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Small Grains and Field Peas: 2009 Variety Recommendations (2008 Crop Performance Results)

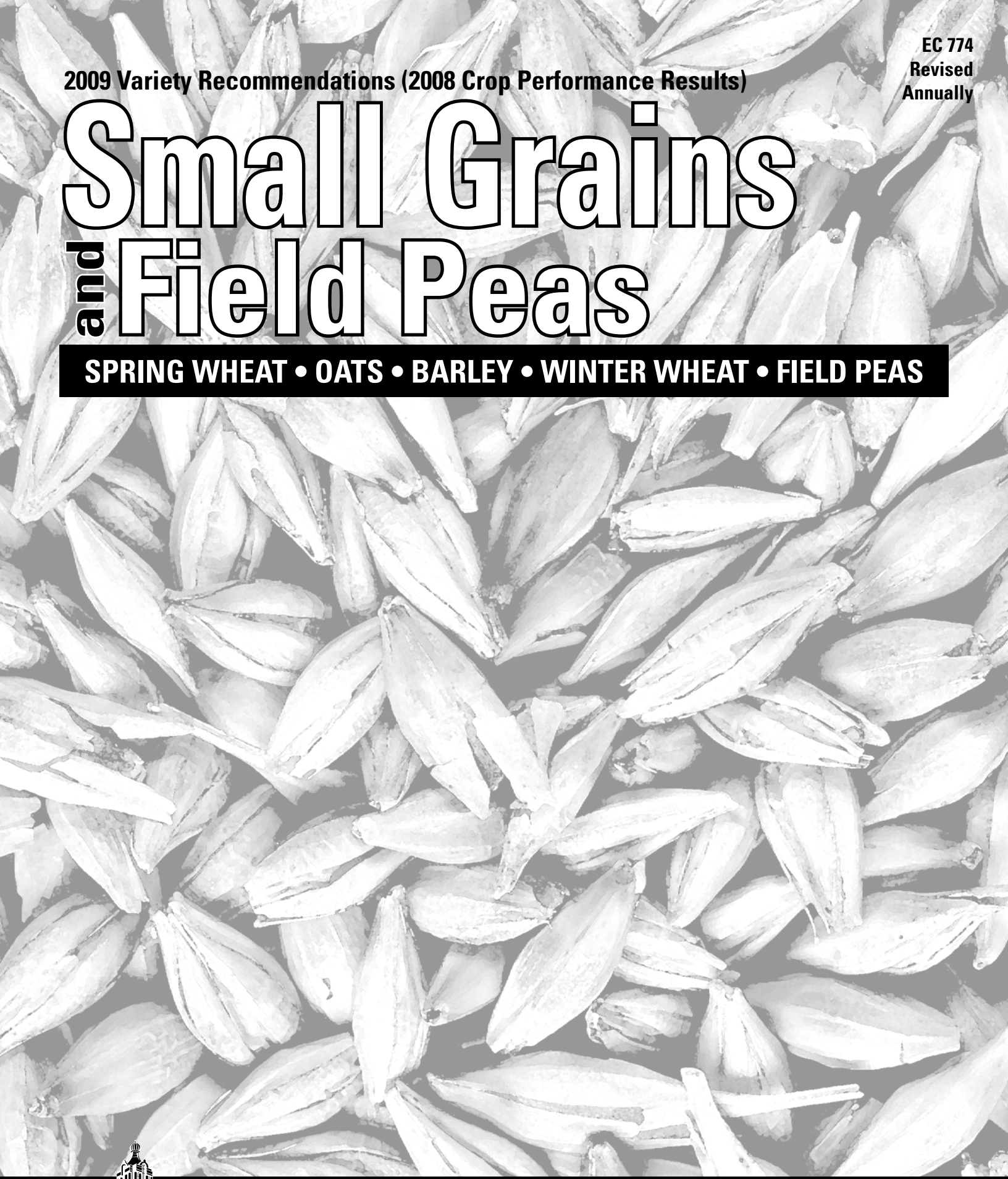
Cooperative Extension Service, South Dakota State University

EC 774
Revised
Annually

2009 Variety Recommendations (2008 Crop Performance Results)

Small Grains and Field Peas

SPRING WHEAT • OATS • BARLEY • WINTER WHEAT • FIELD PEAS



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The crop performance trials are available at http://plantsci.sdstate.edu/varietytrials/vartrial.html

Small Grain Variety Recommendations for 2009

Recommendations are based on information from the South Dakota 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. The performance of recommended varieties in response to environmental conditions is generally better than that 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 crop adaptation area (CAA) where each is most suited, are listed below:

[PVP] Plant variety protection has been issued or is anticipated; seed sales are restricted to classes of certified seed.

[# PVP] Plant variety protection with non-title V status.

[# PVP/SLR] Plant variety protection with non-title V status and seed licensing requirements.

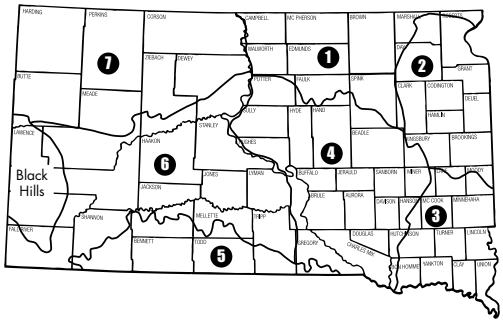
SPRING WHEAT			
Recommended		**Acceptable/Promising**	
Variety	**CAA**	**Variety**	**CAA**
Briggs [PVP]	all except 3	Glenn [PVP]	Statewide
Faller [PVP]	Statewide	Tom [PVP]	3, 4
Granger [PVP]	all except 3		
Howard	Statewide		
RB07 [PVP]	all except 3		
Steele-ND [PVP]	all except 3		
Traverse [PVP]	Statewide		

OAT			
Recommended		**Acceptable/Promising**	
Variety	**CAA**	**Variety**	**CAA**
Beach [# PVP]	5, 6, 7	Buff (hull-less)	Statewide
Jerry [# PVP]	5, 6, 7	Don	5, 6, 7
Morton [# PVP]	1, 2, 7	Hi Fi [# PVP]	1, 2, 7
Souris [# PVP, SPL]	Statewide	Reeves	5, 6, 7
Stallion [PVP]	Statewide		

BARLEY			
Recommended		**Acceptable/Promising**	
Variety	**CAA**	**Variety**	**CAA**
Conlon [PVP]	1, 4, 6, 7	Drummond [PVP]	Statewide
Eslick - feed	6, 7	Pinnacle [PVP]	1, 2, 7
Lacey [PVP]	Statewide	Rassmusson [PVP]	Statewide
Tradition [PVP]	Statewide		
Rawson [PVP]	1, 2, 7		

WINTER WHEAT			
Recommended		**Acceptable/Promising**	
Variety	**CAA**	**Variety**	**CAA**
Alice (white) [PVP]	1[pc], 4[pc], 5, 6, 7[pc]	Arapahoe [PVP]	1[pc], 3, 4[pc], 5, 6, 7[pc]
Expedition [PVP]	1[pc], 4, 5, 6, 7[pc]	Darrell [PVP]	1[pc], 4, 5, 6,7[pc]
Harding [PVP]	1[pc], 2[pc], 4, 7	Hatcher [PVP]	5, 6, 7[pc]
Millennium [PVP]	1[pc], 4[pc], 5, 6, 7[pc]	Hawken [PVP]	3, 4[pc], 5, 6
Nu Dakota [PVP]	5, 6, 7[pc]		
Overland [PVP]	1[pc], 3, 4[pc], 5, 6, 7[pc]		
Wendy (white) [PVP]	5, 6, 7[pc]		
Wesley	5, 6, 7[pc]		

Crop Adaptation Areas for South Dakota (revised 1992)



American Malting Barley Assoc. approved malting varieties tested by SDSU:

Conlon	Drummond
Lacey	Robust
Stellar-ND	Tradition

[pc] Plant into protective cover.

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

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Small Grains and Field Peas

2008 South Dakota Test Results, Variety Traits, and Yield Averages

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Variety selection is a very important management decision in a sound crop production program. This report contains variety recommendations, descriptions, and yield data for the spring-seeded small grains of spring wheat, oat, and barley; fall-seeded winter wheat; and spring-seeded field peas.

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 a variety merely selected for its yield history.

Disease resistance is based on reactions to prevalent races of a disease. Disease resistance changes over time; therefore, growers should inspect variety disease reactions annually and not assume they have not changed.

Variety Recommendations (inside cover)

The Plant Science Department Variety Recommendation Committee makes small grain variety recommendations annually. Recommendations for a 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, annual rainfall, disease incidence, and farming practices common to a given CAA.

Varieties are listed as "Recommended" or "Acceptable/Promising." Varieties with 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 meet the criteria for 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 to assure genetic and variety purity.

How to Use This Information

It is suggested that growers use this bulletin as follows:

1. Check the variety CAA designations for the "Recommended" and "Acceptable/ Promising" lists on the inside cover and compare them to the CAA map of South Dakota. **Identify the varieties suggested for your CAA.**

2. **Evaluate the varieties you selected for desirable traits.** The descriptive information (tables 3, 6, 9, 12, and 14) is updated as changes occur and is obtained from S.D. crop testing plots and research plots maintained by plant breeders and plant pathologists. Protein, height, and bushel weight (test weight) data are obtained from every location when possible. Disease resistance ratings continually change; so new information is reported as it becomes available. Evaluate maturity by comparing the relative heading rating of each variety to the maturity check variety given (see footnote 1 in table C). The Fusarium head blight tolerance ratings for hard red spring wheat are also given. The head blight ratings show **there is no variety resistance to this disease.** It does, however, indicate that **some varieties are more tolerant of the disease than other varieties.**

3. **Evaluate each variety you select for agronomic performance.** 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 and least-significant-difference (LSD) values are rounded to the nearest bushel per acre. Yield averages for spring wheat are reported in table 1, oat in tables 4a-b, barley in table 7, winter wheat in tables 10a-b, and field pea in table 13. Averages for bushel weight, protein content levels, and plant height in spring wheat are reported in table 2, oat in table 5, barley in table 8, and winter wheat in table 11.

The test yield and high and low yield variety averages, least significant difference (LSD) values, the yield value needed to identify the top-performance group (TPG-value), and the test coefficient of variation (CV) values are listed below each location yield column. Similarly, the averages for bushel weight, height, lodging,

and grain protein, the LSD values needed to identify the TPG, and the test CV values for each variable are listed below each variable column. Performance information is derived from data that includes both released varieties and experimental lines. Thus, one can compare varieties to experimental lines that may be released in the near future.

Comparing yields over years

Always compare one-year yields with other one-year yields, and three-year yields with other three-year yields.

Determine if data is valid

Always determine if the data is valid. The coefficient of variation (CV) value listed at the bottom of each yield column is a measure of experimental error. Yield tests with CV values of 15% or higher contain a higher level 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 that are discussed later. Likewise, the LSD value and the top performance group for yield or other performance variables are not shown if the CV exceeds 15%.

Use LSD values to evaluate yield differences between varieties

The LSD value indicates if the yield or other performance variable of one variety is significantly different from another variety. If the difference between two varieties is greater than the LSD value, the varieties differ. If the difference is equal to or less than the LSD value, the varieties do not significantly differ. For example, at Brookings, the variety Faller averaged 49 bu/a in 2008 compared to Briggs at 46 bu/a. Was the yield difference between these two varieties significant? Compare the yield difference of 3 bu/a between the two varieties (59 – 46) to the LSD value of 5 bu/a. Since the 3 bu/a difference is less than the LSD value of 5 bu/a, the varieties do not differ significantly in yield. If the difference had been 6 bu/a, the difference would have exceeded 5 bu/a; and there would have been a significant yield difference between the varieties.

Use the LSD value to determine the top performance group (TPG) or entries for each location

At each location, any test entry that qualifies for the TPG can be identified in each column as follows: First, find the highest value within the column and subtract the test LSD value from it to obtain an intermediate value. For example, in the spring wheat at South Shore, the highest 2008 yield was RB07 at 85 bu/a. If we subtract the test LSD of 7 from this high yield, we obtain an intermediate value of 78 bu/a (85 – 7 = 78). Second, the TPG-value must be greater than the intermediate value. Remember, these values are rounded to the nearest whole bushel. Therefore, the TPG-value must be at least one bushel greater than the intermediate value of 78. This means the TPG-value must be at least 79 bu/a; and in this case, entries in the TPG must yield 79 bu/a or higher to be in the best performing group for yield.

Similarly, the TPG of entries for the bushel weight, plant height, lodging score, and grain protein can also be identified for each table column. The TPG values for the yield, bushel weight, tall height, and high grain protein are minimum TPG values because the LSD value is subtracted from the highest average value to identify the TPG. In contrast, the TPG value for lodging score, short height, and low protein is a maximum TPG value because the LSD value is added to the lowest average value to identify the TPG.

For example, you might subtract the LSD value from the tallest entry to identify the tallest entries or TPG suitable for use as forage. In contrast, you might add the LSD value to the shortest entry to identify the shortest entries (TPG) if you are looking for short entries. Another example would be to subtract the protein LSD value in barley from the highest protein entry to identify the highest protein entries for feed. In contrast, you might add the barley protein LSD value to the lowest protein entry to identify the lowest protein entries for malting, where relatively low protein values are desired. The TPG values for all variables are reported as "TPG value" at the bottom of each variable table with all column values that qualify for the TPG identified with the plus (+) sign.

Sometimes, a LSD value is not given and the designation NS^ is listed. This indicates variety differences were not significant (NS) or could not be detected. Therefore, all the varieties have a similar potential and are considered to be in the TPG. In test trials with high levels of experimental error (CV exceeds 15%), LSD and TPG values are not reported because the data contained too much experimental error to be valid.

Use top-yield group for yield information to evaluate variety yield stability

When evaluating yield performance, remember that environmental conditions change over locations and over years. Therefore, look at performance data from as many test locations and years as possible. Look at the "yield stability" of a variety over many locations. A simple way of evaluating "yield stability" is to see how often a variety is in the TPG for yield over all test locations. The top-yield frequency (expressed as percent) is the number of locations across the state where an entry was in the TPG for yield. **The statewide top yield percentage for each spring wheat entry is reported in table 1, for oat entry in tables 4a and 4b, and for barley in table 7.** The top-yield frequencies for winter wheat and field pea entries were not determined.

A variety with a relatively high top-yield frequency will appear in the top-yield group at many locations. For example, a variety with a top yield percentage of 50% or more exhibits better yield stability than a percentage of 20% or less. A percentage of 50% or higher is considered good for one year and percentages of 80-100% are common for the longer three-year period. High percentages for the three-year period are generally more common than for the current year because there is two more years of data, which tends to reduce yield variability and enables the test to more easily identify the TPG at each location. Varieties with a high top-yield percentage have the ability to adapt to a wide range of environmental conditions over many locations. In contrast, entries with a low top-yield frequency typically adapt to a narrow

range of environments. Look for entries with **top-yield percentages of 50% or higher** if possible, and don't be surprised if the percentage reaches 100% for the longer three-year period.

Use of origin, traits, and disease reactions tables

Growers are encouraged to use the traits and disease reactions tables for spring wheat (table 3), oat (table 6), barley (table 9), winter wheat (table 12), and field pea (table14) every year. These tables contain the most up-to-date information in South Dakota for any changes in traits and disease races.

When evaluating winter wheat entries it is suggested that you also review the relative coleoptile length values reported in table 12. Entries with relatively long coleoptiles are able to germinate and emerge from deeper seeding depths than entries with shorter coleoptiles. This trait may be advantageous in years where the soil moisture is deeper than the normal seeding zone. The coleoptile length of 3.2" for Harding is used as the reference standard (100%) for making comparisons. The coleoptile of Tandem is generally longer, whereas the coleoptiles of Alice, Wendy, Arapahoe, Darrell, Expedition, Millennium, and Wesley are shorter than for Harding. Note: The coleoptile for Wendy is the shortest of all entries and may exhibit poor emergence if planted as deep as Tandem.

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
Montana- MT	Nebraska- NE
North Dakota- ND	South Dakota- SD
Wisconsin- WI	

Many public varieties were developed and released jointly by one or more experiment stations or USDA. Proprietary entries tested by seed company and listed by crop include:

Wheat:	Agri Pro - AP	Trigen Seed, LLC- TS
	Westbred, LLC- WB	
Barley:	Busch Agricultural Resources, Inc- BARI	
Field pea:	Alternate Seed Strategies – ASS	
	Legume Logic – LL	Meridian Seeds – MS
	Pulse USA – PUSA	

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 whenever possible.

Fertility and weed control programs differed between the East River (Brookings, South Shore, Beresford, Spink Co., Selby, and Warner) and West River (Bison, Ralph, and Wall) locations. East River plots were fertilized with a starter application of 55 lb/a of 37-15-0 (20.3 lbs. of N and 8.25 lbs. of phosphorous/a) down a secondary tube at seeding. In addition, at these locations a post-emergence tank-mix of Bronate plus Puma at labeled rates was applied on the spring wheat. West River plots were fertilized with 6 gals/acre of 10-34-0 (6.6 lbs. of nitrogen and 24 lbs. of phosphorous/acre) at seeding. Post-emergence applications of Starane NXT herbicide at 1.25 pt/a were made in West River spring wheat, barley, and oats plots, except at Ralph where an additional 1 pt/a of Axial was applied on the barley and wheat. Field pea plots were seeded at 7 pure live seeds (PLS) per square foot (320,000 seeds/a) with inoculated seed. Chemical weed control consisted of 2 pt/a of Prowl at Wall and Bison; 0.75 pt/a of Poast post-emergence at Selby; and 4.5 oz/a Spartan pre-emergence at South Shore.

Seed size can vary greatly among varieties, so a seed count is conducted on each entry and all seeding rates are adjusted accordingly. The spring-seeded small grain trials were seeded at 42 PLS per square foot. The fall-seeded winter wheat trial seeding rates were 22 PLS per square foot. Under good seedbed preparation and favorable conditions these seeding rates result in seedling densities of about 38 and 20 seedlings per square foot, or densities of about 1.65 million and 870,000 seeds/a, in the spring-seeded and fall-seed small grain trials, respectively. Increase the spring seeding rate to 46 PLS per square foot if the seedbed is poor. If planting is delayed until May 1 or later, increase the seeding rate to 50 PLS per square foot. In winter wheat increase the seeding rate to 28 PLS per square foot if the seedbed is poor. Seeding dates are listed in table B.

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 following people are gratefully acknowledged:
SDSU Oat Breeding Project - *L. Hall*
SDSU Spring Wheat Breeding Project - *K. Glover and J. Kleinjan*
SDSU Winter Wheat Breeding Project - *A. Ibrahim and S. Kalsbeck*
Brookings Agronomy Farm - *D. Doyle and Staff*
N.E. Research Farm (South Shore) - *A. Heuer*
S.E. Research Farm (Beresford) - *R. Berg and Staff*
Central Research Farm (Highmore) - *R. Bortnem and M. Volek*
Dakota Lakes Research Farm (Pierre) - *D. Beck and Staff*

The cooperation and resources . . . of these growers are gratefully acknowledged:

Cooperator	Location	Cooperator	Location
A. & I. Ryckman	Brown Co.	Nelson Brothers	Miller
M. Stiegelmeier	Selby	R. Seidel	Bison
B. Greenough	Oelrichs	S. Masat	Spink Co.
R. & L. Haskins	Hayes	H. Roghair	Okaton
D. Wilson	Sturgis	M. Aamot	Kennebec
R. Van Der Pol	Platte	B. Jorgensen	Tripp Co.
L. Novotny	Martin	L. Erickson	Ralph
D. Patterson	Wall	G. Geise	Selby

This report is available online at http://www.sdstate.edu/~wpls/http/var/vartrial.html.

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

Trait	Crop				
	Spring Wheat	Oats	Barley	Winter Wheat	Field pea
Yield	3/15*	3/15	3/12	3/15	3/15
Bushel weight	3/15	3/15	3/12	3/15	3/15
Height	3/15	3/15	3/12	3/15	3/15
Lodging	WA	WA	WA	WA	WA
Disease reaction	A	A	A	WA	A
Protein	3/15	3/15	3/12	3/15	3/15
Quality data#	2/4	WA	WA	3/15	WA
Unique traits$	WA	WA	WA	WA	WA

* 3 years/15 location-years. # Milling and baking. $ Production & marketing.
A= annually, WA= when available.

Table B. Date test trials were seeded, by crop and test location, in 2008

Location	Crop				
	HRS Wheat	Oats	Barley	Field Pea	HRW Wheat (Fall 2007)
Beresford	.	April 10	.	.	
Bison	Apr 17**	Apr 17	Apr 17	Apr 17	Sept. 19
Brookings	April 21	April 21	April 21	.	Sept. 6
Brookings – IMS*	.	.	.	.	Sept. 6
Brown Co.	April 17	April 17	April 17	.	.
Pierre-DL	.	.	.	.	Sept. 12
Hayes	.	.	.	.	Sept. 17
Kennebec	.	.	.	.	Sept. 20
Martin	.	.	.	.	Sept. 23
Miller	April 5§	April 5	April 5	.	.
Okaton	.	April 17		.	.
Onida	.	.	.	.	Sept. 12
Platte	.	.	.	.	Sept. 14
Ralph	Apr 17	.	Apr 17	.	.
Selby	April 18	April 18	April 18	April 23	Sept. 11
South Shore	April 23	April 23	April 23	April 23	Sept. 11
Spink Co.	April 19	.	.	.	.
Sturgis	.	.	.	.	Sept. 20
Winner	.	.	.	.	Sept. 14
Winner – IMS*	.	.	.	.	Sept. 14
Wall	April 15	April 15	April 15	April 15	Sept. 13

* IMS indicates this trial was an intensive management study.
** Locations that are underlined were dropped because their high coefficient of variation indicated they contained to much error to be a valid test.
§ Shaded dates indicate test trials that were not harvested because of drought or hail. damage.

Performance Trial Highlights

General – The performance of all the small grain crops in year 2008 was variable depending on region. Adequate moisture and cool late spring temperatures produced a bumper winter wheat crop across the state. The same conditions produced a bumper crop of spring wheat, oats, and barley crops in the eastern and central regions of the state. In contrast, limited moisture produced below average yields of spring wheat, barley, and oats in the extreme western regions of the state. Test trial locations and seeding dates are indicated in table B.

Comments regarding tables – Tables 1, 4a-b, 7, 10a-c, and 13 are first sorted high to low by state three-year, and then sorted high to low by state 2008 yield averages. Likewise, tables 2, 5, 8, and 11 are sorted high to low by state or all location bushel weight (BW) average. Care should be taken when reading the yield average tables because the entries are first sorted by three-year averages then by the 2008 averages. You are encouraged to first evaluate yield performance by looking at the three-year averages then by looking at the 2008 yield averages. In some cases, varieties that were only tested in 2008 produced the highest numerical yields for year 2008. In other cases, however, the highest numerical yields may have been produced by varieties that have been tested for three years. Just look at all the values in the 2008 yield column, regardless of if they were tested for the current year or for three years.

HRS Wheat:

Yields (table 1) – The entries **Traverse, Faller, and Steele-ND at 100%; RB07 at 80%; and Howard, Briggs and Granger at 60%** (table 1.) were the top-yield frequency entries for the past three years (2006-08). These entries exhibited very good yield stability or the ability to adapt to a wide range of production environments by being in the top-performance group for yield at more than 60% of the test locations during the past three-year period. The entries **Albany at 87%; RB07 at 83%; Faller and Steele-ND at 67%; and Howard at 50%** were the top-yield frequency entries for 2008.

Bushel weight (table 2) - The top bushel weight entries (five-location averages in tables 2) included 10 entries at 60 lbs., including the varieties **Glenn, Tom, Ada, Kelby, and Granger.** Varieties differing by 1 lb. were significantly different.

Height (table 2) - The check variety **Chris at 37" was the tallest**, while **Kelby and Samson at 28" were the shortest entries.** Entries differing by **1"** were significantly different.

Lodging (table 2) – The entries **Howard, Faller, Kuntz, and Traverse** with a lodging score of 2 were significantly higher in lodging resistance compared to the other varieties. Entries differing by 1 were significantly different.

Grain protein content (table 2) – The entries **Chris at 14.6%; Glenn and Alsen at 14.0%; Steele-ND at 13.9%; Briggs and Howard at 13.8%; and Hat Trick at 13.7%** were highest in grain protein. Entries differing by **0.9%** were significantly different.

Spring oat:

Yields (table 4b) – The entries **Souris, HiFi, Beach, and Stallion at 100%**; and **Morton at 75%** (table 4c) were the top-yield frequency entries for the past three years (2006-08). These entries exhibited very good yield stability or the ability to adapt to a wide range of production environments by being in the top-performance group for yield at more than 80% of the test locations for the past three years. The entries **Souris at 100%; HiFi at 71%**; and **Beach at 57%** were the top-yield frequency entries for 2008.

Bushel weight (table 5) - The top bushel weight entry (table 5) was the hulless entry **Buff at 45 lbs.** Hytest was the highest in bushel weight among the hulled entries. The eastern and western bushel weight averages indicate entries had to differ by **1 lb.** to be significantly different.

Height (table 5) - The tallest entries were **Beach and Morton at 43"** in the eastern, and **Beach and Morton at 42"** and **Hytest, Reeves, and Jerry at 41"** in the western test trials. Entries differing by **1"** in the eastern and **2"** in the western test trials were significantly different.

Lodging (table 5) – The eastern lodging score differences among the entries were not significant (NS).

Grain protein content (table 5) – The entry **Hytest at 16.5%** in the eastern and **Stark Hls at 20.4%** in the western test trials were the highest in grain protein. Entries differing by **0.5% and 0.8%** in the eastern and western test trials, respectively, were significantly different.

Spring Barley:

Yields (table 7) - The entries **Eslick at 100%; Rawson at 75%;** and **Tradition and Conlon at 50%** (table 7) were the top-yield frequency entries for the past three years (2006-08). These entries exhibited very good yield stability or the ability to adapt to a wide range of production environments by being in the top-performance group for yield at more than 50% of the test locations during the past three-year period. The entries **Eslick at 80%** and **Rawson and Pinnacle at 40%** were the top-yield frequency entries for 2008.

Bushel weight (table 8) – The four-location average indicated the top bushel weight entry was Conlon at 49 lbs. Entries differing by **1 lb.** were significantly different.

Height (table 8) – The four-location average indicated **Rawson, Robust, and Drummond at 32"** were the tallest entries; while **Eslick at 26"** was the shortest entry. Entries differing by 2" were significantly different.

Lodging (table 8) – The entry **Rawson with lodging score of 2** had the best lodging resistance among the entries tested. Entries differing by **1** were significantly different.

Grain protein content (table 8) – The top grain protein entries were **Tradition at 12.1%; Conlon and Drummond at 12.0%; Robust at 11.9%; and Stellar-ND at 11.8%.** The entry **Pinnacle (10.5%)** was the lowest in grain protein content. Entries differing by **0.4%** were significantly different.

HRW Wheat:

Yield (tables 10a-c) - The individual location averages for yield for the past three years (2006-08) at Wall, Sturgis, Winner, Martin, and Brookings were valid. At these locations, the entries **Overland, NuDakota, Expedition, Wendy~W, Wesley, Millennium, and Wahoo** appeared most often in the top-yield group. In 2008, the entries **Overland, NuDakota, Expedition, and Smoky Hill** appeared in the top-yield group most often.

Bushel weight (table 11) - The top bushel weight entry was **RonL at 60 and 59 lbs** in the western and eastern trials, respectively. Entries differing by **1 lb** were significantly different.

Height (table 8) - **Harding at 40"** was the tallest entry in the western trials; and entries differing by **1"** were significantly different.

Grain protein content (table 11) – **Harding at 13.8% and Hawken at 13.7%** were the highest in grain protein in the western trials; while **Harding at 13.4% and Lyman at 13.3%** were the highest in grain protein in the eastern trials. Entries differing by **0.3% and 0.4%** in the western and eastern test trials, respectively, were significantly different.

Field Pea:

Yield (table 13) – When averaged over the past two years (2007-2008) there was no difference among the entries in yield performance at Selby and Wall; while at South Shore all the entries but K2 that had been tested for two years were in the top performance group. The top entries for yield for 2008 by location were: South Shore – **Spider at 74, Cooper at 69, and Eclipse at 66 bu/a**; Selby – **Spider at 37 bu/a**; Wall – **Spider at 35 bu/a**.

Grain protein content (table 14, average of South Shore and Selby) – **CDC Striker at 29.1%** was the highest and **SW Midas at 24.2%** was the lowest in protein.

Table C. Explanation of performance table footnotes

No.	Explanation of footnotes
	Tables with yield, bushel weight, height, and grain protein averages:
[1]	Heading (small grains) – The number of days an entry takes to grow from the emergence stage to the heading stage (complete head emergence). This value is determined by comparing the entry with a known maturity check variety listed in footnote 1 at the bottom of each performance table. The heading value, if known, is listed after each variety name.
[2]	~W (winter wheat) – Denotes a white wheat variety.
[3]	State top-yield frequency (spring grains) – the frequency (%) of all test sites that an entry was in the top performance-group for yield on a statewide basis. A value of 50% or higher is considered good.
[4]	Lodging score (all crops): 0= all plants erect, 3= 50% of plants lodged at 45°-angle, 5= all plants flat.
[5]	Least Significant Difference (LSD 0.05) (all crops) – the difference two values within a column must equal or exceed to be significantly different from one another at the 0.05 level of probability. If the difference is less than the LSD value, the difference between the values is nonsignificant (NS).
[6]	TPG-value (all crops) – the minimum value within a column that yield, bushel weight, tall height, and high protein must equal or exceed; or the maximum value within a column that short height, lodging scores, andlow protein must be equal to or less than to qualify for the TPG. TPG- values are identified by a plus (+) sign.
[7]	Coefficient of variation (C.V.) (all crops) - the percent of experimental error associated with a test trial. Ideally, the value for yield is less than 15%. Values less than 5% tend to be less common while values 6 to 15% are more common. Occasionally, values exceed 15%; this means the trial contained too much experimental error to be a valid test; thus, no data for that location is not reported.
	Tables with crop variety origin, traits, and disease reaction information:
[8]	Lodging Resistance & Winter Hardy Ratings: P- poor, F- fair, G- good, VG- very good, or E- excellent.
[9]	Awn Texture (barley): S- smooth, SS- semi-smooth, SR- semi-rough, and R- rough.
[10]	End-use Quality (winter wheat): A- acceptable, F- fair, G- good, E- excellent for B- baking or N- noodles.
[11]	Coleoptile Length (winter wheat) - value is expressed as a percentage of the variety Harding (3-1/4" long).
[12]	Fusarium head blight or headscab - a disease reaction followed by a plus (+) sign indicates a variety exhibits a consistent tolerance to head blight in regards to grain yield and quality compared to other varieties.
[13]	Disease reactions (all crops): VS- very susceptible, S- susceptible, MS- moderately susceptible, MR- moderately resistant, R-resistant, M- mixture of both susceptible and resistant types.
[14]	Plant variety protection (PVP, title V certification option in the US and Plant breeders rights (PBR, Canada) are sold by variety name only as a class of certified seed. Status is yes, no or pending (pdg).
[15]	Relative maturity (field pea): E- early, M- medium, or L- late maturity.
[16]	Leaf type (field pea): N- normal or SL- semi-leafless.

Table 1. Spring wheat yield results at six South Dakota locations, 2006-2008. Table is sorted by 3-yr then by 2008 state yield average.

Variety, Heading [1]	Location Yield Avg. (Bu/a at 13% moist.)											State Yield Avg.(bu/a)		State Top-Yield Freq. (%)	
	Brookings		South Shore		Spink Co.		Brown Co.		Selby		Wall				
	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	2008	3-Yr	2008	3-Yr
RB07, 2	48+	45	85+	65+	66	63+	90+	63+	50+	52+	46+	64	58	83	80
Traverse, 0	45	49+	75	62+	75+	66+	80	64+	42	50+	48+	61	58	33	100
Faller, 4	49+	46+	78	61+	73+	62+	83	64+	45+	50+	48+	63	57	67	100
Steele-ND, 3	47+	46+	80+	65+	70+	62+	80	62+	45+	49+	41	61	57	67	100
Howard, 4	47+	45	82+	66+	70+	63+	84	65+	38	45	42	61	57	50	60
Briggs (Ck), 0	46+	47+	76	63+	65	59	76	61+	37	45	48+	58	55	33	60
Granger, 0	47+	47+	77	60+	66	59	72	57+	40	48+	50+	59	54	33	60
Ada, 1	44	42	65	54	61	56	77	57+	38	46+	42	55	51	0	40
Kelby, 2	43	42	70	58	58	54	76	58+	29	41	46+	54	51	17	20
Glenn, 3	40	39	73	58	61	56	71	55	37	43	.	56	50	0	0
Alsen, 4	40	40	71	55	65	54	77	56	37	41	43	56	49	0	0
Reeder, 3	38	41	61	53	57	49	80	59+	35	42	38	52	49	0	20
Chris, 3	33	34	49	41	42	40	62	49	29	32	35	42	39	0	0
Albany, 4	46+	.	76	.	70+	.	85+	.	47+	.	46+	62	.	87	.
Tom, +2	41	.	74	.	61	.	83	.	33	.	50+	57	.	17	.
Samson, 2	38	.	71	.	59	.	78	.	40	.	48+	56	.	17	.
Hat Trick, 3	41	.	65	.	63	.	74	.	39	.	46+	55	.	17	.
Kuntz, 2	41	.	68	.	58	.	83	.	28	.	43	54	.	0	
Test avg. :	44	44	73	59	64	57	77	59	39	45	45	57	53		
High avg. :	50	49	85	66	75	66	90	65	50	52	50	64	58		
Low avg. :	33	34	49	41	42	40	62	49	29	32	34	42	39		
[5] LSD (0.05):	5	4	7	7	6	8	6	8	6	7	7				
[6] TPG-value :	46	46	79	60	70	60	85	57	45	46	44				
[7] C.V. :	8	8	6	7	6	7	6	7	10	9	11				

[1] Heading- days earlier (-) or later than Briggs, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 2. Spring wheat bushel wt. (BW), height (HT), lodging (LDG), and grain protein (PROT) values averaged over five South Dakota locations in 2008. Table is sorted by BW average.

Variety, Heading [1]	Five-Location Averages*			
	BW lb	HT in	LDG	PROT %
Glenn, 3	60+	34	3	14.0+
Tom, 2	60+	31	3	13.5
Ada, 1	60+	31	3	13.5
Kelby, 2	60+	28	3	14.1+
Granger, 0	60+	35	3	13.6
Alsen, 4	59	31	3	14.0+
RB07, 2	59	30	3	13.7+
Steele-ND, 3	59	33	3	13.9+
Briggs (Ck), 0	59	33	3	13.8+
Howard, 4	59	33	2+	13.8+
Hat Trick, 3	59	31	3	13.7+
Faller, 4	58	32	2+	13.6
Kuntz, 2	58	29	2+	13.6
Albany, 4	58	30	3	12.8
Samson, 2	58	28	3	13.2
Reeder, 3	58	32	3	13.6
Traverse, 0	58	34	2+	13.2
Chris, 3	56	37+	3	14.6+
Test avg. :	59	32	3	13.6
High avg. :	60	37	3	14.6
Low avg. :	56	28	2	12.8
[5] LSD (0.05):	1	2	1	0.9
[6] TPG-value :	60	36	2	13.7
[7] C.V. :	2	9	36	11

[1] Heading- days earlier (-) or later than Briggs, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

* Locations include: Brookings, South Shore, Spink Co., Brown Co., and Selby.

Table 3. Origin, traits, and disease reactions for spring wheat varieties tested in 2008. Table is sorted by relative heading.

Variety	Origin	Relative Heading [1]	Lodging Res [8]	Rust [13]			Fusarium Head Blight	PVP Status [14]
				Stripe	Stem	Leaf		
Briggs (Ck)	SD-02	0	G	MR	R	MR	M+	Yes
Granger	SD-04	0	G	MR	R	MR	M+	Yes
Traverse	SD-06	0	G	MR	R	MR	MR+	Yes
Ada	MN-06	1	G	.	R	R	MS+	Yes
Kelby	AW-06	2	VG	.	MR	R	MR	Yes
Kuntz	AW-07	2	VG	MS	MR	MR	MS+	Yes
RB07	MN-07	2	G	MS	MR	MR	MS	Yes
Tom	MN-08	2	G	.	MR	MR	MR+	Pdg
Samson	WB-07	2	G	S	R	MR	S	Yes
Chris	MN-65	3	P	.	R	MS	S	No
Glenn	ND-05	3	G	MR	R	R	MR+	Yes
Hat Trick	TS-07	3	G	MR	MR	R	MR	Yes
Reeder	ND-99	3	VG	MR	R	MS	MS	Yes
Steele-ND	ND-04	3	G	MR	MR	R	MR+	Yes
Alsen	ND-00	4	G	R	R	MS	MR+	Yes
Howard	ND-06	4	G	.	R	R	MR+	Yes
Faller	ND-07	4	G	.	R	R	MR+	Yes
Albany	TS-09	4	G	R	R	MS	MR+	Pdg

[1] Heading- days earlier (-) or later than Briggs, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 4a. Oat yield results- South Dakota eastern locations, 2006-2008. Table is sorted by 2008 state yield average.

Variety, Heading [1]	Location Yield Avg. (Bu/a at 13% moist.)								Eastern Yield Avg. (bu/a)		State Yield Avg. (bu/a)		State Top-Yield Freq. (%)	
	Brookings		South Shore		Beresford		Brown Co.							
	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr
Souris, 6	133+	130+	157+	140+	155+	135+	138+	129+	146+	.	129	.	100	100
HiFi, 8	128	124+	155+	134+	146+	128+	146+	128+	144+	.	125	.	71	100
Beach, 6	135+	129+	151+	136+	135	126+	137+	120+	140+	Data	122	Data	57	100
Stallion, 8	133+	131+	145+	136+	136	136+	130	120+	136	not	119	not	43	100
Morton, 7	115	116	153+	134+	135	127+	121	112+	131	given,	115	given,	29	75
Jerry, 5	109	113	140	124	128	114	109	90	122	due to	113	due to	29	0
Don, 1	111	109	124	122	134	117	129	100	125	high	107	high	0	0
Reeves, 2	120	109	126	122	131	116	120	91	124	C.V	104	C.V.	0	0
Hytest, 4	101	92	119	103	96	82	111	87	107	·	93	·	0	0
Buff Hls, 3	81	82	120	103	93	89	108	78	101	·	89	·	0	0
Stark Hls, 6	81	66	90	79	82	64	104	76	89	·	77	·	0	0
Test avg. :	120	109	134	121	128	112	123	103	126	111	111	.		
High avg. :	143	131	157	140	155	136	151	129	148	134	129	.		
Low avg. :	81	66	90	79	82	64	100	76	89	71	77	.		
[5] LSD (0.05):	12	14	17	12	11	19	16	23	9					
[6] TPG-value :	132	118	141	129	145	118	136	107	140					
[7] C.V. :	7	6	9	8	6	8	9	11	10					

[1] Heading- days earlier (-) or later than Don, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 4b. Oat yield results- South Dakota western locations, 2006-2008. Table is sorted by 2008 state yield an average.

Variety Heading [1]	Location Yield Avg. (Bu/a at 13% moist.)						Western Yield Avg. (bu/a)		State Yield Avg. (bu/a)		State Top-Yield Freq. (%)	
	Wall		Bison		Okaton							
	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr
Souris, 6	73+	.	84+	.	162+	.	106+	.	129	.	100	100
HiFi, 8	67+	.	77+	.	155+	.	100+	.	125	.	71	100
Beach, 6	65	.	74	.	156+	Data	98	.	122	Data	57	100
Stallion, 8	59	.	70	.	161+	not	97	.	119	not	43	100
Morton, 7	50	.	80+	.	152	given,	94	.	115	given,	29	75
Jerry, 5	71+	.	81+	.	150	due to	101+	.	113	due to	29	0
Don, 1	47	.	60	.	147	high	85	.	107	high	0	0
Reeves, 2	49	.	49	.	133	C.V.	77	.	104	C.V.	0	0
Hytest, 4	45	.	59	.	122	·	75	.	93	·	0	0
Buff Hls, 3	47	.	61	.	111	·	73	.	89	·	0	0
Stark Hls, 6	40	.	45	.	95	·	60	.	77	·	0	0
Test avg. :	57	.	70	.	142	.	90	.	111	.		
High avg. :	76	.	84	.	162	.	106	.	129	.		
Low avg. :	40	.	45	.	95	.	60	.	77	.		
[5] LSD (0.05):	11	.	8	.	9	.	8	.				
[6] TPG-value :	66	.	77	.	154	.	99	.				
[7] C.V. :	14	.	8	.	4	.	12	.				

[1] Heading- days earlier (-) or later than Don, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 5. Eastern, western, and statewide oat bushel weight (BW), height (HT), lodging (LDG), and grain protein (PROT) averages in 2008. Table is sorted by state BW average.

Variety, Heading [1]	Eastern Avg.				Western Avg.			State Avg.		
	BW lb	HT in	LDG	PROT %	BW lb	HT in	PROT %	BW lb	HT in	PROT %
Buff Hls, 3	45+	37	2+	14.8	42+	35	19.2	44	36	16.7
Hytest, 4	41	42	2+	16.5+	39	41+	18.5	40	41	17.3
Stark Hls, 6	41	42	2+	13.7	35	38	20.4+	39	40	16.6
Reeves, 2	39	42	2+	14.8	38	41+	17.2	38	41	15.8
Beach, 6	38	43+	2+	13.2	38	42+	15.9	38	42	14.4
Stallion, 8	38	41	2+	14.0	37	40	16.5	38	41	15.1
Jerry, 5	38	40	2+	14.1	37	41+	18.1	38	40	15.8
Don, 1	37	35	2+	13.9	38	33	16.3	37	34	14.9
Souris, 6	37	36	2+	13.3	37	35	17.3	37	36	15.0
Morton, 7	37	43+	2+	13.8	36	42+	16.8	37	42	15.1
HiFi, 8	37	41	2+	13.5	35	40	17.3	36	41	15.1
Test avg. :	39	39	2	14.2	38	38	17.6	39	39	15.7
High avg. :	45	43	2	16.5	42	42	20.4	44	42	17.5
Low avg. :	37	35	2	12.9	35	33	15.9	36	34	14.4
[5] LSD (0.05):	1	1	NS	0.5	1	2	0.8			
[6] TPG-value :	45	43	2	16.1	42	41	19.7			
[7] C.V. :	3	5	23	5.0	3	5	3			

[1] Heading- days earlier (-) or later than Don, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 6. Origin, variety traits, and disease reactions for oat entries tested in 2008, sorted by relative heading.

Variety	Origin	Relative Heading [1]	Lodging Res [8]	Grain Color	Smut [13]	Rust [13]		Red Leaf [13]	PVP Status [14]
						Stem	Crown		
Hulled types:									
Don	IL-85	1	G	White	R	MS	S	MR	No
Reeves	SD-02	2	G	White	MR	S	MS	MS	No
Jerry	ND-94	5	G	White	MS	MS	S	MS	Yes
Hytest	SD-86	4	G	Lt. Cream	MR	MS	S	S	No
Beach	ND-04	6	F-G	White	R	S	MS	MS	Yes
Souris	ND-06	6	G	White	MR	MS	R	MS	Yes
Morton	ND-01	7	G	White	R	MR	R	MS	Yes
HiFi	ND-01	8	G	White	MR	R	MR	MS	Yes
Stallion	SD-06	8	G	White	S	S	MR	MR	Yes
Hulless types:									
Buff Hls	SD-02	3	G	Hulless	R	S	MS	MR	No
Stark Hls	ND-04	6	G	Hulless	.	MR	MS	S	Yes

[1] Heading- days earlier (-) or later than Don, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 7. Barley yield results at five South Dakota locations, 2006-2008. Table is sorted by 3-yr then by 2008 state yield average.

Variety, Heading [1]	Location Yield Avg. (Bu/a at 13% moist.)									State Yield Avg. (bu/a)		State Top-Yield Freq. (%)	
	Brookings		South Shore		Brown Co.		Selby		Wall				
	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	2008	3-Yr	2008	3-Yr
Eslick, 3	71+	75+	96+	84+	114+	77+	72+	81+	54	81	79	80	100
Rawson, 2	68+	71+	92+	88+	109	77+	56	66	27	70	76	40	75
Lacey, 0	69+	70+	73	77	100	69	54	66	56	70	71	20	25
Tradition, 0	64	60	79	80+	103	71+	50	64	50	69	69	0	50
Drummond, 2	64	61	75	79	95	69+	54	68	51	68	69	0	25
Conlon, 0	67+	63	83	84+	106	68+	37	55	32	65	68	20	50
Stellar-ND, 2	56	63	76	73	100	67+	53	63	64+	70	67	20	25
Robust, 3	58	61	69	71	82	63	48	55	48	61	63	0	0
Pinnacle, 3	68	.	96+	.	121+	.	60	.	47	78	.	40	-
Rasmusson, 3	73+	.	78	.	99	.	59	.	63	74	.	20	-
Test avg. :	66	66	81	80	103	70	54	65	50	71	70		
High avg. :	73	75	96	88	121	77	72	81	64	81	79		
Low avg. :	56	60	69	71	82	63	37	55	27	61	63		
[5] LSD (0.05):	9	12	9	9	11	12	9	11	9				
[6] TPG-value :	65	64	88	80	111	66	64	71	56				
[7] C.V. :	10	8	8	6	7	9	11	10	12				

[1] Heading- days earlier (-) or later than Lacey, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 8. Barley bushel weight (BW), height (HT), lodging (LDG), and grain protein (PROT) values averaged over four locations in 2008. Table is sorted by BW average.

Variety, Heading [1]	Four-Location Averages*			
	BW lb	HT in	LDG	PROT %
Conlon, 0	49+	31	3	12.0+
Eslick, 3	48	26	3	11.2
Tradition, 0	48	31	3	12.1+
Lacey, 0	47	29	3	11.5
Rasmusson, 3	47	30	3	11.4
Pinnacle, 3	47	30	3	10.5
Rawson, 2	47	32+	2+	11.2
Robust, 3	47	32+	3	11.9+
Drummond, 2	46	32+	3	12.0+
Stellar-ND, 2	46	30	3	11.8+
Test avg. :	47	30	3	11.6
High avg. :	49	33	3	12.1
Low avg. :	46	26	2	10.5
[5] LSD (0.05):	1	2	1	0.4
[6] TPG-value :	49	32	2	11.8
[7] C.V. :	2	8	15	5

[1] Heading- days earlier (-) or later than Lacey, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.
* Locations include: Brookings, South Shore, Brown Co., and Selby.

Table 9. Origin, traits, and disease reactions for barley varieties tested in 2008.

Variety	Origin	Relative Heading [1]	Lodging Res [8]	Grain Use	Awn Texture [9]	Loose Smut [13]	Stem Rust [13]	Blotch [13]		PVP Status [14]
								Spot	Net	
Two-row types:										
Conlon	ND-96	0	G	Malt	SS	S	S	M	MR	Yes
Rawson	ND-05	2	F	Feed	SR	S	S	R	MS	Yes
Eslick	MT-04	3	F	Feed	R	S	.	.	.	No
Pinnacle	ND-07	3	.	.	S	.	.	.	MS	Pdg
Six-row types:										
Lacey	MN-00	0	G	Malt	S	S	S	M	S	Yes
Tradition	BARI-03	0	F	Malt	S	MS	MR	M	S	Yes
Stellar-ND	ND-05	2	G	Feed	SS	S	S	M	MS	Yes
Drummond	ND-00	2	VG	Malt	SS	S	S	R	MS	Yes
Rasmusson	MN-08	3	G	.	S	S	S	M	S	Pdg
Robust	MN-83	3	G	Malt	S	S	S	M	S	Yes

[1] Heading- days earlier (-) or later than Lacey, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 10a. Winter wheat yield results - South Dakota western locations, 2006-2008. Table is sorted by 3-yr then by 2008 state yield average.

Variety, Heading [1,2]	Location Yield Avg. (Bu/a at 13% moist.)						Western Yield Avg. (bu/a)		State Yield Avg. (bu/a)	
	Wall		Hayes		Sturgis					
	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr
Overland, 4	85+	61+	78	.	44+	36+	74+	.	77	.
NuDakota~W, 3	78	62+	75	.	39	33	72+	.	76	.
Expedition, 0	80+	61+	81+	.	39	34	70	.	73	.
Wendy~W, -1	84+	64+	83+	.	28	30	69	Data	73	Data
Wesley, 2	79+	61+	77	.	41+	36+	69	not	71	not
Hatcher, 2	65	56	71	.	46+	40+	68	given,	70	given,
Millennium, 4	76	56	77	.	41+	36+	69	due to	71	due to
Wahoo, 3	75	58+	75	.	39	36+	65	high	66	high
Arapahoe, 3	71	56	73	.	36	32	65	C.V.	66	C.V.
Darrell, 5	73	55	79+	.	43+	37+	69	.	71	.
Alice~W, -1	77	60+	74	.	40+	35	69	.	70	.
Harding, 5	67	52	71	.	34	33	63	.	65	.
Tandem, 4	68	55	82+	.	39	35	65	.	64	.
Jagalene, 3	77	58+	70	.	37	34	63	.	67	.
Jerry, 5	62	49	66	.	34	32	60	.	61	.
Smoky Hill, 4	81+	.	85+	.	39	.	71+	.	76	.
Hawken, 3	79+	.	73	.	36	.	70	.	71	.
Fuller, 2	78	.	76	.	36	.	68	.	71	.
Lyman, 3	72	.	75	.	40+	.	70	.	71	.
RonL, 2	71	.	75	.	39	.	68	.	70	.
InfinityCL, 3	72	.	78	.	34	.	69	.	70	.
SettlerCL, 3	75	.	79+	.	33	.	67	.	67	.
Test avg. :	74	57	76	.	37	35	69	.	70	.
High avg. :	85	64	85	.	46	40	74	.	77	.
Low avg. :	62	49	66	.	28	30	60	.	61	.
[5] LSD (0.05):	7	7	7	.	7	5	4	.		
[6] TPG-value :	79	58	79	.	40	36	71	.		
[7] C.V. :	6	10	6	.	12	9	11	.		

[1] Heading- days earlier (-) or later than Expedition, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 10b. Winter wheat yield results - South Dakota western locations, 2006-2008. Table is sorted by 3-yr then by 2008 state yield average (Continued).

Variety, Heading [1.2]	Location Yield Avg. (Bu/a at 13% moist.)								Western Yield Avg. (bu/a)		State Yield Avg. (bu/a)	
	Kennebec		Winner		Winner-IMS		Martin					
	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr
Overland, 4	91	.	75+	57+	84+	.	59	47+	74	.	77	.
NuDakota~W, 3	84	.	83+	58+	84+	.	58	47+	72	.	76	.
Expedition, 0	77	.	70	51+	76+	.	68+	48+	70	.	73	.
Wendy~W, -1	79	.	68	52+	81+	.	60	48+	69	Data not given, due to high C.V.	73	Data not given, due to high C.V.
Wesley, 2	76	.	65	49	82+	.	64+	52+	69		71	
Hatcher, 2	73	.	72	49	77+	.	71+	52+	68		70	
Millennium, 4	89	.	68	52+	71	.	63	47+	69		71	
Wahoo, 3	82	.	58	47	58	.	69+	50+	65		66	
Arapahoe, 3	86	.	61	50+	68	.	61	49+	65		66	
Darrell, 5	81	.	67	47	73	.	68+	49+	69		71	
Alice~W, -1	77	.	71	52+	78+	.	63	48+	69	.	70	.
Harding, 5	86	.	61	49	60	.	59	44	63	.	65	.
Tandem, 4	82	.	56	46	66	.	62	46	65	.	64	.
Jagalene, 3	62	.	57	42	82+	.	54	39	63	.	67	.
Jerry, 5	76	.	56	42	69	.	55	43	60	.	61	.
Smoky Hill, 4	84	.	69	.	84+	.	58	.	71	.	76	.
Hawken, 3	78	.	79+	.	83	.	63	.	70	.	71	.
Fuller, 2	75	.	77+	.	70	.	62	.	68	.	71	.
Lyman, 3	95	.	74	.	65	.	66+	.	70	.	71	.
RonL, 2	79	.	73	.	81+	.	60	.	68	.	70	.
InfinityCL, 3	82	.	75+	.	70	.	69	.	69	.	70	.
SettlerCL, 3	74	.	70	.	74	.	67+	.	67	.	67	.
Test avg. :	81	.	70	50	74	.	63	47	68	.	70	.
High avg. :	95	.	83	58	86	.	71	52	74	.	77	.
Low avg. :	62	.	56	42	58	.	54	39	60	.	61	.
[5] LSD (0.05):	6	.	9	9	11		8	6				
[6] TPG-value :	90	.	75	50	76		64	47				
[7] C.V. :	5	.	10	10	11		8	9				

[1] Heading- days earlier (-) or later than Expedition, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 10c. Winter wheat yield results - South Dakota eastern locations, 2006-2008. Table is sorted by 3-yr then by 2008 state yield average (Continued).

Variety, Heading [1,2]	Location Yield Avg. (Bu/a at 13% moist.)												Eastern Yield Avg. (bu/a)		State Yield Avg. (bu/a)	
	Brookings		Brookings-IMS		Selby		Platte		Onida		Pierre					
	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr	2008	3-Yr
Overland, 4	79	74+	90+	.	84+	.	85+	.	85+	.	57+	.	80+	.	77	.
NuDakota~W, 3	91+	73+	95+	.	83+	.	88+	.	79+	.	55+	.	82+	.	76	.
Expedition, 0	80	69+	96+	.	76	.	85+	.	81+	.	45	.	77	.	73	.
Wendy~W, -1	83	69+	89	.	84+	.	81+	.	81+	.	42	.	77	Data	73	.
Wesley, 2	77	66+	92+	.	73	.	71	.	80+	.	49	.	74	not	71	Data
Hatcher, 2	81	66+	87	.	75	.	73	.	66	.	48	.	72	given,	70	not
Millennium, 4	74	69+	78	.	78	.	77	.	76	.	49	.	72	only	71	given,
Wahoo, 3	78	67+	79	.	67	.	66	.	69	.	45	.	67	one	66	due to
Arapahoe, 3	75	71+	72	.	74	.	67	.	73	.	44	.	68	site	66	high
Darrell, 5	84	67+	90+	.	76	.	72	.	74	.	49	.	74	with	71	C.V.
Alice~W, -1	79	62	88	.	71	.	69	.	79+	.	48	.	72	3-yr	70	.
Harding, 5	75	65+	73	.	71	.	64	.	69	.	52	.	67	avg.	65	.
Tandem, 4	70	60	75	.	70	.	63	.	69	.	36	.	64	.	64	.
Jagalene, 3	70	55	82	.	65	.	72	.	80+	.	60+	.	72	.	67	.
Jerry, 5	68	65+	70	.	74	.	66	.	65	.	28	.	62	.	61	.
Smoky Hill, 4	94+	.	97+	.	78	.	84+	.	80+	.	58+	.	82+	.	76	.
Hawken, 3	88	.	89	.	73	.	72	.	71	.	37	.	72	.	71	.
Fuller, 2	84	.	92+	.	77	.	69	.	79+	.	51	.	75	.	71	.
Lyman, 3	80	.	78	.	81	.	70	.	73	.	48	.	72	.	71	.
RonL, 2	74	.	89	.	72	.	70	.	75	.	53+	.	72	.	70	.
InfinityCL, 3	82	.	85	.	78	.	71	.	71	.	47	.	72	.	70	.
SettlerCL, 3	75	.	87	.	61	.	72	.	70	.	37	.	67	.	67	.
Test avg. :	81	67	86	.	75	.	74	.	75	.	46	.	73	.	70	.
High avg. :	97	74	97	.	84	.	88	.	86	.	60	.	82	.	77	.
Low avg. :	68	55	70	.	61	.	63	.	65	.	25	.	62	.	61	.
[5] LSD (0.05):	7	10	8	.	6	.	9	.	9	.	8	.	5			
[6] TPG-value :	91	65	90	.	79	.	80	.	78	.	53	.	78			
[7] C.V. :	6	8	6	.	6	.	9	.	7	.	12	.	9			

[1] Heading- days earlier (-) or later than Expedition, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 11. Western, eastern, and statewide winter wheat bushel wt.(BW), height (HT), and grain protein (PROT) averages in 2008. Table is sorted by state BW average.

Variety, Heading [1,2]	Western Avg.			Eastern Avg.		State Avg.	
	BW lb	HT in	PROT %	BW lb	PROT %	BW lb	PROT %
RonL, 2	60	35	12.4	59+	11.3	59	11.7
Lyman, 3	60	38	13.5	58	13.3+	59	13.4
Millennium, 4	60	39	12.8	57	12.1	59	12.3
Overland, 4	60	36	12.9	57	12.1	59	12.4
Tandem, 4	60	39	13.4	58	12.8	59	13.0
Smoky Hill, 4	60	33	13.2	58	12.5	59	12.8
Wendy~W, -1	60	31	13.2	57	12.5	59	12.8
Alice~W, -1	60	33	12.9	57	12.1	59	12.4
InfinityCL, 3	60	37	12.6	57	11.8	59	12.1
Darrell, 5	59	37	13.1	57	12.2	58	12.5
Expedition, 0	59	35	12.9	57	11.9	58	12.3
Hawken, 3	59	30	13.7+	57	12.9	58	13.2
Harding, 5	59	40+	13.8+	57	13.4+	58	13.5
Fuller, 2	59	33	13.3	57	12.7	58	12.9
Jagalene, 3	58	34	13.0	56	12.0	57	12.3
Arapahoe, 3	58	38	13.0	57	12.5	57	12.7
SettlerCL, 3	58	33	12.5	56	12.1	57	12.2
Jerry, 5	58	39	13.4	56	13.0	57	13.2
Hatcher, 2	58	33	12.5	56	11.5	57	11.9
NuDakota~W, 3	58	31	13.1	55	11.9	57	12.3
Wesley, 2	58	32	13.4	55	12.7	56	13.0
Wahoo, 3	56	37	13.1	55	12.3	56	12.6
Test avg. :	59	35	13.0	57	12.3	58	12.6
High avg. :	61	40	13.8	59	13.4	60	13.5
Low avg. :	56	30	12.4	55	11.3	56	11.7
[5] LSD (.05):	1	1	0.3	1	0.4		
[6] TPG-value :	61	40	13.6	59	13.1		
[7] C.V. :	3	5	4.0	2	5.0		

[1] Heading- days earlier (-) or later than Expedition, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 12. Origin, traits, and disease reactions for winter wheat varieties tested in 2008.

Variety [2]	Relative Heading [1]	Origin	Lodging Res [8]	Winter Hardy Rtg [8]	End-Use Qlty [10]	Coleoptile Lgth [11]	Wheat Steak Mosaic [13]	Tanspot [13]	Fusarium Head Blight [13]	Rust [13]			PVP Status [14]
										Stripe	Leaf	Stem	
Alice~W	-1	SD-06	G	G	EB	78	MR	MS	MS	.	MS	MR	Yes
Wendy~W	-1	SD-04	E	E	GN	67	MS	R	S	MR	MS	MR	Yes
Expedition	0	SD-02	F	G-E	GB	88	S	MS	S	MS	S	R	Yes
Fuller	2	KS-07	F-G	G	AB	.	MS	MR	MS	.	MR	MR	Pdg
Hatcher	2	CO-04	G	F-G	GB	89	S	.	S	MS	MS	MR	Yes
RonL	2	KS-06	G-E	G	GB	.	MR	.	MR	R	S	MR	Yes
Wesley	2	NE-98	E	G-E	GB	79	S	MR	MR	MR	MS	R	No
Lyman	3	SD-08	F	G-E	AB	90	MR	MD	MS	R	R	R	Pdg
Arapahoe	3	NE-88	F	G-E	GB	83	S	S	MR	MS	MR	MR	Yes
Hawken	3	AP-07	E	G	AB	.	MS	MR	MS	MR	MR	MR	Yes
InfinityCL	3	NE-05	G	G	AB	.	S	.	.	MR	MR	MR	Yes
Jagalene	3	AP-02	E	G	AB	92	MS	MR	S	MR	S	MR	Yes
NuDakota~W	3	AP-06	E	G-E	AB	.	MR	MR	S	MR	MS	MR	Yes
SettlerCL	3	NE-08	G	G	AB	.	S	.	.	MS	MS	MR	Pdg
Wahoo	3	NE/WY-01	G	G	AB	91	S	.	MR	MR	MS	R	Yes
Millennium	4	NE-99	G	F-G	AB	78	S	MS	MS	MR	MR	MR	Yes
Overland	4	NE/SD-07	G	E	AB	89	.	.	MR	R	R	R	Pdg
Smoky Hill	4	WPB-07	G	G	EB	.	MS	MR	S	R	R	MR	Yes
Tandem	4	SD-97	F-G	G	EB	112	S	S	MR	MR	S	MR	Yes
Darrell	5	SD-06	G	G	EB	89	MR	MS	MR	.	MS	R	Yes
Harding	5	SD-99	F-G	E	AB	100	MR	MR	MS	MS	MR	MR	Yes
Jerry	5	ND-01	F	E	GB	92	MS		MS	MR	MR	R	No

[1] Heading- days earlier (-) or later than Expedition, the check variety (Ck) for maturity. Note that additional table footnotes are explained in Table C.

Table 13. Field pea yield results at three South Dakota locations, 2006-2008. Table is sorted by 3-yr then by 2008 three-location yield average.

Variety, Rel. Mat. [15]	Location Yield Avg. (Bu/a) 13% moist.						3-Location Avg. (bu/a)	
	South Shore		Selby		Wall			
	2008	2-Yr	2008	2-Yr	2008	2-Yr	2008	2-Yr
Cooper, L	69+	66+	28	45+	28	27+	42	46
CDC Golden, M	63	66+	26	43+	26	27+	38	45
Eclipse, M	66+	66+	22	41+	25	29+	38	45
CDC Meadow, E	63	59+	27	42+	26	30+	39	44
DS Admiral, E	60	60+	28	40+	28	32+	39	44
Fusion, M	55	60+	20	36+	24	29+	33	42
SW Midas, E	51	56+	25	42+	18	26+	31	41
CDC Striker, M	63	50+	28	40+	28	29+	40	40
K2, E	55	45	23	37+	29	30+	36	37
Spider, M	74+	.	37+	.	23	.	45	.
Polstead, M	61	.	26	.	35+	.	41	.
Tudor, M	64	.	27	.	26	.	39	.
Arcadia, E	68+	.	22	.	27	.	39	.
Camry, M	60	.	26	.	21	.	36	.
Test avg. :	62	59	26	41	26	29	38	43
High avg. :	74	66	37	45	35	32	45	46
Low avg. :	51	45	20	36	18	26	31	37
[5] LSD (.05):	9	20	4	NS	4	NS		
[6] TPG-value :	66	47	34	36	32	26		
[7] C.V. :	10	9	11	7	10	7		

[15] Maturity- relative to other varieties in the trial. Note that additional table footnotes are explained in Table C.

Table 14. Seed source, traits, and disease reactions for field pea entries tested in 2008.

Variety	Seed Source	Rel Mat [15]	Pea Protein content* (%)	Vine		Ldg (1-5) [4]	Fusarium Wilt [13]	Powdery Mildew [13]	Mycos-phaerella Blight [13]	PVP or PBR Status [14]
				Type [16]	Ht (in)					
DS Admiral	LL-02	E	25.7	S-L	17	2	MS	MR	MS	Yes
Eclipse	PUSA-02	M	28.4	S-L	14	1	S	MR	MS	Yes
Fusion	MS-08	M	25.8	S-L	16	4	S	MR	MS	Yes
SW Midas	LL-05	E	24.2	S-L	17	2	MS	MR	MS	Yes
CDC Striker	ASS-02	M	29.1	S-L	18	1	MR	S	MS	Yes
Cooper	MS-02	L	25.7	S-L	17	2	MS	MR	MS	Yes
CDC Golden	ASS-03	M	27.1	S-L	.	2	MS	MR	MS	No
CDC Meadow	ASS-06	E	25.3	S-L	.	.	MS	MR	MS	No
K2	PUSA-04	E	25.6	S-L	16	2	S	S	.	Yes
Polstead	PUSA-07	M	27.9	S-F	17	2	S	MR	S	Yes
Tudor	PUSA-05	M	26.3	S-L	20	2	MS	MR	S	Yes
Camry	PUSA-05	M	25.7	S-L	16	4	S	MR	MS	Yes
Arcadia	LL-07	E	24.5	S-L	20	3	MS	MS	VS	Yes
Spider	LL-08	M	28.2	S-L	21	4	R	R	MR	Yes

[15] Maturity- relative to other varieties in the trial. Note that additional table footnotes are explained in Table C.
* Protein content is an average of two locations-- South Shore and Selby.