12-2003

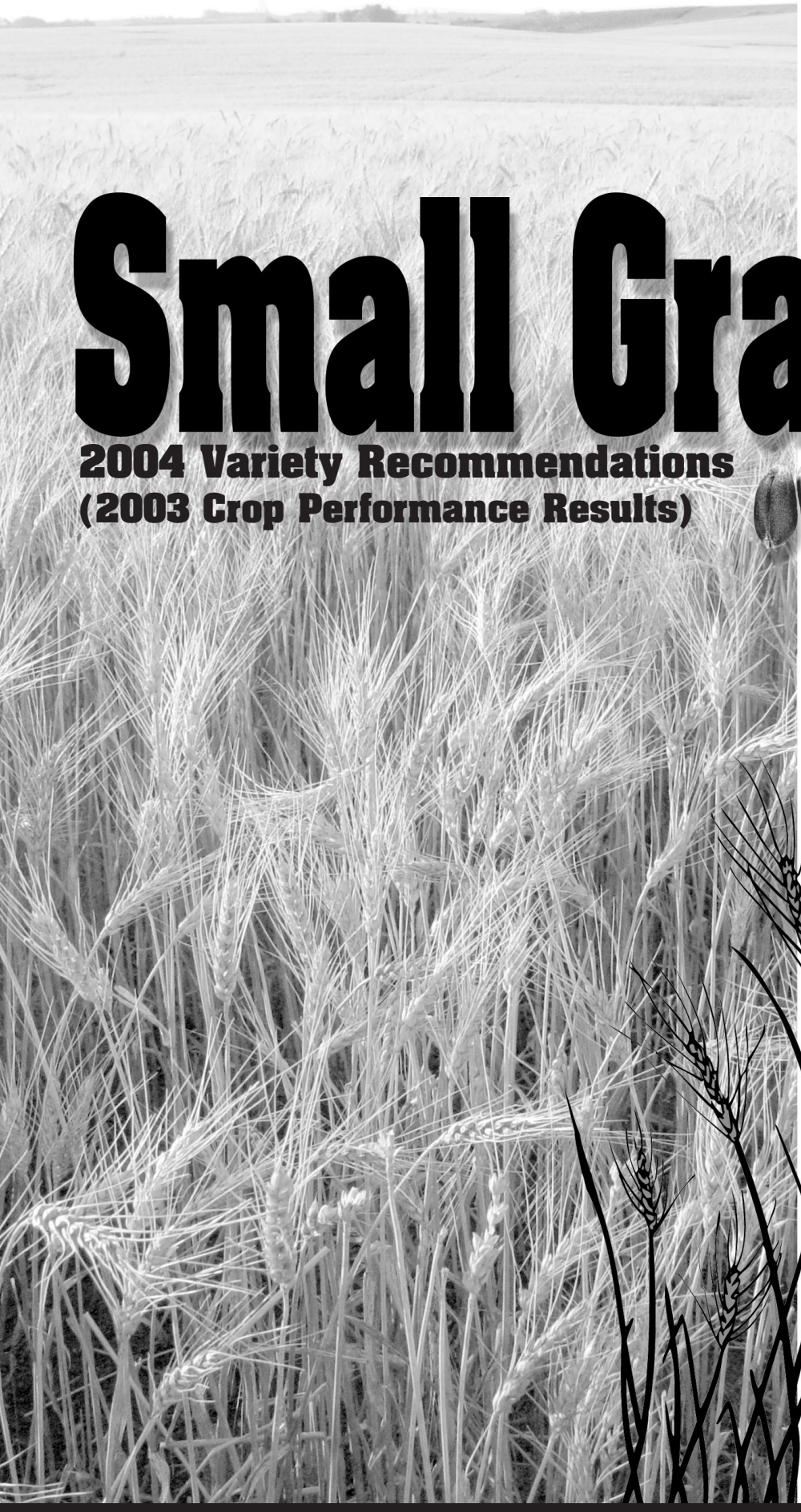
Small Grains: 2004 Variety Recommendations (2003 Crop Performance Results)

Cooperative Extension Service, South Dakota State University

EC 774
Revised
Annually

Small Grains

2004 Variety Recommendations
(2003 Crop Performance Results)



Spring Wheat
Oats
Barley
Winter Wheat

South Dakota State University • Cooperative Extension Service • U.S. Department of Agriculture

This report is available on the World-Wide-Web at http://plantsci.sdstate.edu/varietytrials/vartrial.html

Small Grain Variety Recommendations for 2004

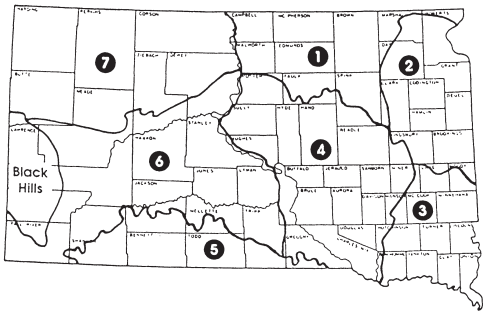
Recommendations are based on data obtained from the South Dakota State University Crop Performance Testing (CPT) Program and regional land-grant university nurseries. Variety performance depends on genetics and the environment. Environmental factors like temperature, moisture, plant pests, soil fertility, 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. 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*
Briggs @	Statewide	Alsen @	1, 2, 7
Forge @	Statewide	Norpro @	1, 2, 7
Ingot @	Statewide	Parshall @	1, 7
Knudson @	Statewide	Walworth @	Statewide
Oxen @	Statewide		
Reeder @	Statewide		
Russ @	Statewide		

Crop Adaptation Areas for South Dakota

(revised 1992)



OATS

Recommended:		**Acceptable/Promising:**	
Variety	*CAA*	*Variety*	*CAA*
Don	1, 4, 5, 6, 7	Buff (hull-less)	Statewide
Jerry #	Statewide		
Loyal +	1, 2, 4, 6, 7		
Reeves	Statewide		

BARLEY

Recommended:		**Acceptable/Promising:**	
Variety	*CAA*	*Variety*	*CAA*
Excel @	1, 2, 4, 6, 7	Conlon @	1, 4, 6, 7
Lacey @	Statewide	Drummond @	Statewide
Robust @	1, 2, 4, 6, 7		

American Malting Barley Association approved malting varieties for South Dakota - 2003.

Conlon	*Lacey*
Drummond	*Legacy*
Excel	*Morex*
Foster	*Robust*

WINTER WHEAT revised

Recommended:		**Acceptable/Promising:**	
Variety	*CAA*	*Variety*	*CAA*
Alliance @	3, 4*, 5, 6	Crimson @	1*, 2*, 3*, 4*, 6, 7
Arapahoe @	1*, 3, 4*, 5, 6, 7*	Expedition @	1*, 4, 5, 6, 7*
Harding @	1*, 2*, 4, 7	Jagalene @	1*, 3, 4*, 5, 6, 7*
Millennium @	1*, 4*, 5, 6, 7	Trego (white) @	5, 6, 7*
Tandem @	1*, 3, 4*, 5, 6, 7*		
Wesley	1*, 3, 4*, 5, 6, 7*		

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

 # PVP non-title V status.

+ Exceptional crown rust resistance

** Plant into protective cover.*

Small Grains

2003 South Dakota Test Results: Variety Traits 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—and 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 important; 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 are new varieties with a high performance potential but that do not meet the 3-year criteria (Table A) needed to make the "Recommended" list. A variety needs 2 years and 6 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.

1. Check the variety-crop adaptation area (CAA) designations for the "Recommended" and "Acceptable/ Promising" lists. 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 traits.** Descriptive information (the traits 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. 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 rating for hard red spring wheat is also given. Note that 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. In addition, stripe rust became a major concern in 2003. Note the stripe rust reactions of the various varieties in the traits table.

3. **Evaluate each variety you select for yield performance**. Yields are obtained from the SDSU Crop Performance Testing Program. Both 1- and 3-year average yields for each variety tested are included for each test location if the variety was tested for 3 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 the test results for you to 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 1-year yields with other 1-year yields, and 3-year yields with other 3-year yields. Do not compare a 1-year average with a 3-year average.

Before evaluating any data at a location, determine whether the data are valid. The CV value at the bottom of each yield column is a measure of experimental error. Yield tests with a CV of 16% or higher contain higher amounts of experimental error than tests with a CV of 10% or less. **Test sites with a CV greater than 15% are not included in the calculations for yield stability. At these sites, the top yielding varieties are not indicated in the table because the validity of the yield differences among the varieties is uncertain as a result of the high level of experimental error**.

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 yield group for each location. For example, at each location the variety with the highest numerical yield is identified using 1- or 3-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 yield group at that location.

For example, the top yielding entry at Brookings for 2003 was an experimental line (not reported) that yielded 67 bu/acre. Subtracting 6 bu/acre (the rounded-off LSD value) from the highest yield entry of 67 bu/acre equals 61 bu/acre. Therefore, all varieties listed in that column yielding 62 bushels or higher are in the top yield group that included Forge, Russ, and Walworth, and one experimental line not reported. Any variety yielding 61 bushels or less is not in the top yield 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 bushel per acre. At some locations, a plus (+) may be absent for all values within a yield column. This indicates the top yielding entries were experimental lines; therefore, no plus signs are indicated because none of the released varieties under test were in the top yield-group.

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 yield group. In some cases a high level of experimental error is indicated by a high CV value. In such a case the top yield group is not determined.

When evaluating yield performance, remember that environmental conditions at a test location seldom repeat themselves from year to year. Look at 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 were developed and released jointly by one or more experiment stations or USDA. Proprietary varieties were released by commercial companies. Company abbreviations for these include:

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

Trial methods

A random complete block design was used in all trials. Plots were harvested with a small plot combine. Plot size differed between the East River and West River locations. East River plots were 5 feet wide and either 12 or 14 feet long;West River plots measured 5 feet wide by 25 feet long. Plots consisted 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. Yield means are generated from four variety replications per location per year.

Fertility and weed control programs differed between East and West River locations. East River plots were fertilized with 60 lb/ac of 18-46-0 (10.8 lb N and 27.6 lb P per acre) down the seed tube at seeding. At Brown County a post-emergence application of Bronate (1 pint) was applied on all the small grain plots. West River plots were fertilized with 6 gal of 10-34-0 per acre (6.6 lb N and 24 lb P per acre) at seeding. Post-emergence applications of 0.5 oz. of Harmony GT (wheat) and 1 pint of Bronate (oats and barley) per acre were applied at the 3- to 5- leaf stage. In addition, .67 pint per acre of Puma was used to control wild oat at Ralph and Bison.

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; at West River locations rates are 22 pure live seeds per square foot. 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 grain seeding rate to 32 and 25 seeds per square foot at 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 (Tables 1a – 1c). The top performing varieties for year 2003 (variety and top yield percentage) were **Alsen and Forge at 63%**, **Reeder and Russ at 50%**, and **Briggs, Oxen, and Walworth at 38%** (see agronomic performance tables for spring wheat). This means these varieties were in the top-yielding group at 63%, 50%, and 38% of the test locations for 2003. The best top-yield varieties over the past three years were **Forge, Reeder, and Russ at 100%**; **Oxen, Knudson, and Parshall at 83%**; and **Alsen, Briggs, Ingot, NorPro and Walworth at 67%** of the test locations. **Ingot** has consistently exhibited the highest statewide bushel weight in the SDSU-CPT trials for the last few years.

Oat (Tables 2a – 2c). In 2003, **Don, HiFi, and Jerry** exhibited a top yield percentage of **50%**. Over the past

3 years the highest top yield percentages were **Jerry at 80%; and Don, Loyal, and Reeves at 60%**.

NOTE: This year the hull-less varieties Buff and Paul exhibited the highest average bushel weights (43 and 42 lb, respectively) followed by the conventional varieties Hytest, Jerry, and Reeves (40, 38, and 38 lb, respectively).

Barley (Tables 3a – 3c). In 2003, the best top yield group percentages were **Haxby at 75%; Valier at 63%, and Conlon** and **Excel at 38%** of the locations tested. The better varieties over the past three years were **Lacey at 100%; Robust at 80%,** and **Conlon, Drummond, and Excel at 60%** of the test locations. The two-row varieties, Haxby and Conlon, tested 1 to 3 lb higher in bushel weight than the average across all varieties.

HRW Wheat (Tables 4a – 4c). In 2003, the better performing varieties were **Jagalene, Millennium, and Wahoo; followed by the varieties CDC Falcon, Expedition, Wesley, Alliance, and Arapahoe** that performed above average. The best varieties for the past 3 years were **Alliance, Arapahoe, CDC Falcon, Expedition, Millennium, Nekota, Tandem, Trego (white), Wahoo, and Wesley**. Limited subsoil moisture and a lack of timely seasonal moisture were major factors in some winter wheat production areas of South Dakota again this year.

Note the coleoptile length of the various varieties included in the agronomic performance table. The coleoptile length of 3.2 inches for Harding is used as the standard (100%) for making comparisons. The coleoptile length for the varieties Crimson, Ransom, and Tandem are slightly longer than for Harding; the coleoptile length for the varieties Alliance, NuPlains, Millennium, Trego, and Wesley are shorter compared to Harding.

The people who put this report together

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.

Others, gratefully acknowledged, are
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S. Masat (Spink Co.)
A. and I. Ryckmann (Brown Co.)
B. Jorgensen (Tripp Co.)
K. Matkins (Sturgis)
W. Miller (Oelrichs)
L. Novotny (Martin)
R. Rosenow (Ralph)
M. Stiegelmeier (Selby)
R. Vander Pol (Platte)
G. Wunder (Bison)

Table A. Minimum criteria required for the recommended list in this publication.

Trait	Crop			
	HRS Wheat	Oats	Barley	HRW Wheat
Yield	3/15*	3/15	3/12	3/15
Bushel weight	3/15	3/15	3/12	3/15
Height	3/15	3/15	3/12	3/15
Lodging	WA	WA	WA	WA
Disease reaction	A	A	A	A
Protein	3/15	-	3/12	3/15
Quality data#	2/4	WA	WA	WA
Unigue traits$	WA	WA	WA	WA

* 3 years/15 location-years. # includes milling and baking.
$ traits that affect production and marketing.
A= annually, WA= when available.

Table B. 2003 Small grain seeding dates by crop and location.

Location	Crops			
	HRS Wheat	Oats	Barley	HRW Wheat
	seeding date			
Beresford	-	Apr 14	-	-
Bison	Apr 9	Apr 9	Apr 9	Sept 17
Brookings	Apr 11	Apr 11	Apr 11	Sept 21
Brown Co.	Apr 8	Apr 8	Apr 8	-
Dakota Lakes	-	-	-	Sept 18
Hayes	-	-	-	Sept 18
Highmore	Apr 10	Apr 10	Apr 10	Sept 19
Kennebec	-	-	-	Sept. 25
Martin	-	-	-	Sept 19
Oelrichs	-	-	-	Sept 26
Platte	-	-	-	Sept 24
Ralph	Apr 9	Apr 9	Apr 9	
Selby	Apr 14	Apr 14	Apr 14	abandoned
South Shore	Apr 15	Apr 15	Apr 15	Oct 3
Spink Co.	Apr 11	-	-	
Sturgis	-	-	-	Sept. 17
Tripp Co.	-	-	-	Sept 24
Wall	Apr 3	Apr 3	Apr 3	Sept 25

Spring Wheat

Table 1a. Spring wheat variety testing yield averages, 2001-2003.

	Location											
	Brookings		South Shore		Highmore		Spink Co.		Selby		Brown Co.	
Variety	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr
	bu/a											
Alsen	48	45	53+	48+	30+	.	65+	46+	45	37	55+	53+
Briggs	53	51+	52+	51+	28	.	60	46+	54	43+	56+	50+
Chris,CK	40	37	43	35	21	.	49	36	37	32	36	39
Dapps	56	.	46	.	26	.	53	.	50	.	49	.
Forge	65+	59+	48	49+	30+	.	60	47+	60+	45+	50	51+
Granite	54	.	51+	.	27	.	58	.	58	.	48	.
Hanna	54	50	49	48+	28	.	57	45+	45	38	46	46+
Ingot	55	50	49	50+	28	.	54	43	58	43+	45	46+
Knudson	51	49	49	48+	22	.	64	48+	55	44+	55+	49+
Norpro	53	52+	52+	49+	27	.	57	48+	54	45+	47	45
Oklee	44	.	47	.	25	.	58	.	45	.	47	.
Oxen	47	44	50	48+	30+	.	65+	50+	46	40+	50	48+
Parshall	57	55+	47	47+	27	.	55	43	62+	43+	46	46+
Reeder	58	53+	53+	52+	28	.	60	49+	61+	47+	42	47+
Russ	64+	55+	52+	50+	35+	.	63	48+	60+	45+	47	48+
Walworth	65+	53+	50	49+	29	.	58	43	59+	44+	49	44
Test avg.*:	54	50	51	48	28	.	60	46	53	42	49	47
Lsd (5%) $:	6	7	5	6	5	.	5	6	5	7	5	7
Cv (%) #:	7	9	7	6	11	.	5	8	6	8	7	6

\+ 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 1b. Spring wheat variety testing yield averages (continued).

							State wide						
							2003					Top yield	
			Location				Bu.			Yield		Group	
	Wall		Bison		Ralph		Prot.	Wt.	Ht.	-- bu/a --		--- % ---	
Variety	'03	3-yr	'03	3-yr	'03	3-yr	pct	lb	in.	'03	3-yr	'03	3-yr
	bu/a												
Alsen	36+	33+	44	.	29	.	15.2	61	31	45	41	63	67
Briggs	31	30	50+	.	33	.	14.5	61	33	46	43	38	67
Chris,CK	31	27	42	.	24	.	15.2	58	35	36	33	0	0
Dapps	31	.	40	.	27	.	15.6	60	34	42	.	0	.
Forge	38+	33+	49+	.	34	.	13.4	61	32	48	45	63	100
Granite	32	.	42	.	28	.	15.5	62	30	44	.	13	.
Hanna	33	29	46+	.	33	.	14.2	60	35	43	41	13	50
Ingot	36+	33+	49+	.	26	.	14.6	62	35	44	42	25	67
Knudson	29	31+	46+	.	28	.	14.6	61	29	44	43	25	83
Norpro	32	30	47+	.	29	.	14.2	58	28	44	43	25	67
Oklee	35	.	42	.	25	.	15.1	61	30	41	.	0	.
Oxen	37+	34+	45	.	26	.	14.7	59	29	44	42	38	83
Parshall	36+	31+	45	.	28	.	15.0	60	34	45	42	25	83
Reeder	37+	34+	49+	.	31	.	14.7	60	31	46	44	50	100
Russ	35	32+	45	.	32	.	14.1	60	33	48	44	50	100
Walworth	37+	33+	43	.	27	.	14.6	60	31	46	42	38	67
Test avg.*:	35	32	45	.	29	.	14.5	60	32	45	42	.	.
Lsd (5%) $:	5	4	5	.	.	.							
Cv (%) #:	10	7	8	.	20	.							

\+ 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.
* Percent of time a variety appears in the top-yield group across eight (2003) or six (2001-2003) test sites when experimental error was low as indicated by c.v. values of 15% or less.

Table 1c. Origin, disease reaction, and other traits for hard red spring wheat entries for year 2003.

		-- Traits# --		----- Disease reaction+ -----				
		Rel. Hdg.	Ldg.	------	Rust	------	Fusarium Head	PVP
Variety	Origin	day	Resis.	Stripe	Leaf	Stem	Blight~	Status
Alsen	ND-00	+4	VG	R	MR	R	MR	Yes
Briggs	SD-02	0	F	MR	R	R	M	**
Chris,CK	MN-65	+3	P	-	MS	R	S	No
Dapps	ND-03	+2	VG	MR	MR	R	S	**
Forge	SD-97	-1	G	MS	MS	MR	MS	Yes
Granite	WP-02	+5	G	MS	R	MS	-	Yes
Hanna	ABI-03	+2	G	MS	MS	MR	-	Yes
Ingot	SD-98	-1	F	MR	MS	R	M*	Yes
Knudson	AP-01	+2	G	MS	MR	R	MS	Yes
Norpro	AP-00	+3	E	MR	MR	R	MS	Yes
Oklee	MN-03	+2	F	-	MS	-	-	**
Oxen	SD-96	+2	G	MR	MR	R	MS	Yes
Parshall	ND-99	+4	G	R	MS	R	MS	Yes
Russ	SD-95	+2	G	R	MR	R	MS	Yes
Reeder	ND-99	+3	G	MR	MS	R	MS	Yes
Walworth	SD-01	+2	F	S	MS	R	M	Yes

E= excellent, VG= very good, G= good, F= fair, P=poor.
+ 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 or anticipated.

Table 2a. Oat variety testing yield averages, 2001-2003.

	Location											
	Brookings		South Shore		Beresford		Highmore		Selby		Brown Co.	
Variety	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr
	bu/a											
Conventional varieties:												
Don	126	112	106+	88+	99	109+	28	.	119+	84	99	.
HiFi	130	.	68	.	101+	.	37	.	106	.	107+	.
Hytest	114	101	84	77	80	83	44+	.	90	72	65	.
Jerry	128	118+	97	87+	109+	108+	38	.	114+	87	103	.
Loyal	129	120+	81	88+	96	98	25	.	95	88	105+	.
Morton	112	.	92	.	96	.	39	.	108	.	93	.
Reeves	121	110	99	91+	94	100+	41+	.	103	78	73	.
Hulless varieties:												
Buff	99	88	73	70	82	80	49+	.	91	72	68	.
Paul	88	62	42	43	61	51	30	.	55	44	40	.
Test avg.*:	118	105	86	81	93	93	38	.	101	79	87	.
Lsd (5%) $:	9	13	10	16	11	16	8	.	8	15	12	.
Cv (%) #:	6	6	8	7	8	6	15	.	6	8	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 2b. Oat variety testing yield averages (continued).

	Location				State wide						
					2003					Top Yield Group	
	Wall		Bison		Prot.	Bu. Wt.	Ht.	Yield			
	'03	3-yr	'03	3-yr	%	lb.	in.	'03	3-yr	'03	3yr
	bu/a							bu/a		%	
Conventional varieties:											
Don	79+	62+	72+	.	15.9	36	30	91	86	50	60
HiFi	77+	.	72+	.	15.2	35	34	87	.	50	.
Hytest	72	55+	61	.	18.4	40	37	76	74	13	20
Jerry	84+	62+	76+	.	16.4	38	35	93	88	50	80
Loyal	72	56+	73+	.	16.6	36	36	84	87	25	60
Morton	75+	.	76+	.	16.3	36	36	86	.	0	.
Reeves	73	58+	64	.	17.7	38	36	84	82	13	60
Hulless varieties:											
Buff Hls	67	50	56	.	17.8	43	32	73	69	13	0
Paul	52	37	50	.	19.4	41	34	52	49	0	0
Test avg.*:	71	55	69	.	17.0	38	35	83	80		
Lsd (5%) $:	10	10	12	.							
Cv (%) #:	10	10	12	.							

+ 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.
* Percent of time a variety appears in the top-yield group across eight (2003) or five (2001-2003) test sites when experimental error was low as indicated by c.v. values of 15% or less.

Table 2c. Origin, disease reaction, and other traits for 2003 oat entries.

Variety	Origin	Rel. Hdg. days	Ldg. Resis.	Grain Color	Smut	Stem	Crown	Red Leaf	PVP*
		--- Traits# ---			-- Disease reaction+ --		-- Rust --		
Conventional varieties:									
Don	IL-85	0	Good	White	R	MS	S	MR	No
Reeves	SD-02	+1	Good	White	MR	S	MR	MR	No
Hytest	SD-86	+3	Good	Lt.Cream	MR	MS	MS	MS	No
Jerry	ND-94	+4	Good	White	-	MS	MR	MS	Yes
Morton	ND-01	+6	Good	White	-	R	-	-	**
Loyal	SD-00	+7	Good	White	R	MS	R	S	No
HiFi	ND-01	+7	Good	White	-	R	MR	-	**
Hulless varieties:									
Buff Hls	SD-02	+2	Good	Hulless	R	S	MS	MR	No
Paul Hls	ND-94	+6	Good	Hulless	MS	MR	MS	S	Yes

+ 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 or anticipated.

Barley

Table 3a. Barley variety testing yield averages, 2001-2003.

	Location									
	Brookings		South Shore		Highmore		Selby		Brown Co.	
Variety	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr
Conlon	67	73	85+	80+	39	.	95	72+	64	66
Drummond	90	83	74	75+	46	.	100	76+	67	68
Excel	110+	100+	68	70	46	.	108+	79+	78	74+
Haxby	113+	.	86+	.	54+	.	111+	.	76	.
Lacey	93	93+	75	74+	46	.	103	80+	85+	78+
Robust	103+	92+	74	71	46	.	81	68+	74	72+
Valier	108+	.	78	.	47+	.	102	.	77	.
Test avg.*	100	88	76	74	45	.	101	75	75	72
Lsd (5%) $:	14	14	6	7	7	.	6	NS	5	8
Cv (%) #:	10	10	5	5	11	.	4	10	4	6

+ 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 3b. Barley variety testing yield averages (continued).

	Location						State wide					
							2003				Top yield Group	
	Wall		Bison		Ralph		Prot.	Bu. Wt.	Ht.	Yield - bu/a -		--- % ---
Variety	'03	3-yr	'03	3-yr	'03	3-yr	%	lb.	in.	'03	3-yr	'03	3-yr
	bu/a												
Conlon	54+	46+	62+	.	41	32	13.2	50	29	63	60	38	60
Drummond	50	40+	54	.	33	28	13.3	48	32	64	61	0	60
Excel	48	44+	53	.	46+	35	12.2	47	31	70	65	38	60
Haxby	59+	.	62+	.	34	.	12.6	52	28	74	.	75	.
Lacey	50	45+	61+	.	40	32	12.8	49	30	69	65	25	100
Robust	43	39+	58+	.	32	25	13.4	48	32	64	60	25	80
Valier	55+	.	58+	.	45+	.	14.0	50	28	71	.	63	.
Test avg.*:	52	43	58	.	40	31	12.9	49	30	68	63		
Lsd (5%) $:	7	NS	6	.	6	.							
Cv (%) #:	10	11	7	.	11	17							

\+ 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.
* Percent of time a variety appears in the top-yield group across eight (2003) or five (2001-2003) test sites when experimental error was low as indicated by c.v. values of 15% or less.

Table 3c. Origin, disease reaction, and other traits for barley entries in 2003.

		--------- Traits# ---------								
		Rel.				- Disease Reaction+ -				
		Hdg.	Ldg.	End	Awn		Stem	Blotch		
Variety	Origin	days	Resis.	Use	Texture	Smut	Rust	Spot	Net	PVP
Conlon	ND-96	0	G	Malt	SS	S	S	MS	MR	Yes
Drummond	ND-00	+2	VG	Malt	SS	S	S	R	MS	Yes
Excel	MN-90	+3	VG	Malt	S	S	S	MR	S	Yes
Haxby	MT-02	+2	-	Feed	S	S	-	-	-	Yes
Lacey	MN-00	0	G	Malt	S	S	-	-	-	Yes
Robust	MN-83	+3	G	Malt	S	S	S	MR	S	Yes
Valier	MT-99	+4	-	Feed	R	S	-	-	-	**

E= excellent, G= good, VG= very good, F= fair, P=poor, S= smooth, SS= semi-smooth.

+ R= resistant, MR= moderately resis., M= intermediate, 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 or anticipated.

Table 4a. Hard red winter wheat variety performance testing yield averages, 2001-2003.

	Location									
	Wall		Bison	Hayes	Martin		Sturgis	Oelrichs		Kennebec
VARIETY	'03	3-yr	'03	'03	'03	3-yr	'03	'03	3-yr	'03
AP502 CL	40+	.	51	60+	61	.	38	73+	.	71
Alliance	44+	37+	53+	54+	69	55+	44+	71+	55+	73
Arapahoe	36+	36+	53+	57+	68	59+	46+	65	55+	78
CDC Falcon	41+	37+	56+	51	61	57+	44+	67	52+	85+
Crimson	42+	37+	53+	38	60	50	40	69	54+	66
Expedition	39+	35+	55+	58+	68	56+	44+	72+	57+	82+
Harding	39+	36+	53+	46	65	53	40	68	54+	70
Jagalene	35+	.	55+	62+	68	.	44+	77+	.	89+
Jerry	41+	.	50	47	59	.	40	57	.	75
Millennium	42+	40+	56+	63+	69	60+	44+	63	57+	77
Nekota	42+	36+	51	52	60	57+	42	70	56+	68
NuPlains~W	44+	37+	49	50	58	52	41	64	52+	60
Ransom	37+	34+	47	45	56	49	39	55	48+	64
Tandem	43+	39+	52+	49	68	57+	42	66	55+	65
Trego~W	38+	34+	57+	55	70	56+	43	70	55+	74
Wahoo	40+	39+	54+	54	75+	61+	45+	71+	59+	81+
Wesley	44+	38+	52+	62+	71	61+	41	65	55+	80+
Test avg.*:	41	36	52	52	65	55	43	67	54	75
Lsd (5%) $:	12	NS	6	8	4	7	4	6	NS	10
Cv (%) #:	NS	11	8	11	4	13	6	7	8	10

~W Indicates a hard white 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.
# A measure of experimental error, a value of 15% or less is best.

Table 4b. Hard red winter wheat variety performance testing yield averages (continued).

	Location								2003		
	Brookings		Highmore		Platte	Pierre	Tripp Co.		Yield	TWT	Prot.#
VARIETY	'03	3-yr	'03	3-yr	'03	'03	'03	3-yr	b/a	lbs	pct
AP502 CL	63	.	40	.	61	36+	43	.	53	57	13.4
Alliance	71	67+	50	38	55	37+	41	47+	55	58	13.2
Arapahoe	85	73+	57+	43+	60	38+	45	42+	57	59	13.7
CDC Falcon	83	74+	53+	43+	60	36+	47	47+	57	59	13.5
Crimson	85	70+	48	37	55	42+	47	41+	54	61	14.4
Expedition	79	67+	51	35	64	37+	46	48+	58	60	13.5
Harding	88	68+	54+	38	55	38+	42	44+	55	60	14.1
Jagalene	90+	.	58+	.	65+	33+	46	.	60	61	13.3
Jerry	87	.	57+	.	57	36+	46	.	54	60	13.8
Millennium	91+	77+	57+	41+	69+	38+	50+	43+	60	61	13.3
Nekota	79	66+	49	35	62	34+	49+	43+	55	60	12.9
NuPlains~W	87	66+	50	37	51	38+	45	38+	53	61	13.8
Ransom	78	71+	48	38	49	33+	45	45+	50	59	14.1
Tandem	75	68+	52+	39+	51	35+	45	46+	54	61	13.9
Trego~W	76	70+	52+	35	61	33+	43	44+	56	60	13.1
Wahoo	86	73+	57+	42+	65+	37+	49+	42+	59	58	13.4
Wesley	83	72+	55+	38	66+	36+	43	45+	58	59	14.0
Test avg.*:	83	70	53	38	62	36	46	45	56	60	13.5
Lsd (5%) $:	10	NS	6	5	9	NS	5	NS	.	.	.
Cv (%) #:	9	11	9	13	11	12	8	14	.	.	.

Brookings, Highmore, Wall, Platte, Pierre, Kennebec, and Tripp Co. locations.

Table 4c. Origin, disease reaction, and traits for winter wheat entries tested in 2003.

		---------- Traits# ----------					-- Disease Reaction+ --					
Variety	Origin	Rel hdg	Ldg Res	End use Qlty	Wntr Hardy Rtg	Cole-optile Pct##	Wht Strk Msc	Tan Spot	-- Rust Str	Lf	-- Stm	PVP*
AP502 CL	AP-03	0	E	-	F-G	89	MS	S	-	S	MR	**
Alliance	NE-93	2	G	A	G	76	MS	VS	MR	S	MS	Yes
Arapahoe	NE-88	3	F	G	G-E	83	S	S	MS	MR	MR	Yes
CDC Falcon	SK-98	4	G	-	G-E	85	-	-	MR	-	R	Can
Crimson	SD-97	5	G	G	G-E	110	MR	R	MR	S	MS	Yes
Expedition	SD-02	0	F	E	G-E	88	-	MS	MS	MS	R	**
Harding	SD-99	5	F-G	A	E	100	MR	MR	MS	MR	MR	**
Jagalene	AP-02	3	E	-	G	92	MR	MR	MR	MR	MR	Yes
Jerry	ND-01	6	F	G	E	92	-	-	MR	S	R	No
Millennium	NE-99	4	G	A	F-G	78	S	MS	MR	MS	MR	Yes
Nekota	NE/SD-94	2	G	G	G	87	MS	MR	S	S	MR	No
NuPlains~W	NE-99	3	G	A	G	72	S	S	MS	MS	MS	Yes
Ransom	ND-98	5	F	P	E	107	S	-	-	MR	MR	Yes
Tandem	SD-97	4	F-G	E	G	112	S	S	MR	S	MR	Yes
Trego~W	KS-99	3	F-G	E	F-G	80	S	MS	S	MR	R	Yes
Wahoo	NE/WY-01	3	G	-	G	91	S	-	MR	S	R	Yes
Wesley	NE-98	2	E	A	G-E	79	S	MR	MR	MS	R	No

~W Hard white wheat variety. @End-use: HR= baking and HW wheat= noodles.
E= excellent, A= acceptable, F= fair, G-good, P=poor. ##Percent of Harding (3.2").
+ R= resistant, MR= moderately resist., M= intermediate, MS= mod. susceptible, S= susc., VS= very susc..
$ Rusts: Stripe= str, leaf= lf, and stem= stm.
* Plant variety protection (PVP), title V, certification option - to be sold by variety name only as a class of certified seed.
** PVP application pending or anticipated.

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