hudson	38.9	39.1	38.8	—	25.4	23.8	24.5	—
Hybrid 007	36.7	38.6	—	—	22.8	20.8	—	—
HyC 606	34.4	36.5	—	—	23.2	20.7	—	—
Hyola 308	36.3	37.9	37.6	35.5	24.5	22.6	22.2	22.1
Hyola 330	40.1	38.8	39.0	36.4	23.7	21.8	22.9	23.9
Hyola 401	37.3	39.6	38.3	38.8	24.1	21.6	23.7	23.9
Hyola 420	37.2	40.2	39.5	35.9	23.3	20.3	21.8	23.4
IMC 03	38.2	39.6	—	—	23.6	22.2	—	—
IMC 130	37.6	37.4	—	—	24.0	23.6	—	—
IMC 137	37.9	39.0	—	—	24.2	23.1	—	—
IMC 140	39.2	39.9	—	—	23.8	23.1	—	—
Impulse	37.4	39.6	39.4	37.5	24.0	20.4	23.3	24.2
KC-701	39.2	—	—	—	24.8	—	—	—
KC-X702	38.8	—	—	—	26.3	—	—	—
KC-X703	39.7	—	—	—	25.2	—	—	—
LG 3260	40.4	42.5	40.7	39.5	25.0	21.4	23.0	24.6

Table 4 continued. Canola seed oil and protein content, expressed as a percent of seed weight at 10 percent moisture (1997).

Locations: R=Roseau; C=Crookston; F=Fosston; K=Kennedy.

Variety	Oil Content				Protein Content			
	R	C	F	K	R	C	F	K
LG 3310	39.3	41.9	41.2	38.5	25.6	21.7	23.6	25.3
OAC Dynamite	39.9	39.5	41.0	37.1	24.2	21.4	23.1	25.3
OAC Summit	38.4	—	—	—	24.9	—	—	—
Optimum 500	40.1	41.3	41.1	40.3	23.4	20.6	21.8	24.9
Oscar	35.7	37.0	34.7	—	25.0	22.7	24.1	—
ProMark 220	39.1	—	—	—	24.4	—	—	—
Proseed Exp 2	39.0	39.6	—	—	24.6	21.2	—	—
Proseed Exp 3	37.5	40.0	—	—	24.6	21.1	—	—
Proseed Exp 4	36.8	39.7	—	—	24.7	21.8	—	—
Quantum	35.4	40.1	37.6	37.8	25.1	21.4	24.2	26.4
Sponsor	35.4	39.8	37.4	37.4	25.6	22.6	25.8	26.4
Sterling	37.8	42.1	39.5	37.2	22.9	19.4	22.1	24.0
SW02582	38.0	—	—	—	26.3	—	—	—
SW H 02606	35.7	—	—	—	23.9	—	—	—
SWLM9702	39.4	—	—	—	23.4	—	—	—
Topscore	37.1	39.3	38.7	38.4	23.8	21.9	23.7	25.1
UI 47.2.1	40.9	41.5	37.5	34.8	23.2	22.2	23.8	24.2
X 710	39.1	40.1	39.5	39.3	23.7	22.7	23.4	26.0
X 801	38.7	41.1	39.7	39.5	23.1	20.5	22.1	23.6
Mean	38.4	39.7	39.0	37.7	24.3	21.8	23.2	24.5
LSD 5%	1.7	1.9	1.7	2.2	1.2	1.5	1.3	1.6

Table 5. Canola plant height and lodging, based on notes taken shortly before swathing (1997).

Key Notes:

[1] Height expressed in inches.

[2] Lodging score: 1=erect; 9=flat.

Locations: R=Roseau; C=Crookston; F=Fosston; K=Kennedy.

Variety	Height				Lodging			
	R	C	F	K	R	C	F	K
44A89	47	38	49	34	1.8	5.5	1.3	3.0
45A71	52	46	51	42	3.5	4.5	3.3	3.3
46A65	55	49	53	39	3.8	4.3	1.5	2.5
97060	49	46	49	43	2.3	3.0	2.5	2.3
97080	51	54	54	45	3.8	4.0	3.0	2.0
97170	51	49	54	46	2.0	4.0	2.8	2.8
Battleford	51	—	—	—	3.5	—	—	—
Beacon	51	—	—	—	2.8	—	—	—
BNS 94043	52	48	54	42	2.0	3.8	2.3	1.8
Brigade	50	—	—	—	1.8	—	—	—
Castor	46	—	—	—	2.5	—	—	—
Cavalier	48	42	—	—	3.3	3.5	—	—
CL EX57	53	—	—	—	4.0	—	—	—
CL2020	42	38	41	—	3.8	4.0	2.3	—
CL2070	56	48	53	—	2.0	2.5	1.5	—
Coronet	54	—	—	—	3.0	—	—	—
Crusher	52	50	55	44	1.5	2.0	1.0	1.0
D1-9124	50	44	47	—	3.5	5.0	1.8	—
Dakini	51	52	56	—	2.8	5.0	2.0	—
Defender	49	—	—	—	3.3	—	—	—
DMS-100	52	47	—	—	2.8	3.5	—	—
Eagle	49	—	—	—	3.5	—	—	—
Ebony	51	47	54	46	1.8	2.3	1.5	1.5
SWLM 9701	50	—	—	—	1.5	—	—	—
Garnet	47	44	47	38	3.3	4.3	2.5	3.0
Global	53	54	59	48	2.8	2.3	1.3	1.8
GOH 18	53	53	56	48	2.3	2.3	2.3	2.3
Golden Boy	54	—	—	—	2.0	—	—	—
HN-9466	52	50	54	46	1.5	2.3	1.3	2.0
Hudson	46	42	45	—	2.3	3.5	1.5	—
Hybrid 007	53	49	—	—	2.3	3.0	—	—
HyC 606	55	56	—	—	2.0	2.5	—	—
Hyola 308	43	38	40	32	2.5	3.8	2.3	4.3
Hyola 330	42	40	40	36	2.5	3.8	1.8	3.0
Hyola 401	40	39	42	34	1.8	3.0	1.0	2.3
Hyola 420	51	42	45	37	3.3	3.8	2.3	2.3
IMC 03	53	42	—	—	5.5	5.3	—	—
IMC 130	50	46	—	—	2.3	4.8	—	—
IMC 137	47	41	—	—	6.8	4.5	—	—
IMC 140	52	43	—	—	4.3	5.3	—	—

Table 5 continued. Canola plant height and lodging, based on notes taken shortly before swathing (1997).

Variety	Height				Lodging			
	R	C	F	K	R	C	F	K
Impulse	52	50	54	46	2.3	2.5	1.3	2.0
KC-701	55	—	—	—	2.0	—	—	—
KC-X702	61	—	—	—	1.3	—	—	—
KC-X703	59	—	—	—	1.5	—	—	—
LG 3260	51	43	46	37	4.3	4.0	1.3	2.8
LG 3310	50	50	54	44	2.5	3.0	1.8	2.0
OAC Dynamite	49	43	48	37	2.0	2.8	1.3	2.5
OAC Summit	56	—	—	—	3.8	—	—	—
Optimum 500	50	49	52	42	2.8	3.3	2.0	3.0
Oscar	48	45	49	—	2.3	2.8	1.5	—
ProMark 220	56	—	—	—	1.5	—	—	—
Proseed Exp 2	59	59	—	—	2.3	2.3	—	—
Proseed Exp 3	55	52	—	—	2.5	3.3	—	—
Proseed Exp 4	51	50	—	—	2.3	2.8	—	—
Quantum	54	47	54	46	2.0	3.3	1.5	2.3
Sponsor	55	54	58	45	1.8	1.5	1.5	1.3
Sterling	50	43	49	37	5.3	4.8	2.3	4.3
SW02582	55	—	—	—	3.0	—	—	—
SW H 02606	52	—	—	—	1.5	—	—	—
SWLM9702	50	—	—	—	1.5	—	—	—
Topscore	53	50	53	43	2.3	3.3	2.0	2.3
UI 47.2.1	48	43	48	38	4.3	5.3	2.5	3.8
X 710	49	47	51	40	2.5	3.8	1.8	2.5
X 801	52	48	55	41	2.5	3.0	1.5	2.3
Mean	51	47	50	41	2.7	3.5	1.8	2.5
LSD 5%	5	4	3	4	1.2	1.0	1.0	1.0

Table 6. Canola seed sources for 1998 planting. Categorized under "developer" or "marketer" and listed alphabetically in each group.

Note Key:

[1] Coding to left of each developer and marketer is keyed to Source Codes column in Table 1.

Developers [1]:

D1	Alberta Wheat Pool, Alberta, Canada
D2	Bonis & Company Ltd., Lindsay, Ontario, Canada
D3	Calgene, Leesburg, Georgia
D4	Cargill Seed, Fort Collins, Colorada
D5	Croplan Genetics PO Box 1291, Minot, ND 58702
D6	Danisco Seed, Maribo Seeds, Coppenhagen, Denmark
D7	DLF Trifolium, Germany
D8	DSV, Germany
D9	Hungnong Breeding, Seoul, Korea
D10	InterMountain Canola - Cargill Foods, Spokane, Wash.
D11	Limagrain Genetics, Saskatoon, Sakatchewan, Canada
D12	Mycogen Seeds, St. Paul, MN
D13	No information available
D14	Ontario Agricultural College, Guelph, Ontario, Canada
D15	Pioneer Hi-Bred Int. 720 S. 48th St., Grand Forks, ND 58201
D16	Svalof Weibull Seed, Lindsay, Ontario, Canada
D17	University of Idaho, Moscow, Idaho
D18	University of Manitoba
D19	Zeneca Seeds, Winnipeg, Manitoba, Canada

Marketers [1]:

M1	Agriprogress Inc., PO Box 2499, Morden, MB R6M 1C2
M2	Agri-Tel Grain Ltd., Box 808, Beausejour, MB CANADA R0E 0C0
M3	Bonis & Company, Linday, Ontario, Canada
M4	Brett-Young Seeds, Box 99, St. Norbert P.S., Winnipeg, MB CANADA R3V 1L5
M5	Calgene, RR 2 Box 207, Park River, ND 58270
M6	Cargill Seeds, 2540 E.Drake Rd, Fort Collins, CO 80525
M7	Croplan Genetics PO Box 1291, Minot, ND 58702
M8	Farmers' Co-op Seeds Ltd., Rivers, MB
M9	Hungnong Seed America, Inc. ,3065 Pachelo Pass Hwy, Gilroy, CA 95020
M10	IMC-Cargill, 2300 N. Yellowstone Hwy, Idaho Falls, ID 83501
M11	IntegraSeed Ltd., Bozeman, Montana
M12	Interstate Payco Seed, West Fargo, ND
M13	Kaystar Seed, PO Box 947, Huron SD 57350
M14	Limagrain Canada Seed, 4-411 Downy Rd., Saskatoon, SK CANADA S7N 4L8
M15	Marketing not determined

Table 6 continued. Canola seed sources for 1998 planting. Categorized under "developer" or "marketer" and listed alphabetically in each group.

M16	Mycogen Seeds, St. Paul, MN
M17	Northern Sales, 135 Lombard Ave., Winnipeg, MB CANADA R3B 0T4
M18	Pioneer Hi-bred Int. 720 S. 48th St., Grand Forks, ND 58201
M19	Proseed, 110 E. 7th, Box 69, Harvey, ND 58341
M20	Seeds2000, Breckenridge, MN
M21	SeedTec International, P.O. Box 40, Bozeman, MT 59771-0040

Canola Planting Rate and Date

Rate is based on normal seedbeds and on normal size, good quality seed. Rate used can vary greatly depending on seed cost, desired stand, expected mortality, emerging ability, seed weight, seed germination, seedbed condition, depth of planting and planting equipment.

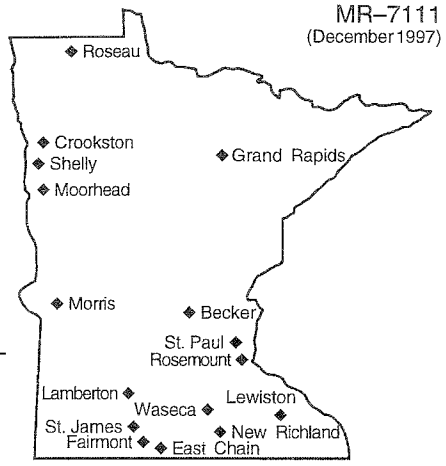
Crop Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
B. napus	50	75,000-150,000	4-8	12/square foot	May
B. rapa	50	190,000	3-5	12/square foot	May

MR–7111
(December 1997)

Minnesota Agricultural Experiment Station

VARIETY TRIALS

Soybean



Locations of soybean trials.

by Nevin D. Young and Ward C. Stienstra, Department of Pathology. Field work was supervised by Thomas R. Hoverstad, Steven R. Quiring, John V. Wiersma, and Russell D. Mathison.

Successful crop production depends to a considerable extent on selecting the best varieties for a particular farm. For that reason, varieties are compared in trial plots on experiment station fields at St. Paul, Rosemount, Waseca, Lamberton, Morris, Crookston, Grand Rapids and Becker, and on farmers' fields. Important old varieties and new varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

Variety Classifications

Varieties are classed into groups under headings such as "recommended," "not adequately tested," "special purpose," etc. Varietal descriptions are arranged alphabetically within groups. "Public" and "private" designations are also attached to some group headings.

Classifications of varieties as "recommended," "other" and "special purpose" are determined each year by the Experiment Station Crop Variety Review Committee. A variety is usually not "recommended" unless it has been better than other varieties in important characteristics in three years of testing.

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

Listings under "other varieties" are usually inferior in one or more characteristics, as demonstrated in comparative tests. Varieties in the "private" category are good performers, on which the MAES does not make recommendations.

Seed of varieties in all these groups may be eligible for certification, and the use of certified seed is suggested. However, certification does not imply recommendation. Registered and certified seed of varieties described in this report can be purchased from seed dealers or from growers listed in the *Minnesota Registered and Certified Seed Directory for 1998 Planting.* This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, 1900 Hendon Avenue, St. Paul, MN 55108, or from county extension agents' offices. The information is also available on-line at <http://www.rrtrade.org/mcia/>.

Interpreting the Tables

The LSD (Least Significant Difference) figures listed are statistical measures of variability within the trials. This statistic is used to determine whether the differences between two varieties are due primarily to genetic difference in the varieties.

If the quality difference between two varieties equals or exceeds the LSD value listed at the bottom of each column, you can conclude that the higher yielding variety was superior. If the difference is less, greater attention should be given to other traits which are also important in making your variety choices.

Protection Act Changes

Varieties receiving their U.S. Plant Variety Protection Act registration beginning in 1995 are identified by the code "PVP(94)." These varieties may *not* be sold by a producer, not even to a relative or neighbor, without the express permission of the variety's developer/owner.

Authors/Researchers

The authors of this report are James H. Orf, Leland L Hardman, Philip J. Schaus and Darryld L. Oistad, Department of Agronomy and Plant Genetics. Information on the reaction of varieties to specific pathogens was largely obtained

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For Crop Production 1998

SOYBEAN VARIETY TRIALS

Minnesota Agricultural Experiment Station — University of Minnesota
December 1997

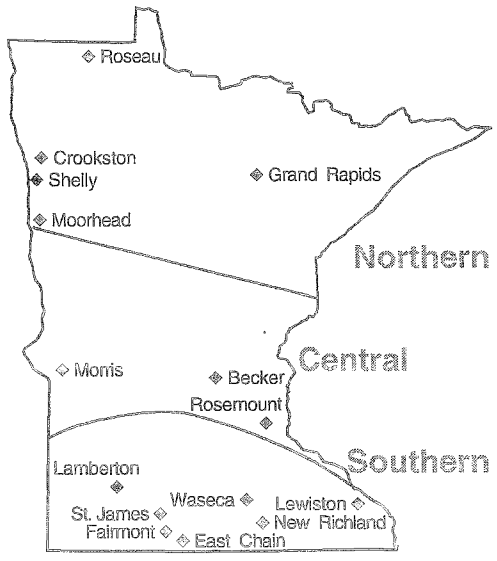
This publication reports the results of soybean variety tests conducted by the Minnesota Agricultural Experiment Station. This report was prepared by James Orf [phone: 612-625-8275; e-mail: <orfxx001@maroon.tc.umn.edu>], Leland L Hardman, Philip J. Schaus and Darryld L. Oistad, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108.

SOYBEAN

Many soybean varieties are available in Minnesota, developed by public and/or private organizations. Important characteristics of these soybean varieties are presented in this section's tables.

Tables 2 to 7 deal with varieties developed by publicly supported institutions and are being considered for recommendation by Minnesota Agricultural Experiment Station. Tables 8 to 11 show performance characteristics of privately developed varieties as well as several public varieties.

Soybean Maturity Zones



Performance trials were conducted at various locations in the northern, central and southern zones. Specific test locations for each zone are indicated in each table. Becker was the only irrigated test location. Hail occurred in October at Shelly and Crookston. The trials were planted between May 1 and June 5 unless otherwise indicated. Row spacings vary in some tables.

Variety Selection Considerations

Several major factors need to be considered in selecting varieties, including maturity, yield, row spacing, plant height and lodging, chlorosis response, protein and oil values, and phytophthora gene, soybean cyst nematode and brown stem rot resistance. Table 1, which

details the available race resistances to phytophthora root rot, is significantly revised from past years.

Maturity—Soybeans are sensitive to day length, so date of maturity is affected by production zone latitude. Because of this, each soybean variety has a narrow range of adaptation.

Varieties that mature before the fall killing frost should be selected to obtain high yield and quality. A soybean variety is considered mature when 95 percent of the pods have reached their mature color. Harvesting would normally be done one to two weeks after this stage is reached, depending on drying conditions.

Relative maturity ratings are shown in the tables. These consist of a maturity group designation followed by a number (varying from 0-9) which indicates the ranking within each maturity group. For example, Agassiz with a relative maturity rating of 0.0, is the earliest group 0 maturity variety while Dassel with a rating of 0.9 is the latest. These rating designations are the result of our experience with the variety over years and test locations.

The relative maturity ratings in the tables for the private varieties were provided by the companies which market them.

Yield—Varieties in each table are listed in order to their actual 1997 maturity date and not on the basis of their long term relative maturity designation. Later maturing varieties are normally expected to have higher yield potential than earlier maturing varieties. Compare yields by looking at varieties with a similar maturity rating. Yield comparisons are more reliable if data are available for several years. Data from different tables should not be compared. All yield data reported in these tables were obtained from replicated tests harvested with a plot combine.

The LSD figures listed at the bottom of table yield columns are measures of variability within the trials. If the yield difference between two varieties within a column exceeds this LSD value, one can assume that the higher yielding variety was truly superior. A 20 percent level of significance is used in the tables. This means that 80 percent of the time, yield differences exceeding the LSD value are real differences, the remaining 20 percent of the time the differences are due to chance.

Row Spacing—Research over many years and at many locations has shown that yields from narrow rows (10 inches to 18 inches) are higher than wide rows (20 inches to 40 inches). Although rankings of varieties can change with row spacing, top performers in a wide spacing should be among the top performers in a narrow spacing.

Plant Height and Lodging—These measurements indicate stem strength and standability of varieties. They relate somewhat to ease of combining. Actual height and lodging scores are influenced by environmental conditions, so values may vary from year to year. Use these values by comparing scores of newer varieties to scores of a familiar variety.

Chlorosis—Ratings for chlorosis are an indication of how much leaf yellowing occurs in tests conducted on a high lime (high pH) soil near Lamberton. They indicate how well varieties perform relative to each other on such soils. How these ratings relate to the numerical values used in editions of *Varietal Trials* prior to 1995 is indicated in the following table:

Pre-1995 Numerical Score	Current Rating Designation
1-2	Resistant (R)
2.1-3	Moderately Resistant (MR)
3.1-4	Moderately Susceptible (MS)
4.1-5	Susceptible (S)

Phytophthora—Phytophthora root rot can cause significant yield losses when susceptible varieties are planted in poorly drained fields. There are many races of this fungus, and it is important to know which are present in a field. Several genes can be incorporated into varieties to provide complete resistance to specific races.

Table 1. Genes for resistance to races of Phytophthora root rot (shading indicates resistance).

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

Some information refers to "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 genes present were determined based on data from greenhouse plants grown by scientists in the University of Minnesota Department of Plant Pathology, and on information supplied by the companies. *Table 1, which details the race resistances provided by the various genes, is significantly revised from past years, incorporating two new races of the fungus and revising the race resistance information for several of the genes.*

Soybean Cyst Nematode—SCN was first identified in Minnesota in 1978 and continues to spread. It is now known to occur in 35 Minnesota counties, according to Cooperative Pest Survey Program data. Areas infested and numbers of nematodes both appear to be increasing. When SCN numbers are high, significant yield losses can occur. Several races of SCN are known to occur in Minnesota. Rotations tonon-host crops and planting resistant varieties assist in managing nematode populations.

Results of a special performance test of public and private varieties resistant to soybean cyst nematode are provided in Table 9. These trials were conducted on "infested" sites near East Chain, Waseca and St. James and on "non-infested" sites at Fairmont, Lamberton and Waseca.

Additional details on the soybean cyst nematode and management of infested fields can be found in the publication *The Soybean Cyst Nematode* (AG-FO-3935), 1990, Minnesota Extension Service, University of Minnesota. It is not available electronically. It is available from Minnesota County Extension offices or the Distribution Center, 3 Coffey Hall, 1420 Eckles Ave., University of Minnesota, St. Paul, MN 55108-6069.

Brown Stem Rot—Brown stem rot is a fungal disease that can cause yield losses in certain situations. The disease occurs most frequently when soybean follows soybean, but can also occur where soybean is planted every other year. Resistant varieties, or longer rotations out of soybean, assist in the management of this disease. See text descriptions of public varieties for information about their resistance to this fungus.

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

White Mold—Sclerotinia stem rot was less damaging to the 1997 crop than it was in 1994. Ratings of varieties for resistance to Sclerotinia are difficult to obtain because infection is dependent upon environmental conditions during and after flowering. Varieties that appear to be resistant one year can be devastated by the disease the next year if conditions are right for the disease to spread. Growers should expect varieties that consistently have less disease over several years will be the best performers under high disease pressure. A reliable test for resistance is not yet available.

Protein and Oil—Protein and oil values were determined using near infrared reflectance analysis. Protein and oil values are expressed on a 13 percent moisture basis. This formula converts the protein and oil value to another moisture basis:

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

The value of a bushel of soybeans based on oil and protein content is calculated by:

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

Where:

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

And:

$$\frac{\text{price of meal \$/ton}}{2000} = \text{\$/pound}$$

Recommended Publicly Developed Varieties

Agassiz—Northern zone. Relative maturity 0.0. Very good yield potential. Good lodging resistance. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural

Experiment Station. Released in 1992. Seed sale regulated by U.S. Plant Variety Protection Act.

Archer—Southern zone. Relative maturity 1.9. Yield, brown stem rot resistance and iron chlorosis resistance similar to BSR 101. Rsp1k and Rps6 genes for resistance to phytophthora. Released 1989 by Iowa Agricultural Experiment Station. Seed Sale regulated by U.S. Plant Variety Protection Act.

Bell—Southern zone. Relative maturity 2.2. Resistant to race 3 and race 14 of the Soybean Cyst Nematode. Recommended as part of a management package for producers with a soybean cyst nematode problem. Fair yield potential. Susceptible to phytophthora. Released by Illinois Agricultural Experiment Station 1989. Seed sale regulated by U.S. Plant Variety Protection Act.

Bert—Southern zone. Relative maturity 1.8. High yield with taller than average plant height. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1991. Seed sale regulated by U.S. Plant Variety Protection Act.

Council—Northern zone. Relative maturity 0.5. High yield. Rps1 gene for resistance to phytophthora. Developed by North Dakota Agricultural Experiment Station. Released 1995. Seed sales regulated by U.S. Plant Variety Protection Act, PVP(94).

Evans—Central zone. Relative maturity 0.6. Rps1 gene for resistance to phytophthora. A good variety for late season plantings in the southern zone. Developed by Minnesota Agricultural Experiment Station. Released 1974. Seed sale regulated by U.S. Plant Variety Protection Act.

Faribault—Central and southern zones. Relative maturity 1.9. Resistant to race 3 and moderately resistant to race 1 of soybean cyst nematode. Different source of soybean cyst nematode resistance than Alpha and Bell. Recommended as part of a management package for producers with a soybean cyst nematode problem. Good yield potential. Resistant to brown stem rot. Rps 1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released in 1994. Seed sales regulated by U.S. Plant Variety Protection Act, PVP(94).

Freeborn—Central and southern zones. Relative maturity 1.6. Resistant to race 3 of soybean cyst nematode. Good yield potential. Resistant to brown stem rot. Rps1 gene for resistance to phytophthora. Recommended as part of a management package for producers with a soybean cyst nematode problem. Developed by Minnesota Agricultural Experiment Station. Released 1995. Seed sales regulated by U.S. Plant Variety Protection Act, PVP(94).

Glacier—Northern zone. Relative maturity 00.8. High yield. Rps6 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1995. Seed sales regulated by U.S. Plant Variety Protection Act, PVP(94).

Granite—Central and southern zones. Relative maturity 1.8. High yield. Resistant to brown stem rot. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1995. Seed sales regulated by U.S. Plant Variety Protection Act, PVP(94).

Hardin 91—Southern zone. Relative maturity 2.0. Good yield potential. Rps1k gene for resistance to phytophthora. Developed by Iowa Agricultural Experiment Station. Released under royalty agreement bylowa State University Research Foundation, 1991. License required for seed production.

Hendricks—Central zone. Relative maturity 0.9. High yield. Good lodging resistance. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released in 1994. Seed sales regulated by U.S. Plant Variety Protection Act.

IA1006—Southern zone. Relative maturity 1.6. Excellent yield potential. Good lodging resistance. Resistant to brown stem rot. Developed by Iowa Agricultural Experiment Station. Released in 1996. Seed will be widely available in 1998.

IA2008R—Southern zone. Relative maturity 2.2. High yield potential. Resistant to brown stem rot. Similar to IA2008 except RPS1k gene for resistance to phytophthora. Developed by Iowa Agricultural Experiment Station. Released 1995.

IA2021—Southern zone. Relative maturity 2.1. High yield potential. Rps1k gene for resistance to phytophthora. Developed by Iowa Agricultural Experiment Station. Released 1995.

Kato—Central and southern zones. Relative maturity 1.3. Outstanding protein level. Very good lodging resistance. Good iron chlorosis resistance. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1989. Seed sale regulated by U.S. Plant Variety Protection Act.

Lambert—Central zone. Relative maturity 0.8. Excellent yield potential. Good lodging resistance. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released in 1992. Seed sale regulated by U.S. Plant Variety Protection Act.

McCall—Northern zone. Relative maturity 00.7. High yield. Tall. Good lodging resistance in its maturity class. Susceptible to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1978.

MN 0301—Northern and central zones. Relative maturity 0.3. High yielding, good lodging resistance. Rps1 gene for resistance to phytophtora. No Registered seed class. Developed by Minnesota Agricultural Experiment Station. Released 1997. Seed sales regulated by U.S. Plant Variety Protection Act, PVP (94).

MN 1301—Central and southern zones. Relative maturity 1.3. High yielding. Rps1c gene for resistance to phytophthora. Good lodging resistance. High protein level. No Registered seed class. Developed by Minnesota Agricultural Experiment Station. Released 1997. Seed sales regulated by U.S. Plant Variety Protection Act, PVP (94).

Ozzie—Northern and central zones. Relative maturity 0.3. High yield. Good lodging resistance for its maturity. Rps1 gene for resistance to Phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1983. Seed sale regulated by U.S. Plant Variety Protection Act.

Parker—Southern zone. Relative maturity 1.5. Excellent yield potential. Lodging resistance

similar to Corsoy 79. Rps1 gene for phytophthora resistance. Developed by Minnesota Agricultural Experiment Station. Released in 1992. Seed sale regulated by U.S. Plant Variety Protection Act.

Sturdy--Southern zone. Relative maturity 2.1. High yield potential. Good lodging resistance and iron chlorosis resistance. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1989. Seed sale regulated by U.S. Plant Variety Protection Act.

Surge—Central zone. Relative maturity 0.9. High yield potential. Good lodging and iron chlorosisresistance. Rps1 gene for resistance to phytophthora. Released in 1997. Developed by South Dakota and Minnesota Agricultural Experiment Stations. Seed sales regulated by U.S. Plant Variety Protection Act, PVP (94).

Not Adequately Tested Publicly Developed Variety

Stride—Central and Southern zones. Relative maturity 1.3. High yield potential. Very good lodging resistance. Rps1 gene for resistance to phytophthora. Released in 1997. Seed will be widely available in 1999. Developed by South Dakota and Minnesota Agricultural Experiment Stations. Seed sales regulated by U.S. Plant Variety Protection Act, PVP (94).

Traill—Northern Zone. Relative maturity 0.0. High yield potential. Good iron chlorosis rating. Released in 1997. Seed will be widely available in 1999. Developed by North Dakota Agricultural Experiment Station. Seed sales regulated by U.S. Plant Variety Protection Act, PVP (94).

Other Publicly Developed Varieties

BSR 101—Southern zone. Relative maturity 1.9. High yield potential, resistant to brown stem rot. Acceptable iron chlorosis score. Rps1 gene for resistance to phytophthora. Developed by Iowa Agricultural Experiment Station. Released 1985.

Corsoy 79—Southern zone. Relative maturity 2.2. Very good yield performance. Rps1-c gene for phytophthora resistance. Poor chlorosis ratings, somewhat lodging susceptible. Developed by Illinois Agricultural Experiment Station. Released 1979.

Dassel—Central zone. Relative maturity 0.9. Yield similar to Evans. Good lodging resistance. Rps6 gene for resistance to phytophthora. Highly susceptible to the herbicide metribuzin. Developed by Minnesota Agricultural Experiment Station. Released 1986. Seed sale regulated by U.S. Plant Variety Protection Act.

Dawson—Central zone. Relative maturity 0.6. Very good tolerance to iron chlorosis on high lime soils. Good yield and lodging resistance. Rps1 gene for resistance to phytophthora but quite susceptible to race 3. Developed by Minnesota Agricultural Experiment Station. Released 1983. Seed sale regulated by U.S. Plant Variety Protection Act.

Hodgson 78—Central and southern zones. Relative maturity 1.4. Average yield. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1978.

IA2008—Southern zone. Relative maturity 2.2. High yield potential. Rps1 gene for resistance to phytophthora. Released 1991. Developed by Iowa Agricultural Experiment Station. Released under royalty agreement by Iowa State University Research Foundation, 1991. License required for seed production.

Kasota—Central and Southern zones. Relative maturity 1.3. Very good yield potential. High protein level. Good lodging resistance. Rps1c gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1990. Seed sale regulated by U.S. Plant Variety Protection Act.

Special Purpose Publicly Developed Varieties

Chico—Small-seeded variety for specialty markets. Relative maturity 0.2. Seed weight is about 5 grams per 100 seeds less than Agassiz. Yields less than Agassiz. Rps1 gene for resistance to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1983.

Danatto—Small-seeded variety for specialty markets. Relative maturity 0.4. Seed size similar to Minnatto. Developed by North Dakota Agricultural Experiment Station. Released in 1996. Seed sales regulated by U.S. Plant Variety Protection Act PVP (94).

Grande—Relatively large seeded variety for specialty markets. Relative maturity 0.6. Seed weight about 6 grams per 100 seeds greater than Evans. Yields less than Evans. Developed by Minnesota Agricultural Experiment Station. Released 1976.

IA 2011—Specialty variety for food products such as tofu. Relative maturity 2.4. Lacks the lipoxygenase-2 enzyme and is high protein. Susceptible to phytophthora. Released under royalty agreement by Iowa State University Research Foundation in 1995. Developed by Iowa Agricultural Experiment Station. License required for seed production.

IA 2012—Specialty large seeded variety for use in various food products. Relative maturity 2.4. Higher yields than previous large seeded varieties. Susceptible to phytophthora. Released under royalty agreement by Iowa State University Research Foundation in 1995. Developed by Iowa Agricultural Experiment Station. License required for seed production.

IA 2016—Specialty variety for use in food products. Relative maturity 2.3. Higher yield and similar seed size and protein content as Vinton 81. Released under royalty agreement by Iowa State University Research Foundation in 1995. Developed by Iowa Agricultural Experiment Station. License required for seed production.

IA 2020—Specialty variety for use in tofu. Relative maturity 2.4. Larger seed size than Vinton 81 and HP 204. Released under royalty agreement by Iowa State University Foundation in 1995. Developed by Iowa Agricultural Experiment Station. License required for seed production.

Minnatto—Small-seeded variety for specialty markets. Relative maturity 0.7. Seed weight about 4 grams per 100 seeds less than Chico. Similar in yield to Chico. Rps1 gene for phytophthora resistance. Developed by Minnesota Agricultural Experiment Station. Released 1989. Seed sale regulated by U.S. Plant Variety Protection Act. (Contact Sigco Sun Products, Inc., Breckenridge, MN, for information).

Proto—Very high protein variety for specialty markets. Relative maturity 0.6. Protein content 3 to 5 percent higher than other varieties. Yields less than Evans. Susceptible to phytophthora. Developed by Minnesota Agricultural Experiment Station. Released 1989.

Toyopro—Very high protein variety for specialty markets. Relative maturity 0.8. Protein content 3 percent to 5 percent higher than other varieties. Yields less than Lambert. Developed by Minnesota Agricultural Experiment Station. Released 1995. Seed sale regulated by U.S. Plant Variety Protection Act, PVP(94) (contact Northland Organic Foods, St. Paul, MN for information).

Vinton 81—Large-seeded, special purpose variety. Relative maturity 1.8. Seed weight 6 to 8 grams per 100 seeds greater than Hardin. Rps1 gene for resistance to phytophthora. Developed by Iowa Agricultural Experiment Station. Released 1981.

Privately Developed Varieties

These private companies entered varieties in the 1996 Minnesota tests. Brand names are noted in parentheses ( ). List is sorted alphabetically by company name.

AgriPro Seeds, 824 2nd Street South, P.O. Box 250, Brookings, SD 57006-0250 (AP)
Albert Lea Seed House, P.O. Box 127, 1414 W. Main, Albert Lea, MN 56007 (Viking)
Cenex/Land O'Lakes, 2827 8th Ave. South, Fort Dodge, IA 50501 (Cenex/LOL)
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., Box 466, Madison, SD 57042 (Mustang)
Ehrich Seed Farms, Inc., 4109 420th Avenue, Elmore, MN 56027 (Ehrich)

Garst Seed Co., 2369 330th Street, Slater, IA 50244 (Garst)
Gold Country Seed, Inc., 220 West Elm St., Norwood, MN 55368 (GCS)
Golden Harvest Seeds, The J.C. Robinson Seed Co., 100 J.C. Robinson Blvd., P.O. Box A, Waterloo, NE 68069 (Golden Harvest)
Great Lakes Hybrids, Inc., 9915 W. M-21, Ovid, MI 48866 (Grt. Lks)
Hy-Vigor Seeds, Inc., 4970 Redwood Ave., Paullina, IA 51046 (Hy-Vigor)

Interstate Payco Seed Company, Box 338, 1215 Prairie Parkway, West Fargo, ND 58078 (Payco)
Jacobsen Hybrid Corn Co., Inc., Box 379, Lake View, IA 51450 (Jacobsen)
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)
Latham Seed Company, 131 180th St., Alexander, IA 50420 (Latham)
LG Seeds, 905 Dexter St., Box 216, Prescott, WI 54021 (LG)
Maple Leaf Foods International, 3080 Yonge Street, Toronto, Ontario M4N 3N1 Canada (MLFI)
Midwest Seed Genetics, P.O. Box 518, Carroll, IA 51401 (M/W Genetics)

Mycogen Seeds, 1340 Corporate Center Curve, St. Paul, MN 55121-1428 (Mycogen Seeds)

NorthStar Genetics, Box 40, Wanamingo, MN 55983 (NS)

Novartis Seeds, P.O. Box 959, Minneapolis, MN 55440-0959 (NK)

Pioneer Hi-Bred Int'l, 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 Drive, 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, Iowa 51401 (Renze)

Sand Seed Service, Inc., 4765 Highway 143, Marcus, IA 51035 (Sands)

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

Semences Prograin, Inc., 145 Bas Riviere Nord, St.-Cesaire, Quebec, Canada J0L 1T0 (Semences)

Star Brand Seed, 4765 Highway 143, Marcus, IA 51035 (Star)

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)

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 2. Yields in bushels per acre of publicly developed soybean varieties in northern zone (1993-97). Sorted by growing zone maturity date, earliest to latest.

Note Key:

[1] 1994-97 data adjusted to 5 year average.

[2] 1995-97 data adjusted to 5 year average.

[3] No data, 1995

[4] 1996-97 data adjusted to 5 year average.

Locations: Cr=Crookston; GRap=Grand Rapids; Mor=Moorhead; Rou=Roseau; Sh=Shelly.

Variety	Cr	GRap	Mor	Rou	Sh [3]
McCall	35	22	27	28	39
Glacier	35 [1]	24	41 [1]	30	35 [1]
Agassiz	41	27	30	28	40
Ozzie	38	—	40	—	39
Traill	41 [2]	24 [2]	34 [2]	28 [2]	37 [2]
Council	—	—	39	—	40 [4]
Evans	42	—	39	—	34
Dawson	42	—	35	—	37
Lambert	45	—	39	—	40
Toyopro	41 [1]	—	35 [1]	—	34 [1]
Hendricks	41 [1]	—	40 [1]	—	38 [1]
LSD 20%	2	1	2	1	1

Table 3. Yields in bushels per acre of publicly developed soybean varieties in central zone (1993-97). Sorted by growing zone maturity date, earliest to latest.

Note Key:

[1] 1995-1997 data, adjusted to 5 year average.

[2] 1996, 1997 data, adjusted to 5 year average.

Locations: Ros=Rosemount; Mor=Morris; Be=Becker; AVG=average for all three sites. Rosemount and Morris grown in 10-inch rows; Becker grown in 30-inch rows.

Variety	Ros	Mor	Be	AVG
Ozzie	38	42	44	41
Evans	39	45	45	43
Council	43 [1]	45 [1]	49 [1]	46 [1]
Lambert	44	47	51	48
Hendricks	44	46	49	46
Kato	42	47	46	45
Parker	44	51	49	48
IA1006	46 [2]	54 [2]	50 [2]	50 [2]
LSD 20%	2	2	2	1

Table 4. Yields in bushels per acre of publicly developed soybean varieties in southern zone (1993-97). Sorted by growing zone maturity date, earliest to latest.

Note Key:

[1] 1994-97 data, adjusted to 5-year average.

[2] 1995-97 data, adjusted to 5-year average.

[3] 1996-97 data, adjusted to 5-year average.

[4] Mid May planting.

[5] Mid-June planting.

Locations: Was=Waseca, Lam=Lamberton, Fai=Fairmont, Lew=Lewiston, AVG=average for all sites. Lamberton and Waseca grown in 10-inch rows; Lewiston and Fairmont grown in 30-inch rows.

Variety	Was and Lam		Fai	Was	Lam	Lew	Mid-May
	[4]	[5]	[4]	[4]	[4]	[4]	AVG
McCall	—	29	—	—	—	—	—
Glacier	—	33 [2]	—	—	—	—	—
Agassiz	—	33	—	—	—	—	—
Ozzie	39	32	32	39	38	—	36
MN0301	46 [2]	—	34 [3]	46 [2]	46 [2]	—	42
Council	45 [2]	—	36 [3]	47 [2]	44 [2]	—	42
Evans	44	36	33	44	44	44	41
Lambert	47	40	36	46	48	47	44
Hendricks	46	40 [1]	37	46	47	48 [1]	44
Kato	51	41	42	48	53	49	48
MN1301	53 [2]	42 [3]	42	53 [1]	52 [1]	—	49
Parker	55	46	43	51	60	51	51
Freeborn	50	—	43	48	52	52 [1]	49
Hardin 91	56	43	42	55	58	54	52
Bert	52	43	41	51	54	54	50
Granite	56	42 [1]	41	55	56	51 [1]	51
Faribault	49	36 [1]	40	46	52	50 [1]	47
Sturdy	55	38	42	52	58	55	52
IA1006	62 [3]	—	43 [3]	56 [3]	63 [3]	—	54
Archer	53	40	39	52	55	47	48
IA2021	62 [2]	43 [3]	45 [2]	56 [2]	64 [2]	56 [2]	55
IA2008	59	—	43	57	60	56	54
IA2008R	61 [2]	43 [3]	44 [2]	57 [2]	62 [2]	—	54
LSD 20%	1	1	1	2	2	2	1

Table 5. Characteristics of publicly developed soybean varieties (1997) for northern zone. Sorted by maturity date for mid-May planting.

Note Key:

[1] Maturity date, from mid-May planting date.

[2] Maturity date, from mid-June planting date.

[3] Lodging score: 1=excellent, 5=very poor.

[4] Height expressed in inches.

[5] PR=Phytophthora resistance: Rps#=gene present, S=susceptible,

[6] Protein and oil percentages, based on 13% moisture.

[7] CR=Chlorosis rating: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

Variety	Maturity Date [1]	[2]	Lodging [3]	Height [4]	PR [5]	Protein [6]	Oil [6]	CR [7]
MCCALL	9-12	—	1.0	24	S	35.0	17.2	MR
GLACIER	9-18	—	1.3	27	RPS6	36.8	16.4	MS
TRAILL	9-21	—	1.8	26	RPS1	37.8	15.9	MS
AGASSIZ	9-22	—	2.0	26	RPS1	36.2	17.4	MR
CHICO	9-23	—	2.5	24	RPS1	37.0	17.0	MS
DANATTO	9-26	—	4.0	32	S	36.7	16.6	MR
MN0301	9-28	—	1.8	29	RPS1	35.8	17.2	MS
OZZIE	9-28	—	1.5	28	RPS1	37.2	16.4	MR
PROTO	9-29	—	1.8	26	S	39.3	15.4	S
EVANS	10-1	—	1.8	30	RPS1	36.3	16.9	MS
COUNCIL	10-1	—	2.0	30	RPS1	36.2	16.9	MR
TOYOPRO	10-2	—	1.5	32	S	39.8	15.4	S
LAMBERT	10-2	—	1.8	33	RPS1	37.1	17.2	MR
MINNATTO	10-2	—	2.0	30	RPS1	38.8	15.8	MR
HENDRICKS	10-4	—	1.5	31	RPS1	36.5	17.3	MS

Table 6. Characteristics of publicly developed soybean varieties (1997) for central zone. Sorted by maturity date for mid-May planting.

Note Key:

[1] Maturity date, from mid-May planting date.

[2] Maturity date, from mid-June planting date.

[3] Lodging score: 1=excellent, 5=very poor.

[4] Height expressed in inches.

[5] PR=Phytophthora resistance: Rps#=gene present, S=susceptible,

[6] Protein and oil percentages, based on 13% moisture.

[7] CR=Chlorosis rating: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

Variety	Maturity Date [1]	[2]	Lodging [3]	Height [4]	PR [5]	Protein [6]	Oil [6]	CR [7]
MCCALL	9-2	—	1.8	27	S	35.2	18.0	MR
GLACIER	9-8	—	1.8	27	RPS6	36.4	17.3	MS
CHICO	9-9	—	2.3	31	RPS1	36.0	17.5	MS
AGASSIZ	9-9	—	1.5	33	RPS1	36.1	17.3	MR
MN0301	9-10	—	1.5	34	RPS1	35.8	17.5	MS
TRAILL	9-10	—	2.0	31	RPS1	38.1	15.7	MS
DANATTO	9-11	—	3.3	30	S	35.3	17.0	MR
OZZIE	9-11	—	1.5	32	RPS1	37.3	16.6	MR
COUNCIL	9-13	—	1.5	34	RPS1	35.3	17.5	MR
PROTO	9-13	—	1.5	28	S	38.9	15.5	S
LAMBERT	9-14	—	1.5	35	RPS1	36.4	17.2	MR
EVANS	9-16	—	2.3	38	RPS1	35.3	17.8	MS
TOYOPRO	9-17	—	1.3	32	S	39.2	15.7	S
MINNATTO	9-17	—	1.5	32	RPS1	37.7	16.1	MR
HENDRICKS	9-19	—	1.5	33	RPS1	36.3	17.3	MS
KATO	9-20	—	1.3	39	RPS1	39.5	15.7	MS
MN1301	9-21	—	1.0	40	RPS1	37.2	16.3	MR
PARKER	9-24	—	2.3	37	RPS1	35.8	17.5	S
BERT	9-25	—	2.3	42	RPS1	35.3	17.3	MS
FREEBORN	9-25	—	1.5	37	RPS1	37.7	16.3	MR
FARIBAULT	9-26	—	1.8	35	RPS1	35.7	17.3	MS
ARCHER	9-26	—	1.5	43	RPS1K+6	36.3	16.7	MR
STURDY	9-26	—	1.5	41	RPS1	37.4	15.9	MS
HARDIN 91	9-27	—	1.8	40	RPS1K	36.6	17.2	MS
GRANITE	9-27	—	2.0	41	RPS1	37.5	16.7	MS
IA1006	9-27	—	1.8	41	S	36.1	16.5	MS
IA2021	9-29	—	2.3	34	RPS1K	35.4	17.5	S

Table 7. Characteristics of publicly developed soybean varieties (1997) for southern zone. Sorted by maturity date for mid-May planting.

Note Key:

[1] Maturity date, from mid-May planting date.

[2] Maturity date, from mid-June planting date.

[3] Lodging score: 1=excellent, 5=very poor.

[4] Height expressed in inches.

[5] PR=Phytophthora resistance: Rps#=gene present, S=susceptible,

[6] Protein and oil percentages, based on 13% moisture.

[7] CR=Chlorosis rating: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

Variety	Maturity Date [1]	[2]	Lodging [3]	Height [4]	PR [5]	Protein [6]	Oil [6]	CR [7]
MCCALL	8-28	9-15	3.3	24	S	34.9	18.0	MR
GLACIER	8-29	9-18	3.3	23	RPS6	35.6	17.8	MS
AGASSIZ	9-2	9-21	2.5	27	RPS1	34.9	18.2	MR
OZZIE	9-5	9-23	2.0	28	RPS1	36.5	17.0	MR
PROTO	9-6	—	3.0	26	S	37.6	16.5	S
MN0301	9-8	—	2.5	29	RPS1	34.2	18.2	MS
COUNCIL	9-10	—	2.5	31	RPS1	34.7	17.9	MR
EVANS	9-10	9-26	3.3	36	RPS1	34.5	18.3	MS
TOYOPRO	9-12	—	2.3	30	S	38.7	16.0	S
LAMBERT	9-13	9-27	3.0	30	RPS1	35.9	17.7	MR
MINNATTO	9-13	—	2.5	29	RPS1	36.5	16.6	MR
HENDRICKS	9-13	9-28	3.0	33	RPS1	36.0	17.3	MS
KATO	9-14	9-29	2.5	34	RPS1	37.8	16.5	MS
MN1301	9-16	9-29	2.0	37	RPS1	36.6	16.8	MR
FREEBORN	9-21	—	2.5	36	RPS1	36.6	16.8	MR
PARKER	9-22	9-29	3.0	39	RPS1	35.2	17.5	S
FARIBAULT	9-23	10-1	3.0	29	RPS1	34.9	17.3	MS
GRANITE	9-24	10-4	2.8	36	RPS1	36.6	17.0	MS
BERT	9-24	10-2	2.8	40	RPS1	34.5	17.7	MS
ARCHER	9-24	10-4	2.8	38	RPS1K+6	35.3	17.2	MR
IA1006	9-25	10-3	2.8	38	S	36.0	16.8	MS
STURDY	9-26	10-3	2.8	37	RPS1	36.0	17.0	MS
HARDIN 91	9-27	10-5	2.8	38	RPS1K+6	36.3	17.3	S
IA2008	9-29	10-5	2.5	37	RPS1	35.8	16.5	MS
IA2021	9-29	10-3	2.5	34	RPS1K	34.9	17.5	S
IA2008R	9-29	10-7	2.5	38	RPS1K	35.8	16.9	MS
IA2036	9-29	10-7	3.3	43	S	36.4	16.8	MS

Table 8A. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the northern zone (1995-97; Crookston, Moorhead, Shelly).

Note Key:

[1] Relative maturity rating provided by originator. Number before decimal represents maturity group. Number after decimal represents ranking within maturity group.

[2] Date represents the number of days after August 31 that variety reaches maturity.

[3] Blend; information furnished by originator.

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
MCCALL	MINNESOTA A.E.S.	00.7	9	35	36	34
9004	PIONEER	00.4	10	36	36	33
5006	MYCOGEN SEEDS	00.6	10	—	—	33
DSR-006	DAIRYLAND	00.6	13	—	—	30
9007	PIONEER	00.7	14	35	34	33
GLACIER	MINNESOTA A.E.S.	00.8	15	36	37	36
AGASSIZ	MINNESOTA A.E.S.	0.0	17	39	39	35
9040	DAHLCO	0.3	17	—	—	33
SOO-66	NK	0.0	18	40	39	38
0102	NS	0.1	18	—	—	34
TRAILL	NO. DAKOTA A.E.S.	0.0	18	—	—	34
9030	DAHLCO	0.3	19	—	—	38
MN0301	MINNESOTA A.E.S.	0.3	20	—	41	41
013	MYCOGEN SEEDS	0.1	20	42	41	40
BYGLAND	GCS	0.3	20	—	42	36
H-1039	GOLDEN HARVEST	0.3	20	—	36	35
9042	PIONEER	0.4	20	38	38	35
KORADA	SEMENCES	0.0	21	43	41	40
OZZIE	MINNESOTA A.E.S.	0.3	21	39	37	36
CX025	DEKALB	0.2	21	—	38	34
CX046	DEKALB	0.4	21	38	37	33
DSR-035	DAIRYLAND	0.3	21	39	38	33
0302	NS	0.3	23	—	—	37
PBR-077X	PBR	0.8	23	—	—	34
W3067	WENSMAN SEED	0.6	24	—	—	38
9071	PIONEER	0.7	25	43	41	37
W3036	WENSMAN SEED	0.3	26	—	42	37
COUNCIL	NO. DAKOTA A.E.S.	0.5	26	40	39	37
L0332	CENEX/LOL	0.3	26	—	—	36
0480	STINE	0.2	27	—	—	41
EVANS	MINNESOTA A.E.S.	0.6	27	40	39	38
LAMBERT	MINNESOTA A.E.S.	0.8	27	41	40	37
9606	PAYCO	0.6	27	—	38	36
DAWSON	MINNESOTA A.E.S.	0.6	27	40	38	36
DST0907	DAIRYLAND	0.7	28	—	—	39
PB-099	PRAIRIE BRAND	0.9	28	—	—	34
DSR-065	DAIRYLAND	0.6	29	—	42	41
9508	PAYCO	0.6	29	—	42	40
690	RAMY	0.3	29	—	41	40
0653	STINE	0.3	29	44	42	39

Table 8A continued. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the northern zone (1995-97; Crookston, Moorhead, Shelly).

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
WINDSOR	GCS	0.6	29	—	—	37
X7707	GCS	0.7	29	—	—	36
PB-094	PRAIRIE BRAND	0.9	29	42	39	35
CX096	DEKALB	0.9	29	38	36	34
0550	AP	0.5	30	—	—	39
W3075	WENSMAN SEED	0.7	30	43	40	38
PB-097	PRAIRIE BRAND	0.9	31	-	43	42
0670	STINE	0.3	31	44	42	40
1073	STINE	0.3	31	—	—	40
PB-098X	PRAIRIE BRAND	0.9	31	—	—	39
0929	AP	0.9	32	—	—	40
LSD 20%				1	1	2

Table 8B. Disease resistance, protein and oil characteristics of public and private soybean varieties for the northern zone (1994-96; Crookston, Moorhead, Shelly).

Note Key:

[1] PR=Phytophthora resistance: Rps#=gene present, S=susceptible, M=mixture of resistant and susceptible.

[2] C=Chlorosis rating: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

[3] Protein and oil percentages, based on 13% moisture.

[4] 2-year average.

[5] 1-year data.

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
MCCALL	S	MR	35.9	35.6	36.4	16.7	17.0	16.6
9004	S	MR [4]	36.4	36.8	37.0	16.8	16.8	16.4
5006	S	—	—	—	37.4	—	—	16.8
DSR-006	S	—	—	—	37.1	—	—	16.4
9007	Rps1	MS	35.2	35.3	36.1	17.2	17.4	16.8
GLACIER	Rps6	MS	36.5	36.4	37.6	16.5	16.7	16.1
AGASSIZ	Rps1	MR	36.2	36.0	36.9	16.7	16.8	16.2
9040	S	—	—	—	36.8	—	—	16.5
SOO-66	Rps1	MS [4]	35.6	35.3	36.4	16.9	17.3	16.5
0102	S	—	—	—	36.7	—	—	16.6

Table 8B continued. Disease resistance, protein and oil characteristics of public and private soybean varieties for the northern zone (1995-97; Crookston, Moorhead, Shelly).

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
TRAILL	Rps1	—	—	—	38.2	—	—	15.7
9030	Rps1	—	—	—	36.5	—	—	16.9
MN0301	Rps1	MS [5]	—	35.0	36.2	—	17.4	16.8
013	Rps1	S [4]	36.3	36.0	37.0	16.7	17.0	16.5
BYGLAND	Rps1	MS [5]	—	36.5	37.7	—	16.8	16.1
H-1039	S	S [5]	—	36.5	36.8	—	17.3	16.8
9042	Rps1	MS	35.6	35.8	37.0	17.1	17.2	16.4
KORADA	Rps1c	MS [4]	36.3	36.1	36.9	16.9	16.9	16.4
OZZIE	Rps1	MS	37.0	36.8	37.7	16.3	16.6	16.0
CX025	Rps1	S [5]	—	35.8	37.4	—	17.1	16.2
CX046	S	MR [4]	37.6	36.4	36.9	16.2	16.6	16.5
DST-035	S	MS	36.3	36.5	37.0	16.7	16.6	16.4
0302	S	—	—	—	37.5	—	—	16.7
PBR-077X	S	—	—	—	36.6	—	—	16.8
W3067	S	—	—	—	37.0	—	—	16.5
9071	Rps1c	MS	34.2	34.4	35.8	17.8	18.0	17.3
W3036	S	S [5]	—	35.1	36.4	—	17.4	16.9
COUNCIL	Rps1	MR [4]	35.6	35.7	37.1	16.9	17.0	16.1
L0332	Rps1k	—	—	—	36.0	—	—	17.2
0480	S	—	—	—	37.2	—	—	16.7
EVANS	Rps1	MS	35.2	35.1	37.0	17.1	17.4	16.9
LAMBERT	Rps1	MR	35.6	35.9	37.2	17.3	17.4	16.6
9606	S	S [5]	—	35.9	36.7	—	16.9	16.7
DAWSON	Rps1	MR	35.0	35.0	36.5	17.1	17.2	16.6
DST0907	S	—	—	—	37.9	—	—	16.0
PB-099	Rps1c	—	—	—	37.6	—	—	16.1
DST-065	Rps1c	MS [5]	—	34.3	35.9	—	17.6	16.8
9505	M	MS [5]	—	35.4	36.9	—	17.1	16.6
690	S	S [5]	—	35.4	36.9	—	17.4	17.0
0653	Rps1c	MS	35.3	35.3	36.7	17.0	17.2	16.7
WINDSOR	S	—	—	—	35.9	—	—	17.3
X7707	Rps1k	—	—	—	37.5	—	—	16.6
PB-094	M	MS [4]	36.0	35.9	37.4	16.7	16.8	16.1
CX096	Rps1	MS	36.5	36.7	38.3	16.5	16.6	15.6
0550	S	—	—	—	37.3	—	—	16.7
W3075	Rps1c	MS [4]	35.5	35.7	37.3	17.1	17.0	16.4
PB-097	S	S [5]	—	35.2	36.4	—	17.4	16.8
0670	S	MS	35.1	35.4	36.6	17.5	17.6	17.0
1073	Rps1c	—	—	—	37.4	—	—	16.5
PB-098X	S	—	—	—	37.5	—	—	16.1
0929	Rps1c	—	—	—	37.0	—	—	16.5

Table 9A. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the central zone (1995-97; Becker, Morris, Rosemount).

Note Key:

[1] Relative maturity rating provided by originator. Number before decimal represents maturity group. Number after decimal represents ranking within maturity group.

[2] Date represents the number of days after August 31 that variety reaches maturity.

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
OZZIE	MINN. A.E.S.	0.3	9	43	42	44
MN0301	MINN. A.E.S.	0.3	10	—	—	48
9071	PIONEER	0.7	11	51	48	52
D061	GARST	0.6	11	—	—	47
LAMBERT	MINN. A.E.S.	0.8	11	48	45	47
COUNCIL	ND A.E.S.	0.5	12	46	44	48
EVANS	MINN. A.E.S.	0.6	12	44	41	47
TS084	TERRA	0.8	13	49	48	53
990	RAMY	0.9	13	—	47	51
91B01	PIONEER	1.0	14	—	—	54
M-0995	MUSTANG	0.9	14	50	48	53
S08-80	NK	0.8	14	—	47	53
H-1082	GOLDEN HARVEST	0.8	14	48	46	51
W3096	WENSMAN SEED CO.	0.9	14	50	49	51
EXP 14831	ZILLER	1.4	15	—	48	53
X103	GOLDEN HARVEST	1.3	15	—	—	51
9610	PAYCO	1.0	15	50	46	51
5100	MYCOGEN SEEDS	1.0	15	—	44	48
DG3095	DYNA-GRO	0.9	15	—	—	47
K-0909+	KRUGER	0.7	16	—	51	58
W3127	WENSMAN SEED CO.	1.2	16	—	—	55
PB-104	PRAIRIE BRAND	1.0	16	51	49	55
DG3134	DYNA-GRO	1.3	16	—	—	55
6091	LG	0.9	16	—	—	53
1394	AP	1.3	16	50	49	53
EXP16326	ZILLER	1.0	16	—	—	52
W3106	WENSMAN SEED CO.	1.0	16	—	49	52
SURGE	MINN. & SD A.E.S.	0.9	16	—	—	51
CX096	DEKALB	0.9	16	46	44	49
TS093	TERRA	0.9	16	46	43	48
RS0995	RENK	0.9	17	—	49	54
W3107	WENSMAN SEED CO.	1.0	17	—	—	53
9132	PIONEER	1.3	17	48	46	52
JULIUS	DAHLMAN	0.9	17	—	47	52
HENDRICKS	MINN. A.E.S.	0.9	17	47	45	52
150 BRAND	LATHAM	1.3	17	—	48	51
1073	STINE	0.3	18	—	48	53
M-0970	MUSTANG	0.9	18	—	—	53
O912	NS	0.9	18	—	—	53
KB128	KALTENBERG	1.2	18	—	—	52

Table 9A continued. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the central zone (1995-97; Becker, Morris, Rosemount).

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
HENRY	DAHLMAN	1.3	18	—	—	52
CX145	DEKALB	1.4	19	51	49	57
L1083	CENEX/LOL	1.0	19	—	—	56
PB-097	PRAIRIE BRAND	0.9	19	—	49	55
E107	TERRA	1.0	19	—	—	54
9151	PIONEER	1.5	19	51	49	53
111	MYCOGEN SEEDS	1.1	19	50	48	52
CX132	DEKALB	1.3	19	—	—	51
DSR-133	DAIRYLAND	1.3	19	50	46	51
E147	TERRA	1.4	20	—	—	60
K-0999	KRUGER	0.7	20	52	50	58
9120	DAHLCO	1.2	20	—	—	53
K-1303+	KSC/CHALLENGER	1.1	20	—	—	52
9140	DAHLCO	1.4	20	—	—	51
KATO	MINN.A.E.S.	1.3	20	45	43	48
PB-146X	PRAIRIE BRAND	1.4	22	—	—	61
T-3162	THOMPSON	1.5	22	—	47	55
DSR-173	DAIRYLAND	1.6	22	51	48	54
M-1133	MUSTANG	1.3	22	52	49	54
9141	DAHLCO	1.4	22	—	—	53
RS1493	RENK	1.4	22	—	47	51
K-1444+	YIELD KING	1.2	23	—	—	60
K-1444	KRUGER	1.2	23	—	—	60
K-1515	KSC/CHALLENGER	1.4	23	—	—	59
1386	STINE	1.2	23	—	—	58
X3614	GCS	1.4	23	—	—	57
9150	DAHLCO	1.5	23	—	—	56
K-1212+	KSC/CHALLENGER	1.0	23	—	—	56
6145	LG	1.4	23	—	49	55
EX-160	LATHAM	1.4	23	—	—	55
5143	MYCOGEN SEEDS	1.4	23	—	49	55
K-1313+	YIELD KING	1.2	23	—	51	55
K-1550	YIELD KING	1.3	23	—	—	55
PB-145X	PRAIRIE BRAND	1.4	23	—	—	55
L1499	CENEX/LOL	1.4	23	—	51	54
G1400	M/W GENETICS	1.4	23	52	49	54
S13-J6	NK	1.3	23	—	—	53
PBR-127	PBR	1.2	23	52	51	53
EXP S1402	SANDS	1.4	23	—	—	51
MN1301	MINN.A.E.S.	1.3	23	—	—	49
SOI 177	SANDS	1.4	24	—	52	56
X5715	GCS	1.5	24	—	—	56
ERICK	DAHLMAN	1.3	24	—	—	56
9514	PAYCO	1.4	24	—	50	56
M-1160	MUSTANG	1.6	24	—	—	54

Table 9A continued. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the central zone (1995-97; Becker, Morris, Rosemount).

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
1512	NS	1.5	24	—	—	54
PARKER	MINN.A.E.S.	1.5	24	50	47	52
X147	GOLDEN HARVEST	1.4	24	—	—	52
EX6245	THOMPSON	1.4	25	—	—	64
K-1819	YIELD KING	1.6	25	56	53	59
CX173	DEKALB	1.7	25	—	—	57
S-144X	SANSGAARD	1.4	25	—	—	56
T-3184	THOMPSON	1.5	25	—	46	54
1680	STINE	1.4	26	—	—	62
K-1777	KSC/CHALLENGER	1.5	26	—	52	60
K-1990	KRUGER	1.6	26	56	53	60
PBR-164X	PBR	1.5	26	—	—	56
PS 1647	PROFISEED	1.5	26	—	—	56
1525	RAMY	1.5	26	—	—	55
DSR-158	DAIRYLAND	1.5	26	—	50	55
EXP 9715	SANDS	1.5	26	—	—	55
PBR-148X	PBR	1.5	26	—	—	54
EXP S1518	SANDS	1.5	26	—	—	52
S-173X	SANSGAARD	1.7	27	—	—	63
2500	STINE	1.5	27	—	—	60
ODIN	GCS	1.6	27	—	—	59
IA1006	IOWA A.E.S.	1.6	27	—	51	57
1995	AP	1.9	27	—	—	57
DSR-180/STS	DAIRYLAND	1.7	27	—	—	55
EX6142	THOMPSON	1.4	27	—	—	55
EX6144	THOMPSON	1.5	27	—	—	53
PBR-169X	PBR	1.5	29	—	57	67
LSD 20%				1	1	2

Table 9B. Disease resistance, protein and oil characteristics of public and private soybean varieties for the central zone (1995-97; Becker, Morris, Rosemount).

Note Key:

[1] PR=Phytophthora resistance: Rps#=gene present, S=susceptible, M=mixture of resistant and susceptible.

[2] CR=Chlorosis rating: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

[3] Protein and oil percentages, based on 13% moisture.

[4] 2-year average.

[5] 1-year data.

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
OZZIE	Rps1	MS	37.6	37.0	37.7	16.2	16.8	16.5
MN0301	Rps1	—	—	—	35.6	—	—	17.4
9071	Rps1c	MS [4]	34.8	34.4	35.0	17.7	18.1	17.8
D061	S	—	—	—	36.2	—	—	16.8
LAMBERT	Rps1	MR	36.5	36.3	37.1	17.3	18.0	17.4
COUNCIL	Rps1	MR	35.6	35.2	36.0	17.2	17.6	17.1
EVANS	Rps1	MS	36.2	35.8	36.6	17.1	17.5	16.8
TS084	Rps1c	MS [4]	35.8	35.0	35.6	17.3	17.8	17.5
990	S	MR [5]	—	35.2	35.8	—	17.7	17.4
91B01	Rps1k	—	—	—	35.5	—	—	17.6
M-0995	S	MS [4]	35.8	35.3	36.2	17.6	18.0	17.5
S08-80	Rps1c	S [5]	—	36.2	37.3	—	17.1	16.2
H-1082	M	MS [4]	35.9	35.2	35.6	17.4	17.8	17.3
W3096	S	MS [4]	35.1	35.0	35.8	17.9	18.0	17.6
EXP 14831	S	MS [5]	—	35.1	36.0	—	17.7	17.2
X103	Rps1c	—	—	—	37.3	—	—	16.6
9610	S	MS [4]	36.0	35.5	36.2	17.3	17.8	17.3
5100	S	MS [5]	—	36.2	37.1	—	17.5	16.6
DG3095	Rps1k	—	—	—	36.4	—	—	16.7
K-0909+	S	S [5]	—	35.3	36.1	—	17.4	17.1
W3127	Rps1c	—	—	—	36.0	—	—	16.9
PB-104	S	MS [4]	35.8	35.5	36.5	17.4	17.7	16.9
DG3134	Rps1c	—	—	—	37.5	—	—	16.3
6091	S	—	—	—	35.9	—	—	17.6
1394	Rps1c	MS [4]	36.7	36.4	37.2	17.3	17.2	16.7
EXP16326	Rps1c	—	—	—	35.5	—	—	17.1
W3106	S	S [5]	—	35.4	36.6	—	17.8	17.2
SURGE	Rps1	—	—	—	37.8	—	—	16.8
CX096	Rps1	MS	36.9	36.3	37.2	16.3	16.7	16.0
TS093	Rps1	MS [4]	36.1	36.1	36.8	17.0	17.3	16.6
RS0995	S	MS [5]	—	35.1	35.7	—	18.0	17.5
W3107	Rps1c	—	—	—	36.3	—	—	16.8
9132	Rps1c	MS [4]	35.5	35.3	35.9	17.3	17.6	16.9
JULIUS	S	S [5]	—	35.5	36.3	—	17.5	17.1
HENDRICKS	Rps1	MS	36.6	36.6	37.3	17.1	17.4	16.9

Table 9B continued. Disease resistance, protein and oil characteristics of public and private soybean varieties for the central zone (1994-96; Becker, Morris, Rosemount).

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
150 BRAND	S	S [5]	—	35.4	36.4	—	17.8	17.4
1073	Rps1c	S [5]	—	35.4	36.3	—	17.7	17.0
M-0970	Rps1c	—	—	—	36.6	—	—	16.7
O912	Rps1c	—	—	—	35.7	—	—	
HENRY	Rps1c	—	—	—	37.7	—	—	16.3
CX145	S	S [4]	37.0	36.3	36.9	16.9	17.4	16.8
L1083	Rps1c	—	—	—	36.3	—	—	17.0
PB-097	S	S [5]	—	35.6	36.5	—	17.6	16.9
E107	Rps1c	—	—	—	36.2	—	—	16.7
9151	Rps1k	MS [4]	36.2	35.6	35.8	17.0	17.5	17.0
111	Rps1	MS [4]	35.1	34.7	35.9	17.3	17.7	17.0
CX132	Rps1	—	—	—	36.5	—	—	16.8
DSR-133	Rps1	MS	35.5	35.0	36.1	17.0	17.4	16.7
E147	S	—	—	—	37.2	—	—	16.3
K-0999	S	S	35.4	35.1	35.9	17.2	17.4	16.7
9120	Rps1k	—	—	—	35.6	—	—	17.3
K-1303+	S	—	—	—	35.9	—	—	16.8
9140	Rps1k	—	—	—	38.1	—	—	15.7
KATO	Rps1	MS	39.2	39.4	39.6	15.9	15.8	15.3
PB-146X	S	—	—	—	37.3	—	—	16.9
T-3162	S	MS [5]	—	35.8	36.7	—	17.1	16.7
DSR-173	Rps1	S	37.1	36.8	37.4	16.7	16.9	16.1
M-1133	Rps1	S [4]	36.8	36.3	36.6	16.7	17.4	16.5
9141	Rps1	—	—	—	36.7	—	—	16.8
RS1493	Rps1k	MS [5]	—	37.5	38.1	—	16.7	15.9
K-1444+	S	—	—	—	37.5	—	—	16.8
K-1444	S	—	—	—	37.1	—	—	17.0
K-1515	S	—	—	—	36.3	—	—	17.0
1386	S	—	—	—	37.5	—	—	16.6
X3614	Rps1	—	—	—	36.6	—	—	16.9
9150	Rps1k	—	—	—	35.0	—	—	17.5
K-1212+	Rps1c	—	—	—	36.7	—	—	16.7
6145	Rps1	MS [5]	—	36.0	36.8	—	17.4	16.6
EX-160	S	—	—	—	36.5	—	—	16.7
5143	S	S [5]	—	35.3	36.3	—	18.0	17.0
K-1313+	Rps1	S [5]	—	35.8	36.5	—	17.4	16.8
K-1550	S	—	—	—	36.6	—	—	16.9
PB-145X	S	—	—	—	36.2	—	—	17.0
L1499	Rps1k	S [5]	—	36.7	37.0	—	17.6	17.1
G1400	S	MS [4]	37.5	36.7	37.8	16.2	16.7	16.2
S13-J6	Rps1k	—	—	—	37.5	—	—	15.9
PBR-127	S	MS [4]	36.7	36.0	36.6	17.4	17.5	16.8
EXP S1402	Rps1	—	—	—	36.1	—	—	16.8
MN1301	M	—	—	—	37.6	—	—	15.9
SOI 177	S	MS [5]	—	36.4	36.9	—	16.9	16.5

Table 9B continued. Disease resistance, protein and oil characteristics of public and private soybean varieties for the central zone (1994-96; Becker, Morris, Rosemount).

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
X5715	Rps1k	—	—	—	35.7	—	—	17.2
ERICK	S	—	—	—	37.2	—	—	16.0
9514	S	MS [5]	—	37.0	37.8	—	16.6	16.1
M-1160	S	—	—	—	36.7	—	—	16.5
1512	Rps1c	—	—	—	35.8	—	—	16.7
PARKER	Rps1	S	35.5	35.0	36.3	17.2	17.6	16.5
X147	Rps1	—	—	—	36.7	—	—	16.6
EX6245	S	—	—	—	37.0	—	—	16.4
K-1819	S	MS	36.2	36.0	36.7	17.1	17.4	16.9
CX173	Rps1c	—	—	—	35.5	—	—	16.8
S-144X	S	—	—	—	36.3	—	—	16.6
T-3184	Rps1	S [5]	—	35.8	36.8	—	16.6	15.8
1680	S	—	—	—	36.6	—	—	16.5
K-1777	S	S [5]	—	36.5	36.2	—	16.9	16.9
K-1990	S	S [4]	36.9	36.9	37.7	16.4	16.9	16.0
PBR-164X	S	—	—	—	37.7	—	—	16.4
PS 168	S	—	—	—	37.8	—	—	16.4
1525	S	—	—	—	36.8	—	—	16.3
DSR-158	S	S [5]	—	36.7	37.6	—	16.8	16.1
EXP 9715	S	—	—	—	37.9	—	—	16.2
PBR-148X	Rps1k	—	—	—	37.9	—	—	15.7
EXP S1518	S	—	—	—	38.2	—	—	16.1
S-173X	S	—	—	—	36.5	—	—	16.3
2500	S	—	—	—	37.2	—	—	16.4
ODIN	S	—	—	—	35.6	—	—	16.8
IA1006	S	S [5]	—	35.4	36.5	—	17.4	16.3
1995	Rps1c	—	—	—	35.9	—	—	16.3
DSR-180/STS	S	—	—	—	37.2	—	—	16.3
EX6142	M	—	—	—	35.8	—	—	17.0
EX6144	S	—	—	—	37.0	—	—	16.6
PBR-169X	S	MS [5]	—	36.4	37.3	—	16.9	15.9

Table 10A. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Note Key:

[1] Relative maturity rating provided by originator. Number before decimal represents maturity group. Number after decimal represents ranking within maturity group.

[2] Date represents the number of days after August 31 that variety reaches maturity.

[3] Blend; information furnished by originator.

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
KATO	MINN. A.E.S.	1.3	15	48	46	46
MN1301	MINN. A.E.S.	1.3	16	—	—	46
E147	TERRA	1.4	18	—	—	53
D174	GARST	1.7	19	—	—	50
STRIDE	MINN. & SD A.E.S.	1.3	20	—	—	51
GUSTAV	DAHLMAN	1.5	20	—	—	51
PARKER	MINN. A.E.S.	1.5	20	52	49	50
FARIBAULT	MINN. A.E.S.	1.9	20	47	46	49
9180	DAHLCO	1.8	20	—	—	49
9163	PIONEER	1.6	21	53	50	51
GL1559	GRT. LKS.	1.5	21	—	—	51
1150	HY-VIGOR	1.5	22	—	—	54
FREEBORN	MINN. A.E.S.	1.6	22	47	45	49
BERT	MINN. A.E.S.	1.8	22	48	45	48
E-167	MUSTANG	1.6	23	—	—	55
VICTOR	DAHLMAN	1.7	23	—	—	53
9172	PIONEER	1.7	24	55	52	55
9210	DAHLCO	2.1	25	—	—	60
X3719	GCS	1.9	25	—	—	59
K-1990	KRUGER	1.6	25	—	—	58
WILTON	DAHLMAN	1.7	25	—	55	57
KB168	KALTENBERG	1.6	25	—	—	56
1796	VIKING	1.7	25	—	52	54
CX197	DEKALB	1.9	25	—	52	53
5181	MYCOGEN SEEDS	1.8	25	—	52	53
G1885	M/W GENETICS	1.9	26	—	59	63
SOI 260	SANDS	1.9	26	60	58	59
K-1990+	KSC/CHALLENGER	1.7	26	—	—	59
9419	PAYCO	1.9	26	59	56	58
GL1872	GRT. LKS.	1.8	26	—	56	58
EX5704	THOMPSON	2.0	26	—	—	57
PS 2035	PROFISEED	2.0	26	—	—	57
6192	LG	1.9	26	—	—	56
TS194	TERRA	1.9	26	58	56	56
M-1190	MUSTANG	1.9	26	—	—	56
S-227	SANSGAARD	2.2	26	—	—	56
J659	JACOBSON	1.9	26	—	—	56
K-2020	KSC/CHALLENGER	1.8	26	—	—	56
2500	STINE	1.5	26	—	—	55
K-2202	KRUGER	2.0	26	—	—	55

Table 10A continued. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
D180	GARST	1.8	26	—	54	55
KINBRAE	GCS	2.0	26	—	—	54
RS1994	RENK	1.9	26	—	54	54
IA1006	IOWA A.E.S.	1.6	26	—	—	54
STURDY	MINN. A.E.S.	2.1	26	52	49	53
EXP15235	ZILLER	—	26	—	—	52
HARDIN 91	IOWA A.E.S.	2.0	26	51	49	52
GRANITE	MINN. A.E.S.	1.8	26	52	50	51
ARCHER	IOWA A.E.S.	1.9	26	51	48	48
DG3202	DYNA-GRO	2.0	27	—	—	61
PB-194	PRAIRIE BRAND	1.9	27	—	—	60
200	MYCOGEN SEEDS	2.1	27	58	57	60
EX-330	LATHAM	1.9	27	—	—	59
PBR-192	PBR	1.9	27		55	59
T-3217 [3]	THOMPSON	2.2	27	—	—	59
D205	GARST	2.0	27	—	—	59
RS1896	RENK	1.8	27	—	55	59
H-1194	GOLDEN HARVEST	1.9	27	59	56	59
TS174	TERRA	1.7	27	58	55	58
TS200	TERRA	2.0	27	—	57	58
E-233	MUSTANG	2.3	27	—	—	58
250 BRAND	LATHAM	1.8	27	—	57	57
S21-A1	NK	2.1	27	—	—	57
410 BRAND	LATHAM	1.9	27	58	56	56
1995	AP	1.9	27	—	—	56
X179	GOLDEN HARVEST	1.8	27	—	—	55
R2098	RENZE	2.0	27	—	—	54
EX6051	THOMPSON	2.0	27	—	—	54
CX205	DEKALB	2.0	27	—	—	54
EX5705	THOMPSON	1.9	27	—	—	53
G2112	M/W GENETICS	2.1	28	—	—	63
X3721	GCS	2.1	28	—	—	63
J750	JACOBSON	2.0	28	62	59	63
CX232	DEKALB	2.3	28	60	58	63
R2297	RENZE	2.2	28	—	—	61
2002	NS	2.0	28	—	—	61
K-2343	KSC/CHALLENGER	2.1	28	61	57	60
R1998	RENZE	1.9	28	—	—	60
DG3195	DYNA-GRO	1.9	28	—	—	60
L2126	CENEX/LOL	2.1	28	—	—	60
X 214	GOLDEN HARVEST	2.1	28	—	—	59
J679	JACOBSON	1.9	28	—	—	59
2302	NS	2.3	28	—	—	59
DSR-195	DAIRYLAND	1.9	28	—	55	59
9190	DAHLCO	1.9	28	—	—	58

Table 10A continued. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield 1996-97	Yield 1997
1995	RAMY	1.9	28	58	56	58
EXP17639	ZILLER	—	28	—	—	58
590 BRAND	LATHAM	2.2	28	57	54	57
2220	AP	2.2	28	—	55	57
KB208	KALTENBERG	2.0	28	—	—	57
2380	EHRICH	2.3	28	—	—	57
EXP S1816	STAR	1.9	28	—	—	57
DSR-220/STS	DAIRYLAND	2.2	28	54	53	57
5205	MYCOGEN SEEDS	2.0	28	—	54	57
T-3212	THOMPSON	2.1	28	—	54	57
R1996	RENZE	1.9	28	—	—	56
K-2121+	YIELD KING	1.9	28	—	—	56
DSR-215/RR	DAIRYLAND	2.1	28	—	—	56
CX229	DEKALB	2.2	28	—	55	56
2025	HY-VIGOR	2.0	28	—	—	55
PS 2000	PROFISEED	2.1	28	57	56	55
IA2021	IOWA A.E.S.	2.1	28	55	52	55
RS2394	RENK	2.3	28	—	54	54
K-2025+	KSC/CHALLENGER	1.8	28	—	—	54
SOI 270	SANDS	1.8	28	—	—	53
WJ 130597	MLFI	2.4	28	—	—	46
PB-2120	PRAIRIE BRAND	2.3	29	60	59	64
M-2200	MUSTANG	2.0	29	62	59	62
K-2625+	KRUGER	2.4	29	58	58	62
SOI 169	SANDS	2.0	29	62	59	61
662 BRAND	LATHAM	2.3	29	—	—	61
2195	RAMY	2.1	29	—	58	61
PB-197	PRAIRIE BRAND	1.9	29	62	59	61
K-2021+	KRUGER	1.8	29	—	—	60
T-3222	THOMPSON	2.2	29	—	—	60
1970	STINE	1.9	29	—	58	60
EX6714	THOMPSON	2.3	29	—	—	60
PBR-202	PBR	2.0	29	—	58	60
H-1218	GOLDEN HARVEST	2.2	29	58	55	60
PBR-216	PBR	2.1	29	—	—	59
K-2162	YIELD KING	1.9	29	—	—	58
9623	PAYCO	2.3	29	—	56	58
DG3256	DYNA-GRO	2.2	29	—	57	58
9245	PIONEER	2.4	29	—	—	58
9233	PIONEER	2.3	29	—	56	58
392 BRAND	LATHAN	1.9	29	—	56	58
2196	VIKING	2.1	29	—	52	57
T-3227 [3]	THOMPSON	2.3	29	57	55	57
660 BRAND	LATHAM	2.4	29	60	57	57
2220	RAMY	2.2	29	57	56	56

Table 10A continued. Maturity characteristics and bushels per acre yields of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Variety	Company Name	Maturity [1]	Date [2]	Yield 1995-97	Yield* 1996-97	Yield 1997
IA2008	IOWA A.E.S.	2.2	29	56	54	55
PBR-218	PBR	2.1	29	—	—	54
K-2425	YIELD KING	2.2	30	—	—	63
2180	STINE	2.0	30	—	—	62
2550	RAMY	2.4	30	—	—	62
GL2334	GRT. LKS.	2.3	30	—	—	59
S-236	SANSGAARD	2.4	30	55	55	59
6245	LG	2.4	30	—	—	58
SOI 276	SANDS	2.4	30	—	—	58
251	MYCOGEN SEEDS	2.4	30	57	55	56
PS 1997RR	PROFISEED	2.0	30	—	—	54
IA2008R	IOWA A.E.S.	2.1	30	53	51	53
2488	STINE	2.3	31	—	—	63
EX-640	LATHAM	2.4	31	—	—	62
PB-235X	PRAIRIE BRAND	2.3	31	—	—	61
IA2022	IOWA A.E.S.	2.5	31	—	52	59
K-2535+	YIELD KING	2.3	31	—	—	59
J876	JACOBSON	2.4	31	—	—	57
DSR-246/STS	DAIRYLAND	2.4	31	—	52	56
PS 2413	PROFISEED	2.4	31	—	—	56
PB-SP20	SANSGAARD	2.2	32	—	—	55
PB-SP23	SANSGAARD	2.3	32	—	—	53
LSD 20%				1	1	2

Table 10B. Disease resistance, protein and oil characteristics of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Note Key:

[1] PR=Phytophthora resistance: Rps#=gene present, S=susceptible, M=mixture of resistant and susceptible.

[2] CR=Chlorosis rating: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

[3] Protein and oil percentages, based on 13% moisture.

[4] 1-year data..

[5] 2-year data.

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
KATO	Rps1	MS	38.9	38.5	38.2	16.2.	16.3	16.2
MN1301	M	—	—	—	37.7	—	—	16.3
E147	S	—	—	—	36.3	—	—	16.5
D174	S	—	—	—	36.3	—	—	16.9
STRIDE	Rps1	—	—	—	35.4	—	—	17.7
GUSTAV	S	—	—	—	35.6	—	—	17.8
PARKER	Rps1	S	36.1	35.5	35.7	17.1	17.7	17.5
FARIBAULT	Rps1	MS	34.4	34.4	35.0	17.6	17.8	17.6
9180	Rps1c	—	—	—	36.8	—	—	16.7
9163	Rps1c	MR [4]	35.0	34.6	35.3	17.4	17.6	17.2
GL1559	Rps1	—	—	—	38.5	—	—	15.7
1150	S	—	—	—	37.0	—	—	16.9
FREEBORN	Rps1	MR [4]	37.4	36.8	37.1	16.2	16.8	16.4
BERT	Rps1	MS	35.4	35.2	35.4	17.2	17.4	17.3
E-167	M	—	—	—	36.5	—	—	16.8
VICTOR	Rps1c	—	—	—	36.1	—	—	17.3
9172	Rps1k	S [4]	35.9	35.6	35.7	16.7	17.0	16.8
9210	Rps1k	—	—	—	36.1	—	—	17.0
X3719	S	—	—	—	36.3	—	—	17.0
K-1990	S	—	—	—	36.6	—	—	16.8
WILTON	S	MS [5]	—	352	35.4	—	16.6	16.4
KB168	Rps1	—	—	—	36.8	—	—	16.8
1796	S	MR [5]	—	35.2	35.4	—	16.9	16.8
CX197	Rps1k	MS [4]	—	35.4	35.3	—	17.3	17.1
5181	S	MS [5]	—	34.7	34.9	—	17.0	16.6
G1885	S	S [5]	—	36.1	36.5	—	17.2	16.8
SOI 260	S	S [4]	36.4	36.1	36.8	17.0	17.2	16.8
K-1990+	S	—	—	—	36.5	—	—	17.0
9419	S	S	36.4	35.9	36.2	17.1	17.5	17.0
GL1872	S	S [5]	—	36.0	36.3	—	17.4	17.0
EX5704	S	—	—	—	36.6	—	—	16.7
PS 2035	S	—	—	—	36.4	—	—	16.8
6192	Rps1c	—	—	—	35.3	—	—	16.7
TS194	S	S	36.6	36.1	36.7	16.7	17.1	17.0
M-1190	S	—	—	—	36.4	—	—	17.1

Table 10B continued. Disease resistance, protein and oil characteristics of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
S-227	Rps1k	—	—	—	36.2	—	—	16.9
J659	S	—	—	—	37.0	—	—	16.7
K-2020	Rps1	—	—	—	34.9	—	—	17.1
2500	S	—	—	—	36.8	—	—	16.8
K-2202	Rps1k	—	—	—	36.6	—	—	16.6
D180	S	MS [5]	—	36.1	36.3	—	17.5	17.1
KINBRAE	Rps1k	—	—	—	36.1	—	—	17.1
RS1994	Rps1	S [5]	—	35.9	36.5	—	16.9	16.4
IA1006	S	—	—	—	35.9	—	—	16.8
STURDY	Rps1	MS	36.5	36.4	36.7	16.8	16.8	16.6
EXP15235	S	—	—	—	36.1	—	—	17.2
HARDIN 91	Rps1k	S	36.6	36.7	36.8	17.0	17.2	16.8
GRANITE	Rps1	MS [4]	36.8	36.6	37.2	16.6	17.0	16.7
ARCHER	Rps1k+6	MS	36.0	35.7	36.4	16.7	17.1	16.7
DG3202	Rps1c	—	—	—	35.1	—	—	16.9
PB-194	S	—	—	—	36.5	—	—	17.1
200	S	MS [4]	35.5	35.2	35.3	17.2	17.4	17.1
EX-330	Rps1c	—	—	—	35.4	—	—	16.5
PBR-192	Rps1c	MS [5]	—	34.9	35.3	—	16.9	16.7
T-3217	S	—	—	—	36.8	—	—	16.3
D205	S	—	—	—	35.3	—	—	16.9
RS1896	S	S [5]	—	35.4	35.3	—	17.3	16.9
H-1194	S	MS [4]	35.4	35.5	36.0	17.4	17.8	17.3
TS174	S	S [4]	36.7	36.0	36.8	16.6	17.0	16.8
TS200	S	S [5]	—	35.2	35.3	—	17.2	17.1
E-233	S	—	—	—	37.5	—	—	15.8
250 BRAND	S	S [5]	—	36.1	36.7	—	17.1	16.8
S21-A1	Rps1k	—	—	—	36.5	—	—	17.0
410 BRAND	S	S [4]	35.8	35.7	36.1	17.2	17.3	16.8
1995	Rps1c	—	—	—	35.2	—	—	16.6
X179	Rps1k	—	—	—	34.3	—	—	17.9
R2098	S	—	—	—	36.5	—	—	16.7
EX6051	Rps1c	—	—	—	35.4	—	—	16.8
CX205	Rps1c	—	—	—	35.5	—	—	17.2
EX5705	S	—	—	—	36.7	—	—	16.8
G2112	S	—	—	—	35.9	—	—	16.7
X3721	S	—	—	—	36.2	—	—	16.4
J750	S	MS [4]	36.0	35.7	36.0	16.9	17.0	16.6
CX232	S	S	36.3	35.9	36.0	17.2	17.4	17.0
R2297	S	—	—	—	36.2	—	—	16.4
2002	S	—	—	—	36.0	—	—	16.6
K-2343	S	S [4]	36.1	35.9	36.2	16.7	16.8	16.6
R1998	Rps1k	—	—	—	36.1	—	—	16.6
DG3195	S	—	—	—	36.4	—	—	16.4
L2126	S	—	—	—	36.3	—	—	16.3

Table 10B continued. Disease resistance, protein and oil characteristics of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
X 214	S	—	—	—	36.1	—	—	16.4
J679	S	—	—	—	35.8	—	—	16.5
2302	S	—	—	—	37.4	—	—	16.0
DSR-195	S	MS [5]	—	35.6	36.0	—	16.9	16.6
9190	S	—	—	—	35.5	—	—	16.9
1995	S	S [4]	35.3	35.1	35.1	16.9	17.0	17.0
EXP17639	S	—	—	—	33.8	—	—	17.2
590 BRAND	S	MS	37.0	36.7	37.2	16.5	16.9	16.6
2220	S	MS [5]	—	36.4	36.9	—	17.0	16.8
KB208	S	—	—	—	35.9	—	—	16.5
2380	S	—	—	—	37.7	—	—	15.9
EXP S1816	Rps1k	—	—	—	36.1	—	—	16.7
DSR-220/STS	S	MS [4]	36.3	35.9	36.1	16.5	16.6	16.4
5205	S	S [5]	—	36.6	36.5	—	16.6	16.7
T-3212	S	S [5]	—	37.0	37.1	—	16.3	16.0
R1996	S	—	—	—	35.5	—	—	17.0
K-2121+	S	—	—	—	35.8	—	—	16.4
DSR-215/RR	S	—	—	—	35.8	—	—	17.2
CX229	Rps1c	S [5]	—	35.1	35.4	—	17.2	16.8
2025	S	—	—	—	35.3	—	—	17.6
PS 2000	S	MS [4]	36.0	35.8	36.1	16.8	17.0	16.3
IA2021	Rps1k	S [4]	34.5	34.5	34.7	18.0	18.1	17.8
RS2394	Rps1	S [5]	—	35.0	35.5	—	17.4	17.1
K-2025+	S	—	—	—	35.7	—	—	17.0
SOI 270	S	—	—	—	35.1	—	—	17.0
WJ 130597	Rps1	—	—	—	40.4	—	—	15.3
PB-2120	S	S	35.7	35.6	35.9	17.0	16.9	16.7
M-2200	S	MS [4]	36.1	35.8	36.3	16.6	16.7	16.4
K-2625+	S	MS [4]	36.0	35.8	36.1	16.4	16.4	15.9
SOI 169	S	MS	36.0	35.5	35.9	16.7	16.8	16.8
662 BRAND	S	—	—	—	36.2	—	—	16.5
2195	S	MS [5]	—	35.6	36.1	—	16.8	16.4
PB-197	S	MS	36.4	35.9	36.3	16.6	16.7	16.3
K-2021+	S	—	—	—	36.1	—	—	16.4
T-3222	S	—	—	—	36.4	—	—	16.7
1970	S	MS [5]	—	35.6	36.0	—	16.8	16.4
EX6714	S	—	—	—	36.0	—	—	16.8
PBR-202	S	MS [5]	—	35.8	36.1	—	16.8	16.4
H-1218	S	MS	35.9	35.4	36.1	16.5	16.9	16.5
PBR-216	S	—	—	—	36.6	—	—	15.9
K-2162	S	—	—	—	35.6	—	—	17.2
9623	S	MR [5]	—	35.8	36.0	—	16.9	16.7
DG3256	S	MS [5]	—	35.7	35.8	—	17.1	16.9
9245	Rps1k	—	—	—	35.1	—	—	16.8
9233	S	MS [5]	—	35.6	36.1	—	16.8	16.5

Table 10B continued. Disease resistance, protein and oil characteristics of public and private soybean varieties for the southern zone (1995-97; Fairmont, Lamberton, Waseca).

Variety	PR [1]	CR [2]	Protein 1995-97 [3]	Protein 1996-97 [3]	Protein 1997 [3]	Oil 1995-97 [3]	Oil 1996-97 [3]	Oil 1997 [3]
392 BRAND	S	MR [5]	—	35.7	35.9	—	16.8	16.5
2196	S	S [5]	—	36.6	37.0	—	16.7	16.4
T-3227	S	S [4]	36.1	36.2	36.3	16.7	16.6	16.2
660 BRAND	S	S	35.9	35.8	36.1	17.1	17.3	16.9
2220	S	MS [4]	35.6	35.6	35.7	17.0	17.1	16.8
IA2008	Rps1	MS	35.6	35.4	35.9	16.6	16.8	16.8
PBR-218	S	—	—	—	35.4	—	—	17.0
K-2425	S	—	—	—	36.3	—	—	16.2
2180	S	—	—	—	36.6	—	—	16.0
2550	S	—	—	—	36.4	—	—	16.5
GL2334	S	—	—	—	36.4	—	—	16.0
S-236	S	S [4]	36.5	36.4	36.8	16.6	16.7	16.3
6245	S	—	—	—	37.1	—	—	16.0
SOI 276	S	—	—	—	36.6	—	—	16.3
251	S	MS	36.0	35.8	35.8	16.6	16.7	16.4
PS 1997RR	Rps1c	—	—	—	34.5	—	—	17.1
IA2008R	Rps1k	MS [4]	35.5	35.2	35.8	16.8	17.0	16.8
2488	S	—	—	—	37.2	—	—	16.4
EX-640	S	—	—	—	37.1	—	—	16.4
PB-235X	S	—	—	—	37.3	—	—	16.7
IA2022	S	MS [5]	—	35.4	36.1	—	17.5	16.8
K-2535+	S	—	—	—	37.2	—	—	16.6
J876	S	—	—	—	35.5	—	—	17.1
DSR-246/STS	S	S [5]	—	34.9	35.5	—	17.1	16.5
PS 2413	S	—	—	—	37.2	—	—	16.7
PB-SP20	S	—	—	—	36.7	—	—	16.3
PB-SP23	S	—	—	—	35.8	—	—	16.7

Table11A. Characteristics of public and private soybean varieties from tests on soybean cyst nematode infested (East Chain, New Richland, and St. James) and non-infested (Fairmont, Lamberton, and Waseca) sites; 1995-97.

Note Key:

[1] Relative maturity rating provided by originator. Number before decimal represents maturity group. Number after decimal represents ranking within maturity group.

[2] Date represents the number of days after August 31 that variety reaches maturity.

[3] CR=Chlorosis rating, 3-year average unless noted: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

[4] SCN=Soybean cyst nematode reaction to a Minnesota isolate that behaves as Race 3: R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible.

[5] PR=Phytophthora resistance: Rps#=gene present, S=susceptible.

[6] Blend; information furnished by originator.

Variety	Maturity [1]	Date [2]	CR [3]	SCN [4]	PR [5]
PARKER	1.5	20	S	S	RPS1
D163N	1.6	20	—	S	S
FARIBAULT	1.9	21	MS	R	RPS1
FREEBORN	1.6	21	MR	MR	RPS1
BT2161CN	1.7	22	S	MR	RPS1K
EX 717	1.7	23	—	MR	S
9182	1.8	24	S	MR	S
PB-188N	1.8	25	—	MR	S
EX 719	1.9	26	—	MR	S
BELL	2.2	26	MS	MR	S
RS2297C	2.2	27	—	MR	RPS1C
PB-210N	2.0	27	—	MR	RPS1K
MARCUS 95	2.3	27	MS	S	RPS1K+6
K-2220SCN	2.0	27	--	MR	S
522CN BRAND	2.1	27	MS	MR	S
K-2120SCN	1.9	28	—	R	S
9234	2.2	28	MS	R	RPS1
IA2021	2.1	28	S	S	RPS1K
EX-342CN [6]	1.8	28	—	MR	S
J770CN	2.0	29	—	S	S
CX235C	2.3	29	—	MR	S
1882	1.7	29	MS	MR	S
PB-215N	2.1	29	—	S	S
K-2444SCN	2.2	29	—	MR	S
NEWTON	2.4	29	MS	R	S
IA2008R	2.1	30	MS	S	RPS1K
IA2036	2.1	30	MS	S	S

Table 11B. Yields in bushels per acre of public and private soybean varieties from tests on soybean cyst nematode infested (East Chain, New Richland, and St. James) and non-infested (Fairmont, Lamberton, and Waseca) sites, 1995-97.

Note Key:

[1] Blend; information furnished by originator.

Variety	Company Name	Infested Yield			Noninfested Yield		
		1995-97	1996-97	1997	1995-97	1996-97	1997
PARKER	MINN. A.E.S.	39	38	42	49	46	43
D163N	GARST	—	—	41	—	—	42
FARIBAULT	MINN. A.E.S.	39	42	46	46	43	44
FREEBORN	MINN. A.E.S.	40	40	46	46	44	44
BT2161CN	ZILLER	—	43	47	—	47	46
EX 717	DEKALB	—	—	49	—	—	45
9182	PIONEER	—	43	50	—	47	48
PB-188N	PRAIRIE BRAND	—	—	51	—	—	50
EX 719	DEKALB	—	—	50	—	—	48
BELL	ILLINOIS A.E.S.	39	38	46	43	50	42
RS2297C	RENK	—	—	53	—	—	50
PB-210N	PRAIRIE BRAND	—	—	50	—	—	50
MARCUS 95	IOWA A.E.S.	44	44	49	52	49	51
K-2220SCN	KRUGER	—	46	49	—	50	50
522CN BRAND	LATHAM	42	41	47	46	44	46
K-2120SCN	KRUGER	—	—	54	—	—	49
9234	PIONEER	—	45	51	—	45	48
IA2021	IOWA A.E.S.	45	46	51	52	49	49
EX-342CN [1]	LATHAM	—	—	49	—	—	49
J770CN	JACOBSEN	—	—	52	—	—	49
CX235C	DEKALB	—	—	52	—	—	50
1882	STINE	—	46	51	—	49	50
PB-215N	PRAIRIE BRAND	—	—	50	—	—	49
K-2444SCN	KRUGER	—	46	49	—	47	48
NEWTON	IOWA A.E.S.	35	34	40	37	35	40
IA2008R	IOWA A.E.S.	—	42	49	—	50	51
IA2036	IOWA A.E.S.	—	—	48	—	—	47
LSD 20%		1	1	2	1	1	2

Soybean Planting Rate and Date

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

Use	Bushel Weight (pounds)	Seeds/pound (number)	Rate/acre (pounds)	Rate (seeds)	Planting Date
10-inch rows	60	2,800	56	3/foot of row	May 5 to May 25
20–inch rows			56	6/foot of row	
30–inch rows			56	9/foot of row	
40–inch rows			56	12/foot of row	