2002

Small Grains: 2002 Variety Recommendations, 2001 Crop Performance Results

Cooperative Extension Service, South Dakota State University

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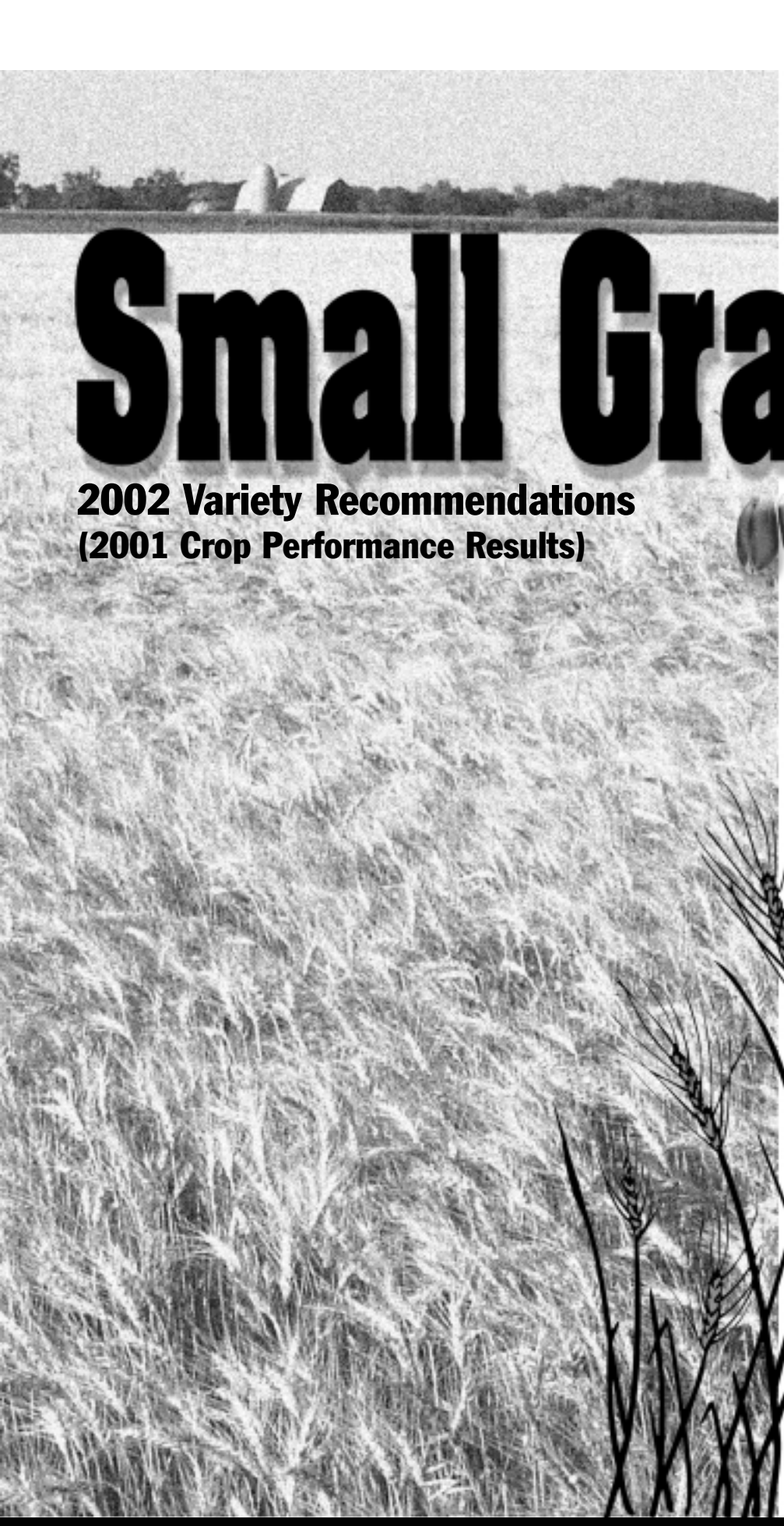
Revised
Annually

Small Grains

2002 Variety Recommendations
(2001 Crop Performance Results)

Spring Wheat
Oats
Barley
Winter Wheat
Field Pea



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Small Grain Variety Recommendations for 2002

Recommendations are based on data obtained from the South Dakota State University Crop Performance Testing (CPT) Program and regional land-grant university nurseries. Variety performance depends on genetics and the environment. Environmental factors like temperature, moisture, plant pests, soil fertility, soil type, and management practices affect variety performance. Note the performance of recommended varieties in response to environmental conditions is generally better than the performance of other varieties. The better performance of a recommended variety, however, cannot always be guaranteed due to its complex response to the environment. **NOTE: The CPT program dropped the testing of Durum wheat varieties this year.** This action was the result of a general lack of interest in Durum wheat production and variety development. Variety recommendations, including the crop adaptation area (CAA) where they are most suited, are listed below:

SPRING WHEAT

Recommended:		**Acceptable/Promising:**	
Variety	*CAA*	*Variety*	*CAA*
Forge @	Statewide	Butte 86	Statewide
Ingot @	Statewide	Ivan @	1,7
Oxen @	Statewide	Norpro@	Statewide
Reeder @	Statewide	Parshall @	1,7
Russ @	Statewide	Walworth @	Statewide

OATS

Recommended:		**Acceptable/Promising:**	
Variety	*CAA*	*Variety*	*CAA*
Don	1,4,5,6,7	Settler	Statewide
Jerry @	Statewide	Troy	1,2,4,6,7
Loyal +	1,2,4,6,7		

BARLEY

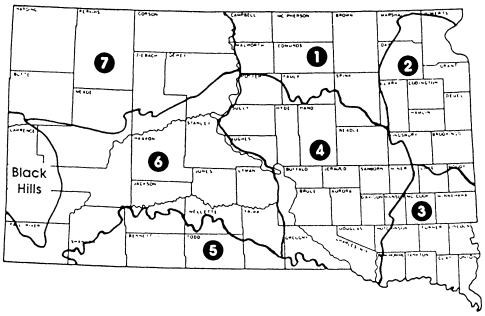
	Recommended:		
Six-Row Variety	*CAA*	*Two-Row Variety*	*CAA*
Excel @~	1,2,4,6,7	Conlon @~	1,4,6,7
Foster @~	Statewide	Logan @	1,4,6,7
Lacey @~	Statewide		
Robust @~	1,2,4,6,7		
Stander @	Statewide		

WINTER WHEAT

Recommended:		**Acceptable/Promising:**	
Variety	*CAA*	*Variety*	*CAA*
Alliance @	3,4,5,6	Millennium @	1*,4,5,6,7
Arapahoe @	1*,3,4,5,6,7*	Rose	1,2,3,4,6,7
Crimson @	1,2,3,4,6,7	TAM 107 @	4,5,6
Harding @	1,2,4,7	Windstar @	1*,3,4,5,6,7*
Nekota	1*,3,4,5,6,7*	2137 @	1*,3,4,5,6,7*
Tandem @	1*,3,4,5,6,7		
Wesley	1*,3,4,5,6,7		

Crop Adaptation Areas for South Dakota

(revised 1992)



\+ *Exceptional crown rust resistance*

~ Recommended *American Malting Barley Association varieties for 2002.*

@ Plant Variety Protection (PVP) applied for or received; seed sales are restricted to classes of certified seed.

** Plant into protective cover.*

Small Grains

2001 South Dakota Test Results, Characteristics, and Yield Averages

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Variety selection is a fundamental element in a sound crop production program. This report contains variety recommendations, descriptions, and yield data for the spring-seeded small grains – hard red spring wheat, oat, and barley – along with the fall-seeded small grain, hard red winter wheat.

Key factors in variety selection include yield, yield stability, maturity, straw strength, height, test weight, quality, and disease resistance. Yield is an important factor; however, a variety with good disease resistance, straw strength, and high grain quality may be more profitable in some cases than the highest yielding variety.

Disease resistance information is based on reactions to prevalent races of a disease. Disease resistance is not constant and new races may develop over time.

Variety Recommendations (inside cover)

The Plant Science Department Variety Recommendation Committee makes small grain variety recommendations annually. Recommendations for a given crop may vary from one crop adaptation area (CAA) to another. Crop adaptation areas (see map) are based on soil type, elevation, temperature, and rainfall. Varieties are recommended on the basis of growing season, average rainfall, disease frequency, and farming practices common to a crop adaptation area.

Varieties are listed as "Recommended" or "Acceptable/Promising." Varieties exhibiting a high level of agronomic performance are listed as "Recommended." Each test entry must meet the minimum criteria listed in Table A before it is eligible for the "Recommended" list. Varieties listed as "Acceptable/Promising" have performed well but do not merit the "Recommended" list, or they are new varieties with a high performance potential but do not meet the three-year criteria (Table A) needed to make the "Recommended" list. A variety needs two years and six location-years in the SDSU crop performance test trials and/or regional nurseries before it is eligible for the "Acceptable/Promising" list.

Certified seed is the best source of seed and the only way farmers can be assured of the genetic purity of the variety purchased.

How to Use This Information

Use this report to select small grain varieties for South Dakota. Use this bulletin as follows:

1. Check the variety-crop adaptation area (CAA) designations for the "Recommended" and "Acceptable/ Promising" lists on the preceding page. Compare these variety-CAA designations with the CAA map of South Dakota. **Identify the varieties suggested for your CAA.**

2. **Evaluate the varieties you selected for desirable characteristics.** Descriptive information (characteristics table) is updated as changes occur. This information is obtained from the SDSU Crop Performance Testing Program and from research plots maintained by plant breeders and plant pathologists. Data like straw strength, protein, height, and test weight are based on statewide averages. Disease resistance continually changes; therefore, new information is reported as it becomes available. To evaluate maturity, compare the relative maturity (heading) rating of each variety to the reference or check variety given. The Fusarium head blight tolerance ratings for hard red spring wheat is also given. Note the head blight ratings show **there is presently no variety resistance to this disease.** It does, however, indicate **some varieties are more tolerant of the disease than others.**

3. **Evaluate each variety you select for yield performance.** Yields are obtained from the SDSU Crop Performance Testing Program. Both one- and three-year average yields for each variety tested are included for each test location if the variety was tested for three or more years. Yield values for each variety and location average and for each location least-significant-difference (LSD) value are rounded to the nearest bushel per acre.

Location averages, LSD values, and coefficients of variation (CV) values listed below each location yield column are calculated using all entries in each test. This includes both released varieties and experimental lines. Only data for released varieties are reported. Therefore, the test average for a location yield column may not equal the average for the individual yields you observe in the table. Likewise, the test LSD values obtained from the location data are also based on both varieties and experimental lines. Varieties and experimental lines are included in these results so one can see how known varieties compare to experimental lines that may be released in the near future.

Always compare yields from the same period of time. Compare one-year yields with other one-year yields and three-year yields with other three-year yields. Do not compare a one-year average with a three-year average.

Before evaluating any data at a location, determine whether the data are valid. The CV value listed at the bottom of each yield column is a measure of experimental error. **Yield tests with a CV of 16% - 20% contain relatively higher amounts of experimental error than tests with a CV of 10% or less. Test sites with a CV greater than 20% are not included in the calculations for yield stability discussed later. In addition, the top-yielding varieties for that location are not indicated in the table because the validity of the yield differences among the varieties are uncertain as a result of the high level of experimental error.**

Use the test LSD value to evaluate yield differences between varieties. The LSD value indicates whether one variety really out-yields another. If a yield difference between two varieties is greater than the LSD value, the varieties differ in yield. If the yield difference is equal to or less than the LSD value, the varieties do not statistically differ in yield.

The LSD value may also be used to determine the top-yielding group for each location. For example, at each location the variety with the highest numerical yield is identified using one- or three-year averages. The reported test LSD value is subtracted from the highest-yielding variety. Varieties with yields greater than this value (highest yield minus test LSD) are in the top-yielding group at that location. For example, the top-yielding spring wheat at Brookings for 2001 was the variety Ember at 71 bu/acre. Subtracting 6 bu/acre (the rounded-off LSD value) from 71 results in a value of 65. Therefore, any variety in the 2001 column with a yield of 65 bushels or higher is in the top yield group. In this case, the top yield group includes Ember and Forge the only varieties with a yield of 65 bushels or higher. In contrast, any variety yielding 64 bushels or less is not in the top-yielding group. For convenience, varieties in the top yield group at each location have been determined by computer and are listed, with a **plus (+) sign**, in the yield columns of each yield table. Yields are rounded-off and reported to the nearest whole bushel per acre.

Sometimes a LSD value is not given and the designation $$ is listed. This indicates yield differences were not significant (ns) or yield differences could not be detected. Therefore, all the varieties have a similar yielding potential and are considered to be in the top-yielding group. In some cases, a high level of experimental error is indicated by a high CV value. In such a case, the top-yielding group is not determined.

When evaluating yields, remember that environmental conditions at a test location seldom repeat themselves from year to year. Therefore, look at as much yield data from as many trial locations and years as possible.

Look at the performance or yield stability of a variety over several locations. A simple way of evaluating yield stability is to see how often a variety is in the top yield group over all test locations. For convenience, the top yield percentage or the percentage of locations where a variety is in the top yield group has been calculated. **The top yield percentage for each variety is given in the agronomic performance average table for each of the spring seeded small grains.**

A variety exhibiting a relatively high, top yield percentage will appear in the top yield group at many locations, but not necessarily at all locations. For example, a variety with a top yield percentage of 50% or more exhibits good yield stability. In contrast, a variety with a top yield percentage of 30% or less exhibits low yield stability.

Varieties with a high, top yield percentage have the ability to adapt to a wide range of environmental conditions across many locations. In contrast, varieties with a low, top yield percentage typically adapt to a narrow range of environments. **Look for varieties with a relatively high, top yield percentage of 50% or higher if possible.**

Origin of Varieties Tested

Public varieties were released from state Agricultural Experiment Stations. Abbreviations for each include:

Colorado – CO
Illinois – IL
Kansas – KS
Minnesota – MN
Nebraska – NE
North Dakota – ND
South Dakota – SD
Texas – TX
Wisconsin – WI

Many public varieties are developed and released jointly by one or more experiment stations or USDA. Some varieties are developed and or released by seed companies. Seed company abbreviations for these include:

AgriPro Wheat, Inc.—AP
Busch Agricultural Resources, Inc.- BARI
General Mills—GM

Trial Methods

The analysis of variance statistical model used to analyze data is a randomized, complete-block design with four replications (four plots for each entry in every trial) at the .05 level of probability. Plots are harvested with a small-plot combine. Plot size differs between the East River and West River locations. East River plots were 5 feet wide and either 12 or 14 feet long compared to West River plots measuring 5 feet wide and 25 feet long. Plots consist of drill strips with 7- or 8-inch spacing at East River locations and 10-inch spacing at West River locations. Trial locations are listed in Table B.

Fertility and weed control programs differed between the East and West River locations. East River plots are fertilized with 60 lb. per acre of 18-46-0 (10.8 pounds of N and 27.6 pounds of phosphorous per acre) down the seed tube at seeding. Post-emergence applications of 1 to 1.5 pints of Bronate are applied at the 3 to 5 leaf stage, depending on the weed problem. West River plots are fertilized with 6 gals. of 10-34-0 per acre (6.6 pounds of nitrogen and 24 pounds of phosphorous per acre) at seeding. Post-emergence applications of 0.10 oz. of Ally herbicide per acre plus 6 oz. active ingredient per acre of 2,4-D (wheat) and 1 pint of Bronate (oats and barley) are applied at the 3 to 5 leaf stage.

Since seed size can vary greatly among varieties, a seed count is conducted on each entry and all seeding rates are adjusted accordingly. At East River locations the adjusted seeding rates are 28 pure live seeds per square foot compared to rates of 22 pure live seeds per square foot at West River locations. Under good seedbed preparation and favorable conditions, these adjusted seeding rates result in seedling densities of about 25 and 20 plants per square foot at the East and West River locations, respectively. This results in a final stand of about 1.1 million and 870,000 plants per acre, respectively. If you have a poor seedbed, increase the spring seeding rate to 32 and 25 seeds per square foot at the East and West River locations, respectively. If planting is delayed until May 1 or later, increase the seeding rates to 35 and 28 seeds per square foot at East and West River locations, respectively. Seeding dates are listed in Table B.

Performance Trial Highlights

HRS Wheat

The top-performing varieties for year 2001 (variety and top yield percentage) are **Knudson and Reeder at 67%; Norpro at 55%; and Forge, Ivan, Oxen, and Saxon at 44%.** See agronomic performance table for spring wheat. This means these varieties are in the top-yielding group at 67%, 55%, or 44% of the test locations for 2001. The best top yield varieties over the past three years are **Ember, Forge, Ivan, Oxen, Reeder, Russ, and Walworth at 100%; Ingot and Parshall at 88%; Norpro and Saxon at 75%; Alsen and HJ98 at 63%; and Butte 86 at 50%** of the test locations. **Ingot** has consistently exhibited the best bushel weight.

Oats

In 2001, **Killdeer at 75%; and Ebeltoft at 50%** exhibited the highest top yield percentages. During the past three years, the best top yield varieties are **Ebeltoft and Loyal at 100%; Jerry and Troy at 80%; and Don, Richard, and Youngs at 60%** of the test locations. NOTE: Youngs and Ebeltoft exhibit excellent yields, but have tested 3 and 5 pounds lower in bushel weight, respectively, than Jerry (Oat agronomic performance table).

Barley

In 2001, the best top yield group percentages are **Logan and Legacy at 88%; Lacey at 75%; Conlon and Stander at 63%; and Drummond and Excel at 50%** of the locations tested. The better varieties over the past three years are **Logan and Lacy at 100%; Conlon and Foster at 88%; Excel, Robust,**

and Stander at 75%; and Drummond at 50% of the test locations. The two-row varieties, Conlon and Logan, tested one to two pounds higher in bushel weight than the six-row varieties over the past three years.

HRW Wheat

In 2001, the better-performing varieties are **Crimson, Harding, Hondo, Millennium, Nekota, Quantum 7588 (a hybrid), Ransom, Tandem, Vista, Wahoo, Wesley and Windstar.** The best varieties for the past three years are **Alliance, Arapahoe, Crimson, Culver, Jagger, Millennium, Nekota, Quantum 7588, Ransom, TAM-107, Vista, Wesley, and 2137.** Winterkill was a major factor in South Dakota this year. It affected the test trials at Brookings, Watertown, Highmore, Wall, Selby, Britton, and Winner. Winter survival percentages averaged at these locations are indicated in the winter wheat agronomic performance table. These percentages help explain the amount of experimental error and the wide range in yields that are associated with these test trials in 2001.

Field Pea

In 2001, **the varieties Delta, CEB1475, Badminton, CEB1158, and Salute** are the top-yielding varieties at Wall, South Dakota. The test trial at Selby, South Dakota was abandoned because it washed out early in the growing season.

The Variety Release/Recommendation Committee…

includes plant breeders, pathologists, research scientists, Extension agronomists, and managers of the Seed Certification Service and Foundation Seed Stocks Division.

The efforts of the following people in making this publication possible are gratefully acknowledged:

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M. Stiegelmeier (Selby)
R. Vander Pol (Platte)
T. Peters (Britton)
S. Masat (Spink Co.)
G. Wunder (Bison).

This report is available on the World-Wide-Web at http://www.sdstate.edu/~wpls/http/var/vartrial.html

Table A. Minimum criteria needed for the recommended list.

	Crop			
Trait	**HRS Wheat**	**HRW Wheat**	**Oat**	**Barley**
Yield,test wt., ht.	3/15*	3/15	3/15	3/12
Protein	3/15	3/15	–	3/12
Heading date	3/6	3/6	3/6	3/6
Quality data	2/4#	WA	WA	WA
Disease reaction	A	A	A	A
Lodging	WA	WA	WA	WA
Unique traits $	WA	WA	WA	WA

* = 3 years/15 location-years.
# = milling and baking.
$ = production or marketing characteristics that affect small grain production in South Dakota.
A = annually.
WA = when available.

Table B. 2001 Seeding dates by crop and location.

	Crop		
Location	**HRS Wheat**	**Oat**	**Barley**
	Date		
Brookings	Apr 20	Apr 20	Apr 20
Brown Co.	Apr 18	Apr 18	Apr 18
Beresford	–	May 18	–
Highmore	Apr 30	Apr 30	Apr 30
Selby	May 1	May 1	May 1
Watertown	Apr 25	Apr 25	Apr 25
Bison	Apr 18	Apr 18	Apr 18
Ralph	Apr 18	–	Apr 18
Wall	Apr 12	Apr 12	Apr 12

Spring Wheat

Table 1. Spring wheat variety testing yield averages, 1999-2001.

Variety	Location											
	Brookings		Watertown		Highmore		Spink Co.		Selby		Brown Co.	
	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr
	bu/acre											
Alsen	43	45+	66	45+	37	30+	45	–	32	46	71+	48+
Butte 86	45	46+	68+	50+	38	31+	44	–	30	45	64	45+
Chris,CK	35	32	43	31	38	26+	30	–	26	34	53	33
Ember	71+	54+	66	49+	41	34+	37	–	40	54+	66	48+
Forge	65	55+	67	50+	46+	36+	46	–	37	50+	69+	50+
GM40002	37	–	57	–	34	–	41	–	33	–	47	–
GM40016	49	–	57	–	33	–	37	–	32	–	52	–
GM40019	57	–	61	–	39	–	51+	–	40	–	65	–
Hanna	51	–	63	–	35	–	48+	–	35	–	61	–
HJ98	45	39	65	45+	35	28+	43	–	35	46	66	45+
Ingot	48	48+	70+	53+	39	31+	42	–	38	50+	60	45+
Ivan	60	50+	61	47+	42+	33+	44	–	45+	53+	54	42+
Keystone	45	–	67	–	39	–	46	–	37	–	63	–
Knudson	51	–	68+	–	45+	–	49+	–	41+	–	59	–
Norpro	53	47+	66	48+	50+	33+	55+	–	42+	48	57	41
Oxen	39	45+	68+	48+	44+	33+	51+	–	35	49+	61	45+
Parshall	63	51+	63	49+	36	33+	43	–	33	51+	63	45+
Reeder	56	48+	70+	52+	37	32+	54+	–	45+	54+	63	47+
Russ	57	53+	67	51+	37	32+	49+	–	39	50+	65	50+
Saxon	48	43	68+	45+	41	31+	48+	–	34	47	62	41
Walworth	49	50+	67	54+	37	33+	40	–	37	51+	50	46+
Test avg.*:	51	47	65	48	39	32	46	–	37	49	62	45
LSD (5%) $:	6	10	4	9	8	ns$$	7	–	4	5	4	8
CV (%) #:	8	9	5	6	14	14	11	–	7	5	4	7

+ Entry is in top-yield group - seed yield comments.
* Test average - only released varieties are reported.
$ LSD (5%) - see yield comments.
$$ Differences within a column are not significant.
A measure of experimental error; a value of 15% or less is best.

Table 1 (continued). Spring wheat variety testing yield averages (Continued).

Variety	Location					
	Wall		Bison		Ralph	
	2001	3-yr	2001	3-yr	2001	3-yr
	bu/acre					
Alsen	47+	44+	41+	40	27	31
Butte 86	43	41	42+	39	21	30
Chris,CK	36	34	34	30	26	26
Ember	44	47+	45+	45+	28	37+
Forge	45	46+	47+	46+	25	34+
GM40002	42	–	39	–	24	–
GM40016	39	–	40	–	25	–
GM40019	47+	–	42+	–	29	–
Hanna	41	–	38	–	26	–
HJ98	47+	44+	46+	45+	29	36+
Ingot	41	43+	44+	44+	26	32
Ivan	47+	45+	43+	47+	30	37+
Keystone	43	–	39	–	28	–
Knudson	45	–	45+	–	35+	–
Norpro	48+	44+	46+	46+	31	37+
Oxen	44	46+	41+	45+	29	37+
Parshall	42	45+	39	41+	25	32
Reeder	46+	47+	46+	45+	33+	35+
Russ	45	45+	45+	47+	26	34+
Saxon	46+	45+	47+	46+	32+	35+
Walworth	44	46+	41+	45+	28	35+
Test avg.*:	44	44	42	44	28	34
LSD (5%) $:	2	4	6	6	3	5
CV (%) #:	3	5	9	9	8	12

+ Entry is in top-yield group - seed yield comments.
* Test average - only released varieties are reported.
$ LSD (5%) - see yield comments.
$$ Differences within a column are not significant.
A measure of experimental error; a value of 15% or less is best.

Table 2. Agronomic performance averages for spring wheat entries tested in year 2001.

Variety	Relative Heading day	2001 Protein pct	2001 Bushel Weight lb	2001 Height inch	Yield-bu/a 2001	Yield-bu/a 3-yr	Top Yield Percentage 2001	Top Yield Percentage 3-yr
Alsen	3	14.9	62	34	45	41	33	63
Butte 86	0	14.1	60	37	44	41	22	50
Chris,CK	3	14.9	59	41	36	31	0	13
Ember	1	3.1	61	35	49	45	22	100
Forge	-1	13.4	61	37	50	46	44	100
GM40002	–	13.5	59	33	39	–	0	–
GM40016	–	14.0	59	33	41	–	0	–
GM40019	–	13.4	60	30	48	–	33	–
Hanna	2	14.4	60	39	44	–	11	–
HJ98	4	13.8	60	33	46	41	22	63
Ingot	-1	14.3	63	38	45	43	22	88
Ivan	5	13.3	61	32	47	44	44	100
Keystone	2	13.5	62	36	45	–	0	–
Knudson	2	13.6	62	33	49	–	67	–
Norpro	5	13.8	60	33	50	44	55	75
Oxen	2	13.9	60	33	46	44	44	100
Parshall	4	14.4	61	38	45	44	0	88
Reeder	3	14.3	61	36	50	45	67	100
Russ	2	13.8	60	38	48	45	22	100
Saxon	5	13.9	59	35	47	42	44	75
Walworth	3	14.0	60	35	44	45	11	100
State test avg.:		14.0	61	36	46	43		

* Percent of time a variety appears in the top-yield group across nine (2001) or eight (1999-2001) test sites when experimenal error was low as indicated by C.V. values of 15% or less.

Table 3. Origin, disease reaction, and other traits for hard red spring wheat entries for year 2001.

Variety	Origin	Stand-ability	Disease reaction			PVP Status
			Leaf Rust	Stem Rust	Fusarium Head Blight	
Alsen	ND-00	Good	MR	R	MR#	**
Butte 86	ND-86	Fair	MS	R	S	No
Chris,CK	MN-65	Poor	MS	R	S	No
Ember	SD-99	Good	MS	MR	M#	**
Forge	SD-97	Good	MS	MR	MS#	Yes*
GM40002	GM-	–	–	–	–	–
GM40016	GM-	–	–	–	–	–
GM40019	GM-	–	–	–	–	–
Hanna	AP-03	Good	MS	MR	–	**
HJ98	MN-98	Good	MR	MR	MS#	Yes
Ingot	SD-98	Good	MS	R	M#	**
Ivan	AP-98	V.Good	R	R	–	Yes
Keystone	WPB-01	Good	MS	MS	–	**
Knudson	AP-03	Good	MR	R	MS#	**
Norpro	AP-00	V.Good	MR	R	MS	**
Oxen	SD-96	Good	MR	R	MS#	**
Parshall	ND-99	Good	MS	R	MS#	**
Reeder	ND-99	V.Good	MS	R	MS#	Yes
Russ	SD-95	Good	MR	R	MS#	Yes*
Saxon	AP-99	V.Good	R	R	S	Yes
Walworth	SD-01	Good	MR	R	M	**

+ R = resistant, MR = moderately resis., M = intermediate, MS = mod. susceptible, S = susc.

Consistent tolerance to head blight in grain yield and quality.

* Plant Variety Protection (PVP), Title V, Certification Option - to be sold by variety name only as a class of certified seed.

** PVP application pending/anticipated.

Table 4. Oat variety testing yield averages, 1999-2001

Variety	Location															
	Brookings		Watertown		Beresford		Highmore		Selby		Brown		Wall		Bison	
	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr
	bu/acre															
Don	111	108+	97	98+	139	–	58	–	90	121	106	–	64	86+	75	95
Ebeltoft	100	111+	101	110+	133	–	71+	–	111+	146+	133	–	72+	98+	82+	113+
Hytest	98	89	91	81	104	–	50	–	80	106	101	–	58	71	62	75
Jerry	131	117+	97	99+	130	–	55	–	85	132+	116	–	66	91+	71	98
Killdeer	146+	–	99	–	130	–	74+	–	115+	–	143+	–	80+	–	91+	–
Loyal	134	121+	113	108+	130	–	56	–	103	133+	147+	–	71	92+	78	103+
Paul Hls	53	64	58	61	70	–	41	–	53	73	85	–	50	62	60	76
Richard	97	99	101	92	129	–	84+	–	115+	129+	131	–	64	86+	73	104+
Riser	83	88	120+	102+	116	–	46	–	74	97	94	–	66	77	67	79
Settler	126	114+	83	93	132	–	56	–	86	130+	108	–	66	84	66	90
Troy	124	114+	92	97+	126	–	62	–	121+	147+	118	–	60	90+	69	95
Youngs	129	122+	106	113+	128	–	64	–	101	144+	129	–	59	84	77	99
Test avg.*:	113	104	101	96	122	–	61	–	98	123	122	–	66	84	74	93
LSD (5%) $:	11	19	10	19	11	–	13	–	12	18	9	–	8	13	11	12
CV (%) #:	7	6	7	7	6	–	15	–	9	7	5	–	9	6	10	9

+ Entry is in top-yield group - seed yield comments.
* Test average - only released varieties are reported.
$ LSD (5%) - see yield comments.
$$ Differences within a column are not significant.
A measure of experimental error; a value of 15% or less is best.

Table 5. Agronomic performance averages for oat entries tested in year 2001.

Variety	Relative Heading day	2001 Protein pct	2001 Bushel Weight lb	2001 Height inch	Yield-bu/a 2001	Yield-bu/a 3-yr	Top Yield Percentage 2001	Top Yield Percentage 3-yr
Don	0	14.8	36	31	92	100	0	60
Ebeltoft	8	15.1	32	32	100	114	50	100
Hytest	3	18.3	39	36	81	83	0	0
Jerry	4	16.2	37	34	94	105	0	80
Killdeer	5	14.2	35	32	110	–	75	–
Loyal	7	17.2	36	37	104	109	13	100
Paul Hls	6	21.0	43	37	59	66	0	0
Richard	3	15.8	34	36	99	102	25	60
Riser	0	18.6	37	31	83	88	13	20
Settler	4	17.3	36	35	91	100	0	40
Troy	6	16.4	35	36	97	105	13	80
Youngs	8	15.7	33	36	99	109	0	60
State test avg.:		16.8	37	34	95	98		

* Percent of time a variety appears in the top-yield group across eight (2001) or five (1999-2001) test sites when experimental error was low as indicated by C.V. values of 15% or less.

Table 6. Origin, disease reaction, and other traits for year 2001 oat entries.

Variety	Origin	Stand-ability	Grain Color	Disease reaction: Smut	Disease reaction: Stem Rust	Disease reaction: Crown Rust	Disease reaction: Red Leaf	PVP Status
Don	IL-85	Good	White	R	MS	S	MR	No
Ebeltoft	ND-99	Good	Ivory	–	R	MR	MR	**
Hytest	SD-86	Good	Lt.Cream	MR	MS	MS	MS	No
Jerry	ND-94	Good	White	–	MS	MR	MS	Yes
Killdeer	ND-00	Good	White	–	R	MR	–	**
Loyal	SD-00	Good	White	R	MS	R	S	No
Paul Hls	ND-94	Good	Hulless	MS	MR	MS	S	Yes
Richard	MN-00	Good	Yellow	MR	–	MR	MS	**
Riser	SD-98	Good	Yellow	MR	S	R	MS	No
Settler	SD-89	Good	White	MR	S	MS	MR	No
Troy	SD-91	Fair	White	MR	S	MS	MR	No
Youngs	ND-99	Good	White	–	R	MR	MR	**

+ R = resistant, MR = moderately resis., MS = mod. susceptible, S = susc.

* Plant Variety Protection (PVP), Title V, Certification Option - to be sold by variety name only as a class of certified seed.

** PVP application pending/anticipated.

Table 7. Barley variety testing yield averages, 1999-2001.

Variety	Location															
	Brookings		Watertown		Highmore		Selby		Brown Co.		Wall		Bison		Ralph	
	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr
	bu/acre															
Two-row types:																
Conlon	82	73	107+	81+	77	63+	85+	85+	94+	76+	50	52+	43+	51+	42+	42+
Logan	87	78+	104+	81+	93+	71+	84+	82+	96+	75+	53+	57+	47+	55+	45+	46+
Six-row types:																
Drummond	74	70	106+	74+	86+	60	83+	82+	96+	76+	48	50	38	48	30	40+
Excel	100+	84+	98	79+	89+	66+	80	81	98+	78+	53+	58+	38	47	36	46+
Foster	86	81+	94	77+	83+	63+	79	80	98+	78+	50	55+	44+	53+	37	44+
Lacey	94+	83+	99+	82+	80+	65+	88+	87+	101+	77+	55+	57+	38	52+	36	49+
Legacy	95+	–	89	–	87+	–	84+	–	96+	–	55+	–	43+	–	42+	–
Mnbrite	79	72	92	73+	82	60	79	76	94+	73+	44	49	32	48	32	41+
Robust	87	77+	94	76+	75	59	80	77	92+	72+	48	51+	37	50+	25	40+
Stander	82	69	83	69	91+	62+	86+	86+	101+	78+	56+	51+	43+	55+	33	45+
Test avg.*:	86	76	97	77	84	63	83	82	97	76	51	53	40	51	36	44
LSD (5%) $:	9	8	8	11	10	10	6	5	ns$$	ns	4	7	7	5	3	ns$$
CV (%) #:	7	9	5	7	9	8	5	5	6	7	5	8	12	13	6	10

+ Entry is in top-yield group - seed yield comments.
* Test trial average - only released varieties are reported.
$ LSD (5%) - see yield comments.
$$ Differences within a column are not significant.
A measure of experimental error; a value of 15% or less is best.

Table 8. Agronomic performance averages for barley entries tested in year 2001.

Variety	Relative Heading day	2001 Protein pct	2001 Bushel Weight lb	2001 Height inch	Yield-bu/a 2001	Yield-bu/a 3-yr	Top Yield Percentage 2001	Top Yield Percentage 3-yr
Two-row types:								
Conlon	0	12.1	50	28	72	65	63	88
Logan	2	11.9	49	29	76	68	88	100
Six-row types:								
Drummond	2	12.2	47	31	70	62	50	50
Excel	3	11.6	47	30	74	67	50	75
Foster	2	11.4	47	31	71	66	38	88
Lacey	0	12.2	48	30	74	69	75	100
Legacy	2	12.0	47	31	74	–	88	–
Mnbrite	2	12.8	48	32	67	61	13	38
Robust	3	12.6	48	32	67	63	13	75
Stander	3	12.0	47	30	72	64	63	75
State test avg.:		12.1	48	30	72	66		

* Percent of time a variety appears in the top-yield group across eight (2001) or eight (1999-2001) test sites when experimental error was low as indicated by C.V. values of 15% or less.

Table 9. Origin, disease reaction, and other traits for barley entries tested in year 2000.

Variety	Origin	Stand-ability	End Use	Awn Texture	Disease reaction: Smut	Disease reaction: Stem Rust	Disease reaction: Blotch Spot	Disease reaction: Blotch Net	PVP Status
Two-row types:									
Conlon	ND-96	Good	Malt	SS	S	S	MS	MR	**
Logan	ND-95	Good	Feed	SS	S	S	MS	MR	Yes*
Six-row types:									
Drummond	ND-00	VGood	Feed	SS	S	S	R	MS	**
Excel	MN-90	VGood	Malt	Sm	S	S	MR	S	Yes
Foster	ND-95	VGood	Malt	SS	S	S	MR	S	Yes
Lacey	MN-00	Good	Feed	Sm	S	–	–	–	**
Legacy	BARI-01	VGood	Malt	Sm	S	MR	MR	MS	Yes
Mnbrite	MN-97	Good	Feed	Sm	S	MS	MR	S	**
Robust	MN-83	Good	Malt	Sm	S	S	MR	S	Yes
Stander	MN-93	VGood	Malt	Sm	S	S	MR	S	Yes

R = resistant, MR = moderately resis., M = intermediate, MS = mod. susceptible, S = susc.
Sm = smooth, SS = semi-smooth texture.
* Plant Variety Protection (PVP), Title V, Certification Option - to be sold by variety name only as a class of certified seed.
** PVP application pending/anticipated.

Table 10. 2001 Malting barley trial, Brown Co.- Allen Ryckman, cooperator. Trial was funded by Busch Agricultural Resources, Inc. - Ft. Collins, CO.

Variety	Bu/acre	Bu.Wt. lb	Protein $ bu/acre	Ht. inch	Lodging 1-5
6B95-2089	113	47	12	34	2
6B95-2482	111	48	13	34	2
6B95-2482-1	115	48	13	34	3
6B95-2482-4	111	48	12	32	2
6B96-3373	111	46	13	30	2
6B96-3733	121+	47	13	34	2
6B97-2037	120+	47	14	33	2
6B97-2195	115	48	12	31	4
6B97-2245	105	47	13	32	4
6B97-2248	107	47	13	34	3
6B97-2601	116	47	13	35	3
6B98-9022	118	46	13	34	3
6B98-9031	118	46	13	35	3
6B98-9058	111	47	13	32	3
6B98-9105	114	46	13	34	3
6B98-9170	123+	47	13	35	2
6B98-9339	119+	46	13	30	3
6B98-9555	102	46	12	33	4
6B98-9558	115	47	12	35	3
6B98-9786	115	46	13	33	1
6B98-9789	115	46	13	34	3
6B98-9814	119+	45	13	33	3
6B98-9831	114	46	13	34	3
6B98-9844	117	45	12	32	4
6B98-9852	115	46	13	33	3
6B98-9920	120+	47	13	35	3
6B98-9940	127+	46	13	35	3
CDC SISLER	106	46	13	37	2
DRUMMOND	105	46	13	33	3
EXCEL	112	47	12	31	3
FOSTER	119+	46	12	34	2
LACEY	111	48	13	32	2
LEGACY	112	46	13	34	2
MNBRITE	102	48	14	33	3
MOREX	97	45	13	34	4
ROBUST	108	47	14	35	3
Trial avg.:	113	47	13	33	3
LSD (5%) $:	8	1	–	–	–
CV (%) #:	5	1	–	–	–

+ Entry is in top-yield group - seed yield comments.
$ LSD (5%) - see yield comments.
$$ Differences within a column are not significant.
A measure of experimental error; a value of 15% or less is best.

Table 11. Hard red winter wheat variety performance testing yield averages 1999-2001.

Variety	Location									
	Brookings		Watertown		Highmore		Selby		Britton	
	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr
	bu/acre									
Alliance	70	–	54	–	36	61+	35	58	42	–
Arapahoe	71	–	66	–	40	56+	32	50	47	–
Avalanche~W	30	–	31	–	23	–	29	–	32	–
CDC Falcon	75	–	69	–	39	–	30	–	49	–
Crimson	67	–	57	–	31	51+	28	46	36	–
Culver	57	–	54	–	29	58+	40	50	43	–
Golden Spike~W	44	–	20	–	25	–	24	–	10	–
Harding	54	–	67	–	29	50+	39	50	40	–
Hondo	45	–	55	–	27	55+	25	46	41	–
Jagger	29	–	26	–	18	52+	24	42	24	–
Jerry~W	81	–	73	–	37	–	31	–	53	–
Millennium	79	–	54	–	34	61+	36	54	47	–
Nekota	62	–	59	–	31	54+	40	50	44	–
NuFrontier~W	62	–	28	–	26	–	26	–	35	–
NuHorizon~W	63	–	39	–	23	–	31	–	30	–
NuPlains~W	47	–	50	–	30	59+	28	51	29	–
Quant.7588~H	61	–	62	–	19	59+	37	61	39	–
Ransom	74	–	79	–	37	52+	29	47	54	–
Rose	62	–	51	–	29	47+	30	42	27	–
Scout 66	41	–	47	–	30	44+	30	39	31	–
Stanton	56	–	28	–	24	–	21	–	27	–
Tam-107	37	–	37	–	14	50+	31	47	25	–
Tandem	70	–	49	–	34	52+	38	52	47	–
Trego~W	72	–	45	–	26	–	29	–	33	–
Vista	66	–	61	–	31	58+	37	49	35	–
Wahoo	69	–	33	–	35	–	30	–	36	–
Wesley	70	–	55	–	33	62+	30	54	42	–
Windstar	70	–	75	–	31	54+	31	43	50	–
2137	36	–	29	–	22	59+	31	52	24	–
Test avg.*:	60	–	49	–	29	55	30	49	37	–
LSD (5%) $:		–	–	–	–	–	ns$$	–	–	–
CV (%) #:	19	–	23	–	20	11	22	18	21	–

~ A hard white (W) winter wheat.
+ Entry is in top-yield group - seed yield comments.
* Test average - only released varieties are reported.
$ LSD (5%) - see yield comments.
$$ Differences within a column are not significant (ns).
A measure of experimental error; a value of 15% or less is best.

Table 11 (continued). Hard red winter wheat variety performance testing yield averages (Continued).

Variety	Location									
	Wall		Martin		Sturgis		Oelrichs		Tripp Co.	
	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr	2001	3-yr
	bu/acre									
Alliance	36	52+	46	64+	69	–	52	82+	58+	62+
Arapahoe	40+	50+	47	62+	66	–	57+	79+	59+	59+
Avalanche~W	27	–	49+	–	69	–	52	–	41	–
CDC Falcon	40+	–	49+	–	62	–	49	–	58+	–
Crimson	41+	51+	49+	59+	62	–	52	69	52	54+
Culver	36	47+	50+	61+	66	–	52	76	48	56+
Golden Spike~W	33	–	54+	–	68	–	54+	–	48	–
Harding	42+	48+	44	52	64	–	53+	68	62+	58+
Hondo	40+	47+	48+	61+	59	–	55+	76	45	52+
Jagger	33	44+	42	55	67	–	57+	82+	45	56+
Jerry~W	35	–	54+	–	60	–	46	–	61+	–
Millennium	46+	48+	49+	59+	68	–	58+	76	54+	59+
Nekota	36	41+	50+	55	63	–	54+	76	52	59+
NuFrontier~W	27	–	46	–	67	–	44	–	60+	–
NuHorizon~W	34	–	49	–	67	–	46	–	49	–
NuPlains~W	38+	44+	50+	61+	65	–	52	75	42	54+
Quant.7588~H	32	51+	53+	69+	76+	–	60+	92+	47	65+
Ransom	42+	49+	48+	53	62	–	49	62	58+	52+
Rose	29	46+	47	53	62	–	46	66	50	48+
Scout 66	41+	44+	44	51	57	–	52	61	49	48+
Stanton	30	–	47	–	67	–	48	–	55+	–
Tam-107	30	42+	48+	63+	61	–	51	79+	48	55+
Tandem	40+	49+	49+	59+	61	–	55+	69	61+	58+
Trego~W	35	–	49+	–	68	–	51	–	52	–
Vista	44+	53+	48+	60+	66	–	56+	74	55+	56+
Wahoo	43+	–	53+	–	69	–	59+	–	59+	–
Wesley	38+	50+	50+	61+	71	–	55+	82+	61+	67+
Windstar	39+	52+	43	57	64	–	52	76	55+	57+
2137	34	50+	47	61+	64	–	50	80+	44	61+
Test avg.*:	36	48	48	59	66	–	52	75	54	57
LSD (5%) $:	8	ns$$	6	10	4	–	6	13	10	ns
CV (%) #:	15	11	9	14	5	–	9	7	14	11

~ A hard white (W) winter wheat.
+ Entry is in top-yield group - seed yield comments.
* Test average - only released varieties are reported.

Table 12. Agronomic performance averages for hard red winter wheat entries tested in 2001.

Variety	Heading Diff. days	Yield-bu/a 2001	Yield-bu/a 3-yr	2001 Bushel Weight lb	2001 Protein pct	2001 Coleoptile length inch*	2001 Winter Survival pct#
Alliance	2	50	60	58	11.4	2.1	64
Arapahoe	3	52	59	58	12.7	2.4	60
Avalanche~W	2	38	–	59	12.6	2.6	40
CDC Falcon	4	52	–	58	12.5	2.6	64
Crimson	5	47	53	61	13.0	3.4	64
Culver	3	47	56	57	12.5	3.4	53
Golden Spike~W	7	38	–	54	12.2	3.2	48
Harding	5	49	54	59	13.0	3.2	59
Hondo	3	44	54	60	12.9	2.9	45
Jagger	0	36	53	56	13.9	2.4	40
Jerry~W	6	53	–	58	13.2	2.9	58
Millennium	4	52	60	60	12.5	2.6	59
Nekota	2	49	56	59	12.5	2.9	62
NuFrontier~W	4	42	–	57	12.4	3.4	41
NuHorizon~W	3	43	–	58	13.0	3.4	46
NuPlains~W	3	43	55	60	12.6	2.4	48
Quant.7588~H	2	49	65	56	13.0	3.4	49
Ransom	5	53	53	58	12.6	3.4	64
Rose	5	43	50	60	13.1	3.4	50
Scout 66	2	42	46	59	13.0	3.7	54
Stanton	1	40	–	58	12.6	3.2	43
Tam-107	0	38	53	56	12.7	3.2	45
Tandem	4	50	55	60	13.2	3.4	61
Trego~W	3	46	–	60	12.1	2.4	54
Vista	2	50	57	58	12.7	2.9	58
Wahoo	3	48	–	56	12.9	3.2	54
Wesley	2	51	61	58	13.7	2.4	61
Windstar	5	51	57	58	12.7	2.4	55
2137	3	38	57	57	12.0	2.1	37
State test avg.:		46	55	58	12.7		53

* Coleoptile length to nearest 0.1 inch.

\# Average of seven locations: Brookings, Watertown, Highmore, Wall, Selby, Britton, and Winner.

Table 13. Origin, disease reaction, and other traits for hard red winter wheat entries tested in 2001.

Variety	Origin	Lodging Res	Baking Qlty#	Winter Hardiness	Disease reaction: Wheat Streak Msc	Disease reaction: Tan Spot	Disease reaction: Rust Lf	Disease reaction: Rust St	PVP* Status
Alliance	NE-93	Good	Acc	Good	MS	VS	S	MS	Yes
Arapahoe	NE-88	Fair	Good	G-Exc	S	S	MR	MR	Yes
Avalanche~W	CO-01	Poor	Poor	Poor	–	–	S	MR	**
CDC Falcon	SK-98	Good	–	G-Exc	–	–	–	R	Can.
Crimson	SD-97	Good	Good	G-Exc	MR	R	S	MS	Yes
Culver	NE-98	Good	Acc	Fair	S	–	MS	R	Yes
Golden Spike~W	GM-00	Fair	Acc	Fair	–	–	–	MR	–
Harding	SD-99	F-Good	Acc	Exc	MR	MR	MR	MR	**
Hondo	AP-98	Good	–	Good	MR	R	R	R	Yes
Jagger	KS-94	Good	Exc	Poor	MR	R	S	MS	Yes
Jerry~W	ND-01	Fair	Good	Exc	–	–	S	R	**
Millennium	NE-99	Good	Acc	F-Good	S	MS	MS	MR	**
Nekota	NE/SD-94	Good	Good	Good	MS	MR	S	MR	No
NuFrontier~W	GM-01	G-Exc	Poor	Poor	–	–	–	S	**
NuHorizon~W	GM-01	Exc	Acc	Fair	–	–	–	MS	**
NuPlains~W	NE-99	Good	Acc	Good	S	S	MS	MS	**
Quant.7588~H	HYT-99	Good	Acc	–	MS	–	MR	R	Yes
Ransom	ND-98	Fair	Poor	Exc	S	–	MR	MR	**
Rose	SD-81	Good	Exc	G-Exc	S	R	S	S	No
Scout 66	NE-66	Poor	Good	F-Good	MS	MR	S	S	No
Stanton	KS-00	G-Exc	Acc	Fair	–	–	S	R	**
Tam-107	TX-84	Exc	Acc	P-Fair	MR	S	S	MR	Yes
Tandem	SD-97	F-Good	Exc	Good	S	S	S	MR	Yes
Trego~W	KS-99	F-Good	Exc	F-Good	S	MS	MR	R	**
Vista	NE-92	Fair	Good	Good	MS	VS	MR	MR	Yes
Wahoo	NE/WY-01	Good	–	Good	S	–	S	R	**
Wesley	NE-98	Exc	Acc	G-Exc	S	MR	MS	R	No
Windstar	NE-96	Good	Acc	Good	MS	VS	–	R	Yes
2137	KS-95	Exc	Good	F-Good	MR	R	MR	MS	Yes

~ hybrid (H) or white (W) variety.

Exc = exceptional or Acc = acceptable quality.

+ R = resistant, MR = moderately resis., M = intermediate, MS = mod. susceptible, S = susc., VS = very susc..

* Plant Variety Protection (PVP), Title V, Certification Option - to be sold by variety name only as a class of certified seed.

** PVP application pending/anticipated.

Table 14. Field pea agronomic performance averages for year 2001 at Wall, South Dakota.

Variety	Yield-bu/a 2001	Yield-bu/a 2-yr	Bushel Weight lb	Height inch	Score Shatter 1-5	Score Lodging 1-9
Arvika	24	–	62	47	1	9
Atomic	24	–	62	21	1	1
Badminton	32+	–	63	22	1	2
Carneval	30	–	62	25	1	1
CEB1158	32+	–	62	20	1	1
CEB1475	33+	–	63	22	1	1
Cruiser	25	–	62	25	1	2
Crusader	28	–	61	25	1	1
Delta	34+	–	63	23	1	1
Franklin	18	–	62	19	1	4
Grande	24	–	63	25	1	2
Highlight	27	–	63	21	1	3
Integra	27	–	62	25	1	2
Journey	27	–	62	38	1	7
Lifter	19	–	63	22	1	5
Majoret	25	–	64	26	1	1
Profi	28	–	63	23	1	2
PS610152	28	–	63	20	1	2
PS610424	24	–	62	22	1	1
PS710149	17	–	62	22	1	3
Salute	32+	–	62	25	1	1
Toledo	29	–	61	25	1	1
40-10 Magda	26	–	63	46	1	9
Test avg.:	27	–				
LSD (5%)$:	2	–				
CV (%)#:	12	–				

+ Entry is in top-yield group - seed yield comments.
$ LSD - see yield comments.
# A measure of experimental error; a value of 15% or less is best.

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