12-2002

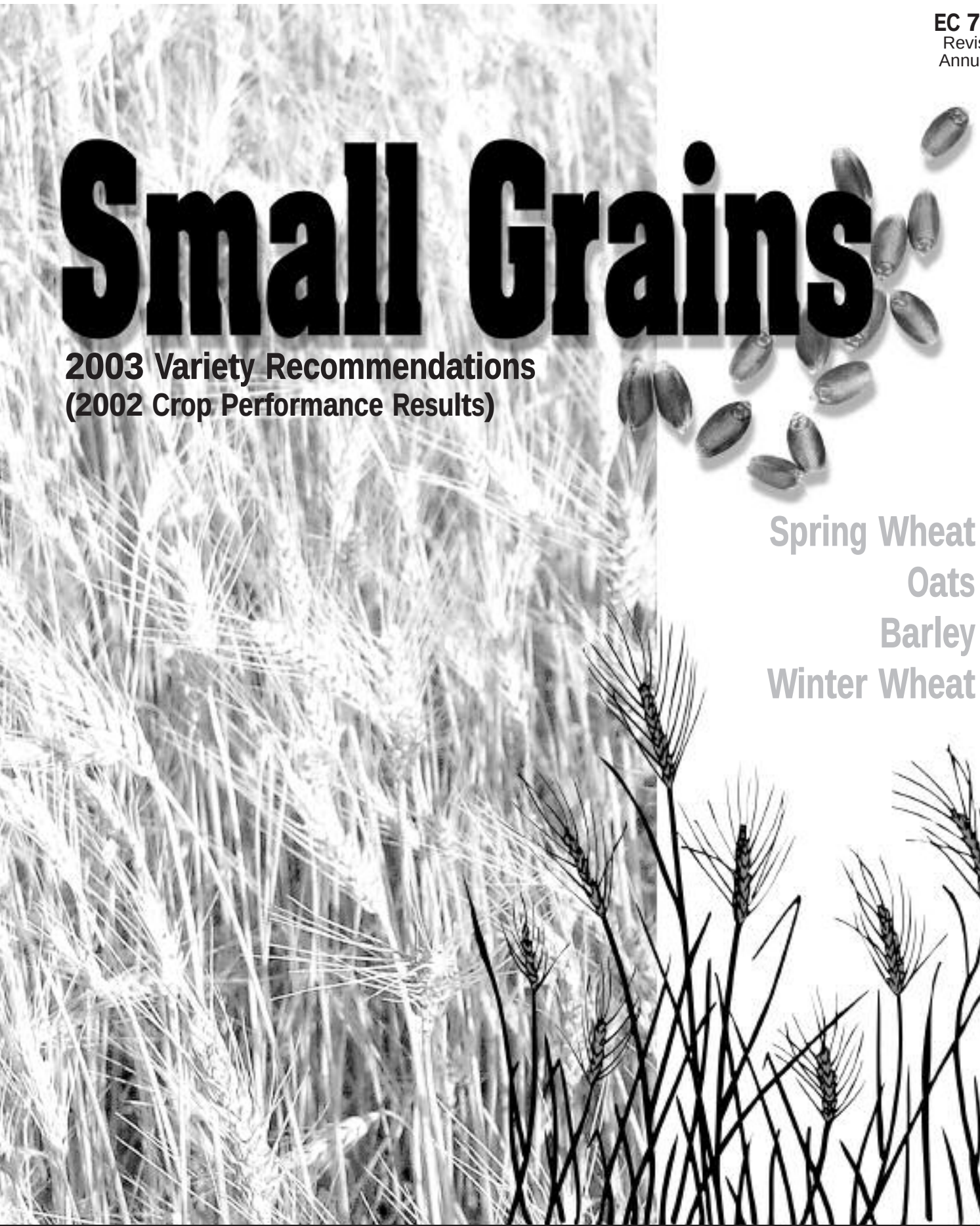
Small Grains: 2003 Variety Recommendations (2002 Crop Performance Results)

Cooperative Extension Service, South Dakota State University

EC 774
Revised
Annually

Small Grains

2003 Variety Recommendations
(2002 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 2003

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, 6
Forge @	Statewide	Ivan @	1, 7
Ingot @	Statewide	Knudson @	Statewide
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	Troy	1, 2, 4, 6, 7
Jerry #	Statewide	Buff (hull-less)	Statewide
Loyal +	1, 2, 4, 6, 7		
Reeves	Statewide		

BARLEY

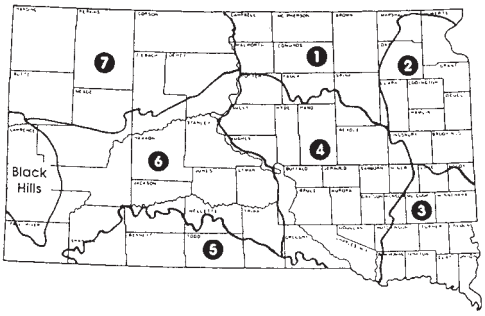
Recommended:		**Acceptable/Promising:**	
Excel @	1, 2, 4, 6, 7	Conlon @	1, 4, 6, 7
Foster @	Statewide	Drummond @	Statewide
Lacey @	Statewide		
Robust @	1, 2, 4, 6, 7		
Stander @	Statewide		

WINTER WHEAT

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*	Nekota	1*, 3, 4*, 5, 6, 7*
Harding @	1*, 2*, 4, 7	Trego (white) @	6, 7*
Millennium @	1*, 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)



 # PVP without Certification Option
+ Exceptional crown rust resistance

American Malting Barley Association approved malting varieties for South Dakota - 2002.

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

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

** Plant into protective cover.*

Small Grains

2002 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, 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 (CAA) area 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 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 pages. 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 (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. Data like straw strength, protein, height, and test weight are based on statewide averages. Disease resistance continually changes; therefore, new information is reported at 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 the test 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% 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 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 entry for spring wheat at Brookings for 2002 was an experimental line (not reported) that yielded 52 bu/acre. Subtracting 6 bu/acre (the rounded-off LSD value) from 52 results in a value of 46. Therefore, all varieties listed in that column yielding 46 bushels or higher are in the top-yielding group that includes Briggs, Forge, Ingot, Norpro, Plata, Walworth, and five experimental lines. However, any variety yielding 45 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-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. Proprietary varieties were released by commercial companies. Company abbreviations for these include:

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

Trial Methods

A random complete block design is used in all trials. Plots are harvested with a small plot combine. Plot size differs between the East River and West River locations. East River plots are 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. Yield means are generated from four variety replications per location per year.

Fertility and weed control programs differed between the East and West River locations. East River plots were 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 were applied at the 3 to 5 leaf stage, except for Brown Co. where wild oat was a problem. At Brown Co. a post-emergence application of Puma/Bronate (.5 pint/1.0 pint) was applied on the spring wheat and barley plots. The oat plots at Brown Co. were mowed down just prior to head emergence of the wild oat. West River plots were 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) were 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 growers have a poor seedbed increase the spring grain 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 2002 (variety and top yield percentage) are **Plata at 50%, and Briggs, Forge, Norpro, Oxen, Reeder, and Walworth at 33%.** See agronomic performance table for spring wheat. This means these varieties are in the top-yielding group at 50% or 33% of the test locations for 2002. The best top yield varieties over the past three years are **Forge, Knudson, Norpro, Oxen, Reeder, and Russ at 100%; Briggs, Ingot, Parshall, and Walworth at 83%; Alsen at 67%; and Ivan at 33%** of the test locations. **Ingot** has consistently exhibited the highest statewide bushel weight in the SDSU-CPT trials over the last few years. In 2002, the varieties Granite and Keystone also averaged 58 pounds in bushel weight. *(HR spring wheat agronomic performance table).*

Oats

In 2002, **Don and Jerry at 40%** were the only varieties that even came close to exhibiting a top yield percentage of 50%. Over the past three years the highest top yield percentages are **Loyal at 80%; Jerry, Killdeer, Reeves, and Troy at 60%; and Don and Richard at 40%.** NOTE: This year HiFi, Killdeer, Leonard, Morton, Richard, and Troy averaged 30 pounds per bushel in weight. This was 4

pounds lighter than the test average of 34 pounds. Five experimental lines (not reported) averaged from 34 to 38 pounds in bushel weight for 2002 *(Oat agronomic performance table).*

Barley

In 2002, the best top yield group percentages are **Lacey at 75%; and Legacy and Robust at 50%** of the locations tested. The better varieties over the past three years are **Excel, Foster and Lacy at 100%; Robust and Stander at 83%; and Conlon and Drummond at 67%** of the test locations. The two-row variety, **Conlon**, tested 3 pounds higher in statewide bushel weight than the next best bushel weight variety Lacey this year *(Barley agronomic performance table).*

HRW Wheat

In 2002, the better-performing varieties are **Alliance, Arapahoe, Expedition, Millennium, Nekota, Tandem, Trego (white), Wahoo, and Wesley.** The best varieties for the past three years are Alliance, Arapahoe, Expedition, Millennium, Nekota, NuPlains (white), Tandem, Trego (white), Wahoo, and Wesley. Limited subsoil moisture and a lack of timely seasonal moisture was the major factor affecting winter wheat production in South Dakota this year. Severe drought in many areas of winter wheat production lead to a lot of wheat being baled for forage and a high amount of experimental error and the wide range in yields associated with these test trials in 2002. Note the coleoptile length of the various varieties included in the agronomic performance table. The coleoptile of Scout 66 (3.7") is longer than for Alliance and 2137 (2.1"). Therefore, Scout 66 can reasonably be seeded more deeply than either Alliance or 2137.

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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B. Jorgensen (Tripp Co.)
K. Matkins (Sturgis)
W. Miller (Oelrichs)
L. Novotny (Martin)
R. Rosenow (Ralph)
M. Stiegelmeier (Selby)
R. Vander Pol (Platte)
R. Irwin (Britton)
S. Masat (Spink Co.)
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. 2002 Small grain seeding dates by crop and location.

Location	Crops			
	HRS Wheat	Oats	Barley	HRW Wheat
	seeding date			
Beresford	-	Apr 9	-	-
Bison	Apr 16*	Apr 16*	Apr 16*	Sept 24*
Brookings	Apr 14	Apr 14	Apr 14	Sept 22
Brown Co.	Apr 23	Apr 23**	Apr 23	-
Dakota Lakes	-	-	-	Sept 20-21*
Hayes	-	-	-	Sept 25*
Highmore	Apr 4*	Apr 4*	Apr 4*	Sept 21
Martin	-	-	-	Sept 27
Newell	-	-	-	Sept 20*
Oelrichs	-	-	-	Sept 18
Platte	-	-	-	Sept 26
Ralph	Apr 16*	Apr 16*	Apr 16*	
Selby	Apr 10	Apr 10	Apr 10	Sept 25
South Shore	Apr 16	Apr 16	Apr 16	Oct 3
Spink Co.	May 16	-	-	
Sturgis	-	-	-	
Tripp Co.	-	-	-	Sept 26
Wall	Apr 10	Apr 10	Apr 10	Sept 25

* Site abandoned due to severe drought stress.
**Site abandoned due to severe wild oat problem.

Spring Wheat

Table 1. **Spring wheat variety testing yield averages, 2000-2002.**

Variety	Location											
	Brookings		South Shore		Wall		Spink Co.		Selby		Brown Co.	
	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr
	bu/acre											
Alsen	44	45+	26	45+	16	35+	29	39	35	38	32	48+
Briggs	50+	50+	31	49+	15	33+	31	41	41+	42+	33	48+
Butte 86	41	44	27	46+	13	31	30	41	34	38	31	47+
Chris,CK	37	36	21	34	13	27+	28	32	33	32	26	37
Forge	47+	53+	32	48+	17	35+	34	43+	38+	42+	33	49+
Granite	34	.	25	.	15	.	27	.	37+	.	28	.
Hanna	44	.	30	.	13	.	29	.	35	.	32	.
Ingot	46+	47+	32	49+	20+	35+	32	41	32	40+	33	45+
Ivan	41	50+	29	46+	13	34+	31	41	38+	45+	31	42
Keystone	42	.	28	.	16	.	33	.	38+	.	29	.
Knudson	43	51+	28	47+	18	35+	32	43+	36	44+	32	45+
Norpro	50+	50+	31	49+	12	33+	33	47+	41+	44+	31	43+
Oxen	45	45+	28	44+	20+	36+	35	45+	39+	42+	34	46+
Parshall	45	51+	32	48+	16	34+	31	41	34	40+	29	44+
Plata	47+	.	29	.	19+	.	35	.	37+	.	32	.
Pristine	37	.	24	.	17	.	28	.	28	.	29	.
Reeder	45	47+	31	49+	19+	36+	33	48+	35	44+	37+	49+
Russ	44	51+	32	50+	16	35+	32	44+	37+	42+	32	47+
Walworth	46+	47+	28	48+	19+	35+	31	41	36	42+	33	43+
Test avg.*:	45	48	29	46	16	34	32	42	36	41	32	45
LSD (5%) $:	6	9	3	6	2	4	4	5	6	6	4	6
CV (%) #:	9	9	8	6	8	7	10	9	11	7	8	7

+ Entry is in top-yield group. $ LSD (5%) - see yield comments.
* Test trial average - only released varieties are reported.
# 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 2002.**

Variety	Relative Heading day	2002 Protein pct	2002 Bushel Weight lb	2002 Ht. inch	Yield-bu/a '02	Yield-bu/a 3-yr	Top Yield Percentage '02	Top Yield Percentage 3-yr
Alsen	3	16.7	57	26	30	39	0	67
Briggs	1	16.0	56	27	34	41	33	83
Butte 86	0	16.0	56	28	29	39	0	33
Chris,CK	3	16.5	53	30	26	32	0	17
Forge	-1	15.5	57	27	34	43	33	100
Granite	5	17.4	58	24	28	.	0	-
Hanna	2	15.1	55	30	31	.	0	-
Ingot	-1	16.1	58	29	33	40	22	83
Ivan	5	15.2	57	24	30	42	17	67
Keystone	2	15.2	58	27	31	.	0	-
Knudson	2	15.7	57	25	32	42	0	100
Norpro	5	15.9	57	25	33	43	33	100
Oxen	2	16.4	56	26	33	41	33	100
Parshall	4	16.7	56	28	31	41	0	83
Plata	-	15.7	56	23	33	.	50	-
Pristine	-	15.8	55	26	27	.	0	-
Reeder	3	16.0	56	26	33	43	33	100
Russ	2	15.9	56	28	32	42	17	100
Walworth	3	16.3	56	27	32	41	33	83
Statewide avg.:	-	16.0	56	27	32	40		

* Percent of time a variety appears in the top-yield group across six test sites (2000-2002) where C.V. values were 15% or less.

Table 3. **Origin, disease reaction, and traits for hard red spring wheat entries for year 2002.**

Variety	Origin	Stand-ability	-- Disease reaction -- Leaf Rust	Stem Rust	Fusarium Head Blight	PVP Status
Alsen	ND-00	Good	MR	R	MR#	Yes
Briggs	SD-02	Good	R	R	M	**
Butte 86	ND-86	Fair	MS	R	S	No
Chris,CK	MN-65	Poor	MS	R	S	No
Forge	SD-97	Good	MS	MR	MS#	Yes
Granite	WPB-02	Good	MS	R	MS	Yes
Hanna	ABI-03	Good	MS	MR	-	Yes
Ingot	SD-98	Good	MS	R	M#	Yes
Ivan	AP-98	V.Good	R	R	-	Yes
Keystone	WPB-01	Good	MS	MS	-	Yes
Knudson	AP-01	Good	MR	R	MS#	Yes
Oxen	SD-96	Good	MR	R	MS#	Yes
Norpro	AP-00	V.Good	MR	R	MS	Yes
Parshall	ND-99	Good	MS	R	MS#	Yes
Plata	GM-	-	-	-	-	**
Pristine	GM-	-	-	-	-	Yes
Reeder	ND-99	V.Good	MS	R	MS#	Yes
Russ	SD-95	Good	MR	R	MS#	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, 2000-2002.**

Variety	Location: Brookings '02	Brookings 3-yr	South Shore '02	South Shore 3-yr	Beresford '02	Beresford 3-yr	Wall '02	Wall 3-yr	Selby '02	Selby 3-yr
	bu/acre									
Hulled:										
Don	99	102	63	81	89+	96+	45+	63+	42	89
HiFi	92	.	69+	.	65	.	24	.	60	.
Hytest	91	89	56	77	67	69	34	54+	45	84
Jerry	95	110+	66+	86	86+	89+	38	63+	62	101
Killdeer	95	115+	63	91	60	82	27	64+	58	110+
Leonard	101+	.	61	.	77	.	27	.	61	.
Loyal	96	116+	70+	95+	68	84	25	63+	65	107+
Morton	93	.	59	.	58	.	23	.	57	.
Reeves	97	106+	64+	88	78	91+	41	60+	45	93
Richard	96	97	59	86	62	82	28	58+	62	104+
Troy	98	108+	58	84	68	86	26	60+	57	113+
Hull-less:										
Buff	71	83	58	69	70	67	25	47	40	76
Paul	46	57	30	49	22	40	8	40	23	52
Test avg.*:	88	100	58	83	69	81	30	58	52	95
LSD (5%) $:	6	17	7	13	7	17	4	13	7	18
CV (%) #:	5	6	9	7	7	8	9	8	9	9

+ Entry is in top-yield group. $ LSD (5%) - see yield comments.
* Test trial average - only released varieties are reported.
# A measure of experimental error; a value of 15% or less is best.

Table 5. **Agronomic performance averages for oat entries tested in year 2002.**

Variety	Relative Heading day	Protein pct	Bushel Weight lb	Ht. inch	Yield-bu/a '02	Yield-bu/a 3-yr	Top Yield Percentage '02	Top Yield Percentage 3-yr
		------- 2002 -------						
Hulled:								
Don	0	16.2	34	26	68	84	40	40
HiFi	7	15.1	30	28	62	.	20	-
Hytest	3	19.8	37	32	58	73	0	20
Jerry	4	17.0	34	29	70	88	40	60
Killdeer	5	14.5	30	26	61	94	0	60
Leonard	8	17.1	30	27	65	.	20	-
Loyal	7	17.0	32	30	65	93	20	80
Morton	6	16.2	30	29	58	.	0	-
Reeves	1	17.5	34	31	65	85	20	60
Richard	3	16.2	30	29	61	87	0	40
Troy	6	16.3	30	29	62	89	0	60
Hull-less:								
Buff	-2	20.2	40	27	53	68	0	0
Paul	6	19.0	41	29	26	51	0	0
Statewide avg.:	-	17.4	34	29	59	79		

* Percent of time a variety appears in the top-yield group across five test sites(2000-2002) where C.V. values were 15% or less.

Table 6. **Origin, disease reaction, and traits for oat entries tested in 2002.**

Variety	Origin	Stand-ability	Grain Color	Disease reaction: Smut	Stem Rust	Crown Rust	Red Leaf	PVP* Issued
Hulled:								
Don	IL-85	Good	White	R	MS	S	MR	No
HiFi	ND-01	Good	White	-	R	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	-	No
Leonard	MN-02	Good	Yellow	R	S	MR	R	**
Loyal	SD-00	Good	White	R	MS	R	S	No
Morton	ND-01	Good	White	-	R	-	-	**
Reeves	SD-02	Good	White	MR	S	MR	MR	No
Richard	MN-00	Good	Yellow	MR	-	MR	MS	Yes
Troy	SD-91	Fair	White	MR	S	MS	MR	No
Hull-less:								
Buff	SD-02	Good	Hulless	R	S	MS	MR	No
Paul	ND-94	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/anticipated.

Table 7. **Barley variety testing yield averages, 2000-2002.**

Variety	Location											
	Brookings		South Shore		Wall		Selby		Brown Co.		Ralph	
	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr
	bu/acre											
Two-row:												
Conlon	69	70	49+	75+	35+	43+	37	65+	41	67	13	30+
Six-row:												
Drummond	85	77	45	72+	21	35+	46	64+	42	68	21	29+
Excel	91+	88+	45	71+	30+	43+	50	65+	45	71+	24	34+
Foster	87+	82+	45	67+	22	39+	48	65+	45	71+	16	31+
Lacey	92+	86+	48+	71+	31+	44+	47	69+	49+	75+	22	35+
Legacy	95+	.	47+	.	27	.	44	.	40	.	21	.
Robust	88+	79+	45	68+	24	39+	44	62+	50+	69	18	28+
Stander	84	74	46+	64+	26	39+	46	67+	45	72+	19	33+
Test avg.*	86	79	46	70	26	40	45	65	45	70	19	31
LSD (5%) $:	9	10	3	NS	7	NS	NS	NS	4	5	NS	NS
CV (%) #:	7	8	4	6	18	11	22	10	7	7	30	12

\+ Entry is in top-yield group. $ LSD (5%) - see yield comments.
* Test trial average - only released varieties are reported.
NS - Differences between means within a column are non-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 2002.**

Variety	Relative Heading day	2002 Protein pct	2002 Bushel Weight lb	2002 Ht. inch	Yield-bu/a '02	Yield-bu/a 3-yr	Top Yield Percentage '02	Top Yield Percentage 3-yr
Two-row:								
Conlon	0	14.4	46	23	41	57	25	67
Six-row:								
Drummond	2	13.7	42	23	43	56	0	67
Excel	3	12.8	42	22	48	60	25	100
Foster	2	12.7	40	23	44	58	25	100
Lacey	0	12.2	43	22	48	61	75	100
Legacy	2	12.6	42	22	46	.	50	-
Robust	3	13.8	43	23	45	56	50	83
Stander	3	13.3	42	22	44	57	25	83
Statewide avg.:	.	13.2	42	22	45	58		

* Percent of time a variety appears in the top-yield group across four test sites (2001) and six sites (2000-2002) where experimental C.V. values were 15% or less.

Table 9. **Origin, disease reaction, and traits for barley entries tested in 2002.**

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

+ R = resistant, MR = moderately resis., M = intermediate, MS = mod. susceptible, S = susc.
~ S = 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. **Winter wheat variety performance testing yield averages 2000-2002.**

Variety	Location: Brookings '02	Brookings 3-yr	South Shore '02	South Shore 3-yr	Highmore '02	Highmore 3-yr	Selby '02	Selby 3-yr	Platte '02	Platte 3-yr
Hard red:										
Alliance	60+	64+	38	.	27	50+	25	43+	55+	.
Arapahoe	62+	66+	45+	.	31+	50+	29+	43+	56+	.
CDC Falcon	64+	.	41	.	37+	.	30+	.	55+	.
Crimson	58	59	38	.	32+	46+	23	36	49	.
Expedition	58	63+	42+	.	26	47+	28+	46+	56+	.
Harding	59+	61+	45+	.	31+	44+	28+	42+	52	.
Jagalene	66+	.	34	.	33+	.	32+	.	56+	.
Jagger	43	44	26	.	31+	44+	25	34	58+	.
Jerry	63+	.	44+	.	35+	.	22	.	52	.
Millennium	60+	73+	49+	.	33+	50+	31+	45+	53+	.
Nekota	57	60+	39	.	25	43+	25	41+	54+	.
Ransom	63+	60+	39	.	29	45+	21	35	46	.
Scout 66	56	47	31	.	26	40+	22	31	48	.
Stanton	57	.	37	.	25	.	27+	.	52	.
Tandem	58	59	41	.	32+	47+	29+	42+	55+	.
Wahoo	63+	69+	43+	.	35+	46+	29+	41+	55+	.
Wesley	62+	67+	39	.	26	48+	24	43+	59+	.
2137	54	50	38	.	22	42+	28+	41+	55+	.
Hard white:										
Avalanche	57	.	23	.	28	.	24	.	46	.
NuFrontier	62	.	33	.	31	.	21	.	55	.
NuHorizon	59	.	27	.	21	.	17	.	52	.
NuPlains	63+	61+	36	.	29	47+	24	41+	50	.
Trego	62+	65+	42+	.	26	45+	24	39+	53+	.
Experimental line:										
SD92107-3	59	69	46	.	32	48	30	41	48	.
SD92107-5	61	65	45	.	30	48	28	45	50	.
SD97W604	57	64	45	.	26	41	31	37	51	.
Test avg.:	60	61	39	.	29	46	26	40	53	.
LSD (5%) $:	6	14	7	.	8	NS	6	9	7	.
CV (%) #:	7	12	12	.	19	13	16	21	9	.

+ Entry is in top-yield group. $ LSD (5%)- see yield comments.
# A measure of experimental error; a value of 15% or less is best.
NS - differences between means within a column are non-significant.

Table 10 (continued). **Winter wheat variety performance testing yield averages.**

Variety	Location									
	Wall		Hayes		Martin		Oelrichs		Tripp Co.	
	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr	'02	3-yr
Hard red:										
Alliance	32+	47+	33	.	51	56+	44	62+	41+	54+
Arapahoe	32+	46+	29	.	64+	61+	44	61+	23	46+
CDC Falcon	31	.	29	.	60+	.	40	.	37+	.
Crimson	27	45+	26	.	42	52	40	53	23	41
Expedition	32+	43+	31	.	54	56+	45	61+	31	51+
Harding	28	45+	30	.	51	50	41	55	28	47+
Jagalene	31	.	37+	.	66	.	49	.	41	.
Jagger	28	41	32	.	51	47	41	59+	33	40
Jerry	26	.	31	.	51	.	38	.	27	.
Millennium	32+	47+	34	.	61+	58+	50+	61+	25	44+
Nekota	30	42	35+	.	60+	57+	46+	59+	27	44+
Ransom	24	44+	28	.	43	47	41	52	31	44+
Scout 66	28	44+	29	.	44	46	44	56	28	40
Stanton	31	.	30	.	55	.	46+	.	29	.
Tandem	33+	44+	33	.	54	55+	45	57+	33	50+
Wahoo	35+	50+	33	.	55	54+	48+	63+	20	43
Wesley	32+	49+	34	.	63+	61+	46+	61+	30	52+
2137	31	45+	27	.	46	53+	44	57+	29	44+
Hard white:										
Avalanche	29	.	31	.	48	.	47+	.	45+	.
NuFrontier	32	.	35	.	59	.	46	.	36	.
NuHorizon	29	.	30	.	46	.	43	.	38	.
NuPlains	29	44+	27	.	49	56+	40	56+	27	40
Trego	29	44+	31	.	49	51	44	58+	38+	51+
SD92107-3	28	47+	27	.	48	52	37	54	30	50
SD92107-5	25	47+	28	.	59	55	40	56	31	49
SD97W604	32+	40	31	.	55	57	49	56	43	50
Test avg.:	30	45	31	.	52	54	44	58	31	46
LSD (5%) $:	4	7	5	.	15	8	4	7	9	10
CV (%) #:	11	11	2	.	20	17	7	8	22	15

+ Entry is in top-yield group. $ LSD (5%) - see yield comments.
# A measure of experimental error; a value of 15% or less is best.

Table 11. **Agronomic performance averages for winter wheat entries in 2002.**

Variety	Heading Diff. days	Yield-bu/a 2002	Yield-bu/a 3-yr	2002 Bu. Wt. lb	2002 Protein pct	2002 Coleoptile length inch
Hard red:						
Alliance	2	41	53	57	13.6	2.1
Arapahoe	3	41	53	57	15.0	2.4
CDC Falcon	4	42	.	55	14.7	2.6
Crimson	5	36	47	57	15.0	3.4
Expedition	0	40	53	58	14.1	2.4
Harding	5	39	50	57	15.1	3.2
Jagalene		44	.	60	14.2	.
Jagger	0	37	45	58	14.8	2.4
Jerry	6	39	.	56	15.2	2.9
Millennium	4	43	54	58	14.3	2.6
Nekota	2	40	50	58	14.0	2.9
Ransom	5	36	48	55	14.8	3.4
Scout 66	2	35	43	59	14.3	3.7
Stanton	1	39	.	58	13.8	3.2
Tandem	4	41	50	59	14.5	3.4
Wahoo	3	42	52	56	14.7	3.2
Wesley	2	41	54	57	14.8	2.4
2137	3	37	48	57	13.9	2.1
Hard white:						
Avalanche	2	38	.	59	14.0	2.6
NuFrontier	4	41	.	58	13.8	3.4
NuHorizon	3	36	.	59	14.0	3.4
NuPlains	3	37	49	60	14.5	2.4
Trego	3	40	51	59	13.9	2.4
Experimental lines:						
SD92107-3	4	39	52	57	14.7	2.6
SD92107-5	5	40	52	57	14.9	3.4
SD97W604	1	42	49	59	13.8	1.9
Statewide avg.:		39	48	58	14.4	

Table 12. **Origin, disease reaction, and traits for winter wheat entries tested in 2002.**

Variety	Origin	Lodging Res	Baking Qlty#	Winter Hardiness	-- Disease Reaction+ -- Wheat Streak Mosaic	Tan Spot	Rust Lf	Rust St	PVP* Status
Hard red:									
Alliance	NE-93	Good	Acc	Good	MS	VS	S	MS	Yes
Arapahoe	NE-88	Fair	Good	G-Exc	S	S	MR	MR	Yes
CDC Falcon	SK-98	Good	-	G-Exc	-	-	-	R	Can.
Crimson	SD-97	Good	Good	G-Exc	MR	R	S	MS	Yes
Expedition	SD-02	Fair	Exc	G-Exc	-	MS	MS	R	**
Harding	SD-99	F-Good	Acc	Exc	MR	MR	MR	MR	Yes
Jagalene	AP-								**
Jagger	KS-94	Good	Exc	Poor	MR	R	S	MS	Yes
Jerry	ND-01	Fair	Good	Exc	-	-	S	R	No
Millennium	NE-99	Good	Acc	F-Good	S	MS	MS	MR	Yes
Nekota	NE/SD-94	Good	Good	Good	MS	MR	S	MR	No
Ransom	ND-98	Fair	Poor	Exc	S	-	MR	MR	Yes
Scout 66	NE-66	Poor	Good	F-Good	MS	MR	S	S	No
Stanton	KS-00	G-Exc	Acc	Fair	-	-	S	R	**
Tandem	SD-97	F-Good	Exc	Good	S	S	S	MR	Yes
Wahoo	NE/WY-01	Good	-	Good	S	-	S	R	Yes
Wesley	NE-98	Exc	Acc	G-Exc	S	MR	MS	R	No
2137	KS-95	Exc	Good	F-Good	MR	R	MR	MS	Yes
Hard white:									
Avalanche	CO-01	Poor	Poor	Poor	-	-	S	MR	-
NuFrontier	GM-01	G-Exc	Poor	Poor	-	-	-	S	Yes
NuHorizon	GM-01	Exc	Acc	Fair	-	-	-	MS	Yes
NuPlains	NE-99	Good	Acc	Good	S	S	MS	MS	Yes
Trego	KS-99	F-Good	Exc	F-Good	S	MS	MR	R	Yes
Experimental lines:									
SD92107-3	SD-	Good	Good	Exc	-	MR	R	MR	-
SD92107-5	SD-	Fair	Acc	G-Exc	-	-	MR	MR	-
SD97W604	SD-	Fair	Poor	Poor	-	-	S	MR	-

* 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.

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