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2011 Small Grains Report

Southcentral and Southeastern Idaho Cereals Research and Extension Program

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University of Idaho
College of Agricultural and Life Sciences

Cover photo clockwise from top left: 2010 spring wheat loaf volumes; wheat seedling infected with stripe rust, November 2010; Brundage soft white winter wheat infected with stripe rust, summer 2011; and a field day in Ashton.

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Sid Cellan - Soda Springs
Mark and Craig Ozburn - Soda Springs
Gilbert and Carl Hofmeister - Rockland
Dave Cook - Ririe
Duane Grant and Mike Larsen - Rupert
Don Marotz - Ashton
Ned Moon and Melvin Barfuss of Jentzsch-Kearl Farms - Rupert
Marc Thiel - Idaho Falls

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Disclaimer Statement

This report represents research in progress and results may change with additional testing. Recommendations for use or non-use of any variety tested in these trials is not stated or implied. Inclusion of a variety in these trials cannot be construed as recommending that variety over varieties not included in the trials.

ALWAYS read and follow the instructions printed on pesticide labels. The pesticide recommendations in this UI publication do not substitute for instructions on the label. Due to constantly changing pesticide laws and labels, some pesticides may have been cancelled or had certain uses prohibited. Use pesticides with care. Do not use a pesticide unless both the pest and the plant, animal, or other application site are specifically listed on the label. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock. Trade names are used to simplify information; no endorsement or discrimination is intended.

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2011 Small Grains Report for Southcentral and Southeastern Idaho

Juliet Marshall, Chad Jackson, Tod Shelman, Linda Beck, and Katherine O'Brien

Additions and Changes:

For 2011, the number of nurseries was increased: A small winter wheat trial of hard and soft wheat varieties was established in Soda Springs and 2-Row and 6-Row spring barley nurseries were reestablished in Soda Springs after a two season absence.

Aberdeen spring and winter wheat nursery replications were split into a block with fungicide applications and a block without. This was done to determine the effect of stripe rust *(Puccinia striiformis* f.sp. *tritici*) infection on the different varieties. Methods for interpreting the statistics in those tables is given on pages 3-4.

Two Appendices were added to the report to address Fusarium head blight and Low Phytic Acid barleys in depth.

Introduction

Increases in cereal grain yields result from a combination of genetic improvements in varieties and from improved agronomic practices. Studies have shown that genetic improvements have contributed more than 50 percent of the total improvement in yield over the past 30 or 40 years. The objective of the University of Idaho Small Grain Performance Trials is to provide an unbiased appraisal and evaluation of currently available varieties and advanced experimental lines. This information will assist Idaho growers in comparing and selecting varieties best suited to their particular area and growing conditions.

Varietal development programs strive not only for greater yield potential, but also for improved end-use quality, better disease and insect resistance, yield stabilization through improved winter hardiness, better straw strength, etc. A more detailed description of variety development, cooperative extension testing and evaluation, and seed production programs is given in the University of Idaho publication titled, "Small Grain Variety Development and Adaptation in Idaho", CIS 976. Bringing a new variety to the market place is a cooperative effort by many individuals.

Varieties are best evaluated by comparing performance over a number of locations and preferably over more than one year. Varietal performance can change in response to both environmental and cultural/management conditions. This report summarizes small grain trials conducted throughout Southcentral and Southeastern Idaho that were harvested in 2011, as well as milling and baking data from trials harvested in 2010.

Materials & Methods

Locations

Cereal trials were established at six winter and five spring locations throughout SC and SE Idaho during the fall of 2010 and the spring of 2011. For location details, please see the descriptions on pages 5 to 11. The Ririe, Rockland & Soda Springs winter and Soda Springs spring trials were grown under dryland conditions and all other trials were grown under irrigation. The trials at Aberdeen and Kimberly were grown at UI Research and Extension Centers, and the remaining trials were grown in producers' fields.

Agronomic Practices

Untreated seed was planted at the following rates:

- Irrigated Wheat: 1,000,000 seeds per acre or approximately 95 pounds per acre.

- Irrigated Barley: 800,000 seeds per acre or approximately 80 pounds per acre.
- Dryland Wheat: 700,000 seeds per acre or approximately 65 pounds per acre.
- Dryland Barley: 600,000 seeds per acre or approximately 60 pounds per acre.

Row spacing was set at 7 inches using double disk openers for all irrigated locations and the Soda Springs winter and spring dryland locations. The Ririe dryland location used a 10-inch row spacing and hoe-type openers and the Rockland location used a 12-inch row spacing with shanks preceding double disk openers. Plots at all locations except for Aberdeen were planted 5 feet wide by 14 feet long then sprayed back to 10 feet long using glyphosate herbicide. Aberdeen plots were planted 5 feet wide by 13.3 feet long then sprayed back to 9.3 feet long. All entries were replicated 4 times at each location in a randomized complete block design, except Soda Springs winter which had 3 replications. Aberdeen winter and spring wheat nurseries were set up in a split plot design with reps 1&2 being sprayed with fungicide and reps 3&4 left untreated. Except for planting and harvest operations, nitrogen fertilization, and miscellaneous maintenance, trials established in producers' fields received the same "grower management" or cultural operations as applied to the surrounding commercial wheat or barley field.

Nitrogen fertilizer in irrigated locations was managed according to the following methodology: Yield goals were set for each class at each location using historical yield data. These yield goals were used to calculate optimal fertility amounts according to the following methods: Soft white winter, soft white spring, and winter barley; lbs/acre nitrogen needed = 2 times yield goal. Hard winter and hard spring wheat; lbs/acre nitrogen needed = 2.5 times yield goal, plus 40 lbs nitrogen/acre topdressed at flowering. Spring 2 row and 6 row barley: lbs/acre nitrogen needed = 1.7 times the yield goal. Hard wheat nurseries received the remaining balance of nitrogen in urea (46-0-0) topdressed at heading using hand broadcast spreaders. Fertilizers and pesticides applied are listed on pages 6 to 11. Planting and harvesting operations by university personnel were timed to approximately coincide with corresponding cooperator operations.

Description of Agronomic Data

Each entry at each location was measured for grain yield, test weight, plant height, heading date, and lodging (when present).

- Yield is calculated at 60 pounds per bushel for wheat, and 48 pounds per bushel for barley.
- Test weight is reported in pounds per standard bushel.
- Plant height is reported in inches from the soil surface to the tip of the heads, awns excluded.
- Heading date is reported as the date when 50 percent of heads are fully emerged from the boot.
- Lodging is reported as the percent of the plot area that was not standing straight prior to harvest.

Description of End-use Quality Data

Grain protein for each variety in 2011 was analyzed with a Foss NIR grain analyzer. Protein data are found in conjunction with the agronomic data noted above in tables 5 to 57. These protein values are best utilized in comparisons between varieties within a nursery.

Due to the time necessary to complete milling and baking evaluations, test results from the Idaho Wheat Quality Laboratory are not available for the 2011 harvest in this report. Data are given for these characteristics from the 2010 harvest and are found in tables 65 to 76.

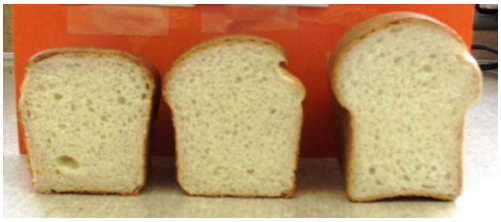
Milling and baking tests and plump seed evaluations use standardized testing methods and are described below:

- Flour protein: this is the flour protein content, measured on a fixed 14 percent moisture basis. Lower numbers are better for soft wheat; higher numbers are preferred for hard wheat.
- Break flour yield: represents ease of milling or kernel softness; higher numbers are preferred.
- Flour yield: the percent of flour obtained from a sample of wheat; higher percentages are better.
- Whole grain protein percent: protein content of the whole grain on a 12 percent moisture basis. Lower percentages are preferred for soft wheat; higher percentages are preferred for hard wheat.
- Hardness value: a measure of kernel hardness; generally soft white wheats are below 35, hard white wheats are between 40-55 and hard red wheats are above 40.

Additional evaluations include the following:

Hard Wheats

Bake volume: This is the volume of an experimental loaf of bread measured in cubic centimeters and reflects protein quality; higher volume is preferred.



Soft Wheats

Cookie diameter: Diameter of a cookie in centimeters; larger numbers are better.

Barley

- Plump: Percent plump is the percent of a sample that stayed on top of a 5.5/64 screen after shaking and consists of the 6/64 and 5.5/64 percentages combined. Both screen percentages are included in the report for increased precision.
- Thins: the percent of a sample that passed through a 5.5/64 screen after shaking.

Statistical Analyses

Data from each nursery were analyzed using SAS 9.2 software with the PROC GLM procedure. Fisher's protected LSD (α=.05) was used for mean comparisons.

Statistical Interpretation

Most tables have a least significant difference (LSD) statistic at the bottom of the table. This statistic is given at the 5 percent error level and is an aid in comparing varieties. If the measured values of any two varieties within a table differ by the LSD value or more, they may be considered different with a confidence level of 95 percent. If the measured values are less than the LSD value, the differences may be due to random error rather than real differences. Coefficient of variation (CV percent) statistic is a general measurement of the precision of each experiment. Lower CV values indicate less experimental

variation and greater precision. Most tables that do not have the LSD and CV statistic are averages over locations or years where specific statistical analyses were not run on the combined data or are from data obtained from only one replication or are a composite sample of all replications (e.g. quality data). Most tables from individual locations also contain yield data from two previous years. The average, LSD, and CV for these data represent the original data set, not just the selected varieties presented in these tables. The Pr>F value shows the validity of the LSD value above it; if the Pr>F value is equal to or greater than .05 (e.g. .1504; .6250), then the LSD value is void. This does not mean there are not differences between the varieties in a category with a void LSD, it simply means differences cannot be determined at the 95% confidence level we set.

For Aberdeen winter and spring wheat nurseries, the trials were split into two treatment blocks with reps 1 & 2 being sprayed with fungicide and reps 3 & 4 being unsprayed as mentioned earlier. This design was implemented after the original 4 rep variety trials were planted, otherwise 4 reps per treatment block would have been used. The data is presented as sprayed vs unsprayed. Pr>F values at the bottom of the columns describe the significance of the spray block x variety interaction. If the Pr>F value is less than .05, then the varieties responded differently to spraying at a 95% confidence level.

To further examine where the significance of the interaction was, or which varieties statistically benefited the most from spraying, a test of simple effects was performed on data fields that showed a significant interaction. The test of simple effects Pr>F values for those data fields is presented to the left of the data columns. The test of simple effects statistics show the statistical significance of the differences between the variety in the sprayed and unsprayed blocks. The same methodology for using the Pr>F values above can be used. For instance, if a variety's yield has a test of simple effects Pr>F value of <.0001, then the differences in yield are highly significant between the sprayed and unsprayed blocks. If the Pr>F value is greater than .0500 then the yield differences aren't statistically significant and it can be inferred that spraying didn't affect yield much.

Due to the nature of the experiment design which has limited replications and restricted randomization of sprayed reps, comparisons of yield should be done conservatively (e.g. a variety with a Pr>F value of .0499, technically significant, could have some of the yield difference coming from replication soil quality instead of fungicide applications).

Varieties Tested

A list of released varieties tested in 2010-2011 is given in Table 1. Included in this table are seed size, number of seeds per pound, and the adjusted seeding rate. Information is also given on the year of release and the releasing agency or company. A short description of new varieties is given in Table 3. Additional information is available from the releasing agency or company.

Seasonal average measurements of several plant growth characteristics from the variety trials are shown in Table 4 for the time period of 2001-2011.

Southcentral & Southeast Idaho Cereal Variety Trial Locations

Winter Locations

Kimberly	Irrigated
Rupert	Irrigated
Aberdeen	Irrigated
Ririe	Dryland
Rockland	Dryland
Soda Springs	Dryland

Spring Locations

Rupert	Irrigated
Aberdeen	Irrigated
Idaho Falls	Irrigated
Ashton	Irrigated
Soda Springs	Dryland

Location Descriptions

Kimberly Winter Irrigated:

Kimberly Research & Extension Center
3825 N. 3600 E. Kimberly, ID

Coordinates: 42° 32’ 58.9” N., 114° 20’ 41.78” W.
Elevation: 3900 ft.
Soil Type: #86 Portneuf silt loam 0-2% slopes
Twin Falls County Soil Type Acreage: 77,747
County Soil Type Percentage: 5.0%
Previous Crop: Dry Beans
Planting Date: October 13, 2010
Harvest Date: August 11, 2011
Chemicals applied: 1 pt/A Maestro MA, 2/3 pt/A Starane
Fertility:

	Organic matter	pH	Free Lime %	Hard winter wheat N#/A	Soft white winter wheat & winter barley N #/A	P	K	S
12" soil test results (N & S= 0-24")	1.4	8.0	4.1	101	101	26 ppm	229 ppm	33 ppm
Fertilizer applied (#/A)				315	200			
Total	**1.4**	**8.0**	**4.1**	**416**	**301**	**26 ppm**	**229 ppm**	**33 ppm**

Rupert Winter Irrigated:

Cooperator: Jentzsch-Kearl Farms
Located at approximately 150 N. Meridian Rd. Rupert, Idaho

Coordinates: 42° 38' 30.11"N., 113° 40' 01.98"W.
Elevation: 4160 ft.
Soil Type: #42 Tindahay sandy loam 0-1% slopes
Minidoka County Soil Type acreage: 6,920
County Soil Type Percentage: 2.1%
Previous Crop: Dry Beans
Planting Date: October 6, 2010
Harvest Dates: August 15, 2011
Chemicals applied: 12 oz/A MCPA , 3 oz/A Sterling Blue, 4 oz/A Tebuzole, 9 oz/A Twinline
Fertility:

	Organic Matter	pH	Free Lime %	Hard winter wheat N#/A	Soft white winter wheat & winter barley N #/A	P	K	S
12" soil test results (N & S= 0-24")	1.3	7.4	<1.0	36	36	54 ppm	179 ppm	26 ppm
Fertilizer applied (#/A)				245	205			
Total	**1.3**	**7.4**	**<1.0**	**278**	**238**	**54 ppm**	**179 ppm**	**26 ppm**

Location Descriptions

Aberdeen Winter Irrigated:

Aberdeen Research & Extension Center
1693 S. 2700 W. Aberdeen, ID

Coordinates: 42° 57’ 48.19” N., 112° 49’ 01.60” W.
Elevation: 4400 ft.
Soil Type: DcA Declo Fine Sandy Loam, 0-2%slopes
Bingham County Soil Type Acreage: 3,020
County Soil Type Percentage: 0.3%
Previous Crop: green manure oats
Planting Date: September 22, 2010
Harvest Dates: August 10, 2011
Chemicals applied: 1 pt/A Maestro MA, 2/3 pt/A Starane, 14 oz/ Quilt on half of reps with herbicide and at heading of wheat

Fertility:

	Organic Matter	pH	Free Lime %	Hard winter wheat N#/A	Soft white winter wheat & winter barley N #/A	P	K	S
12" soil test results (N & S= 0-24")	0.9	8.4	7.8	51	51	16 ppm	155 ppm	50 ppm
Fertilizer applied (#/A)				390	260	100#		100 #
Total	**1.3**	**8.3**	**6.7**	**441**	**311**	**24+ppm**	**155 ppm**	**50+ ppm**

Ririe Winter Dryland:

Cooperator: Dave Cook
Approximately 2 miles south of Ririe Reservoir Dam on Meadow Cr. Rd. Ririe, ID

Coordinates: 43° 33’ 27.09”N., 111° 43’ 04.90” W.
Elevation: 5500 ft.
Soil Type: #42 Ririe silt loam, 4-12% slopes
Bonneville County Soil Type Acreage: 74,713
County Soil Type Percentage: 11.4%
Previous Crop: Peas
Planting Date: September 23, 2010
Harvest Date: August 30, 2011
Chemicals applied: 16 oz/A Goldsky, 7 oz/A Salvo
Fertility:

	Organic Matter	pH	Free Lime %	Hard winter wheat N#/A	Soft white winter wheat & winter barley N #/A	P	K	S
12" soil test results (N & S= 0-24")	1.2	8.0	<1.0	29	29	9 ppm	267 ppm	47 ppm
Fertilizer applied (#/A)				6	6	30 #		
Total	**1.2**	**8.0**	**4.3**	**35**	**35**	**9+ppm**	**267 ppm**	**47 ppm**

Location Descriptions

Rockland Winter Dryland:

Cooperators: Gilbert and Carl Hofmeister

1 ¾ miles south of the Neeley interchange on Rock Cr. Road Rockland, ID

Coordinates: **42° 41' 02.97" N., 112° 55' 11.95" W.**
Elevation: **4543 ft.**
Soil Type: **#44 Neeley silt loam 4-12% slopes**
Power County Soil Type Acreage: **5,717**
County Soil Type Percentage: **0.9%**
Previous Crop: **fallow**
Planting Date: **September 13, 2010**
Harvest Date: **August 10, 2011**
Chemicals applied: **Maestro MA 1.5 pt/A, Maverick 2/3 oz/A, Powerflex 3.5 oz/A, LV-6 1 pt/A**

Fertility:

	Organic Matter	pH	Free Lime %	Hard winter wheat N#/A	P	K	S
12" soil test results (N & S= 0-24")	**1.4**	**8.2**	**2.1**	36	**5 ppm**	**280 ppm**	**12 ppm**
Fertilizer applied (#/A)				35			
Total	**1.4**	**8.2**	**2.1**	**71**	**5 ppm**	**280 ppm**	**12 ppm**

Soda Springs Winter Dryland:

Cooperators: Mark and Craig Ozburn

½ mile north of Soda Springs High School Soda Springs, ID

Coordinates: **42° 40' 09.90" N., 111° 35' 38" W.**
Elevation: **5878 ft.**
Soil Type: **700AA Rexburg-Ririe complex, cool, 1-4% slopes**
Caribou County Soil Type Acreage: **information not available**
County Soil Type Percentage: **information not available**
Previous Crop: **grain**
Planting Date: **September 2010**
Harvest Date: **August 31, 2011**
Chemicals applied: **.10 oz/A Ally, 5.3 oz/A LV6, 1pt/A fulvic acid, 2 lbs/A super 60**

Fertility:

	Organic Matter	pH	Free Lime %	winter wheat N#/A	P	K	S
12" soil test results (N & S= 0-24")	**1.8**	**8.1**	**2.0**	68	**15**	**307**	**14**
Fertilizer applied (#/A)				60	10	0	10
Total	**1.8**	**8.1**	**2.0**	**128**	**15+**	**307**	**14+**

Location Descriptions

Rupert Spring Irrigated:

Cooperator: Duane Grant
Approximately 810 E. 700 N., Rupert, ID

Coordinates: 42° 43' 14.95"N., 113° 30' 36.13"W.
Elevation: 4255 ft.
Soil Type: #36 Sluka silt loam 1-4% slopes
Minidoka County Soil Type Acreage: 35,802
County Soil Type Percentage: 11.1%
Previous Crop: alfalfa
Planting Date: April 6, 2011
Harvest Dates: August 24-25, 2011
Chemicals applied: 1 pt/A Maestro MA, 2/3 pt/A Starane, 9 oz/A Achieve Liquid

Fertility:

	Organic Matter	pH	Free Lime %	Hard Spring wheat N#/A	Soft white spring wheat & spring barley N #/A	P	K	S
12" soil test results (N & S= 0-24")	1.6	7.8	1.4	50	50	1 ppm	242 ppm	33 ppm
Fertilizer applied (#/A)				315	210	100#	40#	30#
Total	**1.6**	**7.8**	**1.4**	**365**	**260**	**1+ ppm**	**242+ppm**	**33+ppm**

Aberdeen Spring Irrigated:

Aberdeen Research & Extension Center
1693 S. 2700 W. Aberdeen, ID

Coordinates: 42 ° 57’ 48.19” N., 112° 49’ 01.60” W.
Elevation: 4400 ft.
Soil Type: DeA Declo loam, 0-2% slopes
Bingham County Soil Type acreage: 40,748
County Soil Type Percentage: 4.5%
Previous Crop: Green manure oats
Planting Date: April 11, 2011
Harvest Date: August 18-19 & 22, 2011
Chemicals applied: 1 pt/A Maestro MA, 2/3 pt/A Starane, 14 oz/A Quilt, 14 oz/A Quilt Xcel, Fungicide applied at herbicide application and heading

Fertility:

	Organic Matter	pH	Free Lime %	Hard Spring wheat N#/A	Soft white spring wheat & spring barley N #/A	P	K	S
12" soil test results (N & S= 0-24")	0.8	8.3	7.7	58	58	35 ppm	150 ppm	34 ppm
Fertilizer applied (#/A)				325	220			100#
Total	**0.8**	**8.3**	**7.7**	**383**	**278**	**35 ppm**	**150 ppm**	**34+ppm**

Location Descriptions

Idaho Falls Spring Irrigated:

Cooperator: Marc Thiel
1/3 mile south of 17th S on 45th W. Idaho Falls, ID

Coordinates: 43° 28’ 42.80” N., 112° 07’ 32.26” W.
Elevation: 4675 ft.
Soil Type: #23 Pancheri silt loam, 2-4% slopes
Bonneville County Soil Type Acreage: 67,839
County Soil Type Percentage: 10.3%
Previous Crop: potatoes
Planting Date: April 19, 2011
Harvest Date: August 26, 2011
Chemicals applied: 1 pt/A Maestro MA, 2/3pt/A Starane, 9 oz/A Achieve Liquid, 14 oz/A Quilt Xcel Fungicide applied at heading on wheat

Fertility:

	Organic Matter	pH	Free Lime %	Hard Spring wheat N#/A	Soft white spring wheat & spring barley N #/A	P	K	S
12” soil test results (N & S= 0-24”)	1.5	8.1	9.3	101	101	32 ppm	264 ppm	29 ppm
Fertilizer applied (#/A)				190	100			
Total	**1.5**	**8.1**	**9.3**	**291**	**201**	**32 ppm**	**264 ppm**	**29 ppm**

Ashton Spring Irrigated:

Cooperator: Don Marotz
1/10 mile south of the intersection of Cave Falls Highway (1400 N) and 4200 E on 4200 E. road Ashton, ID

Coordinates: 44° 05' 1.39" N., 111° 18' 57.34" W.
Elevation: 5629 ft.
Soil Type: #92 Rin silt loam, 1-4% slopes
Fremont County Soil Type Acreage: 6,879 acres
County Soil Type Percentage: 1.1%
Previous Crop: barley
Planting Date: June 2, 2011
Harvest Date: September 28, 2011 – Barley
October 20, 2011 - Wheat
Chemical applied: 1 pt Maestro MA, 9oz Achieve Liquid, 2/3 pt/A Starane, 14 oz/A Quilt Xcel Fungicide applied with herbicide

Fertility:

	Organic Matter	pH	Free Lime %	Hard Spring wheat N#/A	Soft white spring wheat & spring barley N #/A	P	K	S
12" soil test results (N & S= 0-24")	2.6	5.6	<1.0	64	64	33 ppm	307 ppm	27 ppm
Fertilizer applied (#/A)				205	115			35#
Total	**2.6**	**5.6**	**<1.0**	**269**	**179**	**22 ppm**	**188 ppm**	**27+ppm**

Location Descriptions

Soda Springs Spring Dryland:

Cooperator: Sid Cellan

1.75 miles north of Hooper Springs on Govt. Dam Road Soda Springs, ID

Coordinates: 42° 42' 13.10" N., 111° 36' 30.80" W.
Elevation: 5991 ft.
Soil Type: 225AA Ririe-Lostine complex, 1-8% slopes
Caribou County Soil Type Acreage: Information not available
County Soil Type Percentage: Information not available
Previous Crop: Barley
Planting Date: May 17, 2011
Harvest Date: September 21, 2011
Chemicals applied: 1 pt/A Maestro MA, 2/3 pt/A Starane, 14 oz/A Quilt Xcel with herbicide

Fertility:

	Organic Matter	pH	Free Lime %	wheat and barley N#/A	P	K	S
12" soil test results (N & S= 0-24")	1.9	7.3	<1.0	54	28 ppm	433 ppm	11 ppm
Fertilizer applied (#/A)				60			
Total	**1.9**	**7.3**	**<1.0**	**114**	**28 ppm**	**433 ppm**	**11 ppm**

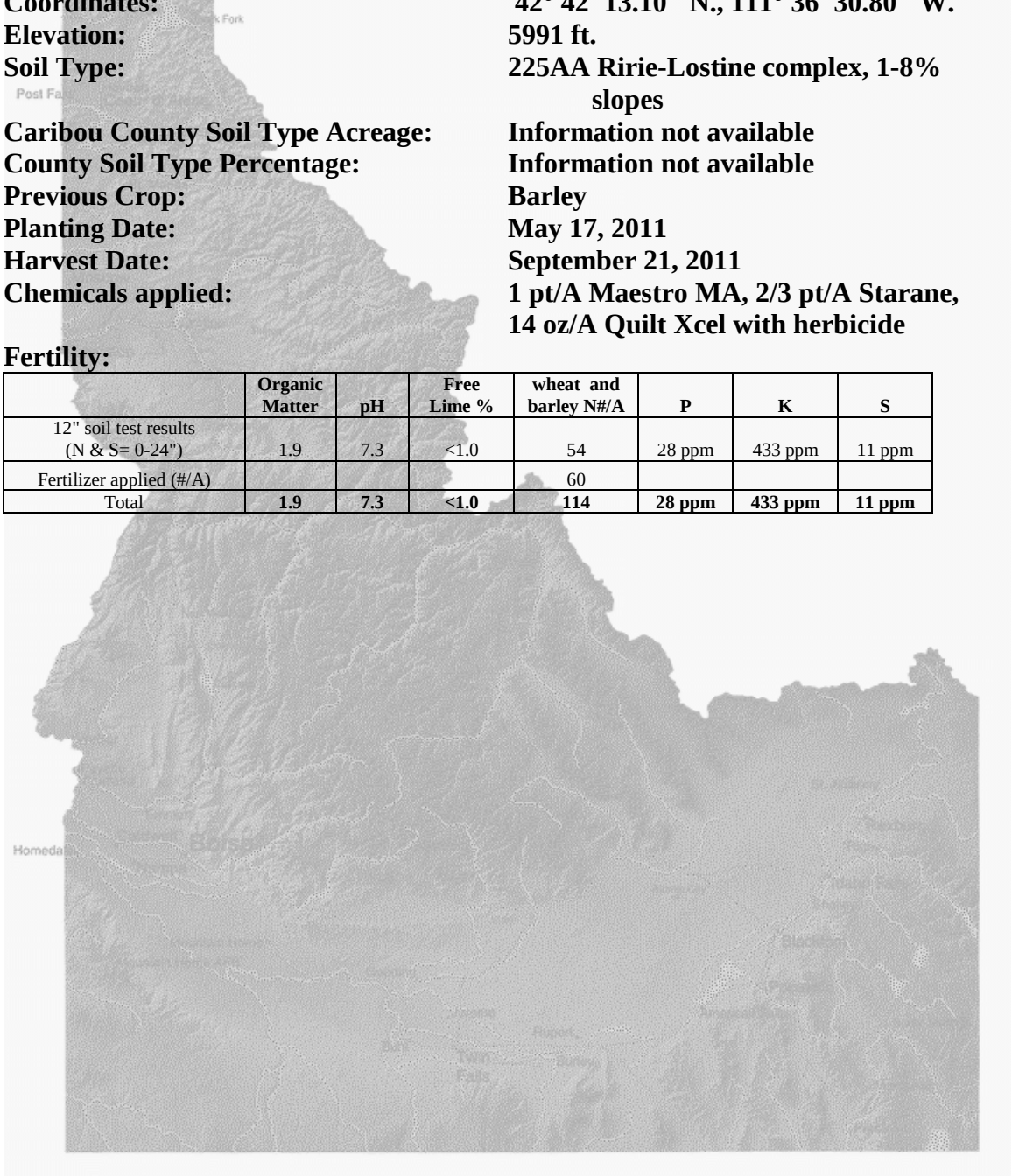


Table 1. Released varieties tested in 2010-2011 with seed size and adjusted seeding rate.

Variety	Exp. No.	1000 Kernel Weight (g)	Seeds per Pound	Adjusted Seeding Rate[1] (lb/A)	Year Released	Developer(s)/Distributor of variety
Soft White Winter Wheat						
AgriPro Legion		47	9,755	103	2008	Syngenta Cereals
AgriPro Salute		52	8,808	114	2007	Syngenta Cereals
AP Badger	RemPop80-3	48	9,450	106	2009	Syngenta Cereals
AP Legacy	ORF2BC9800267-0	48	9,450	106	2009	Syngenta Cereals
Bitterroot	92-22407A	37	12,427	80	2007	Idaho AES, USDA
Brundage	ID86-14502B	44	10,309	97	1996	Idaho AES, USDA
Brundage 96	ID-B-96	41	11,200	89	2002	Idaho AES, USDA
Bruneau	93-64901A	36	12,777	78	2009	Idaho AES, USDA
Coda (club)	WA7752	37	12,259	82	1998	Washington and Oregon AES, USDA
Goetze	ORH010920	41	11,063	90	2007	Oregon State AES, USDA-ARS
Lambert	ID85-153	50	9,072	110	1993	Idaho AES, USDA
Madsen	WA7163	41	11,063	90	1988	Washington, Idaho & Oregon AES, USDA
ORCF-101	OR2010051	44	10,428	96	2003	Oregon AES, USDA
ORCF-102	OR2010007	45	10,193	98	2005	Oregon AES, USDA
Simon	ID91-34302A	45	10,193	98	2002	Idaho AES, USDA
Skiles	ORH010085	45	10,080	99	2007	Oregon AES, USDA
Stephens		41	11,200	89	1977	Oregon AES, USDA
SY Ovation	03PN108#21	43	10,549	95	2011	Syngenta Cereals
UICF Brundage	02-859	39	11,782	85	2009	Idaho AES, USDA
UICF Lambert	99-435	57	8,028	125	2008	Idaho AES, USDA
WB-Junction	BZ6W02-616	43	10,549	95	2011	WestBred / Monsanto
WestBred 456		43	10,549	95	2008	WestBred / Monsanto
WestBred 528	BZ6W98-528	48	9,549	105	2005	WestBred / Monsanto
Hard Red and White (W) Winter Wheat						
AgriPro Paladin	W96-355	38	11,937	84	2005	Syngenta Cereals
Bonneville	IDO421	42	10,800	93	1993	Idaho AES, USDA
Boundary	IDO467	47	9,755	103	1996	Idaho AES, USDA
Curlew	UT9325-55	35	12,960	77	2009	Utah AES, USDA
Decade	MT0552	37	12,259	82	2010	Montana AES
Deloris	UT2030-32	40	11,484	87	2002	Utah AES, USDA
DW	ID0513	35	12,960	77	2001	Idaho AES, USDA
Eddy		39	11,631	86	2004	WestBred / Monsanto
Esperia		37	12,427	80		AllStar Seeds
Garland	UT1706-1	38	12,096	83	1992	Utah AES, USDA
Gary	IDO550	42	10,800	93	2002	Idaho AES, USDA
Golden Spike (W)	UT1944-158	35	12,960	77	1999	Utah AES, USDA
Greenville	UT9743-42	41	11,200	89	2011	Utah AES, USDA
Juniper	IDO 575	35	13,148	76	2005	Idaho AES, USDA
LHS (W)	IDO835	45	10,193	98	2010	Idaho AES, USDA
Lucin-CL		36	12,777	78	2011	Utah AES, USDA
Manning	UT89099	41	11,200	89	1979	Utah AES, USDA
Moreland	IDO517	36	12,600	79	2003	Idaho AES, USDA
Norwest 553	ORN00B553	42	10,800	93	2007	Oregon State AES, USDA-ARS, Nickerson U.K.
NuHills		35	12,960	77		General Mills, Great Falls, MT
NuHorizon (W)	GM10002	36	12,600	79	2001	General Mills, Great Falls, MT
Promontory	UT1567-51	40	11,484	87	1990	Utah AES, USDA
UI Darwin (W)	IDO604	44	10,428	96	2005	Idaho AES, USDA
UI Silver (W)	IDO658	29	15,641	64	2011	Idaho AES, USDA
UI SRG		35	12,960	77	2012	Idaho AES, USDA
UICF Grace (W)	IDO651	38	11,937	84	2009	Idaho AES, USDA
Utah 100	UT1650-150	43	10,549	95	1997	Utah AES, USDA
WB-Arrowhead	ML9W05-2501	42	10,800	93	2011	WestBred / Monsanto
Weston		46	9,969	100	1978	Idaho AES, USDA
Whetstone	W98-344	33	13,745	73	2009	Syngenta Cereals
Yellowstone	MT00159	43	10,549	95	2005	Montana State University

[1]Adjusted to plant 1 million seeds per acre under irrigation according to the number of seeds per pound for each variety.

Table 1 (cont'd). Released varieties tested in 2010-2011 with seed size and adjusted seeding rate.

Variety	Exp. No.	1000 Kernel Weight (g)	Seeds per Pound	Adjusted Seeding Rate[1] (lb/A)	Released	Developer(s)/Distributor of variety
Soft White Spring Wheat						
Alpowa	WA7677	35	12,960	77	1993	Washington, Oregon, & Idaho AES, USDA
Alturas	ID0526	40	11,484	87	2002	Idaho AES, USDA
Babe	WA008039	47	9,755	103	2009	Washington AES, USDA
Cataldo	IDO642	40	11,340	88	2007	Idaho AES, USDA
JD	WA007954	39	11,782	85	2009	Washington AES, USDA
Nick	BZ698-31	41	11,063	90	2000	WestBred / Monsanto
Penawawa		33	13,745	73	1985	Washington AES, USDA
UI Pettit	IDO632	34	13,341	75	2006	Idaho AES, USDA
UI Whitmore	IDO671	34	13,341	75	2010	Idaho AES, USDA
Whit	WA008008	33	13,745	73	2008	Washington AES, USDA-ARS
Hard Red Spring						
Albany		28	16,200	62	2008	Trigen
BuckPronto		46	9,861	101		
Bullseye	B02-0081	44	10,309	97	2009	Syngenta Cereals
Cabernet		45	10,080	99	2007	Syngenta Cereals
Cerere		46	9,861	101		AllStar Seeds
Choteau		33	13,745	73	2005	Montana State University
Iona	IDO492	36	12,600	79	1999	Idaho AES, USDA
Jefferson	IDO462	39	11,631	86	1998	Idaho AES, USDA
Jerome	IDO 566	41	11,063	90	2004	Idaho AES, USDA
Kelse	WA007954	45	10,080	99	2008	Washington AES, USDA
Malbec	RSI50603	52	8,723	115	2009	Syngenta Cereals
UI Winchester	IDO578	41	11,200	89	2009	Idaho AES, USDA
Volt		34	13,540	74	2007	WestBred / Monsanto
WB-Fuzion	BZ901-717	40	11,340	88	2010	WestBred / Monsanto
WB-Rockland	SJ908-247	41	11,063	90	2010	WestBred / Monsanto
WestBred 936	PH986-61	38	11,937	84	1992	WestBred / Monsanto
Hard White Spring Wheat						
Blanca Grande		39	11,631	86	2002	General Mills, Great Falls, MT
Klasic		39	11,631	86	1982	Northrup-King Co., Minneapolis, MN
Lochsa	IDO 597	41	11,063	90	2005	Idaho AES, USDA
Lolo	IDO533	41	11,063	90	2000	Idaho AES, USDA
Otis	WA7931	34	13,341	75	2002	Washington AES, USDA
Pristine	BZ991-408	40	11,340	88	1999	WestBred / Monsanto
Snow Crest		35	12,960	77	2004	WestBred / Monsanto
SY Capstone	03W10348	34	13,341	75	2011	Syngenta Cereals
WB-Idamax	BZ904-336 WP	37	12,259	82	2010	WestBred / Monsanto
WB-Paloma	BZ904-331WP	37	12,259	82	2010	WestBred / Monsanto
Spring Durum Wheat						
Alzada		48	49	20619	2004	WestBred / Monsanto
Kronos		42	48	20833	1996	Arizona Plant Breeders
Utopia		46	42	24096	1997	World Wide Wheat, L.L.C.
Winter Barley						
Alba	OR77	48	9,549	105	2010	Oregon AES, USDA
Charles	94Ab1274	48	9,450	106	2005	USDA-ARS, Aberdeen
Eight-twelve	79Ab812	40	11,340	88	1988	Idaho AES, USDA
Endeavor	95Ab2299	44	10,309	97	2008	Idaho AES, USDA
Kamiak		38	12,096	83		
Kold		39	11,782	85	1993	Oregon AES, USDA
Maja	OR81	35	12,960	77	2009	Oregon AES, USDA
Mathias	OR76	45	10,193	98	2009	Oregon AES, USDA
Schuyler		35	13,148	76	1969	Cornell AES, USDA
Sprinter		40	11,484	87	1987	WestBred / Monsanto
Streaker	OR85	34	13,341	75	2011	Oregon AES, USDA
Strider	ORW6	42	10,930	91	1998	Oregon AES, USDA
Sunstar Pride	SDM204-B	35	13,148	76	1995	Sunderman Breeding, Twin Falls, ID

[1]Adjusted to plant 1 million (800,000) seeds per acre (wheat, barley) under irrigation according to the number of seeds per pound for each variety.

Table 1 (cont'd). Released varieties tested in 2010-2011 with seed size and adjusted seeding rate.

Usage:	Variety	Exp. No.	1000 Kernel Weight (g)	Seeds per Pound	Adjusted Seeding Rate[1] (lb/A)	Year Released	Developer(s)/Distributor of variety
feed/malt	**Two-Row Spring Barley**						
m	B1202		45	10,080	79		Busch Agricultural Resources, Inc., Ft. Collins, CO
m	B3719		43	10,673	75	2011	Busch Agricultural Resources, Inc., Ft. Collins, CO
f	Baronesse	NS078054	44	10,309	78	1992	WestBred / Monsanto
f	Camas	ND9147	48	9,450	85	1998	Idaho AES, USDA
f	Champion		49	9,257	86	2007	WestBred / Monsanto
f	Clearwater	01ID435H	36	12,600	63	2007	Idaho AES, USDA
m	Conrad	B5057	43	10,549	76	2004	Busch Agricultural Resources, Inc., Ft. Collins, CO
m	Copeland		45	10,080	79	1999	University of Saskatchewan, Great Western Malting
m	Harrington		34	13,341	60	1984	University of Saskatchewan
food	CDC McGwire		37	12,259	65		
food	CDC Fibar		39	11,631	69		
m	Metcalfe		43	10,673	75		
m	Hockett	MT910189	49	9,257	86	2007	Montana AES
f	Idagold II		46	9,861	81		Coors Brewing Co. Inc., Burley, ID
food	Julie	03AH6561-94	37	12,259	65	2010	Idaho AES, USDA
f	Lenetah	01Ab11107	47	9,651	83	2008	Idaho AES, USDA
m	Merit	2B91-4947	47	9,651	83	1997	Busch Agricultural Resources, Inc., Ft. Collins, CO
m	Merit 57		31	14,632	55		Busch Agricultural Resources, Inc., Ft. Collins, CO
m	Moravian 69	C69	48	9,450	85	2005	Coors Brewing Co. Inc., Burley, ID
m	Moravian 115	C115	47	9,651	83	2010	Coors Brewing Co. Inc., Burley, ID
m	Moravian 129	C129	39	11,782	68	2011	
m	Moravian 137	C137	44	10,428	77	2010	Coors Brewing Co. Inc., Burley, ID
m	Pinnacle	2ND21863	52	8,723	92	2007	North Dakota AES, USDA
f	Primo	B-99-AL-616	33	13,745	58	2008	Agripro
f	Spaulding	PB1-95-2R-522	46	9,861	81	2006	Plant Breeders 1 Inc., Moscow, Idaho
f	Tetonia	98AB11720	45	10,080	79	2007	Idaho AES, USDA
food	Transit	03AH3054-51	46	9,861	81	2010	Idaho AES, USDA
f	Xena	BZ594-19	43	10,549	76	2000	WestBred / Monsanto
	Six-Row Spring Barley						
m	Celebration		36	12,777	63	2008	Busch Agricultural Resources, Inc., Ft. Collins, CO
f	Colter	79Ab10719-66LC	37	12,427	64	1991	Idaho AES, USDA
f	Creel	93Ab688	37	12,259	65	2002	Idaho AES, USDA
f	Goldeneye	UT95B1216-4087	32	14,175	56	2005	Utah AES, USDA
f	Herald	00ID1550	39	11,631	69	2006	Idaho AES, USDA
m	Lacey	M98	39	11,631	69	2000	Minnesota AES, USDA
m	Legacy	6B93-2978	37	12,427	64	1998	Busch Agricultural Resources, Inc., Ft. Collins, CO
f	Millennium	UT004603	34	13,341	60	2000	Utah AES, USDA
m	Morex		38	12,096	66	1978	Minnesota AES, USDA
f	Steptoe		44	10,309	78	1973	Washington AES, USDA
m	Tradition		37	12,259	65	2003	Busch Agricultural Resources, Inc., Ft. Collins, CO

[1]Adjusted to plant 800,000 seeds per acre under irrigation according to the number of seeds per pound for each variety.

Results and Discussion

Planting conditions

The fall of 2010 provided good conditions for planting winter grain. Pre- or post-planting irrigation was required in irrigated trials for seed to adequately germinate and grow. The dryland planting conditions were initially very dry as well, but there was adequate moisture in October for stand establishment.

Spring planting conditions were also generally good, but a long cold, wet spring resulted in some planting delays and low heat units delayed crop growth.

Weather Conditions

A dry fall was followed by a high moisture in early winter, with above average snow pack. An early snow in November provided cover from cold temperatures. There were several periods of time in January and February where snow had melted and the winter grain was exposed, but there was little to no winter kill. Early snow cover insulated the winter crop, but it resulted in insulating a fall infection of stripe rust as well.

An unusually cool spring and summer and the lack of heat units actually resulted in delayed crop growth. The

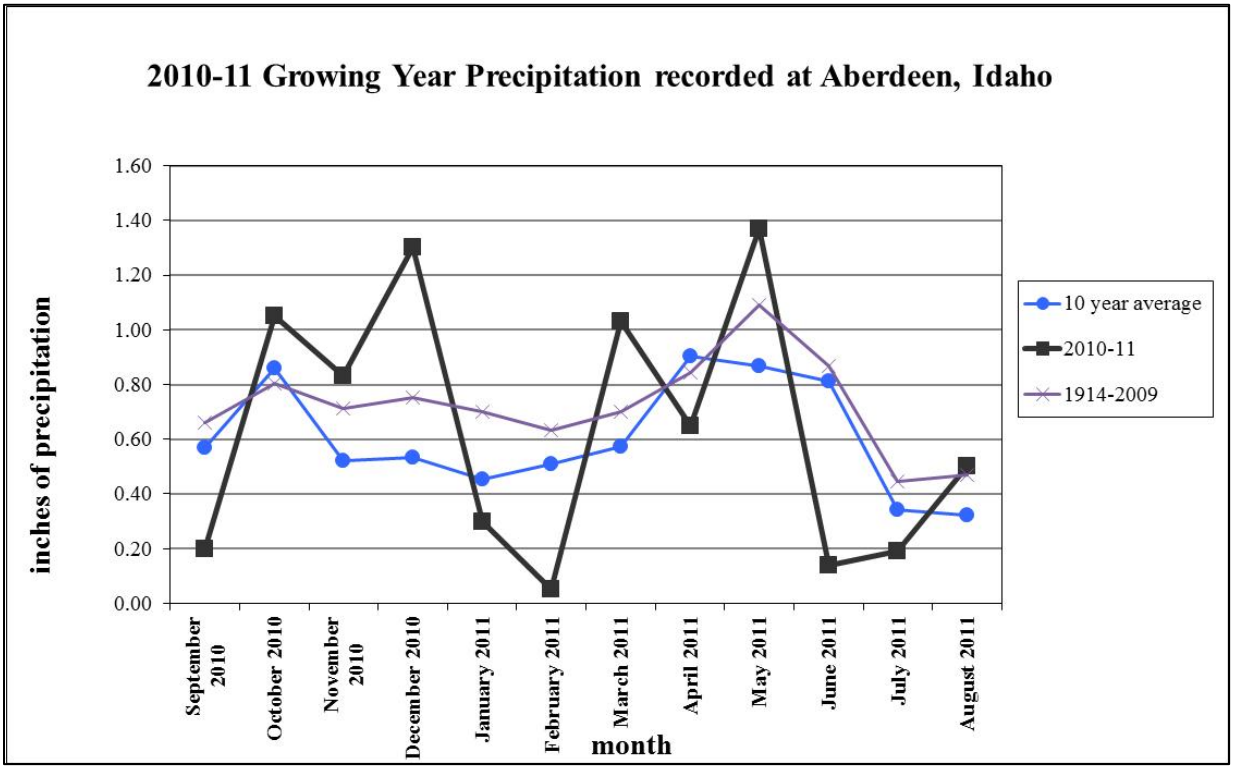


Figure 1. 2010-2011 growing year precipitation versus 10 year and 95 year averages.

temperatures for April, May, and the first two weeks of June were the coldest on record. High winds battered winter grain in southeast Idaho at upper elevation areas (Ririe area) resulting in poor tillering and very delayed crop growth. These same conditions resulted in inadequate heat units to promote crop maturity and drying of grain to levels appropriate for harvest at the higher elevation areas. In some areas, higher than normal spring moisture meant unexpectedly high yield potentials and resulted in low grain protein, especially in the spring grains. Dryland producers had a difficult time meeting nitrogen requirements since almost all nitrogen is applied preplant or at planting, with few efficient options available for in-season nitrogen applications.

A cool spring and summer allowed for long time periods for grain fill, but also delayed grain maturity, delaying harvest for a week or more, depending upon location. Heading date for 2011 calculated over all locations put 2011 as the latest heading date for winter wheat when compared to the previous ten years (since 2001, see Table 4). Heading dates for spring wheat was equal to the other two latest years, 2008 and 2010. Average yield results from these trials put yield at the second lowest for winter wheat, and third highest for spring wheat. Cool conditions and heavy disease pressure from stripe rust significantly impacted winter wheat. Warmer and dryer conditions towards the end of the spring grain growing season and more aggressive fungicide applications helped spring wheat yields, although high grain moisture in late maturing spring wheat varieties also plagued harvest.

There were fewer hail storms and windy conditions in mid-summer which reduced the grain shattering that occurred in the previous crop year (2010). After harvest, there was a lot of volunteer grain that germinated resulting in a second year of heavy green bridge conditions, which has the potential to serve as a source for insects and disease inoculum in the next growing season (2011).

Disease and Insect Problems

Wireworms were very damaging in many areas across the entire region, reducing stand and yield. Damage was more widespread than in 2010. Wireworms were prevalent in some areas in plant crowns throughout the entire spring and into July, probably due to cooler than average temperatures. Similar to last year, as many as five wireworms *per plant* were observed in some fields. Insecticides applied as seed treatments reduced but did not control wireworms and the resultant feeding damage.

A late maturing 2010 spring crop that had a late-season infection with **stripe rust**, extensive green bridge material and optimum conditions for infection resulted in an unusual and widespread fall infection of early planted winter wheat. Over-wintering of the fungi initiated an unprecedented epidemic due to environmental conditions that were optimal for the development of stripe rust in wheat and barley. While barley stripe rust was found in some winter barley and in some spring barley varieties (primarily six-rowed barley), stripe rust did not cause significant yield loss in barley.

Table 2. Winter and spring temperatures in Aberdeen, ID 2011.

Month	# days with no snow cover	# days equal or below 25° F	23° F	15° F	10° F
February	17	13	12	4	4
March	31	19	10	1	0
April	30	12	4	0	0
May	31	3	2	0	0
Totals	109	47	28	5	4

Stripe rust was found in many varieties of both soft white winter and hard winter wheat in the fall 2011. While stripe rust requires living host tissue to survive the winter, the fact that substantial snow fall occurred prior to the ground freezing means that the insulating effect of snow cover allowed both the green tissue of the plants and the infecting fungi to survive cold winter air temperatures. There were several periods of open, uncovered winter crops in February, with temperatures below 23˚F even in March. The stripe rust fungi survived at temperatures below 23˚F, a temperature literature reports state stripe rust cannot survive.

Stripe rust of wheat overwintered in the winter wheat crop, especially in the very susceptible soft white winter variety Brundage, which was very widely planted. Viable stripe rust lesions were found on the Aberdeen R&E research station on March 31, 2011 in several plots that had visible lesions in the fall 2010. Following the coldest April, May, and first two weeks of June on record, the stripe rust epidemic escalated, severely impacting all winter and spring wheat crops. Host resistance and damage was estimated in the variety trials at Aberdeen by comparing two replications of fungicide sprayed plots with two replications of unsprayed plots. (See Tables 27, 32, 39, and 44.) The severity of the epidemic resulted in reduced yields of some resistant varieties.

As a precaution, winter wheat should be actively scouted in the early spring of 2012 for potential insect and disease problems, especially due to the heavy green bridge material that was available following harvest in 2011 and the occurrence of stripe rust in volunteer plants found in fields near Swan Valley and Burley.

Barley scald (*Rhynchosporium secalis*) affected some winter barley in the Magic Valley, but nowhere near the damaging levels of the previous years. Barley scald had very little effect on spring barley in southeast Idaho, and did not cause large yield losses. In most years, low levels of early season scald infection do little to affect the barley crop and yield, and can be ignored. The previous two years were not by any means typical years, and scald ran rampant in fields in 2009 where application of fungicides would

have prevented significant crop loss. In 2010, while the disease was again present in many fields, losses were minimal, probably due to reduced rainfall over the previous year. This will be a disease to watch in future years, especially as production of winter barley increases.

Fusarium foot rot, some **Rhizoctonia** and **Take-all** (*Gaeumannomyces graminis* var. *tritici*) were prevalent in areas where grain followed grain and where irrigation was not reduced to compensate for additional spring rains and reduced evapo-transpiration due to cool conditions. A significant problem in 2009, **Fusarium head blight** reduced yields and contaminated grain with toxins. *Fusarium graminearum* was widespread and often follows corn production. This disease was also severe where spring wheat followed corn in 2009, as the fungus reproduces extensively on corn residue. It is highly recommended that irrigated spring wheat be treated with an appropriate fungicide at flowering to reduce infection, especially when a hard white spring wheat follows corn production. It is essential that a **triazole** fungicide be utilized, as strobilurin fungicides are ineffective in reducing the accumulation of toxins (i.e. deoxynivalenol or DON) that are a by-product of the fungal infection process.

Cool, wet spring conditions resulted in some disease pressure in spring planted grains from damping-off caused by Pythium infection, but the disease was not as widespread as in spring 2010. **Pythium damping-off** occurred in some spring crops due to cold wet conditions at planting. This resulted in reduced root systems, reduced stand and stunted plants. Metalaxyl-based fungicides will control and/or reduce infection and symptom development, but in some cases seed treatments were not completely effective in controlling or reducing disease development.

In the fall of 2010, Russian Wheat aphids (*Diuraphis noxia*) were found causing damage in winter wheat in fields from the Arbon Valley to east of Ririe. There were no reports of damage from Russian wheat aphid in 2011. The Haanchen barley mealy bug (*Trionymus haancheni*) (University of Idaho CIS 1109) was widespread, but damage was mostly limited. In a few irrigated fields in Bonneville county, damage from barley mealy bug was severe following drought stress resulting from delayed irrigation. While the barley mealybug was present in the same dryland production areas found in the past, environmental conditions were good for plant growth and resulted in reduced visible damage in wheat and barley crops.

Green Bridge, 2010 to 2011.
A "green bridge" is generally defined as the overlap of different cropping cycles (or crop generations) within a year. This means there is a constant availability of living, green host material of a given crop. This occurred in many locations in 2010 in southern and southeast Idaho for several reasons: 1) late maturing tillers of winter wheat stayed green and growing even after harvest; 2) windy conditions caused shattering of spring grains prior to complete maturity of the crop; 3) hail storms induced shattering of grains prior to crop maturity. Shattered grain germinated and grew, even prior to harvest of the current year's crop. This resulted in the continuous presence of

living host material, which means there is a constant supply of host plant material for disease-causing organisms and insects. In 2011, there was less early shattering from wind and hail, but there was again a late harvest of spring grain, volunteer grain with stripe rust, and widespread germination of grain that was blown out of the combine at harvest. This again increases the likelihood and risks of higher disease and insect problems for the next growing season. Because of the green bridge, aphids can jump to the emerging (2011-2012) winter crop, causing direct damage and / or transmitting viruses. Foot rot diseases within a field migrate from the dying spring crop to the growing winter crop. Foliar diseases can easily infect the emerging crop within the same field, or can become airborne through the production of spores that then infect crops up to many miles away.

2011 report: Kimberly Research and Extension Center, Winter Grain

The winter wheat nurseries were planted Oct 13 following dry beans. Soils were dry and plots were irrigated after planting to improve emergence. The crop suffered a little winter damage and growing conditions were good but cooler than average. Stripe rust was present, but in these plots, disease severity was less and infection was later (spring infection versus a fall infection in Aberdeen). There were fields in the areas that had severe stripe rust infection, requiring multiple applications of fungicide to reduce yield loss. Soft white winter wheat yields were slightly less than the previous two years, while hard winter wheat yields were about 20 bu/A less than 2010 and 2009. Plots were harvested August 11.

The hard winter wheat group yielded from 81 to 137 bu/A. WB-Arrowhead, a hard red wheat from WestBred, and NuHorizon were the highest yielding varieties. Promontory, Norwest 553, and Yellowstone yielded 134, 132 and 129, respectively. Site average for yield of the hard winter group was 117 bu/A. Test weight average was 59 lbs/bu in 2011, (64 lbs/bu in 2010), and grain protein average for the location was 13.3%. **Averaged over all locations**, the highest yielding hard winter wheat varieties in 2011 were Greenville (125 bu/A), Yellowstone (124 bu/A), WB-Arrowhead (123 bu/A), and Promontory (122 bu/A). **Three year averages** over all locations put Norwest 553 at the top with 131 bu/A followed by WB-Arrowhead, Utah 100, and Yellowstone, at 130, 128, and 128 bu/A, respectively.

In the soft white winter group, yield varied from 93 to 156 bu/A. SY Ovation, Bruneau, and WB-Junction were the highest yielding varieties. Test weight averaged 58 lbs/bu, and grain protein average for the location was a low 11.9%. SY Ovation, WB-Junction, Bitterroot and Bruneau, were the top varieties in the **combined irrigated trials in 2011** at 136, 136, 133 and 131 bu/A, respectively. The top yielding soft white winter varieties **over the last three years** over all locations are WB 528 (133 bu/A), Brundage (133 bu/A), Bruneau (132 bu/A).

Rupert, Jentschz-Kearl Farms, Winter Grain

Plots were planted Oct 6 following dry beans into good soil moisture. Some winter injury occurred in Rupert in the soft white winter wheat and winter barley. Plots were harvested August 15.

Average yield for the winter barley varieties was 133 down 14 bu/A from 2010, and varied from 107 to 172 bu/A. The highest yielding named varieties included Sunstar Pride (172 bu/A), Sprinter (146 bu/A), and Eight-Twelve. Proteins were 11.9% and there was no lodging. Charles, Endeavor, Maja, and Alba, four winter malt varieties, yielded 113, 119, 123 and 141 bu/A, respectively. Endeavor had reduced stands (89%) due to some winter injury. **Combined over the irrigated locations**, Sprinter, Sunstar Pride and Eight-twelve feed barleys were the highest yielding lines. **Over three years**, the winter feed lines yielded 165 bu/A (Eight-twelve), 161 (Sunstar Pride) and 157 bu/A (Strider).

Average yields for the hard winter wheat trial were 96 bu/A, 21 bushels less than at Kimberly. Yield ranged from 60 (NuHills) to 116 bu/A (LHS, hard white). Test weight was good, averaging 62.1 lbs/bu, and protein averaged 13.6%. LHS, Deloris, Greenville, and Golden Spike were the highest yielding named lines at 116, 112, 111, and 111 bu/A, respectively. Stripe rust did not significantly impact yield, as some of the most susceptible lines (LHS and Deloris) were also the highest yielding. Irrigation was limiting as seen by the lower yields and higher proteins at this location.

The soft white winter group ranged in yield from 90 to 121 bu/A. The highest yielding varieties were Brundage (142 bu/A), AP Badger (136 bu/A), and WB 456 (132 bu/A). Test weights were average (60.1 lbs/bu) and grain protein was low at 9.8%. There was no lodging in any of the winter grain nurseries.

Aberdeen R&E Center, Winter Grain

The winter trials in Aberdeen were planted September 22 and harvested August 10. The preceding crop was green manure oats. The winter barley at Aberdeen was slightly damaged by the winter conditions this year, and average spring stands were at 80%. Charles and Endeavor, two-rowed winter malt lines, had better spring stands in Aberdeen than at Rupert, resulting in significantly higher yields. Yields were as high as 200 bu/A with an overall average of 158 bu/A. High yielding varieties included Sprinter (194 bu/A), Mathias (180 bu/A), Charles (177 bu/A) and Eight-twelve (173 bu/A). Charles, Endeavor, Maja, and Alba, four winter malt varieties, yielded 177, 171, 155 and 160 bu/A, respectively.

The winter wheat survival fared better than the winter barley. Average spring stand for both the hard and soft winter wheat nursery was 93%. Following a fall 2010 infection, stripe rust overwintered in the plots, severely affecting the growth of almost all wheat varieties. Two replications of both hard and soft winter wheat nurseries were treated twice with the fungicide Quilt at full labeled rate to determine the effect of fungicide application across varieties. Fungicides were applied at herbicide timing and again at heading. The coldest recorded temperatures for April, May, and the first two weeks of June were optimum for stripe rust to reach epidemic proportions. In Tables 27 and 32, statistically significant differences were obtained from the comparisons of two reps sprayed versus two reps unsprayed. If the test of simple effects resulted in values less than 0.05, then there is a 95% chance that the differences between the sprayed and

unsprayed plots are real. Varieties with Pr>F values more than 0.05 show increasing resistance to stripe rust.

The fungicide-sprayed hard winter wheat yields varied from 109 (UI Darwin) to 162 bu/A (Greenville), with the average at 128 bu/A (two bushels more than 2010). Protein was at an average of 13.3%, and lodging averaged 21%. Greenville was the highest yielding variety and had no lodging. Yellowstone (157 bu/A), Utah 100 (152 bu/A), and Norwest 553 (148 bu/A), were the top yielding varieties with lodging at 58, 0, and 0%, respectively.

The results show a significant effect of sprayed versus unsprayed plots (and subsequently severely stripe rust affected replications) on yield and test weight, reducing yield an average of 34% and reducing test weight 1 lb/bu. Moreland, NuHills, and Deloris yields were reduced by 72, 64 and 84% respectively. Test weights were reduced significantly in some varieties by as much as 4.7, 4, 3.6 lbs/bu (Whetstone, NuHills, and Deloris, respectively). Protein averaged 1% less in the stripe rust affected plots. The varieties least affected by stripe rust included Norwest 553, UICF Grace, and WB-Arrowhead.

The fungicide-sprayed soft white winter wheat yields varied from 128 (Coda) to 179 bu/A (SY Ovation), averaging 154 bu/A, 14 bu/A higher with 30% lower lodging than in 2010. Average proteins were 11.6%. The top yielding varieties were SY Ovation (179 bu/A), WB-Junction (176 bu/A), Skiles (169 bu/A), Bitterroot (169 bu/A), Simon (169 bu/A), and WB 528 (167 bu/A).

The results in the soft white winter trial show a significant effect of sprayed versus unsprayed plots (and subsequently severely stripe rust affected replications) on yield and test weight, reducing yield an average of 28% and reducing test weight 2 lb/bu. Brundage and AP Legacy yields were reduced by 68 and 65%, respectively. Test weight of Brundage was reduced significantly by 6.7 lbs/bu. The varieties least affected by stripe rust included Coda (club wheat), Madsen, Skiles and WB 456.

Ririe, LDS Church Farm, Dave Cook, Winter Grain

This is a high elevation location (5500 ft) and is our main dryland location for winter grain. We usually plant only one rep of winter barley here to roughly test for winter survival. While minimal in 2010 (and therefore results were not reported), in 2011 the survival rates for barley improved substantially, but spring conditions severely reduced growth of both winter barley and wheat. The location was planted September 23, 2010 into good moisture following peas and the trials were harvested August 30.

The hard winter wheat group had reduced average yields (12 bu/A) in comparison to 2010 at 28 bu/A and 2009 at 47 bu/A. The 2011 yield range went from a low of 9 bu/A to a high of 19 bu/A. Curlew, Lucin-CL, DW and Utah 100 were the top yielding hard winter wheat varieties, at 19, 15, 15, and 14 bu/A, respectively. Dryland yields **averaged over all locations and 3 years** averaged 41 bu/A, with the top yielding varieties including Deloris, Curlew, Yellowstone, Utah 100, and UI Silver (45, 44, 43, 43, and 43 bu/A, respectively).

The soft white winter wheat yields varied from 6.5 bu/A (Goetze) to 13 bu/A (Agripro Legion), with the site averaging 9.3 bu/A. Average proteins were low for this soft group at 9.2%. There was no lodging. In addition to Agripro Legion, the top-yielders were Agripro Salute, Simon, and WB 528. Test weight averaged 59 lbs/bu.

Over the **past three years**, the top yielding varieties at this location were Coda, Bitterroot, ORCF-102, and Agripro Legion yielding 32, 29, 29, and 28 bu/A, respectively. Three-year averages on dryland soft white winter grain protein were 10.1% (Table 8). Test weights were 59.6 lbs/bu, and average plant height was 22 inches.

Rockland, Gilbert and Carl Hofmeister, Hard Red and White Winter Wheat

The hard red and white winter wheat trial at the Hofmeisters' was planted September 13 and harvested August 10. Following extensive snow cover, spring stand was slightly reduced to 65% due to snow mold. Throughout this area, some growers also suffered yield losses due to dwarf bunt (*Tilletia controversa*) when using varieties that were susceptible and that had not been treated with appropriate seed treatments. The yield average was 27 bu/A, lower than the 2010 yield average of 39 bu/A. The yield ranged from 22 to 31 bu/A. The top yielding varieties this year were Utah 100 (31 bu/A), SRG (31 bu/A), and Bonneville (29 bu/A). Grain protein average was 11.5%, test weight average was good at 60.8 lbs/bu, and there was no lodging.

Soda Springs, Mark and Craig Ozburn, Dryland Winter Wheat

One small dryland winter wheat trial containing both hard and soft winter wheat was added at Soda Springs this year at the request of area growers. Fifteen lines of hard red, hard white, and soft white winter wheat were included. Survival varied considerably amongst the lines, resulting in an average 62% spring stand. DW, LHS, and UICF Grace had the highest spring stands. Yields averaged 70 bu/A, with the highest yielding varieties including Juniper, Lucin-CL, Bitterroot and DW, LHS and WB 528. If risking planting winter wheat, it is highly recommended that varieties with snow mold tolerance and dwarf bunt resistance be grown in this area. Varieties susceptible to dwarf bunt should only be grown following appropriate seed treatments to control dwarf bunt.

Rupert, Duane Grant and Mike Larsen, Spring Grain

The variety trials in Rupert were planted April 6 and harvested August 24th and 25th. The preceding crop was alfalfa. There were no major weather-related problems and lodging averaged 7%. Average yield for hard spring wheat at Rupert was 92 bu/A, compared to 111 bu/A in 2010, and 107 bu/A in 2009. Test weight average was 60.7 lbs/bu, and average protein was at 13.7%. The top yielding varieties were Choteau (109 bu/A), Cabernet (102 bu/A), the hard white spring wheat Otis (100 bu/A), and Volt (98 bu/A). Buck Pronto, WestBred 936, and Choteau had the highest grain protein (15.3, 14.8, and 14.6% respectively).

Over **three years over all locations**, the highest yielding varieties under irrigation were Otis (117 bu/A), Lolo (117 bu/A), Jerome (111 bu/A), Bullseye

(109 bu/A) and WB-Idamax (109 bu/A). While Otis was developed for dryland conditions, lodging has been minimal under high input situations and yields consistently high. The average 3-yr test weight was 61.2 lbs/bu, and the average grain protein was 12.1%.

The soft white spring wheat yield average was 101 bu/A. In 2010 it was 116 bu/A, and in 2009 the average yield at the Rupert location was 120. In 2011, Alturas yielded 116, UI Whitmore yielded 111 and Babe 104 bu/A. Protein average was low at 10.9%. **Three year averages over all locations** put UI Whitmore at the high yield (117 bu/A), followed by Alturas (116 bu/A), Babe (115 bu/A) and Alpowa (113 bu/A).

The six-row spring barley trial at Rupert yielded an average of 123 bu/A, with a range from 92 to 146 bu/A. Goldeneye (146 bu/A) and Millennium (138 bu/A) were the top yielding feed barleys, and Lacey (138 bu/A) and Legacy (124 bu/A) were the top six-rowed malts. Test weights were low and averaged 46.9 lbs/bu, proteins were 13.7%, and percent plumps were 88.3%. **Over three years**, Goldeneye was the highest yielding feed variety at 126 bu/A, and Legacy was the highest yielding malt variety at 116 bu/A.

Two-rowed barley yields at this location averaged 108 bu/A, below the 2010 average of 122 bu/A, and ranged from 62 to 142 bu/A. The malt variety B3719 yielded 134 bu/A, followed by Copeland (116 bu/A). The feed varieties Champion (134 bu/A), Xena (133 bu/A) and RWA 1758 (136 bu/A) were the highest yielding named varieties. The hulless high beta-glucan food barleys Julie, Transit, CDC McGwire and CDC Fibar yielded 101, 89, 109, and 574 bu/A but also had high test weights (54.6, 52.2, 57.1 and 51.3 lbs/bu, respectively). **Three year averages** for the malt varieties puts Conrad, Pinnacle and Merit at the top (122, 115, and 115 bu/A, respectively), with the Moravian lines doing very well in the Magic Valley, and Conrad doing consistently well over all locations. The feed varieties Xena, Spaulding, Champion, and Baronesse were the top yielding lines over three years and all irrigated locations at 134, 133, 130, and 129 bu/A, respectively.

Aberdeen R&E Center, Spring Grain
Spring variety trials were planted April 11 and harvested August 18th-19th. The preceding crop was green manure oats. Stripe rust of wheat was present during the entire growing season, with cooler temperatures preventing the initiation of High Temperature Adult Plant (HTAP) resistance, resulting in significant impact on yield. As with the winter wheat variety trials at Aberdeen, two reps of the spring wheat nursery were sprayed with fungicide and two were not. The spring wheat trials were sprayed twice with a full rate of Quilt fungicide – once at herbicide timing and a second time at heading. The comparisons between the sprayed and unsprayed reps were complicated by location effects of the two unsprayed reps, which were planted in a bad location of the field. Where the soil was very poor and calcareous, the stand and overall plant health was poor. The western-most plots where fungicides were applied had a poor stand of 84%, but the unsprayed plots were even worse with a 68% stand. There were statistically significant differences between the sprayed and unsprayed replications for yield, where unsprayed plots yielded 38% less than the sprayed

plots. Due to growing conditions at Aberdeen (poor soil conditions and heavy stripe rust pressure), average yields of fungicide-treated hard spring wheat were down almost twenty bushels from the previous year of 121 bu/A. Grain protein averaged 13.7%, with the unsprayed trials 1.3% less in grain protein than in the fungicide applied reps. There was no lodging. The 2011 yields ranged from 77 to 133 bu/A in the fungicide sprayed plots, and 23 to 95 bu/A in the unsprayed reps. The varieties showing the least impact from stripe rust were Iona, Buck Pronto, and Malbec with a 19, 20, and 21% yield reduction, respectively. The top three varieties for yield in the sprayed plots were Cerere, Malbec, Kelse, Otis, Volt, Bullseye, and Choteau at 133, 121, 118, 116, 116, 115 and 115 bu/A, respectively. Out of the spring durums, Kronos, Alzada and Utopia yielded 123, 113 bu/A and 98 bu/A.

The soft white spring wheat yields at Aberdeen averaged 127 bu/A where fungicides were applied, with a range from 112 to 141 bu/A. Excellent yields were obtained from Alpowa (138 bu/A), Whit (133 bu/A) and Babe (131 bu/A). Test weights averaged 60.6 lbs/bu and grain protein averages were 11.0%. In the unsprayed reps, the yield loss was 31% below the sprayed plots. The yield ranged from 52 to 137 bu/A, with JD and the advanced breeding lines IDO 669 and IDO 686 showing the least impact on yield from stripe rust infection.

Six-row barley in Aberdeen averaged 148 bu/A, 20 bu/A more than in 2010. Yields ranged from 119 bushels (Morex) to 175 bu/A. Goldeneye and Millennium were the other two top yielding feed barley varieties, at 167 and 161bu/A. For the six-row malt lines, Lacey, Tradition, and Legacy yielded 143 bu/A. Grain protein for the malt lines was variable, ranging from 11.1 to 14.6%. Test weight was 50.9 lbs/bu.

Two-rowed barley lines averaged 139 bu/A, and ranged from 79 to 172 bu/A. This range includes hulless food barleys that yield significantly less than feed lines and have test weight comparable to wheat. The top yielding feed lines were Spaulding, Xena, Champion and Primo (172, 162, 161, and 161 bu/A, respectively). For the malt varieties, B3719, Pinnacle, Conrad and Merit yielded 158, 155, 148 and 145 bu/A, respectively. Test weight averaged 54.6 lbs/bu which is inflated by the number of hulless lines included in the trial. Lodging was high averaging at 35%. These trials were not treated with growth regulators.

Idaho Falls, Marc Thiel, Spring Grain

The Idaho Falls location followed potatoes, was planted April 19th and harvested August 26th. Good growing conditions in Idaho Falls resulted in an average grain yield for the hard spring wheat of 125 bu/A, which was equal to the average in 2010 of 123 bu/A, and similar to 2009 (121 bu/A). Hard spring wheat ranged in yield from 99 to 142 bu/A. Fungicides were applied once at heading to reduce the impact of stripe rust. Average grain protein was low at 12.7%, but test weight was high at 61.4 lbs/bu. The three highest yielding lines were Otis (142 bu/A), Lolo (141 bu/A), and Jerome (137 bu/A).

The club wheat JD and advanced numbered lines topped the yield chart for the soft white spring wheat varieties at

Idaho Falls, with the highest named common wheat varieties being Alpowa (139 bu/A), Nick (133 bu/A), and UI Whitmore (132 bu/A). Yields ranged from 117 bu/A (Cataldo) to 143 bu/A. Test weights were good at 61 lbs/bu, and grain proteins were very low at 9%.

Barley six-rowed feed lines yielded from 105-158 bu/A in Idaho Falls, with Creel (158 bu/A) followed by Millennium (154 bu/A) and Herald (146 bu/A). In the six-rowed malt lines, Lacey (126 bu/A) and Legacy (116 bu/A) out-yielded Celebration, Morex, and Tradition at 116, 107, and 105 bu/A, respectively. Overall site average was 135 bu/A, similar to the 2009 average of 129 bu/A. Test weights were 51.2 lb/bu and thins were low (2.7%).

The two-rowed lines at Idaho Falls averaged 124 bu/A. Of the feed lines, Xena averaged 156 bu/A, had 53.5 lb test weight and 98% plumps. Tetonia, Herald, Primo, and Spaulding were right behind with 149, 141, 141, and 141 bu/A, respectively. In the malt group, the high yielders were B3719 (144 bu/A), Pinnacle (143 bu/A), Conrad (138 bu/A), and Moravian 69 (133 bu/A). Pinnacle had very high test weight (53.3 lbs/bu), very low lodging (5%), and 99% plump. Lodging in Harrington was 69% and values in Merit and Merit 57 were 60%.

Ashton, Don Marotz, Spring Grain

The Ashton location was planted very late (June 2) due to cold wet conditions at the upper elevation areas. The preceding crop was barley. Previous problems with barley mealy bug were not significant this year in the Ashton area. Stripe rust was present in most areas of the upper valley and fungicides were important to protect wheat from significant yield losses. HTAP was ineffective at Ashton. Barley plots were harvested September 28th. Due to late crop maturity, the wheat was harvested October 20th.

The average yield for the hard spring wheat was 94 bu/A, compared to 2010 at 54 bu/A and 2009 at 87 bu/A. The range in yield varied from 72 bu/A to 112 bu/A. Test weights were very low at 55.2 lbs/A, and protein averaged 12.3%. The high yielding varieties were WB-Idamax (112 bu/A), followed by Lolo (109 bu/A), UI Winchester (107 bu/A). The highest proteins were seen in Kelse (13.8%), Buck Pronto (13.3%), the two white varieties Pristine (13.7%) and Klasic (13.7%), with the location average of 12.3%. There was no lodging in the hard spring wheat at this location.

In the soft spring wheat trial, Babe yielded 108 bu/A, close to JD (102 bu/A) and followed by UI Whitmore (101 bu/A) and Penawawa (101 bu/A). The average yield for the soft white spring trial was 100 bu/A, and ranged from a low of 91 bu/A (Cataldo) to a high of 112 (IDO 599). The test weight average was a very low 53.9 lbs/A, with some lodging in JD (spring club). Grain protein was low, averaging 10.5%.

In the six-rowed barleys at Ashton, the yield average was 119 bu/A, 70 bu/A more than the previous year (2010) at 49 bu/A. In the feed barley, Goldeneye out-yielded the others at 139 bu/A, 53.3 lb test weight and 95% plumps. Millennium was the closest next variety at 120 bu/A, 51.8 lb test weight and 92% plumps. The malt line Legacy yielded 119 bu/A, with 52.8 lb test weight and 98% plumps.

Two-row barley yields ranged from 64 to 141 bu/A. The average was 107 bu/A, with the highest feed lines being Xena (141 bu/A), Spaulding (131 bu/A), Champion (124 bu/A) and Lenetah (122 bu/A) all exceeding Baronesse at 116 bu/A. Conrad, B3719, and Pinnacle were the top yielding malt varieties at 124, 113, and 112 bu/A, respectively. Test weights were very low this year, averaging 55.1 lbs/bu and percent plumps were high, and proteins averaged 14.4%.

Soda Springs, Sid Cellan, Spring Grain

The only spring dryland extension trials were in Soda Springs, and this year we re-initiated the dryland barley trials following the reduction in the off-station barley trials by the USDA-ARS breeding program. The nursery was planted May 17th and harvested September 21th. The previous crop was barley.

Yield averages for the hard red and white spring nursery were 37 bu/A, slightly higher than in 2010 (32 bu/A), and lower than they were in 2009 (75 bu/A). The range in yield went from 25 to 45 bu/A (Klasic hard white). The four highest yielding named varieties Klasic, Lolo, Lochsa, and Otis were hard white springs yielding 45, 45, 44, and 44 bu/A, respectively. Kelse was the highest yielding hard red spring wheat at 42 bu/A. Test weights averaged 59.3 lbs/bu, and proteins were averaging 14%, with the highest proteins in Choteau (15.2%) and WestBred 936 (14.9%).

For the soft white spring wheat, the nursery averaged 50 bu/A. The yield ranged from 34 to 64 bu/A. Alturas, Cataldo, JD and Whit were the four top yielding varieties at 57, 56, 52, and 52 bu/A, respectively. Two Idaho advanced lines yielded 64 and 60 bu/A. Test weight average was 59.2 lbs/bu, and proteins were at 12%.

2011 was a good year in Soda springs for the barley trials. The six-rowed trials averaged 59 bu/A and the two-rowed lines averaged 65 bu/A. In the six-rowed trial, the highest yielding feed lines were Creel, Herald and Colter at 70, 67, and 61 bu/A, respectively. Percent plumps were high at 94%. Test weights were a little low, averaging 48.1 lbs/bu for both feed and malt lines. The highest yielding malt lines include Celebration (64 bu/A) and Morex (61 bu/A)

The two-rowed varieties included feed, malt and specialty food lines, including some high test-weight hulless lines, with yields ranging from 43 to 81 bu/A. The highest yielding feed lines were Spaulding, Lenetah, Champion and Camas at 81, 79, 78 and 77 bu/A, respectively. The highest yielding malt line was Harrington (77 bu/A) followed by Conrad (70 bu/A), Moravian 69 (66 bu/A), and Pinnacle (66 bu/A). Average test weights were high due to the high test weight hulless advanced lines and varieties Julie, Transit, CDC McGwire, and CDC Fibar. There was almost no lodging at this location, the protein averaged 16% and plumps were 97%.

Table 3. New Variety Descriptions

SPRING BARLEY

B3719 – a recent release from Busch Agricultural Resources, B3719 was tested for the first time in 2011, out yielding other two-rowed malt varieties. B3719 was similar to Conrad in test weight, height and heading date and high plumps, with below average proteins.

Celebration – a six-rowed barley released in 2008 by Busch Agricultural Resources, LLC. Celebration has some resistance to Fusarium head blight and consistently lower toxin (DON) content in the grain. In the three years of testing in southern Idaho, yields were comparable to Morex, while protein and lodging were higher than average.

Champion – a 2007 release from WestBred, LLC. Champion is a very high yielding, two-rowed spring feed barley. Combined over locations and years, Champion yields were comparable to Xena and Spaulding under irrigation. Champion has greater than average test weight, and average height, lodging, and plumps, heading 1-2 days earlier than Baronesse.

Clearwater (01ID435H) – a 2007 release from the USDA-ARS in Aberdeen and the Idaho Ag Experiment Station, Clearwater is the first named variety that is a low-phytic acid, hulless, two-rowed spring feed barley. The hulless, low-phytate characteristic should be valuable in the feed industry for monogastric animals, especially fish, where there is concern about high phosphorus concentrations in the waste stream. Clearwater, because of the hulless characteristic, has very high test weight. Maturity, height, and lodging are average, and Clearwater has a high percent protein.

Copeland – a two-rowed malt variety developed by the University of Saskatchewan and released in 1999, Copeland was tested starting in 2009 in the southern Idaho variety trials. Copeland yielded similar to Conrad and Moravian 69, and much higher than Harrington. Copeland was 3-4 in taller than average, had lower protein, and was average for lodging and test weight.

Herald (00ID1550) – Herald is a low-phytate, hulled six-rowed feed barley released by the USDA-ARS and Idaho AES in 2006. Seed characteristics make this an excellent feed barley for monogastric animals (swine), as phosphorus is reduced in the waste stream. Depending on the year and environment, Herald has a high yield potential (see Tables 23, 49) and may also prove useful in the fish food industry. Herald is agronomically similar to its parent, Colter, but has lower test weight and higher plump.

Hockett (MT910189) – two-rowed malt barley released in 2007 by Montana State University. Hockett should replace Harrington with higher yields and less lodging under irrigated and dryland conditions. Under dryland and irrigated conditions in southeast Idaho, Hockett is similar to Harrington with higher plumps.

Julie (03AH6561-94) – a two-rowed hulless barley released by the USDA-ARS and the University of Idaho AES in 2010 for high-beta-glucan content and intended for human consumption. Julie has high test weight and protein, similar to other food barleys, with greater percentage of seed beta-glucan than other industry standards such as CDC Fibar and CDC McGwire.

Lenetah (01Ab11107) – a 2008 release from the USDA-ARS and Idaho AES, Lenetah is a high yielding two-rowed feed

variety particularly well-adapted to the rain-fed conditions of northern Idaho. Lenetah has average test weight, heading, protein, plump and height, but has higher lodging than Tetonia. Lenetah has consistently yielded higher than Baronesse in northern Idaho, but under the irrigated conditions in southern and southeast Idaho yields have been similar to Baronesse.

Moravian 115 (C115) – Moravian lines are two-rowed MillerCoors lines originally targeted for the Magic Valley area, and were only planted in the Rupert and Idaho Falls nurseries (except Moravian 129 which was only planted in the dryland trial at Soda Springs). Moravian 115 was released in 2010 from Coors Brewing Company, Inc, in Burley ID. M115 had low test weights and plumps, is very short, and yielded below M69 and M137 in Rupert and Idaho Falls in 2011.

Moravian 137 (C137) – Moravian 137 yielded close to M69 in 2011, with similar heading date, height, protein and plumps. In 2010, both varieties were tested only in Rupert, and Moravian 137 out yielded M69 by 14 bu/A.

Moravian 69 (C69) – two-rowed spring malt barley released by Coors Brewing Co. in 2005. Moravian 69 has very high yields. Height is very short, and lodging is much less than Harrington.

Pinnacle (2ND21863) – two-rowed spring malt barley released by North Dakota State University and the USDA-ARS in 2007. Pinnacle is a widely adapted malt line, and was a top yielding variety over the previous three years (2008-10), similar to Conrad and Moravian 69. Pinnacle had high test weight, low to average protein and high plumps and was 2-3 days earlier than average for heading date.

Primo (B-99-AL-616) – a 2008 two-rowed feed variety from AgriPro, now Syngenta Seeds, Primo has yielded well under high stress conditions, doing well under dryland production conditions. Primo has been above average for irrigated yield and average for other agronomic characteristics, competing with Baronesse and Tetonia for yield.

Spaulding (PB1-95-2R-522) – a two-rowed spring feed variety, and a Plant Breeders 1 release, Spaulding has excellent yield potential for the Magic Valley area, and yielded comparable to Xena and Champion over irrigated locations. Spaulding has above average test weight and plump, average maturity and height and below average protein and lodging.

Tetonia (98AB11720) – two-rowed spring feed barley released in 2007 by the USDA-ARS in Aberdeen and the Idaho Ag Experiment Station. Tetonia has high yield potential over many locations, and is well adapted to Idaho and Montana. Tetonia yielded slightly less than Baronesse in the irrigated nurseries and slightly more in the dryland nurseries over the last three years.

Transit (03AH3054-51) – a two-rowed hulless variety released by the USDA-ARS and the University of Idaho AES in 2010 for high-beta glucan content and intended for human consumption. Seed beta-glucan content is higher than other industry standards such as CDC Fibar and CDC McGwire. Transit yields are lower but the percent beta-glucan is higher than Julie.

WINTER BARLEY

Alba (OR77) – a six-rowed winter malt variety released in 2010 by the Oregon AES and the USDA-ARS. Yields over the past three years have been comparable to Endeavor and Eight-Twelve. Winter hardiness is better than Endeavor and Charles (both are two-rowed winter malt varieties).

Endeavor (95Ab2299) – Endeavor is the second two-rowed winter malt variety released by the USDA-ARS and the IAES approved by AMBA for malt quality. Endeavor has improved malt quality and yield over Charles, especially in the Magic Valley area where winter kill is less of a problem than in eastern Idaho. Endeavor has excellent test weight and plumps, and is average for heading date, height and lodging.

Maja (OR81) – a six-rowed winter barley released by Oregon AES as a winter malt variety. Yields in the first year of testing in southern Idaho were slightly less than Charles, but in the second year (2010) yields were above trial average and 35 bu/A greater than Charles. Maja has very high test weight and plumps, and very low lodging.

Mathias (OR76) –a six-rowed winter malt barley released by the Oregon AES and the USDA-ARS in 2009. Mathias yields have been slightly less than Alba with similar test weight and spring stand, and earlier maturity. Both have very high plumps.

Streaker (OR85) – a hulless, six-rowed winter / facultative habit barley with high beta-glucan for food barley, Streaker will be released by OSU and the USDA-ARS in 2012. Streaker yields are below the average for winter feed and malt lines, but as a hulless barley, it has a very high test weight. Spring stand was reduced due to some sensitivity to winter conditions.

SPRING WHEAT

Albany – a hard red spring wheat released in 2008 by Trigen. Albany was first planted in the extension trials in 2011, and yields, test weight and height were average with slightly higher lodging and lower protein than average. Albany averaged four days later for flowering than WestBred 936.

Babe (WA008039) – Babe is a soft white spring wheat derived from Alpowa. It was released by Washington State AES in 2009. Babe has better emergence than Alpowa with a more upright growth habit, similar yield, better quality and higher test weight. Babe has improved high-temperature adult plant resistance to stripe rust over Alpowa, and has performed above average for yield in southeast Idaho trials. Yields are similar to UI Pettit when stripe rust is controlled.

Bullseye (B02-0081) – Bullseye is a high quality hard red spring wheat released by AgriPro, now Syngenta Seeds, in 2009. Combined over irrigated locations, Bullseye yields were equal to Jerome and WB-Idamax with higher test weights over the last three years. Bullseye was average for height and grain protein.

Cabernet – a 2007 hard red spring wheat from Resource Seeds, now Syngenta Cereals, Cabernet yields are similar toWestBred 936 with higher test, with similar heading date, and is about three inches shorter with lower protein.

Cataldo (IDO642) – a soft white spring wheat released in 2007 from Idaho AES. Cataldo is very similar to Alturas (partial waxy), and bred for Hessian Fly resistance for the rain-fed production areas of the PNW. It yields slightly less, is earlier and shorter than Alturas, and has adult plant resistance for stripe rust. End-use quality is similar to Alturas for cookies and Asian noodles.

Cerere – a hard red spring wheat released by Trigen. Cerere was first planted in the extension trials in 2011, and yields were comparable to Jefferson, but Cerere had very low test weight and was very late flowering with late maturity. Yield of Cerere was excellent at Aberdeen when stripe rust was controlled (see Table 39), but it is unsuited for higher elevation conditions and is very susceptible to the current races of stripe rust.

JD (WA 8047) – JD is a soft white spring club wheat released in 2009 by the Washington State AES that has shown stable yield performance in Washington, with both seedling and high-temperature adult plant resistance to stripe rust. While JD has exceptional club wheat quality, yields are lower than many common soft white wheat varieties in our area, comparable to Penawawa. JD had excellent resistance to the current races of stripe rust.

Kelse (WA007954) – a hard red spring wheat released in 2008 through the Washington AES, and the USDA-ARS. Kelse was taller than average under irrigation, and yielded below average in the first two years of testing in southern Idaho. Yield was similar to WestBred 936, with higher test weight and protein. Kelse has seedling and adult plant resistance (HTAP) to stripe rust and Hessian Fly resistance.

Malbec (RSI-50603) – a hard red spring wheat released by Resource Seeds, Inc, now Syngenta Cereals, in 2009. Malbec is similar to Iona and Choteau for yield and test weight, is shorter with comparable protein.

SY Capstone (03W10348) – hard white spring wheat released in 2011 by Syngenta Cereals. Over irrigated locations in 2011, yield was greater than Klasic with similar test weight. SY Capstone was shorter than average and about 5 inches taller than Klasic with lower protein.

UI Pettit (IDO632) – is a soft white spring wheat released in 2006 through the Idaho AES.Yields and test weight are similar to Alturas, but UI Pettit is 4 inches shorter and heads 3-4 days earlier than Alturas. Yield of UI Pettit and other soft white spring wheat with high temperature adult plant resistance (HTAP) to stripe rust suffered yield loss due to unusually cold temperatures in April, May, and June which prevented the initiation of HTAP in many varieties.

UI Whitmore (IDO671) – Soft white spring wheat released in 2011 by the Idaho Ag Experiment Station, UI Whitmore is very high yielding with yields similar to Alturas.

UI Winchester (IDO578) – a hard red spring wheat released by the Idaho Ag Experiment Station for dryland production areas in 2009, but also does well under irrigation. UI Winchester performed similar to Jefferson in the extension trials.

Volt – hard red spring wheat carried by WestBred since 2007. In the first year in the trials, Volt was agronomically similar to Choteau and Jefferson for yield with higher test weight than Jefferson.Volt does well under irrigated high-yield environments, and has tolerance to Fusarium head blight (FHB or scab), and resisting the accumulation of DON toxins.

WB-Fuzion (BZ901-717) – hard red spring released by WestBred (a unit of Monsanto) in 2009 with very good end-use quality. Yields in these trials were similar to Cabernet and UI Winchester and significantly higher than WestBred 936, which suffered from a highly susceptible reaction to stripe rust. Fuzion is about 4 inches taller than WestBred 936.

WB-Idamax (BZ904-336) – hard white spring released by WestBred (a unit of Monsanto) in 2009 with excellent quality, similar to Klasic. Three year averages show WB-Idamax yields were slightly above WB-Paloma, similar to Jefferson (hrs), and was at average for heading date, plant height, and protein.

WB-Paloma (BZ904-331WP) – a hard white spring wheat released in 2009 by WestBred (a unit of Monsanto) as a possible replacement for Snow Crest. Over three

years of testing, Paloma had yield comparable to WB-Idamax and Jefferson (hrs) under irrigation, yielding 108% of Snow Crest.

WB-Rockland (SJ908-247) – hard red spring wheat released by WestBred (a unit of Monsanto) in 2010. WB-Rockland is highly resistant to stripe rust, but yields have been low in the trials. WB-Rockland should respond well to higher seeding rates.

Whit (WA008008) – a soft white spring wheat released in 2008 through the Washington AES, and the USDA-ARS. In three years of extension testing in southern Idaho, Whit has yielded below average, comparable to Nick and Cataldo, but higher than Penawawa. Whit has moderate resistance to stripe rust (high temperature adult plant resistance) and to Hessian fly. Whit is a partial waxy wheat with milling and baking characteristics similar to Alturas and Alpowa.

WINTER WHEAT

AgriPro Legion – Like Salute, Legion is a tall semi-dwarf soft white winter variety, with white chaff, early to average maturity. Legion was moderately susceptible to current (2011) prevalent races of stripe rust but was similar to Tubbs for both winter-hardiness and snow mold tolerance. Legion yields similar to Brundage over the previous three years but test weights were below average. Like all AgriPro varieties (now Syngenta Cereals), it is a PVP, Title V variety.

AgriPro Salute – a soft white winter selection by AgriPro (now Syngenta Cereals) from the cross: Rod/Stephens 3*/SF4. Salute is a tall semi-dwarf, white-chaffed variety with early maturity and good straw strength for a taller wheat. Salute was moderately susceptible to current (2011) prevalent races of stripe rust but under most years should have adequate protection in southern Idaho. AP Salute has average winter-hardiness and snow mold tolerance. Salute has large heads, excellent yield potential with average test weights and grain protein.

AP Badger (RemPop80-3) – a 2009 released soft white winter wheat from AgriPro (Syngenta Cereals), AP Badger yields were above average in 2010 and below average in 2011. AP Badger is shorter than average with lower test weights and good straw strength.

AP Legacy (ORF2BC9800267-0) – also released in 2009 by AgriPro (Syngenta Cereals) AP Legacy was very susceptible to current races of stripe rust in 2011. AP Legacy had average yields in 2010 comparable to WB 528 and Bruneau, and below average in 2011, comparable to Coda and Brundage.

Bitterroot (92-22407A) – released in 2007 by the University of Idaho AES, Bitterroot is an excellent quality soft white winter wheat. Yields have been similar to Brundage 96, with better test weight and is 3 inches taller. Bitterroot also has better stripe rust resistance than Brundage.

Bruneau (93-64901A) – soft white winter wheat released in 2009 by the University of Idaho AES. Bruneau has been one of the highest yielding soft white winter wheat in these trials averaged over the past three years, comparable to WB 528 and Brundage. Bruneau is resistant to stripe rust, and also has excellent end use quality, good straw strength and low protein. It is susceptible to dwarf bunt.

Curlew (UT9325-55) – a hard red winter wheat released by the Utah AES for dryland production areas of southern Idaho and Northern Utah in 2009. Curlew yields comparable to Deloris, Utah 100 and Yellowstone under dryland conditions and is

agronomically similar to Utah 100. Curlew is moderately resistant to dwarf bunt, and is susceptible to stripe rust. Under irrigation, Curlew yields were average but lodging was high.

Decade (MT0552) – a 2010 release by the Montana AES, Decade is a hard red winter wheat with yields similar to Boundary and Eddy but having higher protein. Decade has a tendency to lodge under irrigation and should be grown under dryland conditions. Decade is very susceptible to stripe rust.

Goetze (ORH010920) – a soft white winter wheat released in 2007 by Oregon AES and the USDA-ARS as a replacement to 'Foote', which had become susceptible to stripe rust. Goetze is adapted to western Oregon production conditions, and also has resistance to Septoria leaf blotch. Across the trials this year, Goetze performed similar to Brundage 96. Goetze requires little to no vernalization and is susceptible to winter kill. End use quality is similar to Stephens and Tubbs.

Lucin-CL – Utah AES released this Clearfield line in 2010. Clearfield wheats have resistance to imazamox herbicides such as to Beyond® herbicide for hard to control grassy weeds. Lucin-CL is adapted to dryland production conditions, and is agronomically similar to Deloris. It also has moderate resistance to dwarf bunt. Yields so far have been similar to Curlew and Utah 100.

Greenville (UT9743-42) – Utah AES released Greenville hard red winter wheat in 2010. In the extension trials harvested in 2011, Greenville was the highest yielding variety under irrigation, and was average under dryland conditions. Test weight, height and lodging were below average. Heading date was average. Greenville currently has fairly robust stripe rust resistance and moderate dwarf bunt resistance.

LHS (IDO835) – a hard white winter wheat released in 2010 by the Idaho AES for high yield potential under dryland conditions. In the first year of dryland trials, LHS did very well in Ririe and average in Rockland. While LHS yielded well under irrigation, it will lodge and is very susceptible to stripe rust.

Norwest 553 – a hard red winter wheat developed by Oregon State and Nickerson U.K. in cooperation with the USDA-ARS. Norwest 553 is resistant to stripe rust and tolerant to Fusarium crown rot, and has yielded very well in the third year of testing, comparable to Utah 100 and WB-Arrowhead. Norwest 553 was shorter than average with excellent lodging resistance. Grain protein and test weight were average.

Skiles (ORH010085) – a soft white winter wheat released in 2007 by Oregon AES and the USDA-ARS. Skiles has better winter hardiness than Goetze, Stephens or Tubbs, is moderately resistant to stripe rust, and has tolerance to crown rot and Cephalosporium stripe. In the three years it's been in these trials, Skiles' yield was average, was shorter with good lodging resistance.

SY Ovation (03PN108#21) – a soft white winter wheat released by Syngenta Cereals in 2011. SY Ovation has had excellent yields over the past two years, and in 2011 showed a high level of resistance to stripe rust. Test weight, heading date, height and protein were average, and SY Ovation had lower lodging than average. In 2011, yields were comparable to WB-Junction and Bitterroot.

UICF Brundage (02-859) – a soft white winter Clearfield wheat derived from Brundage released in 2009 by the Idaho AES. Clearfield wheats have resistance to imazamox herbicides such as Beyond®, for hard to control grassy weeds. Performance and agronomic characteristics are very

similar to Brundage, but is much more resistant to stripe rust than Brundage.

UICF Lambert (99-435) – a soft white winter Clearfield wheat released in 2008 by the Idaho AES. Clearfield wheats have resistance imazamox herbicides such as to Beyond® herbicide, for hard to control grassy weeds. Performance and agronomic characteristics are very similar to Lambert.

UICF Grace (IDO 651) – a hard white winter Clearfield wheat released in 2009 for the rainfed production areas. UICF Grace has resistance to imazamox herbicides such as Beyond®, and will be useful in areas where jointed goatgrass and cheatgrass are problems. Yields are comparable to Juniper and Bonneville. Grace is tall and susceptible to black chaff, making it suited to dryland production.

UI Silver (IDO 658) – a hard white winter wheat released in 2011 by the University of Idaho AES. UI Silver had excellent dryland yields in extension testing, similar to Utah 100 over the last three years. UI Silver has good end use quality for both bread and Asian noodles. UI Silver has resistance to stripe rust, dwarf bunt, and carries the SrTmp gene for resistance to stem rust. It is susceptible to black chaff, which can be a problem under irrigation.

WestBred Arrowhead (ML9W05-2501) – a hard red winter wheat released by WestBred (a unit of Monsanto) in 2011. Yields of WestBred Arrowhead averaged over the last three years have been excellent, similar to Utah 100 and Norwest 553. WestBred Arrowhead, like Norwest 553, showed excellent resistance to stripe rust in this year's epidemic. Under irrigation, height was similar to Promontory, test weight was above average and lodging was below average.

WestBred 456 – a soft white winter wheat from WestBred, (a unit of Monsanto), was released as an improvement over WB 470 and as a replacement for WB 528. WB 456 yielded slightly less than WB 528 and had higher test weight. WB 456 is three inches shorter than WB 470 with improved lodging resistance. WB 456 has an early heading date, 5-6 days earlier than average, and had excellent resistance to stripe rust in this year's epidemic.

WestBred Junction (BZ6W02-616) – a soft white winter wheat released in 2011 by WestBred (a unit of Monsanto). In this the second year in these trials, averaged over all irrigated locations, the yield was excellent, equal to SY Ovation and greater than WestBred 456, but with a little lower test weight than WestBred 456.

Whetstone (W98-355) – is a hard red winter wheat from AgriPro, now Syngenta Cereals, in 2009. Whetstone has been a consistent high-yielding, high test weight wheat. Whetstone is a medium height semidwarf with buckskin colored chaff at maturity. Whetstone is an early maturing wheat with a good level of winter-hardiness but is susceptible to the current prevalent races of stripe rust (2011). Whetstone has good straw strength and has performed well in both irrigated and dryland production. Whetstone has average protein and very good loaf volume. Whetstone is a PVP, Title V variety.

Table 4. Ten year averages of selected agronomic characteristics, 2001-2010 compared to 2011.

NOTE: "Average" values are for years 2001 to 2010

Winter Wheat

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
	# of			# of			# of			# of		Days		# of	
Year	Loc.	bu/A	Year	Loc.	lb/bu	Year	Loc.	in.	Year	Loc.	date	fr. Jan.1	Year	Loc.	%
2004	3	122	2004	3	61.1	2005	4	38	2011	5	6/19	171	2010	5	21
2005	4	104	2008	5	60.9	2004	3	36	2010	5	6/18	171	2009	5	17
2009	5	102	2001	4	60.9	2009	5	35	2008	5	6/14	166	2011	5	9
2003	4	101	2006	4	60.8	2010	5	34	2002	4	6/10	162	2007	4	9
2006	4	98	2007	4	60.3	**Avg.**	**---**	**33**	2009	5	6/9	162	2006	4	8
Avg.	**---**	**97**	2010	5	60.3	2011	5	32	2001	4	6/8	160	**Avg.**	**---**	**7**
2007	4	96	2011	5	60.2	2006	4	32	2005	4	6/7	159	2003	4	7
2010	5	95	**Avg.**	**---**	**60**	2003	4	32	**Avg.**	**---**	**6/7**	**159**	2008	5	4
2001	4	89	2009	5	60.0	2001	4	32	2004	3	6/3	155	2005	4	4
2002	4	88	2003	4	59.7	2002	4	31	2006	4	6/1	153	2004	3	2
2011	5	86	2005	4	59.3	2007	4	30	2003	3	5/31	152	2001	4	0
2008	5	80	2002	4	57.8	2008	4	30	2007	4	5/30	151	2002	4	0

Spring Wheat

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
	# of			# of			# of			# of		Days		# of	
Year	Loc.	bu/A	Year	Loc.	lb/bu	Year	Loc.	in.	Year	Loc.	date	fr. Jan.1	Year	Loc.	%
2009	5	107	2006	5	62.1	2003	4	34	2008	5	7/9	192	2003	4	62
2008	5	102	2009	5	61.8	2009	5	34	2010	5	7/9	192	**Avg.**	**---**	**8**
2011	5	96	2001	7	61.4	2010	5	33	2011	5	7/9	192	2006	5	6
2003	4	96	2002	7	60.8	2005	5	32	2005	5	7/3	186	2007	5	5
2010	5	91	2008	5	60.7	2011	5	32.1	2009	5	7/3	185	2010	5	5
2005	5	87	2010	5	60.6	2004	4	32	2004	4	7/1	183	2011	5	3
Avg.	**---**	**86**	**Avg.**	**---**	**61**	**Avg.**	**---**	**31**	**Avg.**	**---**	**6/30**	**183**	2005	5	2
2007	5	81	2005	5	60.2	2007	5	30	2002	7	6/29	181	2001	7	1
2004	4	79	2004	4	59.6	2008	5	30	2003	4	6/28	180	2004	4	1
2001	7	79	2003	4	59.4	2001	7	29	2006	5	6/27	179	2008	5	0
2006	5	72	2011	5	59.2	2002	7	29	2001	6	6/24	176	2002	7	0
2002	7	67	2007	5	58.6	2006	5	29	2007	5	6/21	173	2009	5	0

Spring Barley

YIELD			TEST WEIGHT			PLANT HEIGHT			HEADING DATE				LODGING		
	# of			# of			# of			# of		Days		# of	
Year	Loc.	bu/A	Year	Loc.	lb/bu	Year	Loc.	in.	Year	Loc.	date	fr. Jan.1	Year	Loc.	%
2009	4	118	2009	4	52.5	2010	4	37	2008	5	7/11	193	2003	4	78
2008	5	114	2005	5	52.0	2009	4	34	2011	5	7/9	191	2007	5	35
2011	5	112	2010	4	51.7	2004	4	34	2010	4	7/4	187	**Avg.**	**---**	**28**
2010	4	106	2011	5	51.6	2011	5	33	2005	5	7/4	186	2011	5	26
2005	5	103	2006	5	51.5	2002	7	32	2009	4	6/30	183	2001	7	25
Avg.	**---**	**102**	2004	4	50.7	2003	4	32	**Avg.**	**---**	**6/29**	**181**	2010	4	24
2003	4	102	2008	5	50.7	2005	5	32	2004	4	6/29	181	2004	4	23
2001	7	101	**Avg.**	**---**	**51**	**Avg.**	**---**	**31**	2006	5	6/28	180	2002	7	22
2004	4	99	2002	7	50.1	2008	5	31	2002	7	6/26	178	2005	5	21
2007	5	99	2003	4	49.2	2001	7	29	2001	6	6/25	177	2006	5	21
2002	7	96	2007	5	49.2	2007	5	27	2007	5	6/23	175	2008	5	15
2006	5	82	2001	7	48.4	2006	5	26	2003	4	6/20	172	2009	4	13

Table 5. Hard Winter Wheat Irrigated Nurseries, 3-Year Averages (2009-2011; 9 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Norwest 553	131.1	61.2	97	6/10	34	7	12.7
WB-Arrowhead	129.7	61.9	97	6/10	39	16	12.5
Utah 100	128.3	60.0	97	6/14	43	21	12.5
Yellowstone	127.5	61.2	96	6/9	40	18	12.6
NuHorizon (W)	126.4	63.1	95	6/7	38	15	12.0
Deloris	124.0	62.2	96	6/12	42	26	12.6
Whetstone	122.8	61.4	96	6/6	37	16	13.2
Promontory	121.7	61.9	96	6/10	39	29	12.5
Boundary	119.2	60.7	97	6/12	37	24	11.8
Moreland	118.7	59.8	96	6/10	36	15	13.3
Eddy	115.6	61.5	96	6/9	36	19	12.5
Garland	115.0	58.2	95	6/13	29	13	13.4
Curlew	114.3	59.7	97	6/10	40	54	14.1
Manning	113.9	60.4	94	6/11	39	55	12.9
DW	113.4	60.4	97	6/11	39	57	12.9
Esperia	113.1	60.1	97	6/6	33	9	12.9
UI Darwin (W)	112.5	61.7	97	6/11	43	62	13.5
AP Paladin	112.4	60.3	98	6/10	36	13	13.7
Golden Spike (W)	111.5	59.4	97	6/14	39	52	12.4
NuHills	109.9	62.0	96	6/6	36	21	13.5
Weston	108.0	62.1	97	6/10	43	46	13.8
Bonneville	107.9	62.2	98	6/15	44	47	14.2
Average	118.0	61.0	96	6/10	38	29	13.0
LSD (α =.05)	6.3	0.7	1.9	0.6	1.1	10.7	0.7
CV%	11.1	2.5	4.1	0.8	5.8	78.4	5.4
Pr > F	<.0001	<.0001	0.0435	<.0001	<.0001	<.0001	<.0001

(W) = white

Table 6. Soft White Winter Wheat Irrigated Nurseries, 3-Year Averages (2009-2011; 9 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
WB 528	133.0	60.4	98	6/10	36	21	10.6
Brundage	132.7	60.8	97	6/9	35	12	10.5
Bruneau	131.8	58.6	96	6/13	37	29	10.1
Brundage 96	129.5	58.7	97	6/12	35	9	10.7
ORCF-101	129.0	59.2	97	6/13	36	5	11.1
Agripro Salute	128.9	58.5	98	6/12	38	12	11.2
Simon	128.8	59.3	97	6/13	37	12	11.0
Agripro Legion	128.7	57.7	98	6/13	38	29	10.6
Bitterroot	128.6	59.3	97	6/13	39	13	10.6
ORCF-102	128.4	59.0	97	6/13	38	21	10.6
UICF Lambert	128.1	58.8	98	6/11	38	16	11.3
Madsen	127.7	58.9	97	6/13	37	10	11.5
00-475-2DH	127.0	59.4	98	6/13	36	26	10.6
Lambert	126.8	58.4	97	6/11	38	16	11.1
WB 456	126.4	61.1	97	6/8	35	14	11.4
Skiles	125.8	59.6	97	6/13	36	5	11.1
UICF Brundage	124.8	58.3	98	6/12	35	17	11.2
Coda*	123.8	59.9	95	6/15	38	28	11.9
Goetze	123.3	58.5	94	6/8	34	9	10.4
Stephens	120.8	58.8	97	6/13	37	21	11.0
Average	127.7	59.2	97	6/12	37	16	10.9
LSD (α =.05)	5.9	0.7	2.9	0.8	1.0	9.5	0.7
CV%	9.6	2.4	6.3	1.1	5.5	123.7	6.5
Pr > F	0.001	<.0001	0.5574	<.0001	<.0001	<.0001	<.0001

*club wheat

Table 7. Winter Barley Irrigated Nurseries, 3-Year Averages (2009-2011; 6 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plumps (>6/64)	Plumps (>5.5/64)	% thin
93Ab669	166.2	49.6	86	6/3	37	22	11.8	75.8	15.1	9.2
Eight-Twelve	164.9	49.2	91	6/2	35	20	11.4	80.9	12.7	6.9
94Ab1777	164.1	48.4	88	6/3	39	21	12.7	57.2	23.5	19.5
02Ab2732	163.2	47.9	86	6/7	38	26	11.1	76.4	13.8	9.9
Sunstar Pride	160.6	48.3	89	6/5	34	28	10.7	62.0	20.8	17.4
Strider	156.9	49.5	93	6/1	34	30	12.2	74.4	15.7	10.2
Sprinter	156.6	49.5	91	6/4	37	36	12.6	72.8	18.3	9.3
02Ab2739	156.0	47.5	88	6/6	36	32	11.6	70.4	17.5	12.5
02Ab2701	153.4	48.2	91	6/4	39	29	11.9	71.0	17.0	12.1
Alba	148.8	50.8	93	6/4	37	19	12.6	86.6	9.3	4.3
Maja	143.0	50.3	88	6/2	36	14	12.4	79.7	10.8	10.0
Schuyler	142.7	49.9	90	6/6	38	26	12.4	68.6	19.3	12.5
02Ab339	140.3	50.5	91	6/7	37	28	12.5	67.8	20.7	11.6
Endeavor	140.2	51.9	74	6/5	35	30	13.1	85.3	8.7	6.3
Charles	139.3	50.4	78	6/3	33	31	13.1	86.2	7.4	6.8
Mathias	138.4	50.8	94	5/30	36	4	13.2	91.3	6.1	2.9
Average	152.2	49.5	88	6/4	36	25	12.2	75.4	14.8	10.1
LSD (a =.05)	12.4	1.5	4.3	3.7	1.8	12.0	0.8	11.2	5.5	7.1
CV%	14.1	5.5	8.6	4.2	8.7	85.5	5.8	12.9	32.3	61.2
Pr > F	<.0001	<.0001	<.0001	0.0014	<.0001	<.0001	<.0001	<.0001	<.0001	0.0010

Table 8. Hard Winter Wheat Dryland Nurseries 3-Year Averages (2009-2011; 5 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Deloris	45.0	61.6	81	6/23	31	0	11.8
Curlew	43.5	61.1	82	6/20	30	0	12.0
Yellowstone	43.3	60.9	82	6/20	28	0	11.4
Utah 100	43.1	60.6	81	6/22	30	0	12.0
UI Silver (W)	42.5	61.8	81	6/22	28	0	11.6
NuHorizon (W)	41.2	61.8	79	6/18	26	0	10.8
Boundary	40.4	59.3	81	6/23	25	0	11.0
Gary (W)	40.3	60.4	81	6/23	29	0	11.1
Moreland	40.2	59.5	78	6/20	25	0	12.0
Golden Spike (W)	40.2	60.1	80	6/23	28	0	11.6
Garland	40.0	58.8	77	6/23	21	0	12.7
Promontory	39.5	61.8	83	6/21	28	0	11.4
Juniper	39.3	60.0	79	6/21	28	0	12.4
UICF Grace (W)	39.0	60.3	84	6/20	35	0	12.0
Bonneville	38.2	61.5	79	6/24	30	0	13.1
Weston	37.2	61.7	78	6/21	31	0	12.8
UI Darwin (W)	37.1	62.3	84	6/22	30	0	12.8
Average	40.6	60.8	81	6/21	28	0	11.9
LSD (α =.05)	2.9	0.5	4.6	0.8	1.0	0.0	0.6
CV%	12.7	1.6	9.2	0.8	6.0	.	4.5
Pr > F	<.0001	<.0001	0.0441	<.0001	<.0001	.	<.0001

(W) = white

Table 9. Soft White Winter Wheat Dryland Nurseries, 3-Year Averages (2009-2011; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Coda*	32.3	61.1	80	6/29	22	0	10.7
00-475-2DH	29.6	61.1	78	6/29	22	0	10.8
Bitterroot	29.2	60.5	81	6/29	23	0	11.3
ORCF-102	29.0	60.0	77	6/28	23	0	10.6
Agripro Legion	28.0	58.9	79	6/28	23	0	9.5
UICF Brundage	28.0	58.2	79	6/27	21	0	9.6
Simon	27.5	58.7	81	6/28	22	0	9.9
Stephens	27.5	60.7	79	6/28	21	0	10.2
Agripro Salute	26.9	58.3	80	6/26	23	0	9.6
ORCF-101	26.9	58.4	76	6/28	22	0	10.5
WB 528	26.3	60.8	83	6/26	22	0	10.2
Madsen	26.2	58.5	75	6/29	22	0	10.7
Bruneau	26.1	59.5	76	6/29	21	0	9.6
Goetze	25.5	59.1	66	6/26	21	0	10.3
UICF Lambert	25.4	58.8	76	6/26	24	0	9.2
Brundage 96	25.0	58.1	81	6/28	22	0	9.8
Skiles	23.6	60.4	80	6/28	21	0	10.7
Lambert	22.5	59.7	75	6/26	23	0	9.8
WB 456	21.8	60.3	78	6/25	21	0	10.3
Brundage	20.5	60.5	80	6/25	20	0	9.7
Average	26.4	59.6	78	6/27	22	0	10.1
LSD (α =.05)	3.8	1.1	8.0	0.8	1.2	0.0	0.9
CV%	18.1	2.2	12.7	0.6	6.8	.	5.5
Pr > F	<.0001	<.0001	0.0679	<.0001	<.0001	.	0.002

*club wheat

Table 10. Hard Spring Wheat Irrigated Nurseries, 3-Year Averages (2009-2011; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Spring Wheat							
Otis (W)	116.6	61.3	99	7/5	41	0	11.4
Lolo (W)	116.5	60.8	99	7/5	37	5	11.4
Jerome	110.9	60.6	100	7/2	34	0	11.7
Bullseye	108.9	62.7	99	7/4	32	3	11.9
WB-Idamax (W)	108.7	60.8	99	7/2	32	0	12.2
Jefferson	107.7	61.3	99	7/4	35	3	12.0
WB-Paloma (W)	105.6	61.7	99	7/2	31	0	12.2
Malbec	105.6	61.7	99	7/3	32	0	12.4
Iona	105.6	61.3	99	7/4	38	7	12.6
Choteau	105.3	61.5	99	7/5	36	0	12.9
UI Winchester	104.5	61.3	99	7/3	34	5	12.1
Lochsa (W)	103.6	59.2	99	7/4	35	0	12.7
SY Capstone (W)	103.3	61.2	99	7/1	31	0	11.9
Cabernet	103.0	61.7	99	7/3	29	2	11.8
WB-Fuzion	102.4	61.6	99	7/2	37	0	12.7
Kelse	100.9	60.9	99	7/5	37	0	13.1
Pristine (W)	100.4	61.9	99	7/1	36	0	12.8
Blanca Grande (W)	99.5	62.7	99	6/30	30	0	12.0
Snow Crest (W)	97.6	61.5	99	6/30	30	0	12.5
Klasic (W)	96.1	61.6	99	6/30	27	2	12.2
Westbred 936	95.9	58.8	99	7/3	32	2	12.5
Durum Wheat							
Alzada	106.4	61.8	99	7/2	34	4	11.2
Kronos	106.4	61.0	99	7/1	30	0	11.6
Utopia	106.1	60.1	99	7/4	31	4	11.1
Average	104.9	61.2	99	7/3	33	2	12.1
LSD (α =.05)	3.3	0.4	0.5	0.4	0.7	3.4	0.5
CV%	7.7	1.5	1.2	0.6	5.4	534.8	5.3
Pr>F	<.0001	<.0001	<.0001	<.0001	<.0001	0.0001	<.0001

(W) = white

Table 11. Soft White Spring Wheat Irrigated Nurseries, 3-Year Averages (2009-2011; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
IDO 599	118.1	60.2	99	7/3	36	7	9.2
UI Whitmore	117.4	60.6	99	7/5	37	1	9.0
IDO 644	116.9	59.5	99	7/2	35	3	9.2
IDO 669	116.0	60.4	99	7/5	39	9	9.3
Alturas	115.7	60.2	99	7/5	36	3	9.0
Babe	115.0	61.3	100	7/5	39	6	9.4
IDO 668	114.5	60.5	99	7/4	36	2	9.7
Alpowa	113.0	60.1	99	7/7	38	4	9.5
UI Pettit	111.9	60.2	99	7/1	32	4	9.3
Whit	110.2	60.6	99	7/4	35	7	9.6
Nick	110.1	60.5	99	7/4	35	4	9.5
Penawawa	107.5	60.9	99	7/6	36	4	9.6
Cataldo	106.7	60.4	98.913	7/2	35	0	9.7
Average	113.3	60.4	99	7/4	36	4	9.4
LSD (α =.05)	3.7	0.3	0.4	0.3	0.7	5.0	0.3
CV %	7.9	1.2	0.9	0.4	4.7	296.5	4.1
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	0.0686	<.0001

Table 12. 6-Row Barley Irrigated Nurseries, 3-Year Averages (2009-2011; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (> 6/64)	Plump (>5.5/64)	% Thin
Feed										
Goldeneye	125.6	51.3	99	7/1	37.9	22.9	8.6	82.6	8.1	5.0
Millennium	123.8	50.3	99	6/30	38.6	13.5	8.2	73.1	13.7	8.4
Creel	123.4	50.6	98	6/30	37.3	21.6	7.5	75.9	12.2	7.9
Steptoe	119.3	49.6	99	6/30	37.5	29.2	7.6	80.9	8.1	5.2
Herald	115.5	49.8	97	7/1	38.4	16.1	7.9	81.3	9.0	4.6
Colter	114.5	50.0	99	6/30	37.5	18.4	7.7	75.8	12.0	7.1
Malt										
Lacey	115.5	51.7	99	6/30	38.2	15.9	8.7	85.8	6.0	2.6
Legacy	110.1	51.0	98	7/2	38.6	32.2	8.5	81.6	8.7	5.1
Tradition	107.4	51.6	99	7/1	39.0	20.3	8.8	85.5	6.0	2.6
Morex	104.4	50.3	98	7/2	38.6	41.1	8.4	72.8	13.5	9.4
Celebration	102.5	50.8	98	7/2	37.8	33.8	9.2	84.7	7.0	3.3
Average	114.7	50.6	98	7/1	38	24	8.3	80.0	9.5	5.6
LSD (α =.05)	5.1	0.5	0.8	0.6	1.1	8.2	0.4	3.1	1.6	1.8
CV%	11.2	2.4	2.0	0.8	7.0	84.3	6.6	4.9	21.3	40.3
Pr > F	<.0001	<.0001	<.0001	<.0001	0.037	<.0001	<.0001	<.0001	<.0001	<.0001

Table 13. 2-Row Barley Irrigated Nurseries, 3-Year Averages (2009-2011; 12 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (> 6/64)	Plump (5.5/64)	% Thin
Feed										
Xena	133.7	53.2	98	7/5	35	19	11.2	90.5	6.0	3.4
Spaulding	133.4	54.0	99	7/6	35	10	11.4	91.8	5.4	3.3
Champion	129.5	53.7	99	7/5	34	14	11.8	91.6	5.4	2.9
Baronesse	128.9	53.1	99	7/6	32	20	10.7	90.7	5.8	3.5
RWA 1758	128.6	53.4	99	7/6	32	15	10.8	92.1	4.9	3.0
Idagold II	127.7	51.5	99	7/8	28	10	11.2	85.4	9.7	5.0
Primo	127.5	52.6	99	7/6	31	31	10.8	87.9	7.1	4.9
Tetonia	127.3	53.0	99	7/7	33	24	10.9	87.5	7.4	5.1
Lenetah	126.5	53.1	98	7/6	35	38	12.0	92.5	4.5	3.3
Camas	119.9	53.4	99	7/5	35	15	12.6	91.5	5.1	3.5
Julie*	101.7	59.3	96	7/7	34	12	13.3	81.0	12.2	6.4
Clearwater*	97.7	56.9	96	7/6	34	28	12.9	75.3	16.4	8.3
Transit*	88.5	57.5	98	7/8	36	15	13.1	78.8	14.7	6.2
Malt										
Conrad	122.3	52.5	99	7/6	33	22	11.7	93.1	4.3	2.6
Copeland	117.7	52.4	99	7/7	37	28	12.0	86.5	4.4	3.2
Pinnacle	115.4	53.6	98	7/3	37	7	12.0	96.4	2.1	1.5
02Ab17271	115.1	50.6	99	7/10	35	24	11.9	83.8	9.0	7.0
Merit	111.4	49.8	99	7/8	35	30	11.8	81.5	9.6	8.9
B1202	111.2	51.8	99	7/6	34	24	12.0	92.2	4.8	2.8
Hockett	108.6	53.1	99	7/4	33	36	12.0	90.7	5.5	3.9
Harrington	103.3	51.7	99	7/7	34	45	12.2	82.5	10.2	7.2
Average	117.9	53.3	99	7/6	34	22	11.8	87.7	7.4	4.6
LSD (α =.05)	5.3	1.1	1.2	1.8	0.9	8.1	0.5	5.8	2.4	2.4
CV%	11.2	5.2	2.9	2.3	7.0	91.3	5.6	8.2	40.2	66.3
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

*indicates hulless variety

Table 14. Hard Spring Wheat Dryland Nurseries, 3-Year Averages (2009-2011; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Spring Wheat							
Otis (W)	59.8	60.3	97	7/21	29	0	10.9
Lolo (W)	56.3	60.7	94	7/21	27	0	10.8
Jerome	52.6	59.8	97	7/19	26	0	10.9
Lochsa (W)	52.5	60.1	95	7/20	27	0	11.2
Jefferson	51.5	60.8	95	7/20	26	0	11.5
Iona	51.4	60.2	94	7/21	27	0	11.4
WB-Idamax (W)	49.9	59.8	95	7/19	24	0	10.6
UI Winchester	47.8	60.3	95	7/19	24	0	11.0
Pristine (W)	47.8	61.1	95	7/18	27	0	11.8
Kelse	47.3	58.9	97	7/21	28	0	11.7
Westbred 936	46.5	59.9	95	7/19	24	0	11.6
Blanca Grande (W)	45.3	61.0	95	7/17	23	0	11.5
Snow Crest (W)	44.8	60.1	96	7/17	23	0	11.5
Klasic (W)	44.3	61.5	95	7/17	20	0	11.1
WB-Fuzion	42.3	60.5	97	7/18	27	0	11.8
Choteau	41.5	59.0	92	7/21	24	0	13.1
Spring Durum							
Utopia	43.2	58.8	92	7/21	22	0	11.0
Kronos	42.9	60.5	90	7/19	22	0	10.5
Average	48.2	60.2	95	7/19	25	0	11.3
LSD (α =.05)	4.5	0.8	2.9	0.6	1.3	0.0	1.1
CV%	11.6	1.7	3.8	0.4	6.3	.	6.0
Pr>F	<.0001	<.0001	<.0001	<.0001	<.0001	.	0.0236

(W) = white

Table 15. Soft White Spring Wheat Dryland Nurseries, 3-Year Averages (2009-2011; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
IDO 599	65.6	60.0	97	7/19	27	0	8.8
IDO 644	63.1	59.1	96	7/18	25	0	8.7
Alturas	62.4	59.3	96	7/22	26	0	8.4
Cataldo	61.2	60.1	94	7/18	24	0	9.2
IDO 669	60.8	59.7	94	7/22	28	0	9.9
UI Whitmore	60.3	59.5	95	7/22	24	0	9.1
Penawawa	58.4	60.6	95	7/22	25	0	9.3
Whit	58.1	59.9	96	7/20	26	0	8.9
Babe	55.7	58.9	98	7/22	27	0	9.3
IDO 668	55.4	59.8	97	7/20	26	0	9.1
Nick	55.2	60.0	95	7/20	25	0	9.7
UI Pettit	51.7	60.5	94	7/17	22	0	9.5
Alpowa	48.3	54.2	93	7/24	27	0	9.8
Average	58.2	59.3	95	7/20	26	0	9.2
LSD (α =.05)	5.9	0.9	3.2	0.6	1.4	0.0	0.6
CV%	12.4	1.9	4.2	0.4	6.6	.	3.6
Pr > F	<.0001	<.0001	0.0778	<.0001	<.0001	.	0.0004

Table 16. 6-Row Barley Dryland Nurseries, 3-Year Averages (2007, 2008, 2011; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (> 6/64)	Plump (>5.5/64)	% Thin
Feed										
Creel	35.1	43.7	98	7/17	19.0	0.0	11.6	51.4	21.6	27.1
Herald	32.1	43.2	98	7/18	18.2	0.0	11.7	63.2	17.2	20.1
Goldeneye	30.3	46.4	98	7/19	19.2	0.0	13.5	61.1	19.5	19.5
Millennium	29.7	47.0	98	7/16	19.1	0.0	12.8	46.0	25.8	28.5
Colter	29.6	42.5	98	7/17	17.9	0.0	11.7	54.5	21.2	24.5
Steptoe	28.6	45.9	97	7/17	19.1	0.0	11.7	68.5	15.8	15.8
Malt										
Lacey	31.0	45.0	98	7/18	18.1	0.0	13.6	63.0	19.6	17.9
Morex	31.0	44.5	98	7/19	18.6	0.0	13.7	45.2	22.4	32.9
Legacy	29.0	47.1	98	7/19	19.5	0.0	13.5	65.8	19.1	15.4
Tradition	27.0	43.7	97	7/18	18.5	0.0	14.4	63.1	17.4	19.7
Average	30.4	44.9	98	7/18	19	0	12.8	58.2	20.0	22.1
LSD (α =.05)	6.5	3.7	1.5	1.7	1.5	0.0	1.8	8.5	6.2	8.1
CV%	26.2	10.1	1.9	1.0	9.8	.	8.1	8.5	18.1	21.4
Pr > F	0.5013	0.2	0.4938	0.0249	0.4292	.	0.0219	<.0001	0.1098	0.0029

Table 17. 2-Row Barley Dryland Nurseries, 3-Year Averages (2007, 2008, 2011; 3 site-years)

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)	Plump (> 6/64)	Plump (5.5/64)	% Thin
Feed										
RWA 1758	36.0	47.0	98	7/21	15	0	12.3	66.4	16.3	17.1
Camas	35.8	47.6	97	7/20	18	0	12.8	56.4	20.2	23.7
Primo	32.8	46.0	98	7/22	16	0	12.0	62.8	19.3	17.6
Tetonia	32.5	46.1	98	7/24	16	0	13.0	61.4	17.9	20.5
Spaulding	31.6	44.7	98	7/23	19	0	13.0	41.8	10.1	14.7
Xena	31.6	47.8	98	7/20	18	0	12.5	62.0	19.0	19.2
Baronesse	31.3	44.3	98	7/24	17	0	13.3	64.2	17.3	18.3
Lenetah	29.8	45.9	98	7/27	19	0	13.4	64.5	18.6	16.4
CDC McGwire*	28.8	55.9	93	7/23	19	0	13.6	25.0	14.3	60.7
Clearwater*	28.4	53.3	92	7/23	20	0	14.0	30.1	15.4	54.4
Idagold II	24.6	44.9	98	7/22	17	0	13.0	57.2	24.0	19.0
Malt										
Metcalfe	36.1	48.1	98	7/21	19	0	13.6	77.0	13.9	8.8
Harrington	33.8	43.8	98	7/25	18	0	14.0	57.4	22.4	19.9
Pinnacle	33.5	49.9	98	7/17	19	0	13.0	67.4	14.6	18.0
Conrad	31.9	45.8	98	7/24	17	0	13.0	65.9	17.0	17.0
B1202	30.5	46.1	98	7/23	17	0	13.4	57.0	20.0	22.6
Hockett	29.4	46.8	98	7/22	18	0	13.1	73.0	15.8	11.2
Merit	25.1	44.5	98	7/23	17	0	13.3	64.6	20.3	16.4
Average	31.3	47.1	97	7/22	18	0	13.1	58.6	17.6	22.0
LSD (α =.05)	5.8	2.5	2.5	1.8	1.3	0.1	1.2	18.3	11.9	21.2
CV%	22.7	6.4	3.1	1.0	9.0	1469.7	5.3	18.8	40.7	58.2
Pr > F	0.0588	<.0001	<.0001	<.0001	<.0001	0.4615	0.0957	<.0001	0.8234	0.0014

*indicates hulless variety

Table 18. Irrigated Hard Winter Wheat Data Combined from Kimberly, Rupert, and Aberdeen, 2011.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Greenville	124.5	59.1	96	6/15	31	7	13.2
Yellowstone	123.7	60.9	95	6/15	39	21	13.3
WB-Arrowhead	122.6	61.9	97	6/14	38	9	13.3
Promontory	122.0	62.3	95	6/15	37	19	12.8
Utah 100	121.1	60.1	96	6/17	40	10	13.0
Norwest 553	120.3	61.6	97	6/15	32	1	13.7
NuHorizon (W)	118.2	62.3	95	6/13	36	6	12.9
Golden Spike (W)	117.0	60.5	97	6/17	37	37	12.3
Whetstone	115.3	61.2	97	6/10	36	20	13.5
LHS (W)	115.1	60.4	98	6/18	38	32	12.5
Manning	114.2	60.7	94	6/15	37	42	13.6
Boundary	113.1	61.1	98	6/16	37	12	12.1
Deloris	111.6	62.1	94	6/17	40	19	13.0
IDO660 (W)	111.5	60.8	94	6/14	36	2	14.7
Moreland	110.9	60.2	95	6/14	34	6	14.1
Esperia	109.7	60.3	98	6/10	31	7	13.6
Curlew	106.4	59.5	95	6/15	38	50	14.3
Eddy	105.9	60.8	97	6/14	34	10	13.6
Bonneville	102.6	62.3	97	6/18	42	36	14.5
Weston	102.2	61.9	95	6/14	41	26	14.7
Decade	98.8	60.2	96	6/15	38	9	14.5
Garland	96.0	57.1	94	6/18	28	24	14.2
NuHills	95.3	60.6	96	6/10	35	2	14.8
AP Paladin	91.0	59.6	97	6/15	35	5	15.1
Average	111.2	60.7	96	6/15	36	17	13.6
LSD (α = .05)	10.1	1.0	3.1	1.2	1.8	19.1	1.6
CV%	10.3	1.8	3.7	0.8	5.7	127.6	6.0
Pr >F	<.0001	<.0001	0.3545	<.0001	<.0001	<.0001	0.0016

Table 19. Irrigated Soft White Winter Wheat Data Combined from Kimberly, Rupert, and Aberdeen, 2011.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
96-16702	143.1	61.1	88	6/15	39	7	10.7
SY Ovation	135.9	60.0	98	6/15	36	5	11.0
WB-Junction	135.6	59.8	98	6/13	34	30	11.7
Bitterroot	132.5	59.7	87	6/19	37	19	10.7
Bruneau	130.6	60.1	96	6/18	36	8	9.8
Simon	130.3	60.1	98	6/16	37	2	11.2
Agripro Salute	129.7	59.3	87	6/17	38	9	11.3
00-475-2DH	128.8	62.0	97	6/18	35	18	10.4
Skiles	127.2	59.9	87	6/17	34	1	11.6
ORCF-102	126.8	59.3	98	6/18	37	9	10.6
BZ6W02-647AA	125.7	58.9	98	6/14	34	22	10.7
Stephens	125.6	59.6	97	6/18	37	31	10.7
UICF Lambert	125.3	59.1	95	6/16	38	2	11.8
WB 528	125.2	60.1	98	6/14	35	16	11.1
Agripro Legion	125.1	57.1	97	6/16	38	41	10.2
WA8092	124.9	57.1	98	6/22	37	52	11.7
WB 456	122.3	60.4	97	6/12	33	4	11.9
Brundage 96	121.6	59.0	97	6/16	35	0	10.5
Goetze	120.4	58.4	82	6/13	32	0	10.2
Madsen	120.2	59.2	95	6/18	35	5	11.9
ORCF-101	119.9	58.4	86	6/17	35	0	11.8
UICF Brundage	118.1	58.0	96	6/17	32	0	11.8
AP Badger	117.8	57.8	98	6/16	32	0	11.2
IDO663	117.3	58.9	98	6/15	35	1	11.6
Lambert	116.3	59.6	93	6/14	39	1	11.4
Coda*	115.8	60.6	95	6/19	38	46	11.7
AP Legacy	113.5	58.2	97	6/19	38	5	11.2
Brundage	106.9	59.8	97	6/14	34	0	11.3
ID98-19010A	100.0	58.2	97	6/15	34	2	10.3
Average	123.2	59.3	95	6/16	36	11	11.1
LSD (α = .05)	10.6	1.2	11.7	1.1	1.3	13.6	1.4
CV %	9.7	2.2	14.0	0.7	4.1	139.1	7.9
Pr > F	<.0001	<.0001	0.7571	<.0001	<.0001	<.0001	0.1470

* indicates club wheat variety

Table 20. Irrigated Winter Barley Data Combined from Rupert and Aberdeen 2011.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plump (>6/64)	Plump (>5.5/64)	% Thin
Sprinter	169.7	48.4	96	6/6	35	28	12.6	84.3	10.4	5.3
Sunstar Pride	164.8	48.0	95	6/16	36	33	11.3	60.4	18.5	21.0
OR91	164.6	48.1	83	6/5	37	4	13.7	84.2	10.6	5.1
OR92	161.7	48.6	90	6/6	37	1	14.1	92.4	5.8	1.7
Eight-Twelve	158.8	48.8	96	6/5	35	12	12.0	78.6	13.9	7.5
02Ab2732	158.2	48.6	94	6/11	38	31	12.0	81.0	10.6	8.2
94Ab1777	157.7	47.7	95	6/7	39	16	13.2	50.6	22.5	26.5
OR818	156.7	48.1	97	6/5	38	11	13.9	85.2	10.2	4.4
93Ab669	156.5	48.6	92	6/6	36	29	11.9	68.3	17.7	13.7
Strider	155.7	47.0	96	6/6	35	34	12.0	66.3	17.8	15.6
Alba	150.3	49.9	97	6/7	37	17	12.4	84.4	11.1	4.3
Mathias	147.2	50.3	97	6/1	39	0	13.4	88.6	7.5	3.7
OR816	145.9	48.2	94	6/7	41	24	12.6	71.7	15.3	12.8
Schuyler	145.3	49.9	97	6/9	39	24	12.8	61.9	24.8	13.4
Charles	145.3	50.4	96	6/5	36	34	13.2	83.7	7.7	8.5
Endeavor	145.1	51.2	86	6/9	37	38	12.9	83.0	9.5	7.3
02Ab2739	143.4	47.0	92	6/9	37	43	11.9	66.5	17.6	15.9
UTWB9703-19	141.6	48.2	94	6/10	39	35	11.4	67.1	19.1	13.5
Maja	139.1	49.1	93	6/6	37	22	12.7	67.3	12.4	20.2
02Ab2701	138.3	47.2	96	6/4	41	27	12.0	64.1	19.4	16.3
02Ab339	135.7	49.8	95	6/10	37	31	12.4	59.2	25.0	15.6
Kold	134.6	48.0	96	6/9	35	27	12.5	65.6	20.8	13.3
Streaker*	131.1	53.9	84	6/3	37	37	12.5	44.3	32.3	23.3
Kamiak	125.8	48.5	97	6/2	36	39	12.7	70.3	17.8	11.9
Average	148.9	48.9	93	6/7	37	25	12.6	72.0	15.7	12.0
LSD (α = .05)	22.0	1.4	7.3	1.3	1.9	17.4	1.2	25.0	9.4	18.1
CV %	14.9	2.8	7.9	0.8	5.2	71.0	4.8	16.8	28.9	72.8
Pr > F	0.005	<.0001	0.0011	<.0001	<.0001	<.0001	0.0065	0.0387	0.0006	0.3739

*indicates hulless variety

Table 21. Irrigated Hard Spring Wheat Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2011.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand	Heading Date	Height (in)	Lodging (%)	Protein (%)
Otis (W)	114.4	58.6	98	7/11	39	1	12.2
WA8123 (W)	113.9	59.5	98	7/8	34	0	12.8
WB-Idamax (W)	110.2	58.6	96	7/8	32	0	13.0
Jerome	109.6	58.1	99	7/7	33	0	12.8
Malbec	108.3	60.5	98	7/7	30	0	13.3
Choteau	106.7	59.8	98	7/10	34	0	13.7
Volt	105.9	60.5	98	7/11	33	0	13.2
Jefferson	105.8	59.1	97	7/9	34	11	13.3
Lolo (W)	105.6	57.9	98	7/10	36	6	12.1
Cerere	105.6	55.5	97	7/14	33	0	11.4
UI Winchester	105.4	59.7	99	7/8	33	14	13.3
IDO 702	104.2	58.1	99	7/9	35	10	13.6
WB-Paloma (W)	104.0	59.5	96	7/7	29	0	13.4
Cabernet	103.3	60.0	98	7/8	28	2	12.8
SY Capstone (W)	103.3	59.5	98	7/6	30	0	12.7
Albany	103.2	59.6	98	7/12	33	10	12.3
Bullseye	103.2	60.4	98	7/9	31	10	13.3
Kelse	103.0	59.2	99	7/10	36	0	14.3
Iona	102.6	58.9	98	7/9	36	16	14.0
Buck Pronto	102.2	59.5	98	7/6	34	1	14.4
WB-Fuzion	100.5	59.5	99	7/7	36	0	14.0
10F x Inc1	100.1	60.9	98	7/9	34	15	13.5
Snow Crest (W)	97.3	59.7	96	7/6	28	0	13.2
Blanca Grande (W)	97.2	61.5	98	7/5	29	0	12.7
Klasic (W)	94.1	59.4	98	7/5	25	6	13.8
Lochsa (W)	92.4	56.7	98	7/9	33	0	13.4
Pristine (W)	91.4	60.0	96	7/6	32	1	13.8
WB-Rockland	87.3	59.5	97	7/8	27	0	14.0
WestBred 936	80.0	54.2	98	7/8	31	0	13.5
Durum Wheat							
Kronos	115.4	60.1	98	7/6	30	0	13.3
Alzada	112.8	60.3	97	7/7	33	7	12.9
Utopia	109.4	58.3	98	7/9	30	1	13.3
Average	103.4	59.1	98	7/8	32	3	13.2
LSD (α = .05)	6.8	0.9	1.3	1.0	1.2	9	0.8
CV%	8.8	2.1	1.7	0.7	5.0	348.1	4.4
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	0.0039	<.0001

(W) = white

Table 22. Irrigated Soft White Spring Wheat Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen 2011

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand	Heading Date	Height (in)	Lodging (%)	Protein (%)
IDO 686	126.6	59.2	99	7/10	39	4	10.5
IDO 687	123.7	60.1	98	7/10	37	0	10.2
IDO 599	121.2	58.8	98	7/9	35	7	10.0
IDO 669	117.8	59.2	98	7/11	37	11	10.2
Babe	117.6	59.5	99	7/10	38	8	10.4
Alturas	116.7	58.7	98	7/10	36	1	10.0
UI Whitmore	116.7	59.3	98	7/10	36	1	9.8
IDO 644	113.5	58.0	98	7/7	34	0	10.2
Alpowa	113.5	58.2	98	7/11	38	1	10.6
IDO 668	112.4	59.1	98	7/9	35	0	10.8
Penawawa	110.8	59.2	98	7/10	35	2	10.7
JD*	110.1	58.8	99	7/12	40	40	11.4
Whit	109.9	58.9	97	7/8	34	5	10.7
UI Pettit	108.1	58.4	98	7/8	30	0	9.9
Nick	106.7	58.4	98	7/9	34	0	10.0
Cataldo	101.4	59.1	97	7/7	34	0	10.5
Average	113.7	58.9	98	7/10	36	5	10.4
LSD (α = .05)	6.8	0.7	1.0	1.6	1.1	8.5	0.6
CV%	7.9	1.7	1.4	1.1	4.3	253.1	4.0
Pr > F	<.0001	0.0003	<.0001	<.0001	<.0001	<.0001	0.0001

*club wheat

Table 23. Irrigated 6-Row Spring Barley Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2011

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plumps (>6/64)	Plumps (>5.5/64)	% Thin
Feed										
UT2120-14	148.1	50.4	96	7/2	34	24	12.3	91.3	5.9	2.9
Goldeneye	146.2	51.8	98	7/4	38	24	12.9	87.4	7.8	4.6
Millennium	142.7	49.8	98	7/2	39	19	12.4	75.6	14.9	9.7
UT2120-35	142.0	50.7	97	7/2	34	28	12.2	89.2	7.0	3.8
Creel	140.8	49.5	95	7/3	37	28	11.2	77.8	13.0	9.0
Herald	133.7	49.4	94	7/4	38	18	12.2	85.9	9.2	4.6
Steptoe	127.8	48.4	97	7/4	38	44	11.5	83.9	9.5	6.8
Colter	122.4	49.1	96	7/3	38	26	12.0	78.0	13.2	8.5
Malt										
Lacey	130.3	51.9	97	7/3	39	26	13.0	93.0	4.8	2.2
01Ab9663	126.8	50.6	97	7/5	42	38	11.5	85.3	7.6	6.5
Legacy	125.6	50.6	97	7/5	39	41	12.6	88.8	7.0	4.1
Tradition	119.4	51.1	98	7/5	39	39	12.6	90.3	6.7	3.2
Celebration	113.7	50.5	95	7/5	38	50	13.4	89.5	6.9	3.9
Morex	102.4	49.3	95	7/6	39	65	12.2	71.5	16.0	12.6
Average	130.9	50.2	96	7/4	38	32	12.3	84.8	9.2	5.9
LSD (α = .05)	8.5	0.9	2.0	0.8	1.8	16.6	0.8	6.0	3.3	3.4
CV%	9.3	2.6	2.9	0.6	6.6	75.0	4.5	5.0	24.4	39.8
Pr > F	<.0001	<.0001	0.0074	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

Table 24. Irrigated 2-Row Spring Barley Data Combined from Rupert, Idaho Falls, Ashton, and Aberdeen, 2011.

Variety	Yield (bu/A)	Test Wt (lb/bu)	Spring Stand	Heading Date	Height (in)	Lodging (%)	Protein (%)	Plumps (>6/64)	Plumps (>5.5/64)	% Thin
Feed										
Xena	147.8	52.8	95	7/7	35	27	11.8	90.7	5.3	3.6
Spaulding	141.9	53.7	98	7/8	34	27	12.4	88.7	5.9	4.4
08ID2661	139.0	51.9	97	7/9	33	19	11.2	85.4	9.1	5.1
Champion	138.9	53.6	96	7/7	35	13	12.7	92.5	3.7	3.0
Tetonia	136.1	52.8	97	7/9	32	26	11.6	86.2	7.8	5.5
MT103022	134.2	52.5	98	7/8	33	28	12.5	91.7	4.9	2.7
Primo	133.3	52.0	97	7/8	31	43	11.6	85.9	8.3	5.6
Lenetah	130.1	52.6	95	7/8	35	37	13.1	90.2	5.5	3.9
08ID2657	129.8	52.1	98	7/10	34	15	11.9	88.3	6.9	4.1
Camas	129.5	52.9	99	7/7	34	27	13.7	89.4	5.6	4.5
Baronesse	129.1	52.4	98	7/8	32	33	11.5	87.8	7.6	4.5
Herald	127.6	49.2	93	7/4	38	20	11.6	85.2	9.7	4.9
RWA 1758	126.9	53.3	97	7/8	32	19	11.8	91.4	4.7	3.4
08ID1358	125.2	52.7	98	7/8	33	26	12.4	88.5	8.0	3.1
Idagold II	123.7	49.9	98	7/10	29	20	12.2	75.3	14.6	9.4
08ID1549*	121.7	58.8	93	7/9	34	43	13.5	77.0	15.1	7.2
08ID1713*	120.4	61.2	94	7/9	36	34	13.9	70.2	20.0	9.2
08ID1756*	119.4	58.9	96	7/8	34	42	13.6	73.1	14.6	11.6
CDC McGwire*	117.6	59.2	94	7/9	35	41	14.0	62.8	24.7	12.1
08ID734*	114.9	57.1	96	7/10	35	33	15.1	66.9	20.9	10.9
MT103020*	111.1	61.2	91	7/4	38	17	12.5	66.0	16.0	17.3
Julie*	106.8	56.7	92	7/13	35	20	14.2	76.1	15.7	6.7
Clearwater*	100.8	57.6	94	7/8	35	30	13.9	75.9	15.6	7.9
Transit*	95.9	56.2	96	7/10	36	21	14.5	78.2	14.5	6.3
MT103050	95.3	49.1	98	7/9	37	51	14.0	88.2	6.5	4.6
MT103005*	92.4	59.9	95	7/9	38	54	14.2	62.5	21.4	15.5
CDC Fibar*	84.2	56.1	94	7/7	37	63	15.1	76.7	14.8	7.9
MT103014*	68.4	60.4	95	7/7	43	23	14.0	89.0	6.5	3.9
Malt										
B3719	137.2	52.2	97	7/7	34	26	11.8	93.8	3.3	3.7
Conrad	130.9	52.3	97	7/8	34	35	12.2	91.7	4.5	3.5
2Ab04-X001084-27	129.4	50.4	96	7/8	31	49	12.2	85.8	8.2	5.2
Pinnacle	129.1	53.5	97	7/6	37	8	13.2	95.1	2.5	1.7
Merit 57	120.5	50.1	93	7/10	34	49	13.2	82.3	9.7	7.2
Hockett	119.5	52.4	98	7/6	32	44	13.0	85.6	8.0	6.1
Copeland	119.3	52.0	98	7/9	37	38	12.8	91.0	4.8	3.5
B1202	118.0	51.5	98	7/8	33	33	12.5	90.9	5.2	3.2
Metcalfe	116.9	52.0	97	7/8	36	47	13.4	86.6	6.4	6.8
Merit	111.1	48.7	97	7/10	35	48	13.0	72.0	11.7	15.6
Harrington	109.7	51.2	96	7/9	34	56	13.0	79.4	12.2	7.9
02Ab17271	108.8	50.0	96	7/12	36	45	13.5	78.7	10.1	10.2
Average	119.5	53.7	96	7/8	35	34	13.0	82.9	9.9	6.5
LSD (α = .05)	7.7	0.9	2.3	0.7	1.4	11.9	1.2	7.9	4.2	4.8
CV%	11.1	2.6	3.7	0.6	7.0	69.3	6.5	6.8	29.5	51.6
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

* indicates hulless variety

Table 25. Agronomic data for winter wheat at Kimberly, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand%**	**Date**	**(in.)**	**(%)**	**(%)**
Hard Winter Wheat									
WB-Arrowhead	143.4	134.7	137.2	60.5	96	6/15	38	0	12.4
NuHorizon (W)	145.7	122.0	136.9	62.1	90	6/12	38	0	11.6
Promontory	146.4	132.1	133.6	61.2	92	6/15	39	25	12.4
Norwest 553	149.1	133.9	131.8	60.5	98	6/17	34	0	13.1
IDO660 (W)	---	127.8	130.0	59.5	92	6/16	37	5	13.5
Yellowstone	142.9	140.1	128.9	59.1	90	6/17	39	23	13.8
Whetstone	135.6	134.7	126.3	59.5	96	6/10	37	10	13.7
Esperia	121.9	116.2	123.4	61.1	97	6/8	32	0	12.7
Moreland	133.6	140.5	123.1	58.7	91	6/16	35	0	13.6
Curlew	137.0	142.3	122.3	58.4	90	6/17	38	81	13.8
Utah 100	137.2	148.1	120.2	57.3	92	6/19	42	1	13.1
Greenville	---	---	119.1	55.1	94	6/16	28	10	14.2
Golden Spike (W)	118.3	161.5	116.2	58.2	95	6/21	39	49	12.5
Boundary	129.5	136.1	115.8	59.6	99	6/19	37	11	11.7
Manning	122.1	145.9	114.0	57.5	88	6/17	38	59	13.4
Weston	109.8	128.9	112.9	60.6	90	6/16	42	41	14.3
Eddy	138.9	127.4	110.0	60.0	96	6/15	36	1	12.8
NuHills	136.6	111.8	108.9	60.2	93	6/10	35	1	13.6
Deloris	135.6	140.5	107.4	60.4	91	6/20	42	20	12.8
LHS (W)	---	157.5	107.0	57.2	99	6/20	38	36	13.2
Bonneville	119.9	142.3	103.8	60.8	96	6/22	43	63	15.0
AgriPro Paladin	143.0	132.9	102.7	56.8	96	6/18	36	11	14.4
Decade	---	126.7	100.6	57.5	94	6/17	38	4	13.4
Garland	123.5	132.9	81.3	52.6	88	6/20	30	39	15.1
Average	130.7	136.8	117.2	58.9	93	6/16	37	20	13.3
LSD (α=.05)	13.3	9.8	16.6	2.0	7.2	1.8	2.8	31.9	
CV %	7.2	5.0	9.9	2.5	5.5	0.7	5.4	110.7	
Pr > F	0.0	<.0001	<.0001	<.0001	0.0556	<.0001	<.0001	<.0001	

(W) = White

Table 26. Agronomic data for winter wheat at Rupert, irrigated, 2011.

Variety	Yield (bu/A) 2009	2010	2011	Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
LHS (W)	---	118.0	115.8	62.9	100	6/15	35	0	11.6
Deloris	120.3	125.6	111.8	63.0	99	6/13	37	0	12.6
Greenville	---	---	111.4	61.9	100	6/13	28	0	12.5
Golden Spike (W)	82.6	85.7	110.7	62.8	100	6/14	33	0	10.9
Boundary	118.8	109.6	106.7	62.1	100	6/13	33	0	12.5
Manning	98.3	83.1	106.7	63.3	100	6/13	33	0	12.8
Utah 100	103.1	135.4	106.4	62.7	100	6/15	36	0	12.6
Promontory	118.6	96.9	103.8	63.4	100	6/13	32	0	13.1
Yellowstone	113.5	104.5	102.0	62.2	100	6/12	36	0	13.8
Garland	114.9	100.9	100.6	61.1	100	6/14	24	0	13.8
Bonneville	95.6	93.3	99.1	64.5	100	6/15	38	0	13.4
WB-Arrowhead	129.1	125.6	99.1	62.8	100	6/12	34	0	13.7
Eddy	106.1	98.0	96.6	61.0	100	6/11	30	0	14.2
Norwest 553	124.0	120.9	94.7	62.4	99	6/12	29	0	13.7
Moreland	115.9	99.1	93.7	61.1	100	6/12	29	0	13.9
Whetstone	131.8	119.8	93.3	62.8	100	6/7	31	0	13.6
NuHorizon (W)	139.8	108.9	89.7	62.1	99	6/11	31	0	13.4
IDO660 (W)	---	132.9	87.5	61.4	100	6/11	33	0	14.9
Curlew	108.8	101.6	86.8	61.1	100	6/12	34	0	14.0
Weston	93.4	107.5	85.7	63.2	99	6/12	37	0	14.4
Decade	---	119.8	83.1	61.8	100	6/12	33	0	15.4
Esperia	122.2	103.8	82.4	60.1	100	6/8	27	0	14.5
AgriPro Paladin	102.5	107.1	69.7	61.1	100	6/12	30	0	15.4
NuHills	122.7	96.2	60.3	59.8	100	6/7	29	0	16.9
Average	108.1	106.3	95.7	62.1	100	6/12	32	0	13.6
LSD (α=.05)	20.5	27.3	15.6	1.0	1.0	1.1	2.6	0	
CV %	13.4	18.3	11.5	1.1	0.7	0.5	5.8	.	
Pr > F	<.0001	0.0002	<.0001	<.0001	0.7502	<.0001	<.0001	.	

(W) = White

Table 27. Agronomic data for winter wheat at Aberdeen, irrigated, 2011.

	Yield (bu/A)						test of simple effects	Test Wt.		test of simple effects					
Variety	2009	2010	sprayed 2011	unsprayed 2011	bushel loss	yield loss	Pr > F	sprayed (lb/bu)	unsprayed	Pr > F	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat															
Greenville	---	---	161.6	113.2	48.4	30%	0.0001	61.5	60.2	0.1899	94	6/19	41	18	13.5
Yellowstone	128.1	145.6	156.9	115.5	41.4	26%	0.0009	62.2	62.3	0.8741	95	6/17	45	30	12.5
Utah 100	115.9	148.3	152.2	107.7	44.5	29%	0.0004	60.8	59.6	0.2272	95	6/19	46	39	12.3
Norwest 553	122.6	162.8	148.3	153.0	-4.7	-3%	0.6931	62.2	62.5	0.7513	90	6/17	39	1	13.6
UI Silver (W)	---	107.2	146.8	96.0	50.7	35%	<.0001	61.9	62.2	0.7917	93	6/19	41	92	12.8
WB-Arrowhead	---	---	140.5	135.1	5.5	4%	0.6453	63.2	62.2	0.2697	94	6/17	45	36	14.2
NuHorizon (W)	117.5	144.0	138.2	119.4	18.7	14%	0.1181	63.2	62.6	0.5617	95	6/17	43	18	12.6
NuHills	104.6	124.1	138.2	49.2	89.0	64%	<.0001	62.9	58.9	<.0001	94	6/18	42	4	13.9
Whetstone	104.6	129.2	137.4	67.9	69.5	51%	<.0001	61.8	57.1	<.0001	91	6/16	41	44	13.8
Esperia	101.5	121.4	136.6	93.7	42.9	31%	0.0006	59.4	58.7	0.4605	94	6/17	35	19	13.8
Promontory	112.8	124.1	135.1	114.0	21.1	16%	0.0796	62.3	62.5	0.8741	91	6/16	43	23	12.4
Golden Spike (W)	107.4	99.5	131.1	83.5	47.6	36%	0.0002	60.4	60.7	0.7513	95	6/17	42	75	12.8
Manning	124.5	108.9	129.6	111.6	18.0	14%	0.1339	62.0	61.0	0.2930	94	6/18	42	96	13.7
Decade	---	---	126.5	39.8	86.7	69%	<.0001	62.3	58.1	<.0001	91	6/17	45	19	14.3
LHS (W)	---	129.6	125.7	49.2	76.5	61%	<.0001	62.0	62.5	0.6347	94	6/20	44	55	12.8
IDO660 (W)	---	134.7	122.6	67.1	55.4	45%	<.0001	62.1	57.1	<.0001	90	6/18	43	0	14.2
DW	119.8	112.0	121.8	109.3	12.5	10%	0.2947	60.4	61.2	0.3707	93	6/18	40	96	13.5
Juniper	---	---	121.8	98.4	23.4	19%	0.0521	62.8	63.3	0.5617	95	6/17	54	39	14.4
Moreland	107.7	135.1	121.0	34.3	86.7	72%	<.0001	61.3	---	.	95	6/15	42	15	15.0
Boundary	110.5	125.7	120.2	69.5	50.7	42%	<.0001	62.0	61.5	0.5617	94	6/16	45	19	12.0
Deloris	133.9	119.1	119.4	19.5	99.9	84%	<.0001	63.4	59.8	0.0003	91	6/20	42	26	13.4
Garland	118.7	146.4	116.3	67.9	48.4	42%	0.0001	58.3	56.7	0.1054	95	6/21	32	63	13.3
Eddy	112.4	134.7	116.3	50.0	66.4	57%	<.0001	62.0	58.4	0.0003	91	6/18	39	28	13.3
Curlew	116.3	106.2	114.0	93.7	20.3	18%	0.0910	58.4	60.1	0.0764	95	6/16	47	90	14.7
Weston	118.7	104.2	114.0	89.0	25.0	22%	0.0387	62.2	60.9	0.1899	94	6/15	48	24	14.3
Lucin-CL	---	---	112.4	71.0	41.4	37%	0.0009	60.8	58.2	0.0089	94	6/19	36	38	13.7
AP Paladin	111.3	131.2	110.1	46.1	64.0	58%	<.0001	62.1	61.0	0.2697	95	6/17	40	0	14.0
UI Darwin (W)	134.7	108.5	109.3	96.8	12.5	11%	0.2947	63.5	63.6	0.8741	93	6/18	45	48	13.9
UICF Grace (W)	---	107.2	108.5	106.2	2.3	2%	0.8435	61.2	61.5	0.7917	94	6/16	49	33	15.1
Bonneville	112.8	97.2	106.9	75.7	31.2	29%	0.0105	60.9	62.9	0.0381	95	6/20	46	64	14.3
Average	115.4	126.1	128.0	84.8	43.2	34%		61.6	60.6		93	6/18	43	38	13.5
LSD (α=.05)	19.8	20.6	---	---				---	---		3.4	3.4	4.7	43.2	
CV %	12.2	11.2	11.1					1.5			2.6	1.4	7.9	80.4	
Pr > F*	0.0006	<.0001	<.0001					<.0001			0.0259	0.1248	<.0001	<.0001	

(W) = White

*Pr>F values for 2009-10 are for the varieties; for 2011 yield and test wt it is for the spray*variety interaction.

Table 28. Agronomic data for winter wheat at Ririe, dryland, 2011.

Variety	Yield (bu/A) 2009	2010	2011	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Winter Wheat									
Curlew	51.3	26.9	18.5	62.2	80	6/27	22	0	10.1
Lucin-CL	---	---	15.2	62.6	86	6/27	24	0	10.8
DW	48.1	28.0	14.5	59.7	88	6/27	23	0	10.5
Utah 100	48.3	26.5	13.8	61.1	85	6/28	23	0	10.8
UICF Grace (W)	46.3	32.7	13.8	60.1	88	6/27	27	0	11.1
Bonneville	46.7	35.2	13.1	61.2	71	6/29	22	0	11.4
Moreland	49.4	26.5	13.1	60.9	80	6/27	20	0	10.3
Norwest 553	---	---	13.1	61.6	79	6/28	20	0	10.6
LHS (W)	---	34.5	12.7	59.7	85	6/28	20	0	9.9
Deloris	53.3	31.9	12.3	62.0	85	6/27	23	0	10.0
Golden Spike (W)	45.4	30.5	12.3	60.7	83	6/27	21	0	10.1
Decade	---	25.8	12.0	60.3	80	6/26	22	0	10.0
IDO660 (W)	---	33.1	12.0	60.0	85	6/26	21	0	10.1
Gary (W)	50.5	26.9	12.0	60.0	80	6/27	21	0	9.3
Garland	49.4	24.0	11.6	61.2	85	6/28	19	0	12.1
Juniper	48.7	24.7	11.6	60.5	83	6/27	25	0	9.8
Boundary	49.8	26.2	11.3	59.9	88	6/28	20	0	9.3
Weston	46.9	22.9	11.3	60.7	78	6/26	23	0	11.5
Yellowstone	46.0	31.2	11.3	60.4	80	6/26	22	0	9.5
SRG	---	---	10.9	60.9	85	6/27	23	0	10.4
NuHorizon (W)	50.6	23.2	10.5	61.0	73	6/26	20	0	9.0
Promontory	45.4	18.5	9.8	61.5	86	6/27	22	0	9.9
UI Darwin (W)	42.7	26.5	9.4	62.0	88	6/28	22	0	11.7
UI Silver (W)	53.9	22.2	9.4	62.4	85	6/28	21	0	11.1
Average	46.6	27.6	12.4	60.8	82	6/27	22	0	10.4
LSD (α=.05)	7.5	10.2	4.7	2.0	14.5	1.0	2.2	0.0	
CV %	11.5	26.3	26.8	2.3	12.5	0.4	7.2	.	
Pr > F	<.0001	0.0934	0.0314	0.0527	0.5858	<.0001	<.0001	.	

(W) = White

Table 29. Agronomic data for winter wheat at Rockland, dryland, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009***	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**
Hard Winter Wheat									
Utah 100	96.4	42.3	31.4	60.6	66	6/18	32	0	12.0
SRG	---	---	31.4	60.8	68	6/20	31	0	12.2
Bonneville	69.0	35.6	29.4	62.1	66	6/24	30	0	12.9
Weston	78.6	34.0	29.4	61.8	60	6/18	34	0	12.1
Lucin-CL	---	---	29.3	61.3	66	6/19	34	0	11.9
Curlew	93.8	41.6	29.1	60.8	63	6/20	30	0	11.6
UI Silver (W)	101.3	39.2	29.1	62.1	66	6/23	28	0	11.2
Yellowstone	99.1	43.5	28.9	60.7	69	6/19	28	0	11.5
LHS (W)	---	41.7	28.2	60.1	59	6/22	26	0	10.8
NuHorizon (W)	99.2	35.5	28.1	61.4	75	6/17	25	0	10.5
Deloris	98.6	45.9	27.8	61.6	61	6/22	32	0	11.5
Gary (W)	88.7	37.1	26.9	61.2	68	6/23	27	0	10.5
Boundary	87.8	40.8	26.8	59.2	66	6/20	26	0	10.3
Greenville	---	---	26.5	59.6	58	6/19	25	0	10.6
Juniper	84.7	40.1	26.1	61.1	63	6/18	36	0	12.3
DW	97.1	40.0	25.6	61.1	63	6/22	25	0	11.7
UICF Grace (W)	78.7	37.1	25.4	60.5	65	6/18	36	0	11.1
Norwest 553	---	---	24.5	60.9	59	6/21	23	0	12.2
Decade	---	42.2	24.4	60.8	65	6/20	26	0	11.3
IDO660 (W)	---	35.3	23.7	60.2	66	6/18	24	0	12.2
Moreland	93.9	35.4	23.2	58.8	63	6/19	25	0	11.4
Golden Spike (W)	94.5	35.6	23.1	60.2	63	6/25	27	0	11.1
UI Darwin (W)	85.5	36.0	22.4	62.5	73	6/21	29	0	12.4
Promontory	102.1	38.7	22.3	61.7	69	6/21	28	0	11.2
Garland	85.5	47.6	22.1	57.7	59	6/23	21	0	11.9
Average	90.5	39.0	26.6	60.8	65	6/20	29	0	11.5
LSD (a=.05)	8.6	7.3	5.5	0.9	11.4	3.1	3.1	0	
CV %	6.7	13.2	14.7	1.0	12.5	1.3	7.6	.	
Pr >F	<.0001	<.0001	0.0117	<.0001	0.3619	<.0001	<.0001	.	

(W) = White

*Preston Data

Table 30. Agronomic data for winter wheat at Kimberly, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand%**	**Date**	**(in.)**	**(%)**	**(%)**
Soft White Winter Wheat									
SY Ovation	---	---	155.7	59.9	99	6/17	36	0	11.1
96-16702	---	---	152.5	60.5	98	6/15	40	2	10.8
Bruneau	146.5	148.1	149.2	59.1	96	6/21	38	18	9.9
WB-Junction	---	130.0	147.0	59.6	99	6/13	36	41	11.8
00-475-2DH	149.7	135.8	141.9	60.3	97	6/21	36	33	10.8
Simon	139.2	137.2	141.9	59.4	98	6/18	37	0	10.5
Agripro Salute	140.1	141.2	139.0	58.3	97	6/17	38	0	10.9
BZ6W02-647AA	---	---	138.7	58.7	97	6/15	34	24	11.0
AP Badger	---	134.0	137.2	56.1	97	6/19	32	0	12.1
IDO663	---	134.3	136.1	58.7	98	6/16	37	1	11.3
WB 456	132.1	123.4	134.7	60.0	95	6/14	31	0	14.4
Skiles	135.2	119.8	134.3	58.4	96	6/19	33	1	12.0
UICF Lambert	140.2	137.9	133.2	57.4	99	6/17	39	5	12.7
WB 528	141.0	137.6	132.5	58.2	98	6/15	35	19	12.3
Bitterroot	142.4	138.3	131.4	57.6	97	6/21	38	28	10.9
Stephens	131.8	126.7	129.6	58.0	96	6/21	37	49	11.9
Agripro Legion	151.7	149.2	127.8	55.0	98	6/20	39	60	11.9
Madsen	140.8	130.0	127.8	57.5	95	6/21	36	11	13.8
Lambert	146.3	145.2	126.3	57.5	99	6/15	39	3	12.0
ORCF-102	146.1	131.8	126.3	57.0	98	6/20	38	21	12.5
Coda*	139.8	119.1	125.2	59.3	97	6/22	38	78	13.5
Brundage 96	136.9	133.9	123.8	57.6	98	6/17	35	0	11.8
Goetze	133.1	123.8	123.1	57.5	88	6/13	33	0	10.5
ORCF-101	133.2	122.4	120.2	57.4	96	6/20	35	0	12.5
WA8092	---	---	112.2	54.9	98	6/23	38	86	13.6
UICF Brundage	131.3	128.1	110.4	56.2	94	6/20	33	0	14.1
AP Legacy	---	134.0	108.5	54.1	98	6/21	39	0	12.2
Brundage	144.2	135.0	102.0	57.6	96	6/14	35	0	12.4
ID98-19010A	---	135.4	93.3	55.5	97	6/16	34	4	11.0
Average	138.9	132.9	129.0	57.8	97	6/18	36	16	11.9
LSD (α=.05)	8.0	11.1	19.0	2.2	5	1.3	1.6	28.3	
CV %	11.9	5.9	10.5	2.7	4	0.5	3.1	125.4	
Pr > F	0.0034	<.0001	<.0001	<.0001	0.0686	<.0001	<.0001	<.0001	

* = Club Wheat

Table 31. Agronomic data for winter wheat at Rupert, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand%**	**Date**	**(in.)**	**(%)**	**(%)**
Soft White Winter Wheat									
96-16702	---	---	120.5	58.4	75	6/15	34	0	10.0
ORCF-102	130.6	114.4	116.2	60.8	100	6/16	33	0	8.5
WA8092	---	---	115.4	61.3	100	6/20	35	0	8.8
Bitterroot	125.2	110.7	109.4	59.1	75	6/18	31	0	9.8
UICF Brundage	115.3	120.1	109.3	61.2	100	6/14	29	0	8.9
Agripro Legion	130.1	109.6	107.8	58.8	99	6/15	34	0	8.5
00-475-2DH	113.3	123.4	107.1	58.0	99	6/15	32	0	9.4
UICF Lambert	123.5	129.2	106.7	61.3	93	6/14	36	0	10.3
Stephens	112.2	110.4	106.4	61.0	100	6/16	34	0	8.4
WB-Junction	---	117.3	104.2	59.9	100	6/11	31	0	11.0
ORCF-101	121.5	125.3	102.1	60.8	75	6/15	30	0	10.0
Brundage 96	124.0	128.9	100.2	59.4	99	6/14	31	0	9.1
Coda*	123.4	94.4	100.2	60.0	97	6/17	34	0	9.8
AP Legacy	---	126.3	99.5	58.9	99	6/16	34	0	9.6
Simon	120.6	127.8	99.5	60.9	100	6/14	33	0	10.1
Bruneau	126.5	115.5	98.4	59.6	98	6/16	31	0	8.6
WB 528	111.8	128.5	96.9	61.9	99	6/13	31	0	9.4
Madsen	122.7	120.2	96.6	60.7	99	6/16	30	0	9.2
Brundage	133.0	141.6	95.8	59.2	100	6/12	29	0	10.3
BZ6W02-647AA	---	---	95.5	59.7	100	6/12	30	0	10.4
SY Ovation	---	---	94.7	58.4	100	6/14	34	0	11.3
Agripro Salute	131.4	124.2	94.4	58.8	75	6/15	34	0	10.9
WB 456	132.6	131.8	92.9	61.6	100	6/9	29	0	10.2
AP Badger	---	136.1	92.6	58.9	99	6/15	30	0	9.8
Goetze	127.2	105.3	92.4	60.2	73	6/12	28	0	9.0
ID98-19010A	---	130.3	91.8	60.3	99	6/14	30	0	10.0
IDO663	---	115.5	91.8	60.5	100	6/13	30	0	11.1
Lambert	132.1	117.6	90.4	60.5	85	6/13	35	0	10.4
Skiles	115.9	126.7	89.5	61.0	75	6/15	32	0	10.5
Average	122.4	121.0	100.6	60.1	94	6/14	32	0	9.8
LSD (α=.05)	20.3	13.6	13.9	0.7	27.9	1.2	2.1	0.0	
CV %	11.8	8.0	9.5	0.8	21.2	0.5	4.6	.	
Pr > F	0.3813	<.0001	0.0004	<.0001	0.4452	<.0001	<.0001	.	

* = Club Wheat

Table 32. Agronomic data for winter wheat at Aberdeen, irrigated, 2011.

	Yield (bu/A)						test of simple effects	Test Wt.		test of simple effects					
Variety	2009	2010	sprayed 2011	unsprayed 2011	bushel loss	yield loss	Pr > F	sprayed (lb/bu)	unsprayed	Pr > F	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Soft White Winter Wheat															
SY Ovation	---	---	178.8	153.8	25	14%	0.0313	61.5	60.9	0.7355	95	6/18	43	39	11.0
WB-Junction	---	138.6	175.6	146.0	30	17%	0.0112	60.6	59.5	0.4999	94	6/16	40	60	12.0
Skiles	113.0	156.1	169.4	155.3	14	8%	0.2195	61.6	61.1	0.7355	91	6/18	40	1	11.9
WA8092	---	---	169.4	143.6	26	15%	0.0266	53.2	54.9	0.2985	94	6/23	40	86	13.2
Bitterroot	131.3	144.4	169.4	121.8	48	28%	<.0001	61.0	60.4	0.6898	93	6/19	45	26	10.9
Simon	129.8	143.2	168.6	120.2	48	29%	<.0001	59.9	61.6	0.2985	94	6/19	44	6	12.4
WB 528	134.1	139.3	167.1	99.1	68	41%	<.0001	61.6	59.8	0.2712	94	6/16	42	39	11.7
Agripro Salute	111.9	146.4	163.9	129.6	34	21%	0.0036	61.5	60.1	0.3746	93	6/18	45	29	12.0
Brundage 96	128.0	131.9	160.0	122.6	37	23%	0.0016	61.3	59.5	0.2712	94	6/17	41	0	10.8
BZ6W02-647AA	---	---	160.0	87.4	73	45%	<.0001	61.2	59.1	0.2001	95	6/16	41	30	10.7
96-16702	---	---	158.5	145.2	13	8%	0.2459	62.9	62.6	0.8538	94	6/17	43	15	11.2
Bruneau	125.6	139.3	157.7	128.0	30	19%	0.0112	61.2	59.7	0.3584	90	6/18	41	30	10.4
Goetze	114.3	144.0	156.9	79.6	77	49%	<.0001	59.8	54.9	0.0037	89	6/15	38	0	11.7
WB 456	106.8	139.7	156.1	140.5	16	10%	0.1732	61.6	61.2	0.8059	94	6/17	43	13	11.7
Stephens	123.5	125.3	156.1	131.1	25	16%	0.0313	59.5	59.4	0.9266	91	6/19	45	58	11.9
Agripro Legion	117.9	130.0	154.6	128.8	26	17%	0.0266	59.0	56.7	0.1612	91	6/17	43	86	10.7
Madsen	126.1	140.5	152.2	141.3	11	7%	0.3384	58.9	59.4	0.7822	89	6/19	41	21	12.2
UICF Brundage	127.2	141.7	151.4	104.6	47	31%	0.0001	59.9	59.0	0.5599	94	6/17	40	6	11.8
AP Legacy	---	144.4	151.4	52.3	99	65%	<.0001	60.9	56.0	0.0034	93	6/20	45	13	11.4
ORCF-102	122.0	140.9	149.1	104.6	44	30%	0.0002	61.5	58.3	0.0531	91	6/17	43	0	11.5
Lambert	126.2	129.6	148.3	74.9	73	49%	<.0001	61.5	60.6	0.6019	95	6/17	45	0	12.3
UICF Lambert	118.9	128.8	146.8	97.6	49	34%	<.0001	60.8	60.2	0.7355	94	6/17	44	0	12.5
ORCF-101	130.4	155.7	146.0	126.5	20	13%	0.0901	59.7	60.5	0.6019	88	6/16	42	0	12.0
00-475-2DH	116.3	133.1	146.0	93.7	52	36%	<.0001	63.2	61.5	0.2985	91	6/17	41	13	10.9
Brundage	110.4	146.4	139.0	44.5	94	68%	<.0001	61.9	55.3	0.0001	95	6/17	40	0	11.2
IDO663	---	---	130.4	127.2	3	2%	0.7837	59.7	59.8	0.9510	94	6/17	41	1	11.6
AP Badger	---	153.4	129.6	106.9	23	17%	0.0502	60.2	59.7	0.7355	95	6/16	38	0	11.2
ID98-19010A	---	144.4	129.6	27.3	102	79%	<.0001	60.9	54.5	0.0023	93	6/17	39	1	10.5
Coda*	133.6	130.4	128.0	130.4	-2	-2%	0.8368	60.8	60.1	0.6673	90	6/19	42	59	12.7
Average	122.0	140.0	154.1	110.3	44	28%		60.6	59.0		93	6/17	42	21	11.6
LSD (α=.05)	18.2	13.6	---	---				---	---		3.8	3.2	2.8	27.9	
CV %	10.5	6.9	8.6					2.7			2.9	1.3	4.8	94.6	
Pr > F ‡	0.0995	0.0001	<.0001					0.0224			0.0018	0.0297	<.0001	<.0001	

* = Club Wheat

‡Pr>F values for 2009-10 are for the varieties; for 2011 yield and test wt it is for the spray*variety interaction.

Table 33. Agronomic data for winter wheat at Ririe, dryland, 2011.

Variety	Yield (bu/A) 2009	2010	2011	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Soft White Winter Wheat									
Agripro Legion	47.4	23.6	13.1	58.9	63	6/28	21	0	8.8
96-16702	---	---	12.0	60.6	70	6/27	21	0	8.8
Agripro Salute	46.6	22.1	12.0	58.4	63	6/28	21	0	8.2
Simon	47.4	23.2	12.0	57.2	70	6/28	20	0	9.1
WB 528	44.1	23.2	11.6	60.0	78	6/27	21	0	8.6
ORCF-102	47.4	28.3	11.3	60.2	63	6/28	21	0	9.9
AP Badger	---	29.8	10.9	58.0	65	6/29	19	0	8.4
Coda*	52.9	33.4	10.5	61.0	68	6/30	19	0	10.0
Skiles	38.1	22.1	10.5	60.8	68	6/28	21	0	9.9
Brundage 96	40.8	24.3	9.8	57.8	68	6/28	21	0	8.8
SY Ovation	---	---	9.4	58.7	53	6/29	20	0	9.6
AP Legacy	---	26.5	9.4	59.3	70	6/30	22	0	10.7
BZ6W02-647AA	---	---	9.4	57.5	65	6/27	20	0	8.3
ORCF-101	43.2	28.0	9.4	56.4	58	6/29	21	0	8.5
Lambert	34.6	24.0	9.1	59.5	50	6/28	21	0	8.9
UICF Brundage	45.5	29.4	9.1	59.1	60	6/28	20	0	8.7
WA8092	---	---	9.1	58.5	68	7/2	20	0	9.9
Brundage	32.5	20.3	8.7	59.9	65	6/27	19	0	9.2
Bruneau	45.2	24.7	8.3	58.5	60	6/29	19	0	8.9
WB-Junction	---	16.7	8.0	58.0	70	6/27	20	0	8.8
UICF Lambert	42.5	25.8	8.0	58.1	60	6/28	21	0	8.8
WB 456	38.0	19.2	8.0	59.4	73	6/28	21	0	9.3
00-475-2DH	50.5	30.9	7.6	60.0	65	6/30	19	0	10.6
Bitterroot	51.3	28.7	7.6	60.5	73	6/30	20	0	10.8
IDO663	---	28.0	7.6	58.0	70	6/27	19	0	8.8
Madsen	47.7	23.2	7.6	56.2	55	6/29	21	0	9.3
Stephens	44.5	30.5	7.6	60.5	73	6/29	19	0	9.4
ID98-19010A	---	26.5	6.9	58.5	65	6/27	20	0	8.8
Goetze	45.7	24.3	6.5	60.7	55	6/28	20	0	9.0
Average	45.0	25.2	9.3	59.0	65	6/28	20	0	9.2
LSD (α=.05)	8.8	6.0	4.2	2.8	19.8	2.0	2.5	0	
CV %	13.9	16.8	32.4	3.2	21.8	0.8	8.9	.	
Pr > F	0.0014	<.0001	0.1428	0.0	0.6509	0.001	0.4139	.	

* = Club Wheat

Table 34. Agronomic data for winter wheat at Soda Springs, dryland, 2011.

Variety	Yield (bu/A) 2011	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Juniper	78.4	62.0	70	7/3	43	0	12.7
Lucin-CL	77.9	60.7	57	7/4	40	0	11.9
Bitterroot	76.0	58.3	60	7/5	32	0	11.2
DW	75.0	60.1	78	7/3	31	0	11.3
LHS	75.0	59.3	77	7/4	34	0	10.7
WB 528	74.1	58.4	53	7/2	31	0	10.5
UI Silver	73.6	61.0	60	7/3	34	0	10.4
Golden Spike	72.1	57.0	70	7/3	33	0	10.6
UICF Grace	69.7	59.2	77	7/2	43	0	11.4
Decade	68.7	58.7	63	7/2	33	0	11.7
UI Darwin	68.7	62.1	67	7/3	38	0	11.4
UICF Brundage	66.3	56.5	57	7/4	32	0	11.0
ORCF102	64.4	56.8	50	7/4	27	0	12.4
Gary	62.0	58.7	57	7/4	34	0	10.6
Garland	54.7	54.5	30	7/4	25	0	13.2
Average	70.4	58.9	62	7/3	34	0	11.4
LSD (α=.05)	17.9	2.1	17.4	1.3	5.1	0.0	
CV %	15.2	2.2	16.9	0.4	9.0	.	
Pr > F	0.3857	<.0001	0.0005	<.0001	<.0001	.	

Table 35. Agronomic data for winter barley at Rupert, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
Sunstar Pride	178.2	158.4	172.4	49.1	99	6/15	32	0	10.3	78.9	13.6	7.0
UTWB9703-19	---	---	153.4	48.4	99	6/11	33	0	10.4	83.6	10.6	5.1
94Ab1777	157.7	161.1	151.6	48.5	100	6/6	35	0	12.2	75.4	17.0	6.6
Sprinter	158.6	154.9	145.7	47.4	100	6/5	29	0	11.4	83.2	10.7	5.7
02Ab2732	160.5	152.5	145.2	48.7	95	6/12	33	0	10.7	89.5	6.7	3.3
02Ab2739	166.6	138.9	145.2	48.0	99	6/9	35	0	11.4	84.3	11.0	4.4
Eight-Twelve	166.6	163.8	144.3	48.8	100	6/4	31	0	10.7	84.5	10.9	4.3
Schuyler	136.3	162.1	144.3	50.0	99	6/8	36	0	11.0	70.6	22.4	7.0
Strider	137.5	138.9	141.6	46.4	100	6/5	30	0	11.2	76.2	11.8	11.2
Alba	145.4	169.7	141.1	50.0	100	6/6	32	0	11.4	89.1	7.0	3.3
93Ab669	170.5	151.6	139.3	49.8	97	6/6	32	0	11.0	89.7	7.4	2.2
OR91	---	167.4	134.9	47.4	86	6/6	31	0	13.3	90.5	6.2	2.9
OR818	---	117.5	133.9	48.1	98	6/6	32	0	14.0	94.0	4.4	1.1
02Ab2701	166.3	156.1	129.8	46.3	100	6/5	34	0	11.3	69.6	15.2	14.7
02Ab339	157.9	173.8	127.1	50.1	100	6/8	33	0	11.0	71.9	20.5	7.1
OR92	---	154.7	123.4	48.2	86	6/7	32	0	13.5	96.7	2.3	0.7
Maja	132.7	156.1	123.0	50.3	96	6/6	32	0	12.0	92.0	5.8	1.8
Streaker*	---	141.6	120.7	54.7	91	6/4	31	0	11.7	52.9	32.6	14.2
Endeavor	148.6	92.6	119.3	52.3	89	6/10	34	0	11.8	89.6	6.0	3.8
OR816	---	139.2	115.3	48.4	97	6/7	36	0	11.9	85.2	8.4	5.9
Mathias	120.9	151.3	114.4	49.1	99	5/31	31	0	12.5	84.9	9.7	4.9
Charles	156.3	103.5	113.4	50.3	99	6/6	30	0	11.7	81.5	7.4	10.6
Kold	---	---	112.1	48.9	99	6/9	30	0	10.9	80.3	14.5	4.4
Kamiak	---	165.8	106.6	47.6	100	6/1	31	0	11.6	62.8	20.7	16.4
Average	153.3	147.1	133.2	49.0	97	6/7	32	0	11.9	81.5	11.8	6.2
LSD (α=.05)	20.7	32.6	26.0	1.7	8.1	2.0	2.6	0				
CV %	12.0	14.9	13.7	2.4	5.9	0.9	5.6	.				
Pr > F	0.0008	0.0019	0.0002	<.0001	0.0031	<.0001	<.0001	.				

*indicates hulless variety

Table 36. Agronomic data for winter barley at Aberdeen, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	2009	2010	2011	(lb/bu)	Stand %	Date	(in.)	(%)	(%)	(>6/64)	(>5.5/64)	% Thin
OR92	---	184.9	200.0	48.9	94	6/5	42	1	14.6	88.0	9.3	2.7
Sprinter	155.2	134.7	193.7	49.5	93	6/7	42	55	13.9	85.3	10.1	4.9
OR91	---	178.6	186.9	48.8	79	6/4	42	8	14.1	77.8	15.0	7.2
Mathias	121.5	137.6	180.0	51.5	95	6/2	47	0	14.2	92.3	5.3	2.4
OR818	---	196.1	179.6	48.1	95	6/5	43	21	13.7	76.4	16.0	7.6
Charles	134.7	142.0	177.1	50.5	93	6/5	41	69	14.7	85.8	7.9	6.3
OR816	---	156.6	176.6	47.9	90	6/7	47	49	13.4	58.2	22.1	19.7
93Ab669	175.7	186.4	173.7	47.4	86	6/6	41	58	12.8	46.9	28.0	25.1
Eight-Twelve	157.6	143.0	173.2	48.7	91	6/7	40	24	13.3	72.6	16.8	10.6
02Ab2732	157.6	201.7	171.3	48.5	93	6/10	42	63	13.3	72.5	14.4	13.1
Endeavor	143.4	154.7	170.8	50.1	84	6/9	41	76	14.1	76.3	12.9	10.8
Strider	173.0	182.0	169.8	47.6	91	6/6	39	67	12.7	56.4	23.7	19.9
94Ab1777	161.0	189.3	163.9	47.0	91	6/7	43	33	14.2	25.7	27.9	46.4
Alba	146.9	132.7	159.5	49.8	94	6/8	43	34	13.4	79.6	15.1	5.3
Kold	---	169.8	157.1	47.0	93	6/9	41	53	14.1	50.9	27.1	22.1
Sunstar Pride	190.0	172.2	157.1	46.9	91	6/17	39	65	12.3	41.8	23.3	34.9
Maja	143.9	171.7	155.2	47.9	90	6/6	43	44	13.4	42.5	19.0	38.5
02Ab2701	172.2	154.7	146.9	48.1	91	6/3	47	54	12.8	58.6	23.6	17.8
Schuyler	153.7	131.7	146.4	49.9	94	6/10	42	49	14.6	53.1	27.2	19.7
Kamiak	---	113.2	144.9	49.5	94	6/2	41	78	13.7	77.8	14.9	7.3
02Ab339	105.9	116.1	144.4	49.6	91	6/13	42	61	13.8	46.5	29.4	24.1
02Ab2739	154.18	189.79	141.5	46.0	84	6/10	39	86	12.5	48.6	24.1	27.3
Streaker*	---	147.8	141.5	53.1	78	6/2	42	74	13.4	35.7	32.0	32.3
UTWB9703-19	---	---	129.8	48.0	90	6/9	44	70	12.3	50.5	27.6	21.9
Average	153.1	157.7	164.2	48.8	90	6/7	42	50	13.6	62.5	19.7	17.8
LSD (α=.05)	20.6	39.4	35.8	2.2	12.3	1.6	2.8	35.1				
CV %	9.4	17.6	15.4	3.1	9.7	0.7	4.8	50.2				
Pr > F	<.0001	<.0001	0.0119	<.0001	0.2996	<.0001	<.0001	<.0001				

*indicates hulless variety

Table 37. Agronomic data for winter barley at Ririe, dryland, 2011.

Variety	Spring Stand%	Heading Date	Height (in)	Lodging (%)
Kamiak	60	6/24	11	0
02Ab2701	60	6/26	13	0
02Ab2732	50	6/27	10	0
Mathias	50	6/28	10	0
Alba	70	6/26	9	0
Sunstar Pride	50	6/27	9	0
UTWB9703-19	50	6/30	12	0
02Ab339	70	6/26	11	0
93Ab669	70	6/24	11	0
94Ab1777	40	6/28	14	0
Kold	60	6/30	9	0
Maja	60	6/22	12	0
Strider	60	6/27	13	0
OR816	60	6/22	12	0
OR92	60	6/24	11	0
Sprinter	60	6/27	7	0
Charles	60	6/28	8	0
Streaker*	60	6/28	8	0
02Ab2739	70	6/29	15	0
Endeavor	50	6/29	7	0
OR91	40	6/27	11	0
Schuyler	60	6/25	9	0
Eight-Twelve	70	6/28	17	0
OR818	50	6/26	6	0
Average	57.9	6/26	10.6	0.0

*indicates hulless variety

† Only one replication was planted in Ririe.

‡ yield, test weight, protein, and plump data are omitted due to a high level of contamination from volunteer wheat in all plots

Table 38. Agronomic data for spring wheat at Rupert, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand%**	**Date**	**(in)**	**(%)**	**(%)**
Hard Spring Wheat									
WA8123 (W)	---	---	109.3	62.7	100	6/27	34	0	13.2
Choteau	104.5	104.5	101.6	61.4	99	6/29	36	0	14.6
Cabernet	101.6	114.7	99.8	62.0	100	6/27	28	0	13.5
Otis (W)	124.1	116.5	99.5	60.1	100	6/29	40	4	12.4
Volt	---	101.3	97.6	63.3	100	6/29	34	0	13.2
Malbec	99.5	109.3	96.6	62.4	100	6/25	31	0	14.3
Snow Crest (W)	97.6	108.5	95.5	61.8	100	6/25	29	0	14.2
Albany	---	---	95.1	61.3	100	6/29	33	21	12.9
Blanca Grande (W)	99.5	114.3	95.1	63.5	100	6/25	30	0	13.3
WB Idamax (W)	102.0	118.0	94.4	61.1	100	6/27	31	0	13.4
Buck Pronto	---	---	93.3	61.6	100	6/25	35	0	15.3
Iona	115.4	111.8	92.9	61.0	100	6/28	38	28	14.3
Jefferson	104.2	110.4	92.6	60.8	100	6/29	35	23	13.6
Klasic (W)	106.0	100.6	92.2	61.7	100	6/24	26	23	13.8
Bullseye	114.7	112.2	91.5	62.5	100	6/28	30	18	13.9
UI Winchester	98.7	108.5	91.1	62.1	100	6/27	32	15	13.8
WB-Paloma (W)	103.8	112.2	91.1	61.9	100	6/27	30	0	14.0
10F x Inc1	---	---	90.8	62.5	100	6/29	36	38	14.2
IDO 702	---	109.3	90.0	60.1	100	6/28	35	21	13.0
Jerome	124.5	113.6	89.3	59.4	100	6/27	34	0	12.9
WB-Rockland	---	94.0	88.6	61.6	100	6/26	27	0	13.9
Kelse	104.9	103.8	88.2	60.2	100	6/29	38	0	14.3
WB Fuzion	110.7	111.1	87.5	60.9	100	6/26	37	0	13.9
SY Capstone (W)	102.4	107.1	87.1	60.7	100	6/25	30	0	13.5
Pristine (W)	105.3	111.4	84.2	61.8	100	6/26	34	3	13.6
Cerere	---	---	82.8	57.1	100	7/4	33	0	11.9
Lolo (W)	125.6	125.6	72.6	58.4	100	6/29	35	21	12.2
Lochsa (W)	112.5	112.2	66.4	56.7	100	6/28	32	0	14.1
WestBred 936	105.6	110.7	46.5	49.8	100	6/28	31	0	14.8
Durum Wheat									
Kronos	106.4	119.1	106.4	61.4	100	6/25	30	0	14.5
Utopia	105.3	112.2	105.6	59.1	100	6/28	30	3	13.6
Alzada	105.6	107.4	104.5	61.7	100	6/26	34	24	14.4
Average	107.2	110.6	91.5	60.7	100	6/27	32	7	13.7
LSD (α=.05)	10.0	9.6	12.5	2.1	0.7	1.2	2.8	27.1	
CV %	6.7	6.1	9.7	2.5	0.5	0.5	6.1	262.9	
Pr > F	<.0001	<.0001	<.0001	<.0001	0.5702	<.0001	<.0001	0.1653	

(W) = White

Table 39. Agronomic data for spring wheat at Aberdeen, irrigated, 2011.

	Yield (bu/A)						test of simple effects						
Variety	2009	2010	sprayed 2011	unsprayed 2011	bushel loss	yield loss	Pr > F	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in.)	Lodging (%)	Protein (%)
Hard Spring Wheat													
Cerere	---	---	132.7	68.7	64.0	48%	<.0001	58.9	74	7/4	33	0	11.6
Malbec	126.4	127.6	121.0	95.2	25.8	21%	0.0310	61.7	80	6/25	32	0	13.9
Kelse	114.8	122.2	117.9	60.1	57.8	49%	<.0001	59.9	75	6/28	34	0	15.3
Otis (W)	140.2	125.7	116.3	65.6	50.7	44%	<.0001	60.9	69	6/30	36	0	12.9
Volt	---	123.3	115.5	75.7	39.8	34%	0.0011	62.5	73	6/29	31	0	14.2
Bullseye	128.1	128.8	114.8	65.6	49.2	43%	<.0001	62.3	76	6/28	30	0	13.9
Choteau	123.6	133.9	114.8	64.8	50.0	44%	<.0001	60.7	73	6/29	32	0	14.5
Jerome	126.9	124.5	110.1	65.6	44.5	40%	0.0003	60.3	85	6/26	33	0	13.1
SY Capstone (W)	110.2	123.3	109.3	53.9	55.4	51%	<.0001	60.3	75	6/26	30	0	13.1
WA8123 (W)	---	---	107.7	73.4	34.3	32%	0.0045	59.0	80	6/27	32	0	13.8
Cabernet	120.7	121.8	104.6	70.3	34.3	33%	0.0045	60.6	74	6/26	26	0	13.4
Buck Pronto	---	---	103.0	82.0	21.1	20%	0.0758	59.6	83	6/25	33	0	15.3
WB-Idamax (W)	111.4	126.5	101.5	55.4	46.1	45%	0.0002	59.1	61	6/26	32	0	14.4
WB-Fuzion	123.5	116.7	99.9	48.4	51.5	52%	<.0001	59.3	79	6/26	33	0	14.7
UI Winchester	120.8	119.4	97.6	76.5	21.1	22%	0.0758	58.9	84	6/27	33	0	14.7
Blanca Grande (W)	114.9	121.0	96.8	71.0	25.8	27%	0.0310	61.9	75	6/25	29	0	13.8
Jefferson	128.4	115.5	96.8	57.8	39.0	40%	0.0014	59.5	78	6/27	31	0	14.5
WB-Paloma (W)	119.1	119.0	96.8	57.0	39.8	41%	0.0011	60.9	68	6/26	28	0	13.6
IDO 702	---	118.3	96.8	42.9	53.9	56%	<.0001	59.1	71	6/27	32	0	14.0
Lolo (W)	132.9	138.2	94.5	45.3	49.2	52%	<.0001	59.8	79	6/28	34	0	12.3
Iona	118.9	107.7	92.1	74.2	18.0	19%	0.1291	60.0	79	6/28	34	0	13.9
Albany	---	---	92.1	54.6	37.5	41%	0.0021	59.7	73	6/29	32	0	12.7
10F x Inc1	---	---	91.3	70.3	21.1	23%	0.0758	61.0	83	6/27	32	0	12.9
Klasic (W)	116.0	111.2	90.6	50.7	39.8	44%	0.0011	57.8	80	6/25	24	0	14.2
Lochsa (W)	128.4	114.4	89.0	35.1	53.9	61%	<.0001	53.8	86	6/28	33	0	14.2
WB-Rockland	---	110.1	85.1	62.5	22.6	27%	0.0570	60.9	74	6/26	26	0	15.6
Westbred 936	115.3	119.0	85.1	23.4	61.7	72%	<.0001	55.1	76	6/27	31	0	10.5
Snow Crest (W)	111.7	119.8	79.6	53.1	26.5	33%	0.0264	58.4	73	6/25	26	0	13.9
Pristine (W)	113.6	113.2	77.3	53.9	23.4	30%	0.0492	62.5	66	6/27	30	0	13.8
Durum Wheat													
Kronos	103.9	118.7	122.6	83.5	39.0	32%	0.0014	60.4	81	6/25	31	0	14.0
Alzada	119.8	125.3	113.2	71.8	41.4	37%	0.0007	61.3	70	6/27	29	0	15.0
Utopia	108.2	124.5	97.6	65.6	32.0	33%	0.0079	60.1	70	6/28	28	0	14.6
Average	119.5	121.1	102.2	63.0	39.2	38%		59.9	76	6/27	31	0	13.8
LSD (α=.05)	10.0	14.4	---	---				2.2	12.1	1.2	3.0	0.0	2.0
CV %	6.0	8.5	14.1					2.5	11.4	0.5	7.0	.	10.2
Pr > F*	<.0001	0.0210	0.1887					<.0001	0.0178	<.0001	<.0001	.	0.0015

(W) = White

*Pr>F values for 2009-10 are for the varieties; for 2011 it is for the spray*variety interaction

Table 40. Agronomic data for spring wheat, Idaho Falls, irrigated, 2011.

Variety	Yield (bu/A) 2009	2010	2011	Test Wt. (lb/bu)	Spring Stand%	Heading Date	Height (in)	Lodging (%)	Protein (%)
Hard Spring Wheat									
Otis (W)	141.3	143.4	142.0	60.4	100	7/6	41	1	12.0
Lolo (W)	150.8	145.9	141.4	58.2	100	7/6	38	0	12.4
WA8123 (W)	---	---	137.6	61.7	100	7/4	34	0	12.4
Jerome	125.3	125.2	136.5	59.3	100	7/4	34	0	12.1
IDO 702	---	132.1	135.2	60.1	100	7/6	37	15	12.6
WB-Paloma	118.0	124.5	131.5	61.3	100	7/4	31	0	12.6
Jefferson	131.2	130.3	129.8	60.8	100	7/6	36	18	12.1
Cerere	---	---	129.7	57.9	100	7/8	35	0	11.3
WB-Idamax	128.1	127.8	128.3	60.3	100	7/5	32	0	12.3
Albany	---	---	127.2	63.4	100	7/6	34	13	11.7
Malbec	112.3	120.9	126.0	62.5	100	7/3	31	0	12.4
Choteau	117.1	119.4	125.6	62.3	100	7/5	34	0	13.3
Bullseye	120.9	131.4	125.1	61.5	100	7/6	33	18	13.3
WB-Fuzion	122.2	120.2	124.5	61.6	100	7/4	38	0	13.5
Volt	---	123.1	124.4	62.5	100	7/6	34	0	12.9
UI Winchester	122.4	120.5	122.1	62.0	100	7/5	35	35	12.3
Pristine (W)	123.3	129.2	121.6	59.8	100	7/3	33	0	13.5
Lochsa (W)	130.4	125.2	120.9	60.1	100	7/6	34	0	12.4
Klasic (W)	102.0	109.3	119.8	63.0	100	7/1	27	0	12.6
Iona	126.3	126.3	119.6	60.4	100	7/5	38	30	14.3
SY Capstone (W)	112.3	125.2	118.7	62.2	100	7/3	31	1	12.0
Kelse	115.4	110.7	118.6	61.3	100	7/6	38	0	14.2
Buck Pronto	---	---	115.4	61.3	100	7/2	34	3	13.9
10F x Inc1	---	---	115.1	64.0	100	7/5	35	16	13.2
Cabernet	114.2	114.7	114.7	62.7	100	7/3	28	8	11.9
Snow Crest (W)	111.2	111.8	114.0	63.0	100	7/1	30	0	12.2
Blanca Grande (W)	117.2	115.1	112.2	63.9	100	7/2	30	0	12.0
WestBred 936	126.0	116.5	111.3	58.9	100	7/5	33	0	12.2
WB-Rockland	---	94.7	98.0	62.6	100	7/3	26	0	13.6
Durum Wheat									
Kronos	110.5	123.4	143.6	62.1	100	7/1	32	0	13.0
Alzada	114.4	118.3	134.9	62.6	100	7/2	34	0	12.4
Utopia	109.1	119.8	131.8	60.8	100	7/4	32	0	12.8
Average	120.9	123.2	125.2	61.4	100	7/4	33	5	12.7
LSD (α=.05)	10.7	8.7	9.5	1.1	0	0.6	1.8	14.6	
CV %	6.2	5.0	5.4	1.3	0	0.2	3.9	219.7	
Pr > F	<.0001	<.0001	<.0001	<.0001	.	<.0001	<.0001	<.0001	

(W) = White

Table 41. Agronomic data for spring wheat at Ashton, irrigated, 2011.

Variety	Yield (bu/A) 2009	2010	2011	Test Wt. (lb/bu)	Spring Stand %	Heading Date	Height (in)	Lodging (%)	Protein (%)
Hard Spring Wheat									
WB-Idamax (W)	94.4	55.9	112.4	54.3	100	7/29	30	0	11.3
Lolo (W)	98.7	61.3	108.5	56.2	100	7/31	35	0	10.7
UI Winchester	89.7	53.0	107.0	55.7	100	7/28	32	0	12.0
Jerome	92.2	59.9	102.7	54.6	100	7/27	32	0	12.9
SY Capstone (W)	94.4	51.5	101.1	55.7	100	7/25	28	0	11.6
Otis (W)	102.0	47.2	100.7	54.3	100	8/2	37	0	11.1
Iona	89.7	58.4	100.7	55.1	100	7/30	33	0	12.2
Jefferson	91.5	57.0	99.7	55.7	100	7/30	32	0	12.7
10F x Inc1	---	---	98.9	56.8	100	7/28	32	0	12.9
WA8123 (W)	---	---	98.1	54.5	100	7/28	32	0	12.1
Buck Pronto	---	---	97.6	55.9	100	7/27	32	0	13.3
Malbec	92.2	47.2	96.0	56.1	100	7/29	29	0	12.0
Cabernet	90.4	44.3	94.8	55.1	100	7/29	28	0	11.7
Kelse	77.0	54.8	94.6	55.3	100	7/30	33	0	13.8
WB-Paloma (W)	84.9	69.0	93.2	55.1	100	7/28	28	0	13.1
Albany	---	---	92.7	54.6	100	8/2	32	0	11.7
Lochsa (W)	89.3	55.5	91.7	53.9	100	7/29	33	0	12.4
Snow Crest (W)	74.1	47.2	91.1	55.4	100	7/26	27	0	12.7
IDO 702	---	50.1	91.0	54.5	100	7/31	33	0	13.5
Volt	---	53.7	90.7	54.9	100	8/3	31	0	12.3
Cerere	---	---	90.7	49.8	100	8/5	31	0	10.5
WB-Fuzion	74.8	46.5	89.9	56.1	100	7/27	33	0	13.2
Choteau	80.9	53.0	88.9	54.9	100	7/31	33	0	12.5
Bullseye	92.9	62.4	87.1	55.9	100	7/31	29	0	11.9
Blanca Grande (W)	73.7	48.3	84.5	57.3	100	7/25	26	0	11.7
WestBred 936	84.2	45.0	79.8	53.4	100	7/27	29	0	12.5
WB-Rockland	---	33.8	76.4	53.8	100	8/1	27	0	12.9
Pristine (W)	79.5	58.8	75.3	57.1	100	7/25	31	0	13.7
Klasic (W)	76.2	54.5	72.2	55.2	100	7/24	22	0	13.7
Durum Wheat									
Alzada	84.6	53.7	98.6	56.2	100	7/28	32	0	10.3
Utopia	97.3	61.0	96.6	54.7	100	7/30	29	0	11.5
Kronos	82.4	54.8	92.8	57.0	100	7/27	29	0	11.9
Average	86.9	53.6	94.2	55.2	100	7/29	30	0	12.3
LSD (α=.05)	11.5	9.8	14.0	1.5	0.4	1.2	2.0	0	
CV %	9.5	12.9	10.6	1.9	0.3	0.4	4.7	.	
Pr > F	<.0001	<.0001	<.0001	<.0001	0.5961	<.0001	<.0001	.	

(W) = White

Table 42. Agronomic data for spring wheat at Soda Springs, dryland, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in)**	**(%)**	**(%)**
Hard Spring Wheat									
Klasic (W)	57.4	30.9	44.6	59.5	100	7/14	20	0	13.4
Lolo (W)	88.3	35.9	44.6	60.8	100	7/17	26	0	13.1
Lochsa (W)	81.9	31.6	43.9	60.1	100	7/16	25	0	14.0
Otis (W)	92.7	43.2	43.6	60.6	100	7/17	26	0	13.0
Kelse	70.1	30.1	41.7	59.2	100	7/17	27	0	14.1
Iona	76.6	36.7	41.0	59.4	100	7/17	28	0	13.7
Jefferson	80.2	33.4	41.0	60.2	100	7/15	26	0	14.3
Pristine (W)	71.2	31.9	40.3	61.0	100	7/14	27	0	14.4
WA8123 (W)	---	---	37.0	58.9	100	7/14	23	0	12.8
Snow Crest (W)	67.2	30.9	36.3	58.1	100	7/14	24	0	14.6
Jerome	81.9	40.3	35.6	59.1	100	7/15	25	0	14.2
WB-Idamax (W)	80.6	33.4	35.6	58.7	100	7/15	22	0	13.5
UI Winchester	76.0	32.7	34.8	59.2	100	7/15	23	0	14.1
Blanca Grande (W)	69.3	31.6	34.8	60.0	100	7/14	23	0	14.2
WestBred 936	73.5	32.7	33.4	59.6	100	7/15	23	0	14.9
Cerere	---	---	32.3	55.7	100	7/21	21	0	13.5
Choteau	69.0	25.0	30.5	57.5	100	7/17	23	0	15.2
WB-Fuzion	63.2	33.0	30.5	59.3	100	7/14	28	0	14.5
Volt	---	27.6	25.0	60.2	100	7/18	24	0	13.4
Durum Wheat									
Kronos	63.7	26.5	38.5	59.7	100	7/14	21	0	14.2
Alzada	---	27.6	37.4	60.0	100	7/15	23	0	14.7
Utopia	64.3	31.6	33.8	58.9	100	7/16	22	0	15.3
Average	74.6	31.9	36.9	59.3	100	7/15	24	0	14.0
LSD (α=.05)	10.6	6.1	7.1	0.9	0.0	1.0	2.4	0	
CV %	10.2	13.5	13.6	1.0	0.0	0.3	7.2	.	
Pr > F	<.0001	<.0001	<.0001	<.0001	.	<.0001	<.0001	.	

Table 43. Agronomic data for spring wheat at Rupert, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand%**	**Date**	**(in)**	**(%)**	**(%)**
Soft White Spring Wheat									
IDO 687	---	116.9	123.4	62.8	100	6/30	41	0	10.4
IDO 686	---	121.3	116.5	61.8	100	6/30	40	10	10.9
Alturas	125.9	120.2	115.8	60.8	100	6/28	38	5	10.8
IDO 669	126.7	120.9	111.1	61.7	100	6/30	38	25	11.1
UI Whitmore	134.8	116.6	110.7	61.6	100	6/29	39	4	10.4
IDO 668	128.1	116.9	107.1	61.9	100	6/28	36	0	11.1
Babe	114.9	115.1	104.2	60.1	100	6/29	40	21	11.4
IDO 644	125.6	117.3	104.2	59.2	100	6/28	38	0	10.8
IDO 599	130.9	116.9	103.8	60.6	100	6/30	37	24	10.3
Penawawa	121.2	115.1	101.6	60.6	100	6/29	38	1	11.4
Alpowa	113.4	118.4	94.0	59.6	100	6/30	40	1	11.4
Whit	114.4	120.2	91.1	59.8	100	6/28	36	14	11.1
Cataldo	106.6	105.3	90.8	59.7	100	6/28	37	0	11.4
UI Pettit	124.9	118.7	88.2	60.4	100	6/26	32	0	9.6
Nick	110.8	114.7	82.8	58.1	100	6/29	36	0	10.7
JD *	---	108.2	80.2	61.0	100	7/2	42	60	12.4
Average	120.2	115.8	101.3	60.5	100	6/29	38	9	10.9
LSD (α=.05)	9.1	11.8	10.8	1.6	0.3	1.2	2.8	25.4	
CV %	5.4	7.1	7.5	1.9	0.2	0.5	5.2	191.0	
Pr > F	<.0001	0.1238	<.0001	<.0001	0.4736	<.0001	<.0001	0.0015	

*= club wheat

Table 44. Agronomic data for spring wheat at Aberdeen, irrigated, 2011.

	Yield (bu/A)						test of simple effects	Test Wt.	Spring	Heading	Height	Lodging	Protein
			sprayed	unsprayed	bushel	yield							
Variety	2009	2010	2011	2011	loss	loss	Pr > F	(lb/bu)	Stand %	Date	(in.)	(%)	(%)
Soft White Spring Wheat													
IDO 686	---	125.7	141.3	109.3	32.0	23%	0.0028	61.8	89	6/28	38	0	10.9
Alpowa	130.6	133.9	138.2	81.2	57.0	41%	<.0001	56.4	79	6/30	36	0	10.2
IDO 644	136.2	133.9	136.6	85.1	51.5	38%	<.0001	60.2	86	6/26	35	0	10.6
IDO 599	131.9	134.7	135.1	97.6	37.5	28%	0.0006	59.8	83	6/28	34	0	10.1
Whit	125.9	128.0	132.7	78.8	53.9	41%	<.0001	60.6	80	6/27	34	0	10.7
IDO 687	---	131.9	131.9	102.3	29.7	22%	0.0052	61.6	83	6/28	35	0	10.8
Babe	134.4	135.4	131.1	82.7	48.4	37%	<.0001	61.5	83	6/27	36	0	10.8
UI Pettit	123.0	126.5	130.4	61.7	68.7	53%	<.0001	59.9	84	6/26	30	0	9.8
Alturas	124.1	124.5	129.6	90.6	39.0	30%	0.0004	61.1	75	6/28	35	0	9.7
UI Whitmore	138.4	122.6	128.8	93.7	35.1	27%	0.0012	60.8	85	6/28	38	0	10.3
IDO 668	130.2	119.8	124.9	82.7	42.2	34%	0.0002	61.2	83	6/27	35	0	11.1
IDO 669	122.3	130.4	122.6	103.0	19.5	16%	0.0573	60.4	86	6/28	38	0	10.9
JD*	---	102.3	119.4	137.4	-18.0	-15%	0.0791	61.6	85	6/30	41	20	11.9
Penawawa	123.6	109.3	119.4	72.6	46.8	39%	<.0001	59.6	83	6/28	34	0	11.2
Nick	120.0	132.3	114.0	51.5	62.5	55%	<.0001	59.2	83	6/28	33	0	10.5
Cataldo	124.6	128.8	112.4	81.2	31.2	28%	0.0034	60.5	80	6/27	34	0	10.8
Average	128.0	125.2	126.8	87.3	39.6	31%		60.4	82	6/28	35	1	10.6
LSD (α=.05)	11.6	15.5	---	---				3.4	10.7	1.0	2.9	6.1	0.8
CV %	6.4	8.7	9.3					4.0	9.2	0.4	5.8	387.3	5.4
Pr > F‡	0.0307	0.0016	0.0005					0.3932	0.6549	<.0001	<.0001	<.0001	0.0004

*=club wheat

‡Pr>F values for 2009-10 are for the varieties; for 2011 it is for the spray*variety interaction

Table 45. Agronomic data for spring wheat, Idaho Falls, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in)**	**(%)**	**(%)**
Soft White Spring Wheat									
JD *	---	119.1	143.3	60.1	100	7/7	40	40	9.8
IDO 686	---	136.5	143.2	60.3	100	7/5	39	5	9.8
IDO 599	127.4	137.9	140.6	59.8	100	7/4	35	0	8.8
IDO 687	---	137.6	139.2	62.4	100	7/6	36	0	9.0
Alpowa	129.9	130.3	138.6	60.0	100	7/6	38	3	8.9
IDO 669	133.0	137.9	136.7	61.1	100	7/5	37	11	8.5
Nick	126.4	133.9	132.9	61.5	100	7/4	34	0	8.5
UI Whitmore	135.8	132.9	132.0	61.3	100	7/5	35	0	9.0
Alturas	130.6	131.0	131.4	61.3	100	7/5	35	0	8.3
Babe	124.2	127.8	131.2	62.1	100	7/5	37	6	8.5
IDO 668	125.9	124.1	131.1	59.6	100	7/5	35	0	9.9
UI Pettit	130.0	132.9	130.0	60.1	100	7/2	31	0	8.6
Whit	129.7	130.0	129.4	62.2	100	7/4	34	3	10.1
IDO 644	132.6	133.9	128.1	59.6	100	7/3	34	0	8.7
Penawawa	117.2	121.6	125.5	62.3	100	7/6	35	5	8.6
Cataldo	120.4	115.8	116.5	62.4	100	7/3	33	0	8.9
Average	129.3	129.8	133.2	61.0	100	7/5	36	4	9.0
LSD (α=.05)	10.1	9.2	12.2	1.5	0.3	0.6	1.4	12.5	
CV %	5.5	5.0	6.5	1.8	0.2	0.2	2.7	218.0	
Pr > F	<.0001	<.0001	0.0074	0.0004	0.4736	<.0001	<.0001	<.0001	

*= club wheat

Table 46. Agronomic data for spring wheat at Ashton, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in)**	**(%)**	**(%)**
Soft White Spring Wheat									
IDO 599	96.6	58.1	112.2	54.0	100	7/29	34	0	10.3
Babe	102.4	57.4	108.1	54.8	100	7/31	36	0	10.1
IDO 686	---	53.7	108.1	53.8	100	8/2	37	0	10.5
IDO 687	---	58.1	104.3	54.5	100	7/31	34	0	10.5
IDO 669	94.0	56.6	103.3	54.1	100	8/2	36	1	10.2
JD *	---	54.1	102.1	54.1	100	8/3	37	28	10.8
UI Whitmore	95.8	64.3	101.3	53.7	100	7/31	33	0	9.6
Penawawa	88.9	51.2	101.0	54.0	100	7/31	33	0	11.4
Nick	94.4	59.5	100.9	54.6	100	7/30	33	0	10.1
Whit	85.3	49.4	97.8	53.7	100	7/29	33	0	10.7
IDO 644	98.0	69.3	96.7	53.8	100	7/26	31	0	10.7
Alturas	96.2	69.7	96.6	52.7	100	8/2	34	0	10.2
Alpowa	100.2	45.4	95.4	53.3	100	8/3	36	1	10.9
UI Pettit	93.7	58.8	94.9	53.4	100	7/25	29	0	10.9
IDO 668	108.2	70.8	92.7	54.1	100	7/29	33	0	10.8
Cataldo	102.4	68.2	91.3	54.3	100	7/26	31	0	10.3
Average	97.8	58.7	99.8	53.9	100	7/30	34	2	10.5
LSD (α=.05)	18.0	9.2	14.7	1.1	0.3	1.3	1.8	7.4	
CV %	13.0	11.1	10.2	1.5	0.2	0.4	3.7	313.3	
Pr > F	0.7493	<.0001	0.1967	0.0693	0.4736	<.0001	<.0001	<.0001	

*= club wheat

Table 47. Agronomic data for spring wheat at Soda Springs, dryland, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in)**	**(%)**	**(%)**
Soft White Spring Wheat									
IDO 644	88.1	43.2	64.3	58.4	100	7/14	25	0	11.7
IDO 599	97.3	39.9	59.5	59.7	100	7/15	27	0	11.3
Alturas	89.1	41.4	56.6	58.6	100	7/16	25	0	10.6
Cataldo	87.8	39.9	55.9	58.7	100	7/14	24	0	11.7
IDO 686	---	39.9	54.8	60.0	100	7/17	25	0	11.5
IDO 669	90.6	38.1	53.7	58.8	100	7/17	27	0	13.0
JD *	---	37.0	52.3	59.0	100	7/18	27	0	13.4
Whit	85.5	36.7	52.3	59.0	100	7/15	27	0	11.6
IDO 687	---	37.8	51.2	60.0	100	7/17	26	0	11.4
IDO 668	75.8	39.9	50.5	59.5	100	7/14	25	0	11.8
Penawawa	89.5	37.8	47.9	59.3	100	7/17	25	0	11.9
UI Whitmore	96.7	36.7	47.6	58.3	100	7/16	24	0	11.8
Nick	83.1	35.2	47.2	59.2	100	7/15	25	0	12.4
UI Pettit	74.6	39.6	41.0	59.7	100	7/14	23	0	12.6
Alpowa	79.9	29.4	35.6	59.2	100	7/18	27	0	12.4
Babe	96.0	37.4	33.8	59.2	100	7/16	24	0	12.6
Average	87.4	38.2	50.2	59.2	99	7/16	25	0	12.0
LSD (α=.05)	12.8	7.1	8.5	0.8	15.1	0.9	2.7	0	
CV %	10.2	13.1	11.9	0.9	10.7	0.3	7.6	.	
Pr > F	0.0002	0.2017	<.0001	<.0001	0.4736	<.0001	0.097	.	

*= club wheat

Table 48. Agronomic data for spring barley at Rupert, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
6- Row Spring Feed Barley												
Goldeneye	117.1	119.3	146.1	45.6	100	6/24	42	14	14.0	85.0	9.2	5.2
UT2120-14	---	130.7	137.5	46.4	100	6/21	38	58	12.8	80.8	11.9	7.2
Millennium	129.3	122.1	135.7	45.8	100	6/23	45	45	14.6	60.5	19.6	19.6
UT2120-35	---	127.1	132.9	46.4	100	6/21	37	53	13.1	82.6	11.1	5.8
Creel	128.9	141.1	131.6	45.4	100	6/24	42	66	12.8	65.2	17.5	16.8
Herald	128.0	116.6	118.9	45.8	100	6/24	43	48	13.8	77.6	13.8	8.3
Steptoe	119.8	114.8	108.9	46.1	100	6/25	43	48	12.7	71.6	15.3	12.8
Colter	127.1	127.1	106.2	44.9	100	6/23	42	70	13.5	60.2	22.3	17.0
6- Row Spring Malt Barley												
Lacey	93.5	110.7	137.5	47.9	100	6/24	42	43	14.2	86.7	8.1	4.8
Legacy	84.9	115.3	123.9	48.2	100	6/25	43	83	14.0	76.2	13.2	10.0
Tradition	74.0	92.6	112.5	49.3	100	6/26	45	85	13.7	78.9	12.9	8.0
Celebration	81.2	99.8	109.4	47.2	99	6/26	44	96	14.8	75.1	14.6	10.2
01Ab9663	---	---	97.6	46.7	100	6/26	46	90	13.6	71.4	13.0	15.6
Morex	99.4	103.0	92.1	48.6	100	6/26	43	91	13.6	56.3	21.1	22.5
Average	109.6	116.6	122.9	46.9	100	6/24	43	60	13.7	73.4	14.5	11.7
LSD (α=.05)	20.1	17.5	17.6	3.1	1.9	1.4	3.3	37.0				
CV %	12.7	10.5	10.1	4.6	1.3	0.5	5.4	43.3				
Pr > F	<.0001	0.0001	<.0001	0.0457	0.389	<.0001	<.0001	0.0002				

Table 49. Agronomic data for spring barley, Aberdeen, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
6-Row Spring Feed Barley												
UT2120-14	---	121.5	174.7	51.3	84	6/22	34	0	13.3	95.5	3.7	1.4
Goldeneye	117.4	119.5	166.9	51.9	93	6/23	37	25	14.1	85.5	9.0	6.1
Millennium	140.0	138.6	161.0	50.5	90	6/21	39	31	12.0	79.7	14.2	7.0
UT2120-35	---	133.2	161.0	50.4	88	6/22	35	18	12.3	87.5	7.6	5.4
Creel	131.5	131.3	156.1	49.3	81	6/23	36	33	11.7	75.7	14.6	10.4
Steptoe	124.4	122.5	151.7	48.7	89	6/23	38	53	12.0	87.9	7.5	5.4
Herald	124.2	149.8	150.8	50.4	76	6/23	33	0	11.8	92.9	5.3	1.9
Colter	131.2	138.6	134.2	50.0	85	6/23	39	26	12.0	84.6	10.0	6.1
6-Row Spring Malt Barley												
Lacey	115.7	124.9	142.5	53.0	88	6/22	39	18	14.6	94.8	4.2	1.7
Legacy	118.8	124.9	142.5	51.3	86	6/23	36	1	12.7	92.8	5.5	2.6
Tradition	115.3	118.6	142.5	51.7	90	6/23	37	33	12.6	93.5	5.5	1.9
01Ab9663	---	---	135.6	51.9	86	6/24	41	39	11.1	85.5	8.9	6.1
Celebration	105.4	114.2	126.9	51.1	83	6/23	38	46	14.1	94.7	4.4	1.8
Morex	117.0	108.3	118.6	50.2	81	6/24	39	63	13.0	74.8	14.5	11.2
Average	121.5	127.6	147.6	50.9	86	6/23	37	26	12.7	87.5	8.2	4.9
LSD (α=.05)	11.3	22.7	17.5	1.3	7.8	0.7	5.5	47.7				
CV %	6.5	12.4	8.3	1.7	6.4	0.3	10.3	130.9				
Pr > F	<.0001	0.012	<.0001	<.0001	0.0169	<.0001	0.2892	0.1936				

Table 50. Agronomic data for spring barley at Idaho Falls, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
6 - Row Spring Feed Barley												
Creel	134.3	157.0	157.5	51.6	100	6/29	40	8	9.5	89.5	7.6	2.9
Millennium	132.9	130.7	154.3	51.2	100	6/27	39	0	11.5	87.2	8.8	4.2
UT2120-14	---	139.8	146.6	50.8	100	6/28	34	21	12.0	94.4	4.1	1.6
Herald	117.1	138.8	146.1	50.4	100	6/30	40	14	11.8	91.3	6.6	2.2
UT2120-35	---	138.4	143.8	51.0	100	6/28	34	28	12.2	93.0	5.3	1.9
Colter	130.2	136.6	140.7	50.8	100	6/28	37	1	11.5	87.4	8.9	3.8
Steptoe	133.9	119.3	134.3	49.1	100	6/29	38	50	10.3	87.2	8.3	4.7
Goldeneye	142.9	129.3	132.9	52.0	100	6/28	36	58	12.4	92.2	5.6	2.3
6 - Row Spring Malt Barley												
01Ab9663	---	---	142.0	53.2	100	7/1	43	21	10.9	94.0	4.2	2.0
Lacey	119.8	124.8	126.1	52.8	100	6/28	38	28	11.3	96.5	2.8	0.9
Legacy	124.3	123.9	116.6	51.3	100	6/30	37	63	11.9	93.5	5.5	1.3
Celebration	108.4	114.8	116.2	51.6	100	6/30	37	38	12.5	96.2	3.1	1.1
Morex	119.8	96.6	107.1	50.0	100	7/1	37	63	11.6	80.9	12.4	7.1
Tradition	127.5	104.8	104.8	51.5	100	7/1	39	35	12.4	95.6	3.4	1.3
Average	129.1	126.7	134.6	51.2	100	6/29	38	29	11.6	91.4	6.2	2.7
LSD (α=.05)	10.7	15.4	15.1	0.8	0.0	1.5	2.2	29.4				
CV %	5.8	8.5	7.8	1.1	0.0	0.6	4.1	71.5				
Pr > F	<.0001	<.0001	<.0001	<.0001	.	<.0001	<.0001	<.0001				

Table 51. Agronomic data for spring barley at Ashton, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
6-Row Spring Feed Barley												
Goldeneye	105.3	44.5	138.8	53.3	100	8/1	36	1	11.0	86.9	7.5	4.7
UT2120-14	---	60.3	133.9	53.1	100	7/27	32	18	11.1	94.5	3.8	1.5
UT2120-35	---	56.7	130.2	53.4	100	7/29	31	15	11.1	93.5	3.8	2.1
Millennium	90.3	49.5	119.8	51.8	100	7/28	34	0	11.4	75.1	16.8	7.8
Herald	96.2	54.5	118.9	50.1	100	7/30	35	11	11.3	81.8	11.2	5.9
Creel	96.2	71.2	118.0	51.6	100	7/28	32	5	10.8	80.6	12.3	6.0
Steptoe	101.6	58.5	116.2	50.5	100	7/28	34	25	11.1	88.9	6.7	4.2
Colter	88.5	50.8	108.4	50.7	100	7/29	33	5	11.1	79.8	11.5	7.2
6-Row Spring Malt Barley												
01Ab9663	---	---	132.0	50.9	100	7/30	38	4	10.4	90.2	4.2	2.3
Legacy	94.4	48.6	119.3	52.8	100	7/30	38	19	11.9	92.5	3.9	2.3
Tradition	79.4	31.3	118.0	53.1	100	8/1	36	5	11.8	93.1	4.8	1.5
Lacey	78.0	40.4	115.3	52.7	100	7/29	36	15	11.8	93.9	3.9	1.4
Celebration	76.2	39.9	102.5	53.2	100	7/31	34	20	12.2	92.1	5.3	2.4
Morex	103.5	43.1	91.7	51.2	100	7/31	36	43	10.7	73.8	15.9	9.5
Average	92.5	48.9	118.6	52.0	100	7/29	34	12	11.3	86.9	8.0	4.2
LSD (α=.05)	20.1	14.8	19.3	1.4	0	2.2	2.5	8.9				
CV %	15.1	21.2	11.4	1.9	0	0.7	5.1	50.8				
Pr > F	0.0485	0.0003	0.0016	<.0001	.	0.0002	<.0001	<.0001				

Table 52. Agronomic data for spring barley at Soda Springs, dryland, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2007**	**2008**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
6-Row Spring Feed Barley												
Creel	12.3	23.7	69.4	47.4	100	7/16	25	0	13.6	72.1	16.7	10.7
Herald	8.9	20.9	66.7	47.6	100	7/18	22	0	13.3	89.4	7.4	2.6
UT2120-35	---	---	64.0	47.0	100	7/16	22	0	14.1	85.9	9.9	4.0
Colter	11.5	16.1	61.3	47.0	100	7/17	21	0	13.8	74.0	15.5	9.7
UT2120-14	---	---	57.6	48.1	100	7/17	22	0	13.3	88.0	8.0	3.7
Goldeneye	9.9	24.8	56.3	49.6	100	7/18	23	0	13.1	80.7	11.4	7.3
Millennium	13.9	19.4	55.8	47.3	100	7/16	24	0	13.8	76.9	15.5	6.9
Steptoe	13.4	18.7	53.5	47.4	100	7/18	24	0	12.6	89.7	6.9	2.8
6-Row Spring Malt Barley												
01Ab9663	---	---	66.7	48.9	100	7/17	28	0	12.8	85.8	10.1	3.4
Celebration	---	---	64.0	48.7	100	7/17	23	0	15.3	84.7	10.9	4.1
Morex	8.0	24.1	60.8	48.8	100	7/19	23	0	13.5	72.9	17.9	8.9
Lacey	10.4	24.6	58.1	48.4	100	7/17	22	0	14.2	82.2	12.7	4.8
Legacy	10.8	22.8	53.5	48.7	100	7/18	26	0	13.3	84.4	10.2	5.1
Tradition	10.5	22.8	47.6	49.6	100	7/18	23	0	14.8	88.2	8.7	2.7
Average	11.3	21.7	58.6	48.1	100	7/17	23	0	13.7	82.5	11.6	5.5
LSD (α=.05)	7.2	9.7	14.7	1.1	0.0	1.4	3.0	0.0				
CV %	44.3	32.0	17.6	1.6	0.0	0.5	9.2	.				
Pr > F	0.6667	0.5707	0.0424	<.0001	.	0.0069	0.0006	.				

Table 53. Agronomic data for spring barley at Rupert, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protien	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
2-Row Spring Feed Barley												
08ID2661	---	---	142.0	51.0	100	6/29	34	15	12.0	89.7	6.6	3.5
Champion	147.8	126.1	134.3	51.8	100	6/27	37	24	14.7	89.2	4.9	6.0
Xena	149.1	128.0	133.4	50.4	100	6/27	35	43	13.4	85.9	8.3	6.0
MT103022	---	---	133.0	51.5	100	6/28	35	24	13.8	92.6	4.1	3.3
RWA 1758	148.3	136.1	127.1	51.8	100	6/30	33	39	12.5	90.6	5.5	3.9
Camas	126.8	115.7	124.8	51.2	100	6/28	34	63	15.2	83.8	8.0	8.2
Spaulding	150.7	135.7	123.9	50.5	100	6/28	36	80	13.9	76.8	12.8	10.4
Tetonia	144.9	141.1	123.4	50.5	100	7/1	31	55	12.8	83.6	10.0	6.2
08ID1358	---	---	122.1	50.7	100	6/28	34	65	13.6	81.6	13.0	5.2
08ID734*	---	---	120.2	55.9	100	7/1	36	56	17.0	55.6	25.4	19.0
Baronesse	161.9	131.1	120.2	51.0	100	6/29	33	35	12.3	86.4	8.6	5.1
Lenetah	149.7	127.1	118.4	50.0	100	6/27	37	60	14.9	83.6	9.2	6.9
08ID2657	---	---	117.5	50.9	100	6/30	38	34	13.5	85.2	8.4	6.6
Herald	---	---	117.1	46.9	100	6/24	38	55	13.5	77.1	14.0	9.0
Primo	143.9	130.2	116.2	49.9	100	6/29	33	72	12.9	84.3	9.7	6.0
08ID1756*	---	---	108.9	54.1	100	6/29	34	59	14.9	62.7	19.7	17.5
CDC McGwire *	---	---	108.9	57.1	100	7/1	35	78	15.0	49.7	28.9	21.3
Idagold II	132.9	134.8	106.6	46.2	100	7/1	29	63	13.2	54.8	24.7	20.3
08ID1549*	---	---	105.3	54.2	100	6/29	35	90	15.7	66.7	20.8	12.4
08ID1713*	---	---	104.4	58.6	100	6/30	38	79	15.5	58.7	24.0	17.2
MT103020*	---	---	101.6	59.3	100	6/23	41	40	13.8	57.2	17.7	25.3
Julie *	96.8	111.2	101.2	54.6	100	7/5	37	35	14.9	68.7	20.8	10.4
Clearwater *	110.0	95.7	93.9	55.0	100	7/1	37	28	16.4	67.3	19.0	13.7
MT103050	---	---	93.5	46.3	100	6/30	38	81	16.3	78.2	10.1	11.6
Transit *	94.4	85.8	88.5	52.2	100	7/3	39	45	15.7	64.9	22.9	12.5
MT103005*	---	---	74.4	57.1	100	6/30	41	82	15.4	42.2	30.2	27.6
CDC Fibar *	---	---	74.0	51.3	100	6/29	36	95	15.2	57.4	24.9	17.6
MT103014*	---	---	61.7	58.2	100	6/27	46	54	14.4	82.6	9.7	7.5
2-Row Spring Malt Barley												
B3719	---	---	133.9	50.0	100	6/28	34	28	13.4	92.2	4.8	3.7
2Ab04-X001084-27	---	132.0	119.3	47.6	100	6/28	32	87	14.1	81.7	10.8	7.8
Copeland	134.3	122.1	115.7	51.1	100	7/1	37	60	14.2	90.9	4.8	4.0
Conrad	134.3	125.2	113.4	49.4	100	6/29	35	83	13.7	82.6	8.7	8.7
Merit 57	---	135.5	112.1	47.6	100	7/1	34	70	15.1	74.9	14.3	10.7
B1202	111.3	112.1	108.5	49.3	100	6/29	32	67	14.3	85.2	8.7	6.1
Pinnacle	123.5	112.5	107.1	50.8	100	6/28	39	16	15.2	92.2	4.5	3.2
Moravian 69	143.2	128.0	105.3	45.9	100	7/2	30	60	13.2	63.5	21.3	15.5
Hockett	103.0	108.9	103.0	49.5	100	6/26	35	70	14.9	78.8	12.4	8.9
Moravian 137	---	142.5	102.1	47.2	100	7/1	30	63	14.4	68.9	16.6	14.1
Harrington	112.2	105.3	101.6	49.7	100	6/30	35	70	14.1	80.3	10.6	8.9
Metcalfe	---	---	95.3	47.2	100	6/30	37	88	16.5	66.1	13.8	20.4
Moravian 115	---	143.8	95.3	42.1	100	7/2	31	66	16.2	65.8	20.7	13.4
02Ab17271	127.5	141.1	90.8	45.8	100	7/2	37	71	16.2	62.5	16.1	21.3
Merit	107.8	122.1	86.7	43.5	100	7/1	39	83	15.3	50.6	14.5	35.1
Average	129.4	121.5	108.2	50.7	100	6/29	35	59	17.1	91.9	14.1	11.7
LSD (α=.05)	21.6	14.6	20.8	3.2	0.6	1.6	4.9	41.2				
CV %	8.2	8.5	13.7	4.5	0.4	0.6	9.8	49.8				
Pr > F	<.0001	<.0001	<.0001	<.0001	0.7609	<.0001	<.0001	0.0005				

* indicates hulless variety

Table 54. Agronomic data for spring barley, Aberdeen, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
2-Row Spring Feed Barley												
Spaulding	139.6	137.6	171.7	55.5	93	6/26	36	6	12.1	95.1	3.3	1.6
08ID2661	---	---	163.0	52.7	88	6/27	33	44	11.9	89.0	8.1	2.8
Xena	139.9	125.9	162.0	53.8	79	6/25	36	25	12.2	93.5	4.0	2.4
Champion	142.9	134.2	161.0	54.2	84	6/25	36	10	11.7	96.1	2.6	1.4
Primo	131.8	107.8	160.5	52.3	86	6/26	33	46	12.8	83.6	9.6	7.1
08ID2657	---	---	155.2	52.7	93	6/28	35	15	12.5	88.6	8.4	2.9
Herald	---	---	154.7	49.5	73	6/24	41	3	10.9	87.8	8.7	3.7
Tetonia	138.2	124.9	154.7	53.9	86	6/27	33	10	12.7	83.9	8.3	7.7
Camas	121.1	129.3	153.7	52.7	95	6/25	35	20	12.9	92.0	5.0	3.1
MT103022	---	---	152.2	53.1	94	6/26	34	51	13.8	90.0	7.1	3.2
Baronesse	133.6	126.9	151.3	52.4	91	6/26	34	39	12.7	87.6	8.9	3.9
Idagold II	136.8	169.3	150.3	51.7	94	6/28	29	0	11.9	86.1	9.5	4.7
Lenetah	137.4	136.1	147.8	53.0	81	6/25	38	44	12.8	90.9	5.3	4.0
08ID1358	---	---	143.4	53.9	90	6/25	34	8	12.2	96.2	3.4	0.6
08ID1549*	---	---	142.0	60.3	74	6/27	36	31	12.2	88.5	7.8	3.8
08ID1713*	---	---	137.1	61.7	78	6/27	37	35	13.0	71.4	21.2	7.7
RWA 1758	144.3	131.3	131.7	54.1	89	6/25	34	3	12.9	91.6	4.8	3.6
CDC McGwire *	---	---	130.8	59.8	76	6/26	38	53	13.3	72.1	20.0	7.9
MT103020*	---	---	126.4	62.2	68	6/24	39	5	11.2	67.2	16.4	16.4
08ID1756*	---	---	123.9	58.3	85	6/26	36	68	13.8	73.2	12.9	13.9
08ID734*	---	---	122.5	56.8	84	6/29	36	30	14.3	69.8	21.3	9.1
Julie *	122.6	103.0	115.1	57.8	69	7/2	37	38	15.0	73.4	17.3	9.3
Transit *	93.9	101.0	113.7	57.6	83	6/28	38	25	14.5	84.2	11.2	4.5
Clearwater *	111.1	97.6	111.2	58.6	78	6/26	35	41	14.4	82.4	13.1	4.7
CDC Fibar *	---	---	103.9	57.2	75	6/26	39	73	16.0	81.8	13.1	5.1
MT103005*	---	---	103.4	61.6	80	6/29	38	70	14.2	70.9	18.1	10.8
MT103050	---	---	98.1	49.8	91	6/29	36	55	12.9	92.6	5.0	2.3
MT103014*	---	---	79.5	62.6	81	6/28	43	4	14.2	93.6	4.5	2.0
2-Row Spring Malt Barley												
2Ab04-X001084-27	---	127.8	158.6	51.5	83	6/26	32	50	13.8	85.3	8.4	6.2
B3719	---	---	158.6	53.3	89	6/25	36	26	11.8	95.8	2.7	6.0
Pinnacle	128.9	96.1	154.7	55.2	86	6/24	38	8	13.3	98.6	1.1	0.6
Conrad	130.3	122.0	148.3	53.0	86	6/27	37	34	12.0	96.5	4.2	1.5
Merit	123.9	117.6	144.9	51.0	86	6/29	36	48	13.2	79.4	11.5	9.3
B1202	116.1	123.9	142.5	52.9	91	6/26	35	26	13.5	94.8	3.1	2.0
Copeland	121.6	124.9	142.0	52.8	91	6/27	37	34	13.2	94.2	3.2	2.5
Metcalfe	---	---	142.0	53.6	89	6/26	38	48	14.0	93.3	4.2	2.5
Hockett	123.8	112.7	140.0	53.3	91	6/24	32	65	13.6	84.7	8.6	6.8
Merit 57	---	109.8	138.1	51.9	74	6/28	35	63	13.0	87.6	7.2	5.3
02Ab17271	113.7	116.1	132.2	51.7	85	6/30	37	41	13.7	86.4	7.2	6.4
Harrington	104.8	110.3	129.3	51.5	85	6/28	35	71	13.4	78.1	14.3	7.7
Average	126.2	119.1	138.6	54.6	85	6/27	36	35	13.1	86.2	8.9	5.2
LSD (α=.05)	15.8	24.2	17.8	2.1	11.0	1.1	2.8	32.7				
CV %	8.2	14.4	9.2	2.7	9.3	0.4	5.6	67.2				
Pr > F	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001				

* indicates hulless variety

Table 55. Agronomic data for spring barley at Idaho Falls, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
2-Row Spring Feed Barley												
Xena	141.1	147.0	155.1	53.5	100	7/3	36	30	11.2	95.9	2.2	2.0
08ID2661	---	---	150.2	52.1	100	7/6	34	15	10.0	88.8	7.7	3.6
Tetonia	139.3	132.9	148.8	52.9	100	7/6	33	25	10.2	92.1	5.1	3.0
Herald	---	---	141.1	49.8	100	6/30	41	20	11.6	89.8	7.9	2.6
Primo	135.2	142.0	141.1	52.2	100	7/5	32	45	10.6	90.9	5.8	3.7
Spaulding	144.3	151.1	140.5	54.1	100	7/4	34	18	11.6	93.9	3.1	3.0
RWA 1758	145.7	138.8	137.7	53.0	100	7/5	33	28	11.3	93.4	3.7	2.9
Champion	137.9	141.1	136.7	53.5	100	7/3	34	18	12.5	94.7	3.4	2.1
Idagold II	128.0	140.7	136.6	50.0	100	7/5	29	18	12.7	79.5	13.9	7.0
08ID2657	---	---	136.3	52.2	100	7/6	34	10	10.7	95.0	3.5	1.9
Lenetah	144.8	138.4	132.5	53.1	100	7/5	34	40	13.3	95.0	3.2	2.3
08ID1549*	---	---	132.4	60.3	100	7/4	35	45	12.9	75.1	18.9	5.8
08ID1756*	---	---	132.0	61.5	100	7/5	35	33	13.0	79.6	14.0	6.3
MT103022	---	---	130.2	51.7	100	7/4	32	33	11.5	91.8	5.2	2.9
Baronesse	146.1	141.6	129.3	52.2	100	7/5	32	45	11.0	89.2	6.3	4.8
08ID1713*	---	---	129.2	62.2	100	7/4	36	20	13.7	72.5	21.6	6.2
CDC McGwire *	---	---	127.3	60.1	99	7/3	36	31	9.9	64.1	27.4	9.1
08ID1358	---	---	126.1	52.7	100	7/4	32	30	11.9	90.3	6.6	3.4
MT103020*	---	---	125.1	61.3	100	7/1	38	23	12.3	64.5	17.4	18.6
Camas	137.1	139.3	124.3	53.3	100	7/2	36	14	13.8	93.7	3.5	3.2
Julie *	126.6	128.0	116.2	57.5	100	7/8	35	6	11.9	77.6	17.4	5.0
08ID734*	---	---	115.2	58.5	100	7/5	37	38	14.7	64.5	24.2	10.9
Transit *	101.6	100.7	101.9	57.5	100	7/7	36	15	13.7	80.0	14.0	5.9
Clearwater *	113.5	112.1	99.1	56.8	100	7/3	35	50	11.9	67.4	22.3	10.2
MT103005*	---	---	95.7	59.4	100	7/3	37	55	13.6	59.1	23.0	18.2
MT103050	---	---	91.7	48.9	100	7/2	37	63	14.3	87.5	8.7	3.6
CDC Fibar *	---	---	79.4	56.2	100	7/1	37	68	14.1	79.7	14.7	6.1
MT103014*	---	---	68.6	59.9	100	7/1	41	33	13.6	85.2	9.8	5.3
2-Row Spring Malt Barley												
B3719	---	---	143.7	52.0	100	7/3	34	40	10.9	93.7	3.0	3.4
Pinnacle	143.4	132.5	142.9	53.3	100	7/1	39	5	12.6	96.8	1.9	1.5
Conrad	133.9	140.2	137.5	52.9	100	7/3	34	23	12.5	94.8	2.7	2.6
Moravian 69	---	139.8	132.5	50.3	100	7/8	26	40	10.7	87.4	8.3	4.3
Moravian 137	---	---	129.8	50.6	100	7/8	28	33	11.0	84.2	11.0	4.9
2Ab04-X001084-27	---	127.5	126.1	51.0	100	7/4	31	53	10.4	90.7	6.5	2.9
Hockett	119.8	112.1	125.2	53.0	100	7/3	32	34	12.0	88.4	6.4	5.6
Merit 57	---	128.9	121.3	49.3	100	7/5	34	60	12.6	78.9	11.9	9.2
Moravian 115	---	---	119.8	47.3	100	7/8	27	43	11.0	86.5	9.6	4.5
Metcalfe	---	---	119.2	52.9	100	7/4	33	40	10.9	94.8	3.3	2.3
B1202	124.8	125.7	115.7	51.5	100	7/4	34	38	11.4	94.6	3.5	2.0
Copeland	133.9	135.7	115.7	52.0	100	7/4	37	53	12.1	94.3	3.4	2.4
02Ab17271	136.6	140.7	109.8	50.0	100	7/7	37	68	12.0	80.2	10.7	8.8
Harrington	109.4	117.1	106.6	50.3	100	7/5	33	69	12.7	77.9	13.6	8.7
Merit	130.2	136.1	106.2	48.6	100	7/6	34	60	12.3	74.4	12.6	13.0
Average	132.4	129.7	123.9	53.6	100	7/4	34	35	14.3	85.0	9.8	5.4
LSD (α=.05)	12.3	15.1	14.4	1.5	0.4	1.6	2.3	25.2				
CV %	6.6	8.3	8.3	1.9	0.3	0.6	4.8	51.1				
Pr > F	<.0001	<.0001	<.0001	<.0001	0.0097	<.0001	<.0001	<.0001				

* indicates hulless variety

Table 56. Agronomic data for spring barley at Ashton, irrigated, 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2009**	**2010**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
2-Row Spring Feed Barley												
Xena	104.4	77.6	140.6	53.7	100	8/2	33	10	10.4	87.6	6.6	4.0
Spaulding	118.0	60.8	131.4	54.6	100	8/2	31	3	11.9	89.0	4.5	2.6
Champion	104.8	69.9	123.6	54.9	100	8/2	33	1	12.1	90.1	3.9	2.3
Lenetah	110.3	65.3	121.6	54.2	100	8/4	34	4	11.4	91.3	4.3	2.5
MT103022	---	---	121.5	53.9	100	8/3	31	4	10.9	92.2	3.0	1.5
Tetonia	97.6	71.2	117.3	53.9	100	8/3	30	16	10.6	85.0	7.8	5.1
Baronesse	123.0	82.1	115.6	54.0	100	8/2	28	13	9.8	87.8	6.5	4.2
Primo	118.9	83.0	115.3	53.4	100	8/2	27	10	9.8	84.7	7.9	5.6
Camas	104.8	55.8	115.0	54.6	100	8/2	32	13	13.1	88.0	5.8	3.6
08ID1756*	---	---	112.6	61.6	99	8/2	31	9	12.7	76.9	11.9	8.5
RWA 1758	115.3	87.1	111.3	54.3	100	8/3	28	9	10.4	90.1	4.7	3.1
08ID1713*	---	---	110.8	62.5	100	8/4	33	1	13.3	78.3	13.1	5.7
08ID2657	---	---	110.3	52.6	100	8/4	31	1	11.0	84.4	7.2	4.9
08ID1358	---	---	109.3	53.7	100	8/3	32	3	12.1	85.9	9.0	3.3
08ID1549*	---	---	107.1	60.3	100	8/4	29	5	13.0	77.6	12.7	6.9
CDC McGwire *	---	---	103.4	59.9	100	8/4	34	4	11.6	65.1	22.3	9.9
08ID734*	---	---	101.7	57.3	100	8/6	33	8	14.6	77.5	12.5	4.4
Idagold II	102.1	64.0	101.2	51.8	100	8/4	28	0	11.0	80.7	10.4	5.6
08ID2661	---	---	101.0	52.0	100	8/4	30	3	11.0	73.9	13.8	10.4
Clearwater *	79.9	54.5	99.0	60.1	99	8/3	33	3	12.8	86.3	7.9	3.1
MT103050	---	---	97.8	51.6	100	8/4	37	8	12.5	94.3	2.1	0.7
Herald	---	---	97.6	50.7	100	7/30	34	3	10.6	85.9	8.0	4.3
MT103005*	---	---	96.0	61.5	100	8/3	37	10	13.7	77.9	14.4	5.2
Julie *	87.6	42.2	94.5	57.0	100	8/6	34	0	14.9	84.7	7.2	1.9
MT103020*	---	---	91.3	62.0	99	7/31	34	0	12.8	75.2	12.6	8.8
CDC Fibar *	---	---	79.4	59.9	100	8/2	35	18	15.2	88.0	6.3	2.6
Transit *	70.8	35.4	79.3	57.5	100	8/3	33	0	14.3	83.5	10.0	2.4
MT103014*	---	---	63.8	60.9	100	8/3	44	0	13.7	94.4	1.9	0.8
2-Row Spring Malt Barley												
Conrad	103.9	53.1	124.4	54.1	100	8/3	31	0	10.7	93.0	2.3	1.3
2Ab04-X001084-27	---	85.3	113.4	51.5	100	8/3	30	5	10.5	85.6	7.2	3.8
B3719	---	---	112.6	53.6	100	8/1	31	11	11.3	93.5	2.5	1.7
Pinnacle	84.9	51.7	111.6	54.8	100	8/1	33	4	11.7	92.7	2.5	1.6
Metcalfe	---	---	111.3	54.2	100	8/2	35	13	12.0	92.0	4.2	1.8
Merit 57	---	64.4	110.5	51.7	100	8/4	33	1	12.0	87.7	5.3	3.6
Hockett	98.9	48.1	109.5	53.7	100	8/2	31	8	11.6	90.4	4.4	3.1
Merit	103.0	49.0	106.7	51.7	100	8/4	32	0	11.1	83.7	8.3	5.0
B1202	88.0	59.9	105.5	52.6	100	8/3	32	3	11.0	88.9	5.6	2.6
Copeland	103.5	59.4	103.8	52.2	100	8/4	36	5	11.9	84.4	7.9	5.0
02Ab17271	120.7	55.4	102.3	52.5	100	8/6	34	0	12.0	85.8	6.3	4.1
Harrington	92.6	55.8	101.3	53.2	100	8/3	32	13	12.0	81.4	10.2	6.1
Average	100.5	61.4	106.8	55.1	100	8/3	32	5	14.4	85.6	7.5	4.0
LSD (α=.05)	17.8	13.6	16.2	0.9	0.6	1.6	2.5	10.3				
CV %	12.6	15.8	10.9	1.2	0.4	0.5	5.5	137.0				
Pr > F	<.0001	<.0001	<.0001	<.0001	0.0015	<.0001	<.0001	0.0058				

* indicates hulless variety

Table 57. Agronomic data for spring barley at Soda Springs, dryland 2011.

	Yield (bu/A)			Test Wt.	Spring	Heading	Height	Lodging	Protein	Plump		
Variety	**2007**	**2008**	**2011**	**(lb/bu)**	**Stand %**	**Date**	**(in.)**	**(%)**	**(%)**	**(>6/64)**	**(>5.5/64)**	**% Thin**
2-Row Spring Feed Barley												
Spaulding	3.1	10.4	81.2	52.8	100	7/21	22	0	13.4	94.6	3.4	1.7
Lenetah	2.7	7.3	79.4	50.9	99	7/27	23	0	13.0	95.8	2.1	0.8
Champion	---	---	77.6	52.0	99	7/21	22	0	12.8	95.7	2.5	1.1
Camas	10.7	19.9	76.7	51.1	97	7/21	22	0	14.0	95.1	3.1	1.5
08ID1549*	---	---	75.3	58.7	97	7/23	21	0	13.0	75.3	16.8	6.9
08ID2661	---	---	74.0	49.9	99	7/27	21	0	12.1	93.5	4.8	1.4
RWA 1758	---	21.9	73.1	51.4	100	7/23	18	0	12.3	94.3	3.0	1.8
Tetonia	5.5	19.1	73.1	51.8	100	7/23	19	0	12.3	95.0	3.1	1.2
08ID1713*	---	---	72.1	58.1	99	7/23	22	0	13.3	67.7	20.5	11.1
08ID1358	---	---	71.4	52.0	100	7/23	20	0	14.6	93.8	4.3	1.1
Baronesse	7.6	16.3	69.9	51.3	100	7/23	20	0	12.4	94.7	3.3	1.6
MT103020*	---	---	69.9	60.9	99	7/17	26	0	13.3	84.6	10.4	3.9
Herald	---	---	69.4	48.1	98	7/18	24	0	13.3	92.3	4.9	1.9
08ID1756*	---	---	69.0	60.3	99	7/21	23	0	13.7	74.4	16.9	8.2
Primo	13.6	18.9	65.8	50.4	100	7/23	19	0	11.9	87.6	8.0	3.6
08ID2657	---	---	64.9	50.0	100	7/28	20	0	11.7	92.5	5.6	1.8
Xena	11.1	20.6	63.1	51.0	100	7/22	21	0	12.3	94.1	3.4	1.8
CDC McGwire*	13.2	10.6	62.6	58.2	98	7/24	22	0	12.9	66.9	23.8	8.7
Idagold II	8.2	12.7	62.3	51.0	100	7/21	20	0	13.6	92.0	5.5	1.7
MT103022	---	---	60.3	50.3	100	7/23	19	0	13.3	93.3	4.6	1.6
Clearwater*	10.7	11.1	59.0	57.7	98	7/24	22	1	14.9	77.7	16.3	5.1
08ID734*	---	---	52.6	57.3	100	7/27	21	0	16.5	61.5	23.8	13.7
Julie *	---	---	50.8	57.5	97	7/28	23	0	17.0	80.4	13.7	5.0
MT103005*	---	---	48.6	58.9	100	7/21	22	2	15.5	70.7	20.4	8.5
Transit *	---	---	48.4	57.3	100	7/23	23	0	15.9	66.0	26.0	7.2
MT103050	---	---	46.3	48.3	100	7/25	26	0	13.3	95.5	3.1	0.6
MT103014*	---	---	44.9	60.3	100	7/19	31	0	13.7	94.1	3.3	1.6
2-Row Spring Malt Barley												
2Ab04-X001084-27	---	---	77.1	49.5	100	7/23	20	0	13.1	93.4	4.1	1.6
Harrington	9.6	9.0	76.7	50.0	100	7/22	22	0	14.8	84.1	10.5	4.4
Conrad	12.2	13.8	69.9	50.1	100	7/22	21	0	12.6	93.3	4.3	1.7
Moravian 69	---	---	66.2	50.5	100	7/25	19	0	13.9	99.0	0.4	0.1
Pinnacle	17.2	17.6	65.8	51.9	100	7/19	25	0	14.0	95.2	3.4	1.2
Hockett	5.6	11.8	64.9	51.7	100	7/22	21	0	12.9	92.6	4.9	1.7
Moravian 115	---	---	64.4	49.6	99	7/25	19	0	13.8	95.3	2.5	1.2
Copeland	---	---	64.0	49.3	100	7/23	21	0	13.6	93.4	3.9	1.6
B1202	7.5	20.8	63.1	50.0	100	7/22	19	0	13.0	95.0	3.1	1.4
Metcalfe	8.0	23.6	62.6	50.1	100	7/22	24	0	12.8	91.9	4.8	2.7
Merit	8.6	15.6	59.9	49.8	100	7/22	20	0	14.0	91.7	5.7	2.1
Moravian 137	---	---	53.5	50.2	100	7/22	19	0	14.5	88.2	7.5	3.6
02Ab17271	---	15.6	50.4	49.7	100	7/28	22	0	14.8	91.5	5.2	2.3
Moravian 129	---	---	42.7	50.3	100	7/24	19	0	13.7	94.8	3.7	1.2
Average	9.1	15.5	64.5	52.6	99	7/23	21	0	16.0	88.4	7.7	3.2
LSD (α=.05)	9.9	8.3	16.5	1.3	2.1	2.2	2.3	0.5				
CV %	72.0	37.3	17.7	1.7	1.5	0.8	7.6	733.1				
Pr > F	0.1685	0.0004	<.0001	<.0001	0.0519	<.0001	<.0001	0.0017				

* indicates hulless variety

Table 58. Hard Winter Wheat Yield Percentage of Location Averages, 2011.

Variety	Kimberly	Rupert	Aberdeen	Ririe	Rockland	Variety Average
	(100% =Average)					
Utah 100	103	111	119	111	118	112
Greenville	102	116	126	---	100	111
WB-Arrowhead	117	104	110	---	---	110
Curlew	104	91	89	149	110	109
Yellowstone	110	107	123	91	109	108
Lucin-CL	---	---	88	123	110	107
Norwest 553	112	99	116	105	92	105
Whetstone	108	97	107	---	---	104
LHS (W)	91	121	98	102	106	104
Manning	97	111	101	---	---	103
SRG	---	---	---	88	118	103
DW	---	---	95	117	96	103
NuHorizon (W)	117	94	108	85	106	102
Deloris	92	117	93	100	105	101
Golden Spike (W)	99	116	102	100	87	101
UI Silver (W)	---	---	115	76	110	100
Esperia	105	86	107	---	---	99
Boundary	99	111	94	91	101	99
Gary (W)	---	---	---	97	101	99
Bonneville	89	104	84	105	111	98
Promontory	114	108	106	79	84	98
Moreland	105	98	95	105	87	98
IDO660 (W)	111	91	96	97	89	97
Juniper	---	---	95	94	98	96
Weston	96	89	89	91	111	95
Eddy	94	101	91	---	---	95
Decade	86	87	99	97	92	92
Garland	69	105	91	94	83	88
NuHills	93	63	108	---	---	88
UICF Grace (W)	---	---	85	76	96	85
AP Paladin	88	73	86	---	---	82
UI Darwin (W)	---	---	85	76	84	82
Location Average (bu/A)	117	96	128	12	27	

(W) = White

Table 59. Soft White Winter Wheat Yield Percentage of Location Averages, 2011.

	(100% =Average)				Variety
	Kimberly	**Rupert**	**Aberdeen**	**Ririe**	**Average**
96-16702	118	120	103	129	117
Simon	110	99	109	129	112
Agripro Legion	99	107	100	141	112
Agripro Salute	108	94	106	129	109
WB 528	103	96	108	125	108
SY Ovation	121	94	116	102	108
ORCF-102	98	115	97	121	108
WB-Junction	114	104	114	86	104
Skiles	104	89	110	113	104
WA8092	87	115	110	98	102
BZ 6W02-647AA	107	95	104	102	102
Bruneau	116	98	102	90	101
Brundage 96	96	100	104	106	101
Bitterroot	102	109	110	82	101
AP Badger	106	92	84	117	100
00-475-2DH	110	106	95	82	98
Coda*	97	100	83	113	98
ORCF-101	93	102	95	102	98
UICF Lambert	103	106	95	86	98
UICF Brundage	86	109	98	98	98
Stephens	100	106	101	82	97
WB 456	104	92	101	86	96
AP Legacy	84	99	98	102	96
Lambert	98	90	96	98	95
Madsen	99	96	99	82	94
IDO663	106	91	85	82	91
Goetze	95	92	102	70	90
Brundage	79	95	90	94	90
ID98-19010A	72	91	84	74	81
Location Average (bu/A)	129	101	154	9	

* = Club Wheat

Table 60. Winter Barley Yield Percentage of Location Averages, 2011.

	(100% =Average)		Variety
	Rupert	Aberdeen	Average
Sprinter	109	118	114
Sunstar Pride	129	96	113
OR91	101	114	108
OR92	93	122	107
Eight-Twelve	108	105	107
94Ab1777	114	100	107
02Ab2732	109	104	107
93Ab669	105	106	105
OR818	100	109	105
Strider	106	103	105
Alba	106	97	102
Schuyler	108	89	99
Mathias	86	110	98
02Ab2739	109	86	98
UTWB9703-19	115	79	97
OR816	86	108	97
Endeavor	90	104	97
Charles	85	108	97
02Ab2701	97	89	93
Maja	92	94	93
02Ab339	95	88	92
Kold	84	96	90
Streaker*	91	86	88
Kamiak	80	88	84
Location Average (bu/A)	133	164	

* indicates hulless variety

Table 61. Hard Spring Wheat Yield Percentage of Location Averages, 2011.

Variety	Rupert	(100% =Average) Aberdeen	Idaho Falls	Ashton	Soda Springs	Variety Average
Otis (W)	109	114	113	107	118	112
WA8123 (W)	119	105	110	104	100	108
Malbec	106	118	101	102	---	107
Lolo (W)	79	92	113	115	121	104
WB-Idamax (W)	103	99	102	119	96	104
Kelse	96	115	95	100	113	104
Jerome	98	108	109	109	96	104
Jefferson	101	95	104	106	111	103
Cerere	90	130	104	96	88	102
Bullseye	100	112	100	92	---	101
SY Capstone (W)	95	107	95	107	---	101
Iona	102	90	96	107	111	101
Cabernet	109	102	92	101	---	101
Choteau	111	112	100	94	83	100
UI Winchester	100	95	98	114	95	100
Buck Pronto	102	101	92	104	---	100
WB-Paloma (W)	100	95	105	99	---	100
IDO 702	98	95	108	97	---	99
Albany	104	90	102	98	---	99
Volt	107	113	99	96	68	97
Klasic (W)	101	89	96	77	121	97
10F x Inc1	99	89	92	105	---	96
Lochsa (W)	73	87	97	97	119	95
Blanca Grande (W)	104	95	90	90	95	95
WB-Fuzion	96	98	99	95	83	94
Snow Crest (W)	104	78	91	97	98	94
Pristine (W)	92	76	97	80	109	91
WB-Rockland	97	83	78	81	---	85
Westbred 936	51	83	89	85	91	80
Durum Wheat						
Kronos	116	120	115	99	104	111
Alzada	114	111	108	105	101	108
Utopia	116	95	105	103	92	102
Location Average (bu/A)						

(W) = White

Table 62. Soft White Spring Wheat Yield Percentage of Location Averages, 2011.

	(100% =Average)				Soda	Variety
	Rupert	Aberdeen	Idaho Falls	Ashton	Springs	Average
IDO 686	115	111	107	108	109	110
IDO 599	102	106	106	113	119	109
IDO 687	122	104	105	105	102	107
IDO 644	103	108	96	97	128	106
Alturas	114	102	99	97	113	105
IDO 669	110	97	103	104	107	104
UI Whitmore	109	102	99	102	95	101
IDO 668	106	98	98	93	101	99
Whit	90	105	97	98	104	99
JD*	79	94	108	102	104	98
Penawawa	100	94	94	101	95	97
Babe	103	103	99	108	67	96
Alpowa	93	109	104	96	71	94
Cataldo	90	89	87	91	111	94
Nick	82	90	100	101	94	93
UI Pettit	87	103	98	95	82	93
Location Average (bu/A)	101	127	133	100	50	

*= club wheat

Table 63. 6-Row Barley Yield Percentage of Location Averages, 2011.

	(100% =Average)				Soda	Variety
	Rupert	Aberdeen	Idaho Falls	Ashton	Springs	Average
Feed						
UT2120-14	112	118	109	113	98	110
Creel	107	106	117	99	119	110
Goldeneye	119	113	99	117	96	109
UT2120-35	108	109	107	110	109	109
Millennium	110	109	115	101	95	106
Herald	97	102	109	100	114	104
Steptoe	89	103	100	98	91	96
Colter	86	91	104	91	105	96
Malt						
01Ab9663	79	92	106	111	114	100
Lacey	112	96	94	97	99	100
Legacy	101	96	87	101	91	95
Celebration	89	86	86	86	109	91
Tradition	92	96	78	99	81	89
Morex	75	80	80	77	104	83
Location Average (bu/A)	123	148	135	119	59	

Table 64. 2-Row Barley Yield Percentage of Location Averages, 2011.

	(100% =Average)					
	Rupert	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Variety Average**
Feed						
Xena	123	132	125	132	98	122
Spaulding	114	123	113	123	126	120
Champion	124	116	110	116	120	117
Lenetah	109	114	107	114	123	113
Tetonia	114	110	120	110	113	113
08ID2661	131	95	121	95	115	111
RWA 1758	117	104	111	104	113	110
Camas	115	108	100	108	119	110
MT103022	123	114	105	114	94	110
Baronesse	111	108	104	108	108	108
Primo	107	108	114	108	102	108
08ID1358	113	102	102	102	111	106
08ID2657	109	103	110	103	101	105
08ID1756*	101	105	107	105	107	105
08ID1549*	97	100	107	100	117	104
08ID1713*	96	104	104	104	112	104
Herald	108	91	114	91	108	102
Idagold II	99	95	110	95	97	99
CDC McGwire*	101	97	103	97	97	99
08ID734*	111	95	93	95	82	95
MT103020*	94	86	101	86	108	95
Clearwater*	87	93	80	93	91	89
Julie*	93	88	94	88	79	89
MT103050	86	92	74	92	72	83
MT103005*	69	90	77	90	75	80
Transit*	82	74	82	74	75	78
CDC Fibar*	68	74	64	74	---	70
MT103014*	57	60	55	60	70	60
Malt						
B3719	124	105	116	105	---	113
Conrad	105	117	111	117	108	111
2Ab04-X001084-27	110	106	102	106	120	109
Pinnacle	99	105	115	105	102	105
Moravian 69	97	---	107	---	103	102
Merit 57	104	103	98	103	---	102
Hockett	95	103	101	103	101	100
Copeland	107	97	93	97	99	99
Metcalfe	88	104	96	104	97	98
B1202	100	99	93	99	98	98
Harrington	94	95	86	95	119	98
Moravian 115	88	---	97	---	100	95
Moravian 137	94	---	105	---	83	94
Merit	80	100	86	100	93	92
02Ab17271	84	96	89	96	78	88
Moravian 129	---	---	---	---	66	66
Location Average (bu/A)	108	107	124	107	64	

* indicates hulless variety

2011 Winter Grain Yield Percentage Across All Locations Charts

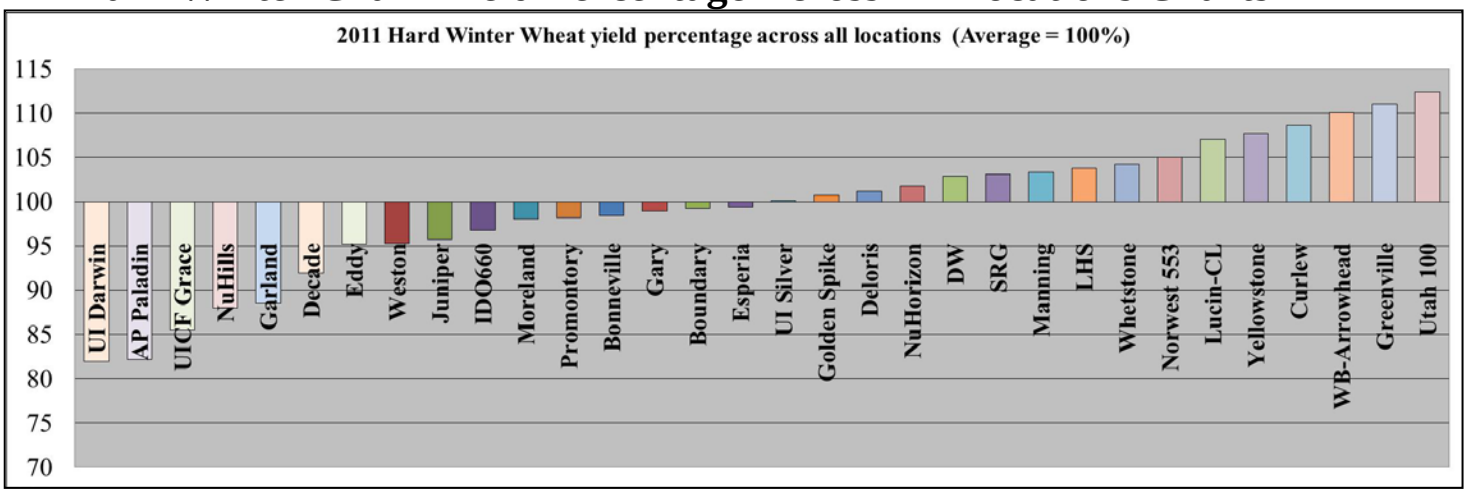


Chart 2. Hard Winter Wheat Yield Percentage Across All Locations.

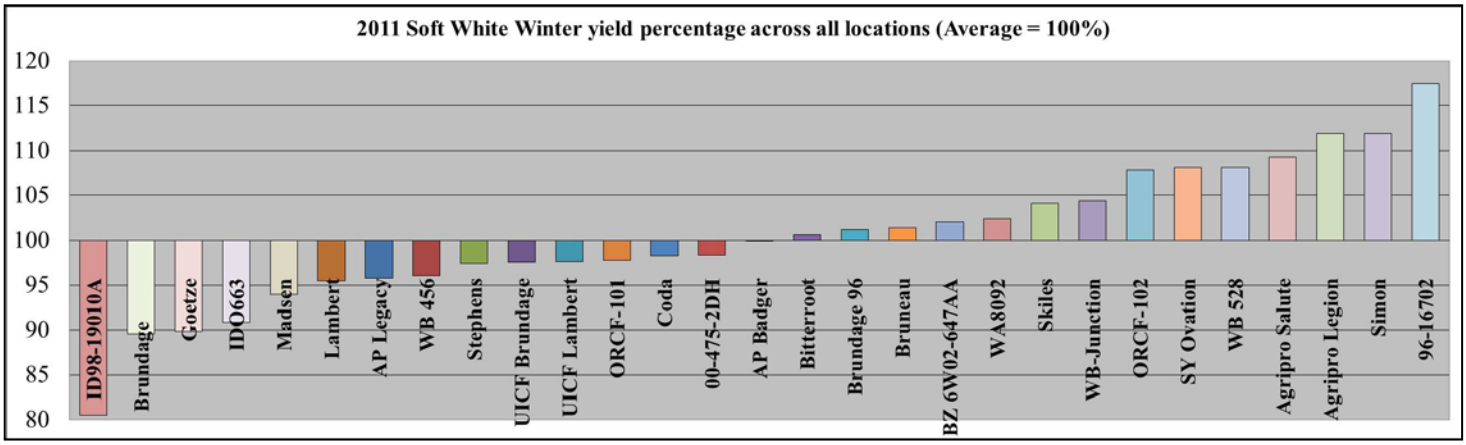


Chart 3. Soft White Winter Wheat Yield Percentage Across All Locations.

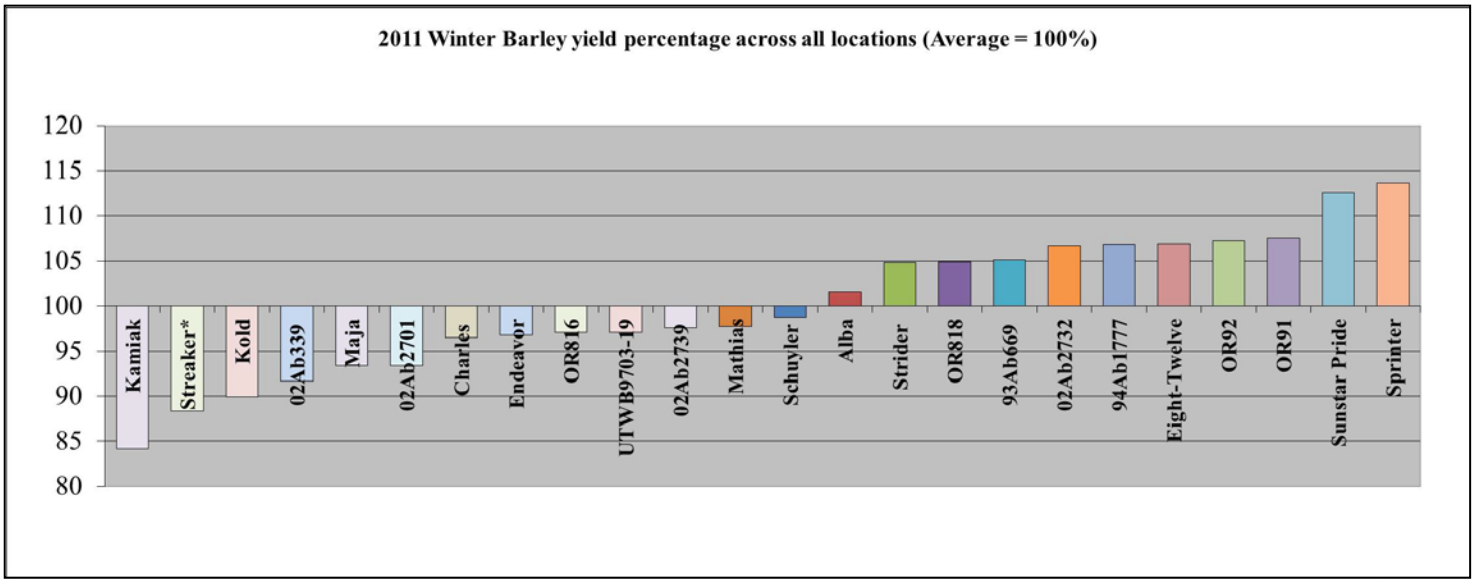


Chart 4. Winter Barley Yield Percentage Across All Locations. * indicates hulless variety.

2011 Spring Grain Yield Percentages Across All Locations Charts

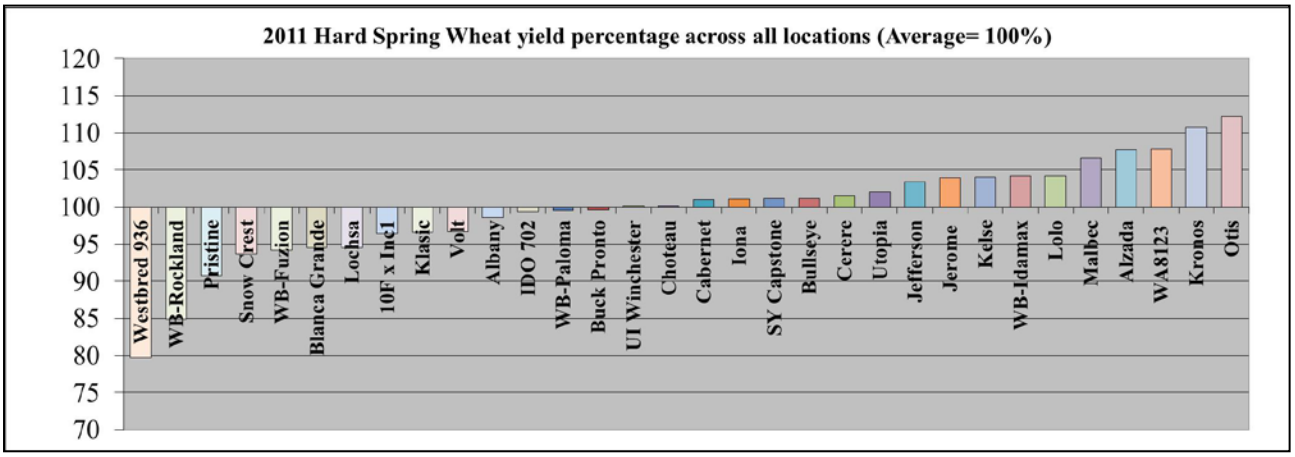


Chart 5. Hard Spring Wheat Yield Percentage Across All Locations.

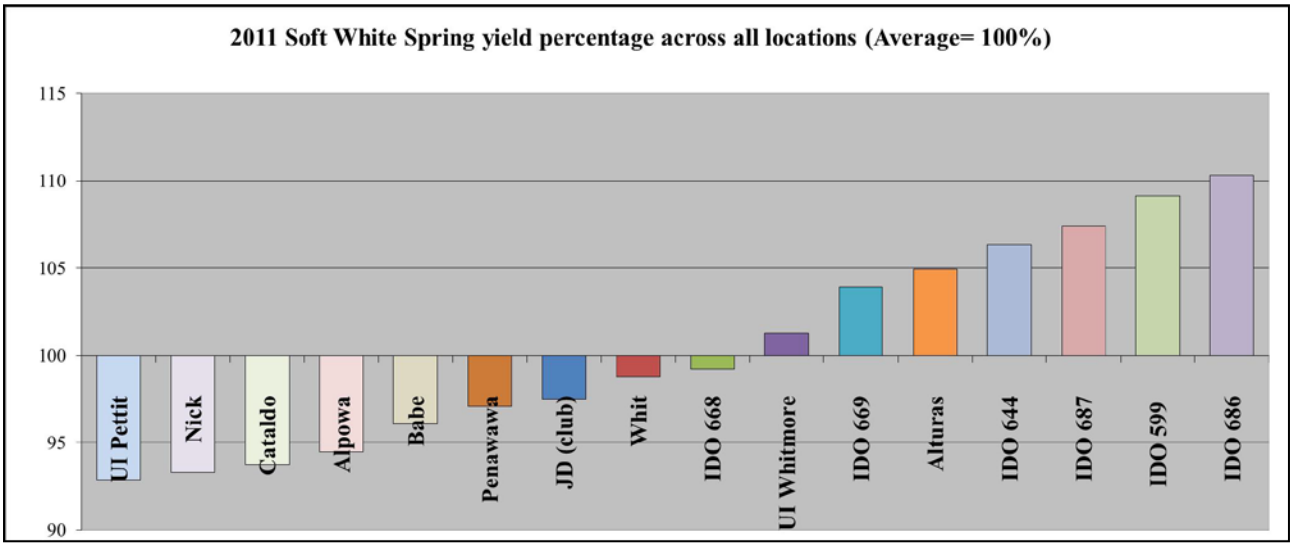


Chart 6. Soft White Spring Yield Percentage Across All Locations.

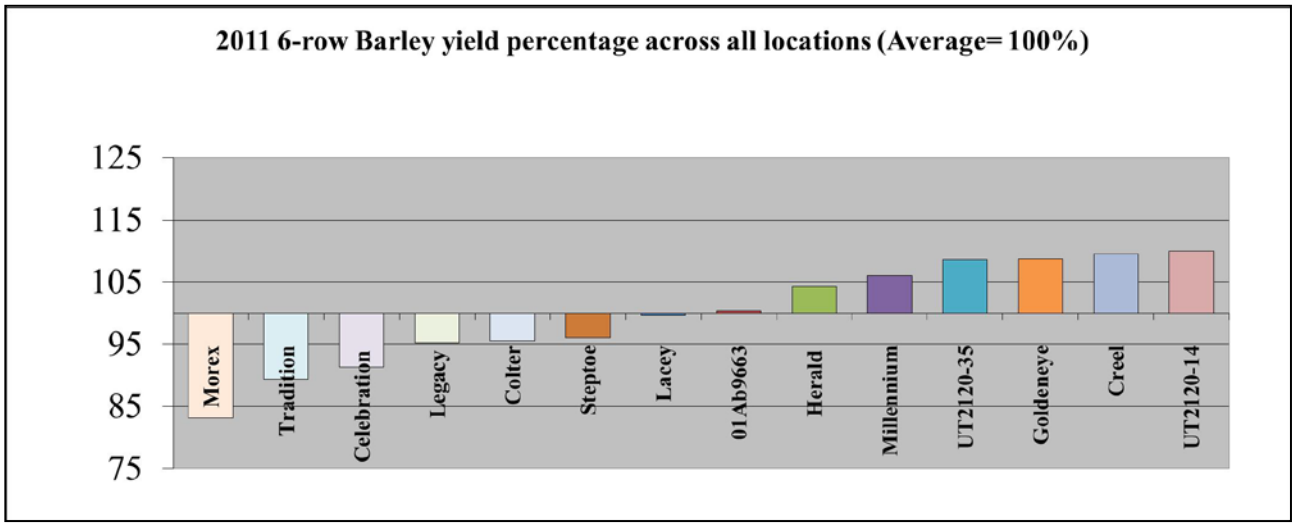


Chart 7. 6-Row Barley Yield Percentage Across All Locations.

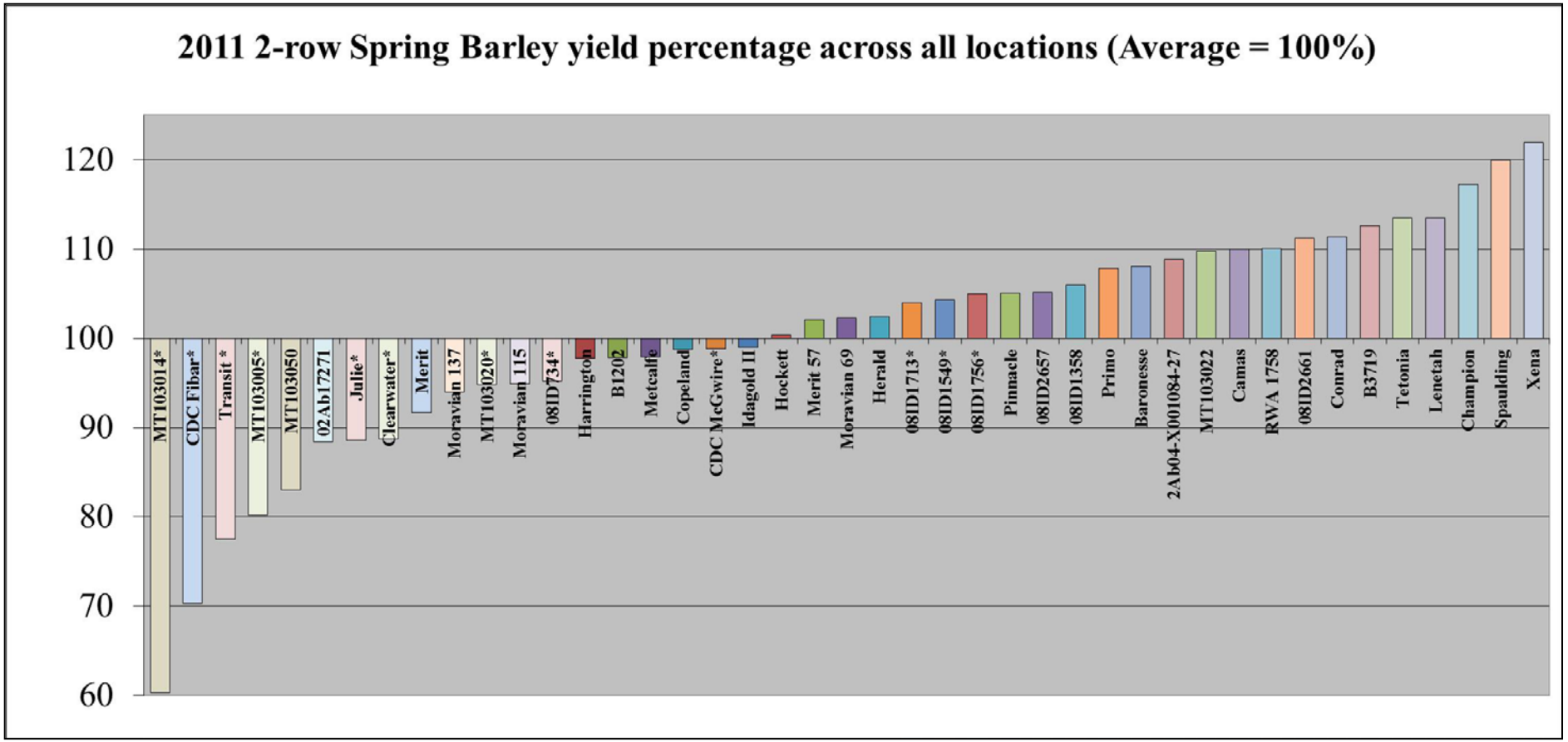


Chart 8. 2-Row Spring Barley Yield Percentage Across All Locations. * indicates hulless variety.

Table 65. Hard Winter Wheat Grain Protein & Kernel Hardness, 2010.

	----------Grain Protein %----------						----------Kernel Hardness 0-100----------					
Variety	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Rockland**	**Average**	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Rockland**	**Average**
Keldin	11.1	13.6	13.6	12.5	10.4	**12.2**	71	64	68	62	58	**64.6**
AgriPro Paladin	11.1	15.2	13.5	13.5	12.7	**13.2**	65	69	73	69	67	**68.6**
BC002-02	11.4	15.4	13.9	12.6	12.3	**13.1**	83	76	89	86	74	**81.6**
Bonneville	11.7	14.2	15.0	13.6	12.0	**13.3**	69	71	85	65	57	**69.4**
Boundary	10.3	12.9	12.8	11.4	10.9	**11.7**	66	71	70	65	65	**67.4**
Curlew	11.2	14.8	14.8	12.4	10.9	**12.8**	73	62	71	69	63	**67.6**
Deloris	11.0	13.5	14.1	13.1	10.9	**12.5**	72	76	77	64	68	**71.4**
DW	10.7	14.0	14.6	12.5	11.3	**12.6**	72	68	76	72	67	**71.0**
Eddy	11.0	13.6	13.1	12.0	11.2	**12.2**	74	64	75	65	64	**68.4**
Esperia	12.0	14.1	13.2	---	---	**13.1**	76	68	77	---	---	**73.7**
Garland	11.2	14.3	13.6	13.4	11.7	**12.8**	72	66	72	66	64	**68.0**
Gary (W)	10.4	13.8	13.8	12.1	11.5	**12.3**	68	69	86	66	58	**69.4**
Golden Spike (W)	10.3	13.7	13.2	12.1	11.8	**12.2**	69	62	86	63	52	**66.4**
UICF Grace (W)	11.8	14.9	14.5	13.1	11.0	**13.1**	88	80	66	74	72	**76.0**
IDO660 (W)	11.9	13.9	14.5	13.3	12.1	**13.1**	83	78	86	70	66	**76.6**
LHS (W)	10.0	13.5	13.7	12.3	11.1	**12.1**	72	61	81	59	53	**65.2**
Manning	10.5	14.3	13.7	13.2	12.6	**12.9**	74	68	78	69	62	**70.2**
WB-Arrowhead	11.8	13.2	13.3	13.4	11.8	**12.7**	71	65	79	64	58	**67.4**
Moreland	11.3	13.9	13.9	12.9	11.2	**12.6**	75	67	70	64	58	**66.8**
Decade	12.1	14.5	13.7	14.2	12.5	**13.4**	76	67	70	70	65	**69.6**
Norwest 553	10.4	13.4	13.0	---	---	**12.3**	69	65	72	---	---	**68.7**
NuHills	12.3	15.1	13.5	---	---	**13.6**	74	69	75	---	---	**72.7**
NuHorizon (W)	11.3	12.9	13.3	11.9	10.6	**12.0**	75	65	66	58	62	**65.2**
Promontory	10.8	14.0	13.1	12.5	10.7	**12.2**	75	62	76	68	61	**68.4**
UI Silver (W)	10.6	14.0	14.7	12.7	11.2	**12.6**	75	77	75	76	68	**74.2**
UI Darwin (W)	11.6	13.8	14.1	13.4	11.9	**13.0**	78	69	77	67	58	**69.8**
Utah 100	11.3	13.1	13.3	13.6	11.0	**12.5**	82	79	73	77	68	**75.8**
Weston	11.7	13.5	14.2	13.2	11.8	**12.9**	66	53	78	58	53	**61.6**
Whetstone	12.0	15.1	13.7	13.7	12.0	**13.3**	8	62	63	72	68	**54.6**
Yellowstone	10.9	14.0	13.4	12.3	11.3	**12.4**	73	70	78	66	63	**70.0**
Juniper	---	---	---	13.5	12.6	**13.1**	---	---	---	73	74	**73.5**
503 CL2	---	---	---	13.3	12.1	**12.7**	---	---	---	72	61	**66.5**
400W CL2	---	---	---	11.6	10.8	**11.2**	---	---	---	60	61	**60.5**
Location Average	**11.2**	**14.0**	**13.8**	**12.8**	**11.5**	**12.7**	**71.5**	**68.1**	**75.6**	**67.6**	**62.9**	**69.1**

(W) = White

Table 66. Soft White Winter Wheat Grain Protein & Kernel Hardness, 2010.

	--------Grain Protein %--------					--------Kernel Hardness 0-100--------				
Variety	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Average**	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Average**
00-475-2DH	8.1	12.7	13.3	14.3	**12.1**	15	24	19	19	**19.3**
Agripro Legion	7.7	11.3	12.9	14.8	**11.7**	11	24	23	17	**18.8**
Agripro Salute	8.3	11.5	12.8	14.6	**11.8**	21	28	27	21	**24.3**
AP Badger	7.8	10.7	12.2	14.2	**11.2**	18	31	34	25	**27.0**
AP Legacy	7.3	10.6	11.9	13.6	**10.9**	17	25	24	19	**21.3**
Bitterroot	8.0	10.5	12.6	14.8	**11.5**	7	23	18	15	**15.8**
Bruehl*	8.3	11.3	12.6	15.3	**11.9**	7	24	20	16	**16.8**
Brundage	8.1	10.7	11.7	13.7	**11.1**	15	26	23	17	**20.3**
Brundage 96	7.9	11.1	13.1	14.3	**11.6**	14	17	24	11	**16.5**
Bruneau	7.4	10.9	12.2	14.0	**11.1**	9	19	18	14	**15.0**
WB-Junction	7.6	11.4	12.2	14.1	**11.3**	12	18	21	16	**16.8**
Coda*	8.6	11.4	14.2	16.4	**12.7**	17	32	30	23	**25.5**
Daws	8.1	11.7	12.7	14.3	**11.7**	16	27	23	15	**20.3**
Goetze	8.3	11.5	12.1	13.6	**11.4**	17	26	27	20	**22.5**
ID98-19010A	7.6	11.4	11.9	12.9	**11.0**	6	11	12	6	**8.8**
IDO663	7.6	11.6	12.6	15.3	**11.8**	10	29	26	19	**21.0**
Lambert	7.5	10.8	13.0	14.7	**11.5**	18	34	30	19	**25.3**
Madsen	7.9	11.3	13.0	14.5	**11.7**	14	27	28	22	**22.8**
ORCF-101	8.7	11.6	12.2	14.8	**11.8**	16	31	26	16	**22.3**
ORCF-102	8.4	12.0	12.8	14.6	**12.0**	16	28	26	26	**24.0**
Simon	7.6	9.7	12.5	14.5	**11.1**	13	28	26	20	**21.8**
Skiles	8.3	12.0	12.5	13.5	**11.6**	19	16	17	18	**17.5**
Stephens	7.6	11.7	13.1	15.0	**11.9**	10	24	23	16	**18.3**
Tubbs 06	8.0	11.3	12.7	14.2	**11.6**	16	30	28	22	**24.0**
UICF Brundage	7.6	11.5	12.1	14.6	**11.5**	3	20	14	11	**12.0**
UICF Lambert	7.3	11.1	13.2	15.1	**11.7**	17	32	31	21	**25.3**
WB 456	8.7	11.3	12.7	13.6	**11.6**	24	32	29	2	**21.8**
WB 528	8.2	11.1	12.8	13.1	**11.3**	16	29	29	21	**23.8**
Westbred 470	9.0	12.2	12.1	13.4	**11.7**	21	26	24	13	**21.0**
Xerpha	8.5	11.4	12.6	14.3	**11.7**	22	31	27	22	**25.5**
Location Average	**8.0**	**11.3**	**12.6**	**14.3**	**11.6**	**14.6**	**25.7**	**24.2**	**17.4**	**20.5**

* = Club Wheat

Table 67. Hard Spring Wheat Grain Protein & Kernel Hardness, 2010.

	----------Grain Protein %----------						----------Kernel Hardness 0-100----------					
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
Hard Red Spring												
Bullseye	12.5	13.2	12.3	10.7	10.5	**11.8**	75	80	79	86	73	**78.6**
Cabernet	12.5	13.1	12.3	10.8	11.0	**11.9**	60	60	68	74	78	**68.0**
Choteau	13.2	14.6	12.6	11.8	12.9	**13.0**	74	85	73	74	74	**76.0**
IDO 667	12.6	13.8	12.2	11.1	11.0	**12.1**	65	67	68	73	74	**69.4**
IDO 702	12.0	14.0	12.4	11.9	11.9	**12.4**	66	69	75	72	76	**71.6**
Iona	12.4	14.5	12.0	10.6	11.1	**12.1**	57	66	73	73	64	**66.6**
Jefferson	12.2	13.8	12.7	10.7	11.2	**12.1**	68	75	75	76	74	**73.6**
Jerome	11.8	13.3	12.3	10.2	10.2	**11.6**	64	67	72	73	65	**68.2**
Kelse	13.7	14.4	13.3	11.5	11.7	**12.9**	64	75	72	75	67	**70.6**
Malbec	12.6	13.7	12.6	11.6		**12.6**	72	74	75	78		**74.8**
OR 4990114	11.9	13.3	12.6	10.4	10.0	**11.6**	60	61	64	70	59	**62.8**
WB-Rockland	13.7	14.4	13.5	11.9	12.8	**13.3**	69	73	71	74	78	**73.0**
Tara 2002	12.3	13.6	12.5	11.0	11.3	**12.1**	59	62	70	72	70	**66.6**
UI Winchester	12.4	14.1	12.3	10.6	11.1	**12.1**	60	62	70	73	76	**68.2**
Volt	12.7	13.1	12.6	11.1	11.4	**12.2**	83	83	87	92	89	**86.8**
Westbred 936	12.7	13.7	13.1	11.0	10.8	**12.3**	60	68	73	76	73	**70.0**
WB-Fuzion	12.6	14.5	13.0	11.4	11.5	**12.6**	75	83	80	80	82	**80.0**
IDO 665	---	---	---	---	10.9	**10.9**	---	---	---	---	68	**68.0**
Hard White Spring												
Blanca Grande (W)	12.3	12.9	12.1	10.8	10.6	**11.7**	46	54	61	65	66	**58.4**
Klasic (W)	11.8	13.1	12.8	10.8	10.5	**11.8**	53	51	61	54	57	**55.2**
Lochsa (W)	12.5	14.4	13.0	11.0	11.2	**12.4**	53	68	79	79	80	**71.8**
Lolo (W)	11.9	13.0	12.1	10.4	10.9	**11.7**	52	68	83	80	70	**70.6**
Otis (W)	11.5	13.5	11.4	10.9	10.9	**11.6**	43	64	80	74	66	**65.4**
Pristine (W)	12.7	14.1	13.4	11.3	11.5	**12.6**	63	71	85	85	79	**76.6**
SY Capstone (W)	12.0	13.1	12.3	10.2	10.2	**11.6**	61	51	63	68	71	**62.8**
Snow Crest (W)	12.2	13.1	12.6	10.8	10.6	**11.9**	57	46	59	56	57	**55.0**
WB-Idamax (W)	11.9	13.4	12.7	10.5	10.3	**11.8**	62	62	76	74	78	**70.4**
WB-Paloma (W)	12.1	13.5	11.9	10.5	10.5	**11.7**	47	64	75	71	73	**66.0**
Spring Durum												
Alzada	13.3	15.0	13.5	12.0	12.5	**13.3**	---	---	---	---	---	---
Kronos	13.3	15.4	13.9	11.7	11.7	**13.2**	---	---	---	---	---	---
Matt	12.7	14.5	12.7	11.3	11.8	**12.6**	---	---	---	---	---	---
Utopia	13.4	15.1	12.6	11.8	12.0	**13.0**	---	---	---	---	---	--
Location Average	**12.5**	**13.8**	**12.6**	**11.0**	**11.2**	**12.2**	**61.8**	**67.0**	**72.9**	**74.0**	**71.7**	**69.5**

(W) = White

Table 68. Soft White Spring Wheat Grain Protein & Kernel Hardness, 2010.

	--------Grain Protein %--------						--------Kernel Hardness 0-100--------					
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
Alpowa	9.1	12.8	10.6	9.9	10.2	**10.5**	23	23	25	37	33	**28.2**
Alturas	8.8	12.1	10.0	9.8	9.2	**10.0**	16	22	20	35	34	**25.4**
Babe	8.7	12.9	10.4	10.1	9.8	**10.4**	23	23	24	39	37	**29.2**
Cataldo	9.6	12.5	11.6	9.6	9.5	**10.6**	19	20	22	32	29	**24.4**
Diva	9.3	13.3	9.6	8.6	9.1	**10.0**	26	27	29	32	32	**29.2**
IDO 599	8.6	12.3	10.5	9.0	8.9	**9.9**	12	26	22	26	24	**22.0**
IDO 644	8.7	12.2	10.8	9.3	9.0	**10.0**	25	31	34	36	35	**32.2**
IDO 668	9.5	12.9	11.1	9.3	9.3	**10.4**	11	21	17	19	32	**20.0**
IDO 669	9.0	12.1	9.9	9.1	9.7	**10.0**	21	26	22	36	36	**28.2**
UI Whitmore	9.1	12.1	10.2	8.8	9.5	**9.9**	20	27	22	28	38	**27.0**
IDO 686	9.2	12.6	10.4	9.2	9.8	**10.2**	16	24	24	32	32	**25.6**
IDO 687	9.1	12.3	10.6	9.1	8.9	**10.0**	20	29	28	34	38	**29.8**
JD*	9.0	13.2	10.8	8.6	9.3	**10.2**	23	34	36	34	34	**32.2**
Nick	9.7	12.9	10.5	9.7	10.0	**10.6**	26	26	28	38	37	**31.0**
Penawawa	9.2	13.6	10.9	9.7	9.5	**10.6**	19	20	20	33	38	**26.0**
UI Pettit	8.6	11.9	10.6	8.7	9.7	**9.9**	17	28	29	26	29	**25.8**
Whit	9.0	12.9	10.3	9.2	9.4	**10.2**	18	25	24	31	29	**25.4**
Location Average	**9.1**	**12.6**	**10.5**	**9.3**	**9.5**	**10.2**	**19.7**	**25.4**	**25.1**	**32.2**	**33.4**	**27.2**

*=club wheat

Table 69. Percent flour protein and flour yield for soft white winter wheat at Kimberly, Rupert, Ririe, and Aberdeen, 2010.

	Flour Protein (%)					Flour Yield (%)				
Variety	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Average**	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Average**
00-475-2DH	6.6	11.1	11.0	9.8	**9.6**	65.1	51.4	55.7	60.6	**58.2**
Agripro Legion	6.3	11.7	10.5	8.9	**9.4**	62.9	46.4	57.6	60.6	**56.9**
Agripro Salute	6.4	11.7	10.5	8.9	**9.4**	64.7	53.2	62.1	61.4	**60.4**
AP Badger	5.8	11.6	10.3	9.4	**9.3**	63.5	53.8	63.6	62.2	**60.8**
AP Legacy	5.4	11.2	10.2	9.0	**9.0**	67.2	55.6	65.9	62.1	**62.7**
Bitterroot	6.2	12.1	11.2	10.0	**9.9**	65.4	53.4	61.9	62.5	**60.8**
Bruehl*	6.5	12.3	11.1	9.4	**9.8**	65.4	49.0	61.3	62.9	**59.7**
Brundage	6.3	11.2	10.4	8.7	**9.2**	62.2	55.1	60.6	60.4	**59.6**
Brundage 96	6.1	11.6	11.0	8.6	**9.3**	62.4	49.8	57.9	59.8	**57.5**
Bruneau	6.1	11.4	10.7	8.7	**9.2**	64.1	51.7	60.5	59.8	**59.0**
WB-Junction	5.8	11.3	10.6	7.8	**8.9**	59.5	50.2	59.3	59.6	**57.2**
Coda*	6.5	12.9	11.8	9.3	**10.1**	66.9	51.3	60.7	63.3	**60.6**
Daws	6.3	11.5	10.8	8.8	**9.4**	63.9	50.8	60.0	59.4	**58.5**
Goetze	6.4	11.5	10.7	9.4	**9.5**	60.8	54.3	59.7	62.2	**59.3**
ID98-19010A	5.9	10.9	10.4	8.7	**9.0**	62.6	51.9	58.2	61.5	**58.6**
IDO663	6.2	12.1	10.9	8.5	**9.4**	64.7	47.7	60.8	63.2	**59.1**
Lambert	5.8	12.0	10.8	7.9	**9.1**	65.3	50.0	59.1	60.4	**58.7**
Madsen	6.5	11.9	11.3	9.5	**9.8**	65.4	52.4	63.4	62.3	**60.9**
ORCF-101	6.9	12.1	10.8	10.1	**10.0**	62.8	52.2	63.7	60.3	**59.8**
ORCF-102	6.5	11.9	11.3	9.7	**9.9**	64.2	50.8	58.4	61.5	**58.7**
Simon	6.2	12.1	11.0	8.8	**9.5**	65.1	52.9	64.3	63.1	**61.4**
Skiles	6.4	11.1	10.8	9.5	**9.5**	62.8	50.8	60.4	57.2	**57.8**
Stephens	6.1	11.8	11.0	9.5	**9.6**	62.3	46.5	56.2	59.1	**56.0**
Tubbs 06	6.4	11.6	10.6	8.7	**9.3**	66.2	52.0	61.9	62.3	**60.6**
UICF Brundage	6.2	11.6	10.6	8.5	**9.2**	60.0	47.6	55.6	55.6	**54.7**
UICF Lambert	6.8	12.0	10.8	7.8	**9.4**	63.9	49.8	60.5	62.1	**59.1**
WB 456	7.7	11.6	11.0	9.4	**9.9**	65.5	59.6	64.1	62.3	**62.9**
WB 528	7.2	11.4	11.2	9.6	**9.9**	63.2	59.6	62.2	60.1	**61.3**
Westbred 470	7.7	11.6	11.0	10.0	**10.1**	61.5	53.7	59.2	56.5	**57.7**
Xerpha	7.3	11.5	9.7	9.5	**9.5**	63.7	52.6	64.5	58.9	**59.9**
Location average	**6.4**	**11.7**	**10.8**	**9.1**	**9.5**	**63.8**	**51.9**	**60.6**	**60.8**	**59.3**

* = Club Wheat

Table 70. Percent break flour yield and cookie diameter for soft white winter wheat at Kimberly, Rupert, Ririe, and Aberdeen 2010.

	Break Flour Yield (%)					Cookie Diameter (cm)				
Variety	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Average**	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Average**
00-475-2DH	45.3	41.7	36.3	41.2	**41.1**	8.8	8.6	8.3	8.8	**8.6**
Agripro Legion	42.8	39.1	35.7	39.9	**39.4**	8.6	8.3	8.5	8.9	**8.6**
Agripro Salute	40.6	39.0	32.8	42.6	**38.8**	8.5	8.5	8.5	9.1	**8.6**
AP Badger	40.4	34.0	33.1	35.5	**35.8**	8.6	8.4	8.4	8.7	**8.5**
AP Legacy	45.1	41.2	37.6	42.7	**41.7**	8.8	8.4	8.6	8.8	**8.6**
Bitterroot	45.9	40.0	37.2	43.8	**41.7**	8.9	8.5	8.6	8.7	**8.7**
Bruehl*	39.2	36.8	34.5	40.0	**37.6**	8.8	8.5	8.8	9.0	**8.7**
Brundage	43.4	41.0	37.0	45.7	**41.8**	8.7	8.7	8.8	8.9	**8.8**
Brundage 96	45.8	43.1	38.2	44.9	**43.0**	9.0	8.6	8.4	9.0	**8.8**
Bruneau	45.5	41.1	37.3	44.0	**42.0**	8.8	8.6	8.7	9.0	**8.8**
WB-Junction	48.7	42.2	37.4	46.2	**43.6**	9.0	8.7	8.7	9.1	**8.9**
Coda*	40.5	38.4	35.7	40.5	**38.8**	8.7	8.4	8.5	8.7	**8.5**
Daws	42.6	39.1	35.7	43.8	**40.3**	8.6	8.3	8.3	8.6	**8.5**
Goetze	41.8	35.1	33.8	42.2	**38.2**	8.6	8.3	8.5	8.7	**8.5**
ID98-19010A	49.1	35.9	40.1	45.5	**42.7**	8.9	8.6	8.9	9.0	**8.8**
IDO663	49.0	35.3	34.8	39.2	**39.6**	8.7	8.4	8.5	8.7	**8.5**
Lambert	42.6	36.5	34.3	43.6	**39.3**	8.6	8.3	8.4	8.8	**8.5**
Madsen	40.7	35.7	31.9	36.5	**36.2**	8.5	8.4	8.3	8.6	**8.5**
ORCF-101	38.7	34.4	31.1	38.2	**35.6**	8.5	8.3	8.4	8.7	**8.5**
ORCF-102	41.6	38.6	33.9	38.6	**38.2**	8.6	8.4	8.4	8.5	**8.5**
Simon	40.1	38.6	32.7	43.7	**38.8**	8.6	8.4	8.3	8.5	**8.4**
Skiles	43.6	43.3	37.3	45.2	**42.4**	8.7	8.6	8.7	8.8	**8.7**
Stephens	42.4	40.6	34.9	41.0	**39.7**	8.7	8.4	8.4	8.6	**8.5**
Tubbs 06	36.3	36.2	30.5	38.0	**35.3**	8.4	8.3	8.3	8.4	**8.4**
UICF Brundage	46.4	41.5	38.4	44.5	**42.7**	9.1	8.6	8.7	8.8	**8.8**
UICF Lambert	39.8	39.0	34.7	43.2	**39.2**	8.5	8.4	8.5	8.7	**8.5**
WB 456	33.9	35.2	33.0	37.3	**34.9**	8.4	8.4	8.6	8.7	**8.5**
WB 528	42.3	36.1	34.9	35.9	**37.3**	8.6	8.5	8.3	8.5	**8.5**
Westbred 470	37.4	38.0	34.1	40.8	**37.6**	8.5	8.4	8.5	8.6	**8.5**
Xerpha	38.1	37.5	33.0	41.4	**37.5**	8.4	8.3	8.3	8.6	**8.4**
Location average	**42.3**	**38.5**	**35.1**	**41.5**	**39.3**	**8.7**	**8.4**	**8.5**	**8.7**	**8.6**

* = Club Wheat

Table 71. Percent flour protein and flour yield for soft white spring wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2010.

	Flour Protein (14% mb)						Flour Yield (%)					
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
Alpowa	7.8	10.3	8.6	7.4	7.6	**8.3**	61.1	56.7	62.9	56.8	57.0	**58.9**
Alturas	7.4	10.2	8.5	7.5	7.0	**8.1**	64.6	60.8	64.8	59.7	60.8	**62.1**
Babe	6.7	10.3	8.7	7.4	7.1	**8.0**	64.3	59.0	63.3	56.0	60.2	**60.6**
Cataldo	7.8	10.5	9.4	7.7	7.4	**8.6**	63.4	58.8	61.6	56.7	58.9	**59.9**
Diva	7.2	10.2	8.4	7.0	6.8	**7.9**	64.3	60.4	62.8	60.0	59.7	**61.4**
IDO 599	6.9	9.9	8.5	7.4	7.0	**7.9**	62.4	62.9	64.6	60.1	63.2	**62.6**
IDO 644	6.6	9.9	8.6	7.2	6.5	**7.8**	66.2	62.0	64.8	58.8	62.2	**62.8**
IDO 668	7.8	10.8	9.5	8.0	7.1	**8.6**	63.8	58.2	63.9	57.9	61.5	**61.1**
IDO 669	7.1	9.9	8.5	7.1	7.4	**8.0**	65.5	62.5	63.3	59.2	60.4	**62.2**
UI Whitmore	7.2	9.9	8.7	6.7	7.1	**7.9**	64.8	62.9	66.4	62.5	60.0	**63.3**
IDO 686	7.6	10.7	8.8	7.0	7.1	**8.2**	66.0	63.8	66.2	61.3	58.9	**63.2**
IDO 687	7.3	10.1	8.4	6.6	6.6	**7.8**	66.7	62.0	65.3	60.9	61.8	**63.3**
JD*	7.0	10.5	8.5	6.4	6.9	**7.9**	67.3	63.6	67.2	63.5	61.4	**64.6**
Nick	7.6	10.5	8.7	6.9	7.3	**8.2**	64.8	58.4	62.6	58.6	59.6	**60.8**
Penawawa	7.4	10.9	8.9	7.2	7.1	**8.3**	60.0	52.1	56.8	55.2	57.3	**56.3**
UI Pettit	6.7	9.9	8.6	6.7	7.6	**7.9**	64.7	63.0	65.9	61.8	60.9	**63.3**
Whit	7.7	10.4	8.6	6.8	7.4	**8.2**	64.1	57.6	59.9	59.3	61.0	**60.4**
Location Average	**7.3**	**10.3**	**8.7**	**7.1**	**7.1**	**8.1**	**64.4**	**60.3**	**63.7**	**59.3**	**60.3**	**61.6**

*=club wheat

Table 72. Percent break flour and cookie diameter for soft white spring wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2010.

	Break Flour (%)						Cookie Diameter (cm)					
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
Alpowa	40.0	39.0	39.0	32.0	36.5	**37.3**	8.5	8.4	8.5	8.1	8.1	**8.3**
Alturas	41.4	37.4	36.5	29.5	32.1	**35.4**	8.7	8.6	8.5	8.0	7.8	**8.3**
Babe	39.9	36.6	36.5	27.7	28.5	**33.8**	9.1	8.5	8.6	7.8	7.9	**8.4**
Cataldo	37.2	35.2	34.3	30.5	29.8	**33.4**	8.8	8.4	8.4	7.9	8.1	**8.3**
Diva	43.4	39.9	39.4	30.9	34.6	**37.6**	8.9	8.6	8.5	8.3	8.2	**8.5**
IDO 599	46.5	38.0	42.5	34.8	39.3	**40.2**	9.1	8.5	8.6	8.1	8.4	**8.6**
IDO 644	40.6	34.7	35.8	29.2	35.0	**35.1**	8.6	8.3	8.4	7.8	8.2	**8.3**
IDO 668	37.1	32.9	36.2	29.4	31.0	**33.3**	8.6	8.4	8.3	7.9	8.1	**8.2**
IDO 669	45.9	42.4	44.5	31.7	35.7	**40.0**	9.0	8.6	8.8	8.0	8.3	**8.5**
UI Whitmore	40.8	37.2	37.0	28.2	29.7	**34.6**	9.0	8.4	8.6	7.9	8.0	**8.4**
IDO 686	39.6	35.6	34.8	27.8	31.5	**33.9**	9.1	8.5	8.4	7.8	7.9	**8.3**
IDO 687	41.3	38.7	39.7	29.4	34.2	**36.7**	9.2	8.5	8.6	7.9	8.0	**8.4**
JD*	42.5	36.0	37.6	31.7	37.1	**37.0**	8.7	8.6	8.5	8.1	8.2	**8.4**
Nick	35.8	36.3	34.2	24.2	28.4	**31.8**	8.8	8.6	8.4	7.8	8.1	**8.3**
Penawawa	40.9	37.4	38.8	26.8	26.2	**34.0**	8.8	8.6	8.6	7.8	8.0	**8.3**
UI Pettit	45.8	37.5	39.4	34.9	34.8	**38.5**	8.9	8.7	8.6	8.1	8.4	**8.5**
Whit	44.1	38.8	41.7	29.9	29.9	**36.9**	9.1	8.6	8.6	8.1	8.2	**8.5**
Location Average	**41.3**	**37.3**	**38.1**	**29.9**	**32.6**	**35.8**	**8.9**	**8.5**	**8.5**	**7.9**	**8.1**	**8.4**

*=club wheat

Table 73. Percent flour protein and flour yield for hard winter wheat at Aberdeen, Kimberly, Rupert, Ririe and Preston 2010.

	Flour Protein (14% mb)						Flour Yield (%)					
Variety	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Rockland**	**Average**	**Kimberly**	**Rupert**	**Aberdeen**	**Ririe**	**Rockland**	**Average**
Hard Red Winter Wheat												
Keldin	9.3	12.2	12.2	11.3	9.4	**10.9**	66.2	60.3	63.2	63.9	59.8	**62.7**
AgriPro Paladin	9.5	13.7	12.2	12.1	11.2	**11.7**	65.2	55.2	63.7	62.6	62.1	**61.8**
BC002-02	9.7	13.5	12.5	11.8	11.3	**11.8**	62.0	53.6	60.6	63.7	59.0	**59.8**
Bonneville	10.2	13.4	13.6	12.4	11.2	**12.2**	67.8	62.8	65.7	64.8	63.3	**64.9**
Boundary	8.8	12.0	11.7	10.1	10.0	**10.5**	67.3	60.4	64.3	64.0	62.2	**63.6**
Curlew	9.8	13.5	13.1	11.1	9.9	**11.5**	66.8	52.4	60.6	63.8	63.2	**61.4**
Deloris	9.8	12.5	13.2	12.1	9.7	**11.5**	69.4	65.4	64.4	67.2	65.0	**66.3**
DW	9.0	12.5	13.2	11.1	10.0	**11.2**	65.3	60.2	60.5	63.2	60.6	**62.0**
Eddy	9.5	12.0	11.8	11.3	10.2	**11.0**	67.7	62.3	66.4	67.2	65.2	**65.8**
Esperia	10.7	13.0	12.0	---	---	**11.9**	63.8	57.2	64.1	---	---	**61.7**
Garland	9.3	12.5	11.7	11.8	10.4	**11.1**	62.2	55.2	59.3	62.2	59.1	**59.6**
Manning	9.1	12.7	12.1	11.8	11.2	**11.4**	67.3	56.6	61.3	63.1	63.2	**62.3**
WB-Arrowhead	10.1	12.3	11.6	12.3	10.7	**11.4**	66.5	61.7	65.8	64.6	64.6	**64.6**
Moreland	9.7	12.0	12.1	11.6	9.8	**11.0**	65.8	55.5	59.1	63.3	59.6	**60.7**
Decade	10.6	13.1	12.4	13.0	10.9	**12.0**	66.2	61.8	64.7	64.4	63.4	**64.1**
Norwest 553	8.8	12.1	11.2	---	---	**10.7**	65.3	61.0	63.7	---	---	**63.3**
NuHills	10.6	13.0	11.9	---	---	**11.8**	60.2	55.9	60.0	---	---	**58.7**
Promontory	9.1	12.0	11.6	11.0	9.6	**10.7**	67.7	58.2	67.5	65.4	64.5	**64.7**
Utah 100	9.3	11.5	11.3	11.8	9.5	**10.7**	65.0	60.4	64.6	63.2	61.2	**62.9**
Weston	10.4	12.4	13.0	12.4	10.7	**11.8**	66.2	59.7	64.7	62.4	61.3	**62.9**
Whetstone	10.2	13.1	12.4	12.6	10.7	**11.8**	65.2	57.8	65.0	64.6	62.7	**63.1**
Yellowstone	9.5	12.8	12.1	11.2	10.2	**11.2**	66.1	57.8	65.2	63.7	63.1	**63.2**
Juniper	---	---	---	12.2	11.4	**11.8**	---	---	---	63.8	62.8	**63.3**
503 CL2	---	---	---	11.7	10.8	**11.3**	---	---	---	63.0	61.4	**62.2**
400W CL2	---	---	---	11.0	9.7	**10.4**	---	---	---	61.6	59.6	**60.6**
Location Average	**9.7**	**12.6**	**12.2**	**11.7**	**10.4**	**11.3**	**65.7**	**58.7**	**63.4**	**63.9**	**62.1**	**62.6**
Hard White Winter Wheat												
Gary (W)	8.4	12.1	11.8	10.5	10.3	**10.6**	64.8	55.6	60.1	63.9	59.3	**60.7**
Golden Spike (W)	8.5	12.0	11.6	10.7	10.8	**10.7**	69.0	56.4	59.2	64.8	59.4	**61.8**
UICF Grace (W)	10.0	13.2	12.6	11.6	9.7	**11.4**	61.9	52.0	57.2	59.1	59.4	**57.9**
IDO660 (W)	10.1	12.4	12.7	12.1	10.8	**11.6**	61.2	60.8	61.7	60.9	60.9	**61.1**
LHS (W)	8.5	12.1	12.1	11.2	10.0	**10.8**	68.3	57.9	63.3	63.7	62.3	**63.1**
NuHorizon (W)	9.7	11.6	12.0	10.9	9.4	**10.7**	64.5	61.6	63.8	62.8	61.3	**62.8**
UI Silver (W)	10.0	12.2	12.8	11.0	9.6	**11.1**	67.3	57.3	61.7	64.2	63.5	**62.8**
UI Darwin (W)	9.9	12.2	12.3	12.2	10.7	**11.5**	66.8	59.2	64.8	62.2	62.9	**63.2**
Location Average	**9.4**	**12.2**	**12.2**	**11.3**	**10.2**	**11.1**	**65.5**	**57.6**	**61.5**	**62.7**	**61.1**	**61.7**

mb= moisture basis

Table 74. Bake volume for hard winter wheat at Aberdeen, Kimberly, Rupert, Ririe and Preston 2010.

	Bake Volume (cc)					
Variety	**Aberdeen**	**Kimberly**	**Rupert**	**Ririe**	**Rockland**	**Average**
Hard Red Winter Wheat						
Keldin	1075	750	1100	1000	750	**935**
AgriPro Paladin	1100	800	1200	1025	950	**1015**
BC002-02	1025	750	1100	1025	975	**975**
Bonneville	1125	925	1150	1025	1000	**1045**
Boundary	1000	650	1025	900	850	**885**
Curlew	1200	850	1175	975	975	**1035**
Deloris	1175	900	1050	1100	925	**1030**
DW	1200	850	1175	1025	975	**1045**
Eddy	1100	850	1000	975	950	**975**
Esperia	1050	1000	1075	---	---	**1042**
Garland	950	700	1025	975	875	**905**
Manning	1100	750	1150	1100	1150	**1050**
WB-Arrowhead	1150	900	1100	1100	1050	**1060**
Moreland	1125	800	1025	925	800	**935**
Decade	1150	925	1100	1100	975	**1050**
Norwest 553	1075	750	1075	---	---	**967**
NuHills	1075	875	1000	---	---	**983**
Promontory	1025	725	1050	925	850	**915**
Utah 100	1075	775	1025	1000	950	**965**
Weston	1175	825	1100	1125	1075	**1060**
Whetstone	1150	825	1100	1100	1025	**1040**
Yellowstone	1150	800	1050	1025	950	**995**
Juniper	---	---	---	1075	1075	**1075**
503 CL2	---	---	---	1075	1025	**1050**
400W CL2	---	---	---	950	925	**938**
Location Average	**1102**	**817**	**1084**	**1024**	**958**	**997**
Hard White Winter Wheat						
Gary (W)	1000	750	1025	900	1025	**940**
Golden Spike (W)	1025	750	1050	950	1050	**965**
UICF Grace (W)	1075	825	1100	1025	825	**970**
IDO660 (W)	1175	875	1100	1050	1025	**1045**
LHS (W)	1050	825	1050	1025	975	**985**
NuHorizon (W)	975	700	950	925	750	**860**
UI Silver (W)	1200	900	1150	1000	900	**1030**
UI Darwin (W)	1125	850	1075	1000	1000	**1010**
Location Average	**1078**	**809**	**1063**	**984**	**944**	**976**

(W) = White

Table 75. Percent flour protein and flour yield for hard spring wheat at Rupert, Aberdeen, Idaho Falls, Ashton, and Soda Springs, 2010.

	Flour Protein (14% mb)						Flour Yield (%)					
Variety	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**	**Rupert**	**Aberdeen**	**Idaho Falls**	**Ashton**	**Soda Springs**	**Average**
Hard Red Spring												
Bullseye	10.9	12.0	10.8	8.4	8.4	**10.1**	65.7	67.9	67.6	47.5	55.6	**60.9**
Cabernet	11.5	12.5	11.1	9.1	8.6	**10.6**	65.1	67.4	67.2	53.7	50.3	**60.7**
Choteau	12.3	13.4	11.6	10.0	10.6	**11.6**	62.8	65.7	65.2	48.4	49.2	**58.3**
IDO 665	---	---	---	---	8.7	**8.7**	---	---	---	---	51.3	**51.3**
IDO 667	11.6	12.9	10.7	9.4	9.2	**10.8**	65.6	65.2	65.6	49.7	49.6	**59.1**
IDO 702	11.0	13.1	11.4	9.4	9.8	**10.9**	63.7	62.8	65.7	47.6	45.4	**57.0**
Iona	11.6	13.7	10.9	9.0	9.1	**10.9**	67.1	65.2	68.4	51.4	51.2	**60.7**
Jefferson	10.9	12.7	11.3	8.9	9.0	**10.6**	67.6	67.6	68.2	53.8	54.2	**62.3**
Jerome	10.6	12.1	10.5	8.5	8.0	**9.9**	68.1	65.7	66.1	51.3	53.9	**61.0**
Kelse	12.4	13.3	12.1	9.6	9.3	**11.3**	63.9	62.8	62.0	48.6	48.7	**57.2**
Malbec	11.5	13.0	11.6	9.7	---	**11.5**	64.3	63.7	62.7	47.8	---	**59.6**
OR 4990114	11.0	12.4	11.2	8.5	7.8	**10.2**	67.3	64.5	66.0	53.1	53.6	**60.9**
WB-Rockland	12.6	13.7	12.5	10.3	10.4	**11.9**	62.6	61.9	62.1	48.7	43.3	**55.7**
Tara 2002	11.1	12.7	11.1	9.1	9.1	**10.6**	65.2	63.5	65.5	49.1	49.6	**58.6**
UI Winchester	11.3	12.7	11.2	9.3	8.8	**10.7**	65.7	62.8	64.8	52.6	50.1	**59.2**
Volt	10.9	11.8	11.2	8.5	8.5	**10.2**	61.4	63.1	61.2	43.0	40.4	**53.8**
WestBred 936	11.7	12.9	11.7	9.0	8.6	**10.8**	64.9	62.6	62.4	48.3	49.8	**57.6**
WB-Fuzion	11.7	13.6	11.9	9.7	9.5	**11.3**	63.1	61.7	63.1	50.0	48.5	**57.3**
Location Average	**11.4**	**12.9**	**11.3**	**9.2**	**9.0**	**10.7**	**64.9**	**64.4**	**64.9**	**49.7**	**49.7**	**58.4**
Hard White Spring												
Blanca Grande (W)	11.1	12.3	10.7	9.1	8.8	**10.4**	58.6	60.8	58.6	50.0	48.7	**55.3**
Klasic (W)	10.8	12.5	11.2	9.2	8.8	**10.5**	65.6	63.7	64.1	54.8	56.6	**61.0**
Lochsa (W)	11.5	13.2	11.5	9.1	9.7	**11.0**	66.3	62.9	65.5	48.5	55.6	**59.8**
Lolo (W)	10.4	11.7	10.7	8.1	9.0	**10.0**	62.0	60.9	60.4	42.8	48.2	**54.9**
Otis (W)	10.4	12.4	10.2	8.7	8.9	**10.1**	65.7	65.2	63.2	44.9	51.1	**58.0**
Pristine (W)	11.0	12.7	11.4	9.0	9.3	**10.7**	65.7	62.6	64.5	49.8	53.8	**59.3**
SY Capstone (W)	11.2	12.4	11.3	8.5	8.4	**10.4**	65.7	64.1	64.8	52.3	55.7	**60.5**
Snow Crest (W)	11.3	12.6	11.8	9.4	9.4	**10.9**	61.3	60.1	59.4	53.1	55.7	**57.9**
WB-Idamax (W)	10.8	12.4	11.5	8.5	8.3	**10.3**	66.1	62.8	64.8	49.5	51.4	**58.9**
WB-Paloma (W)	10.7	12.4	10.8	8.3	8.3	**10.1**	65.2	64.2	62.9	49.8	51.6	**58.7**
Location Average	**10.9**	**12.5**	**11.1**	**8.8**	**8.9**	**10.4**	**64.2**	**62.7**	**62.8**	**49.6**	**52.8**	**58.4**

(W) = White

Table 76. Bake volume for hard spring wheat, 2010.

	Bake Volume (cc)					
Variety	**Aberdeen**	**Ashton**	**Idaho Falls**	**Rupert**	**Soda Springs**	**Average**
Hard Red Spring Wheat						
Bullseye	1125	400	1000	950	675	**830**
Cabernet	1200	400	1050	1050	625	**865**
Choteau	1200	400	1000	1025	775	**880**
IDO 665	---	---	---	---	625	**625**
IDO 667	1200	400	950	1025	400	**795**
IDO 702	1250	400	1050	900	400	**800**
Iona	1250	625	1025	1050	700	**930**
Jefferson	1150	650	1125	975	750	**930**
Jerome	1100	400	1050	975	675	**840**
Kelse	1150	625	1175	1100	650	**940**
Malbec	1175	775	1150	1050	---	**1038**
OR 4990114	1100	650	1100	1025	675	**910**
WB-Rockland	1200	750	1150	1075	675	**970**
Tara 2002	1150	400	1050	1025	700	**865**
UI Winchester	1150	725	1000	1000	675	**910**
Volt	1050	400	950	875	400	**735**
WestBred 936	1175	650	1050	1025	675	**915**
WB-Fuzion	1225	625	1075	1000	750	**935**
Location Average	**1168**	**546**	**1056**	**1007**	**637**	**873**
Hard White Spring Wheat						
Blanca Grande (W)	1200	750	1000	1050	675	**935**
Klasic (W)	1175	750	1100	1050	825	**980**
Lochsa (W)	1175	400	1050	1025	750	**880**
Lolo (W)	1000	400	950	775	400	**705**
Otis (W)	1125	400	925	875	400	**745**
Pristine (W)	1075	650	1050	975	725	**895**
SY Capstone (W)	1175	625	1050	1100	675	**925**
Snow Crest (W)	1200	800	1100	1100	925	**1025**
WB-Idamax (W)	1125	625	1125	1050	700	**925**
WB-Paloma (W)	1200	625	1075	1000	650	**910**
Location Average	**1145**	**603**	**1043**	**1000**	**673**	**893**

(W) = White

Appendix A.

Evaluation of resistance to Fusarium head blight in fifty spring wheat cultivars and advanced lines grown in Pacific Northwest

Jianli Chen, Justin Wheeler, Weidong Zhao, and Juliet Marshall

Fusarium head blight (FHB) is one of the most destructive diseases of wheat (*Triticum aestivum* L. and *T. durum* L.) and barley (*Hordeum vulgare* L.) in warm and humid areas of the world. It has been an increasingly serious problem in the areas with increased conservation tillage, small grain rotations with maize, and favorable weather condition during anthesis. FHB epidemics can cause significant yield losses, shriveled kernels, and deposition of vomitoxin (deoxynivalenol (DON)) on the infected seeds which renders the grain unsuitable for human consumption and animal feed. Wheat and barley losses caused by FHB epidemics in the USA during the 1990s were estimated at close to $3 billion U.S. dollars. FHB has not been a serious problem for small grain production in Southeast Idaho. However, FHB epidemics occurred in sprinkler-irrigated wheat and barley fields in south central and eastern Idaho in 1982 and 1984, resulting in estimated yield losses as high as 50%[15]. Scab epidemics occurred in sprinkler-irrigated spring wheat and barley fields in Montana in 2006 and 2007 and resulted in estimated yield losses over 50% (Luther Talbert, personal communication). Scab infection was also observed in wheat fields in 2008 to 2010. In 2010 and 2011, high DON in grain samples was identified at several grain elevators. This is an emerging threat in the Idaho wheat industries.

TYPES OF FHB RESISTANCE

Resistance to FHB is complex, and has been delineated into five types: (1) type I, resistance to initial infection, (2) type II, resistance to disease colonization within a spike, (3) type III, decomposition or non-accumulation of mycotoxin, (4) type IV, resistance to kernel colonization, and (5) type V, tolerance to yield loss[20,26,12]. Three components of FHB resistance have generally been accepted and included type I, type II and type III[23]. Type II resistance is the major type of resistance and has been studied most extensively. Type II resistance is usually assessed as FHB severity or Area Under the Disease Progress Curve (AUDPC) using single-floret inoculation methods conducted in greenhouse and/or in field experiments. Type I resistance is usually

assessed as FHB incidence using spray-inoculation methods generally conducted in field experiments and occasionally in greenhouse studies. Type III resistance is usually assessed as DON content of grains from naturally infected field trials or single-floret and spray-inoculated experiments conducted in both the greenhouse and field. Highly significant correlations were reported between FHB incidence, severity, and DON content using the same inoculation method and under same environment[5,14,13]. Phenotypic selection on the basis of reduced FHB symptoms should result in a correlated selection response for low fungal biomass and low DON content in the grain[14]. However, poor correlations often have been observed between FHB severity evaluated in greenhouse versus field experiments[6], and between FHB incidence, severity, and DON using different inoculation methods and/or experiments conducted in different years[23].

INHERITANCE OF FHB RESISTANCE REVEALED BY QTL MAPPING

Resistance to FHB is a quantitative trait, governed by several to many genes and modulated by environmental conditions. This is confirmed based on mapping progress. Mapping efforts to date have targeted almost every chromosome containing putative QTL (Quantitative Trait Loci) associated with at least one component of FHB resistance in wheat; however, only QTL on chromosomes 2D, 3A, 3B, 5A, and 6B have been confirmed in two or more mapping populations. One major QTL on 3BS for type II resistance has been identified and confirmed in most Chinese sources, including Sumai 3[1,10], Ning7840[28], CM-82036[2,3], Ning894037[21], Wuhan1[23], Wangshuibai[29], W14[6], and DH181[27]. A QTL on 5AS for type II resistance has been confirmed in Sumai3-related lines, such as CM-82036[3], W14[6], Brazilian source Frontana[24], and the soft red winter (SRW) wheat cultivar Ernie[11]. The 3BS QTL has a larger effect than the 5AS QTL on type II resistance and the 5AS QTL has a larger effect than 3BS on type I resistance[6]. Mapping of FHB resistance in backgrounds lacking the 3BS QTL have identified a QTL on chromosome 3A for type II resistance. This QTL also was reported to have a larger effect than the 5AS QTL on type II resistance in the Brazilian cultivar Frontana[24], and in a Romanian winter wheat cultivar F201R[22]. The 3A QTL also was reported to be associated with type I resistance in a Sumai 3-related line DH181[27]. QTL on chromosomes 2D and 6B for type II resistance have been confirmed in two Sumai 3-related lines, Ning 894037[21] and DH181[27]. QTL for DON

accumulation have only been reported in two studies, in which the QTL on 5AS was identified in Nuy Bay[23], and in a Chinese line W14[6].

SOURCES OF FHB RESISTANCE IN WHEAT

Use of host-plant resistance is considered to be the most practical and effective means to control FHB[20]. Sources with complete resistance have not been found; however, sources with partial resistance have been identified in common wheat and can be classified into four groups. Group I consists of highly resistant sources, which mainly include spring wheat genotypes, such as Sumai 3, Ning7840, Wangshuibai and W14 from China, Nobeokabouzu-komugi and NyuBai from Japan. Sumai 3 and/or its derivatives are the most widely used FHB resistance source in the world. Sumai 3 has been used in Chinese breeding programs for at least 20 years. These sources have been characterized as having resistance to disease spread, called type II resistance. Genotypes in this group usually have 1-3 diseased florets per inoculated spike with little to no rachis colonization, and do not exhibit significant progression in colonization during disease development after inoculation[5]. Since their introduction into the USA in late 1980s, these sources have been used extensively by both spring and winter wheat breeding programs[25] and have resulted in the development of a few spring wheat cultivars such as Alsen, Glenn, and ND2710; winter cultivars, and germplasm with some FHB resistance such as VA04W-433 and VA04W-474. Group II resistance sources include the Brazilian cultivar Frontana, which was postulated as also having resistance to initial infection, called type I resistance, and DON (type III) resistance[16].

Group III resistance sources include adapted winter wheat cultivars or lines of diverse origin that also are referred to as native resistance sources. Genotypes such as soft red winter (SRW) wheat cultivars Ernie[11], Freedom[8], and Roane[9], have expressed variable ratings for FHB incidence, but generally have significantly low ratings in field experiments for FHB severity, yield and/or test weight loss, fusarium damaged kernels (FDK), and DON content[5]. Other winter wheat genotypes, such as the Swiss cultivar Arina[18], the French cultivar Renan[7], and the Romanian cultivar Fundulea 201R[22], also were found to have FHB resistance. These lines have no ancestral relationship with lines in groups I and II on the basis of pedigree, and potentially offer

complementary sources to groups I and II. Although FHB resistance of Group III sources is often only intermediate, these sources are very valuable and their use as adapted parents in crosses with non-adapted sources possibly will produce progeny that are more adapted and have better agronomic characteristics as well as enhanced FHB resistance. Group IV resistance sources include wild relatives of wheat, such as *T. tauschii* (*Coss*.) Schmal., *Roegneria kamoji* C. Koch, and *Th. elongongatum* (Host), etc.[17]. These sources can play an important role in enriching the gene pool and providing novel and complementary sources of FHB resistance. Alien addition, substitution, and translocation lines are being developed by several programs[4,17].

EVALUATION OF FHB RESISTANCE IN PNW SPRING WHEAT LINES

Fusarium head blight (FHB) epidemics occurred in sprinkler-irrigated wheat and barley fields in south central and eastern Idaho in 1982 and 1984, resulting in estimated yield losses as high as 50%[15]. FHB epidemics in spring wheat occurred in sprinkler-irrigated wheat and barley fields in Montana in 2006 and 2007 and resulted in estimated yield losses over 50% (Luther Talbert, *personal communication*). FHB infection was high (10 to 50%) in some adapted cultivars in wheat fields in Aberdeen in 2009. *F. culmorum* was the predominant *Fusarium* species causing FHB and crown and foot rot of wheat and barley in Southern Idaho and Europe[15]. Both *F. culmorum* and *F. graminearum* produce trichothecene mycotoxins like deoxynivalenol (DON) that pose a significant public health hazard[19]. Traditionally, the environmental conditions in Idaho allow for the production of high quality, toxin free wheat grain that meets the needs of many end-products. With the increase in corn production and conservation tillage in the PNW, the risk of FHB infections have increased. Incorporation of resistance into existing germplasm may prevent or reduce future losses.

Wheat materials from PNW have not been previously evaluated for FHB resistance. The University of Idaho Wheat Breeding and Genetics Program initiated a project in 2008 to evaluate and characterize FHB resistance in spring wheat. A total of fifty spring wheat lines including two known spring resistance sources Sumai 3 and W14 were evaluated in two field experiments and three greenhouse experiments. One field experiment was conducted in a nursery at the Northwest

Research & Outreach Center, Crookston, Minnesota in spring 2008 and another in Bozeman, Montana in 2009. Conidial suspensions (5 x 10^4 spores/ml) of *F. graminearum* was sprayed on heads in the field experiments. The field experiments were conducted using randomized complete block designs with one to two replications in 1.5-m-long single-row plots. Ten spikes of each line were evaluated and the percentage of infected spikelets and disease severity was calculated 21 days after inoculation. DON (ppm) testing was conducted on grain harvested from the 2008 field experiment. The three greenhouse (GH) experiments were conducted in Aberdeen, Idaho in 2010 and 2011. Three pots of each plant, two to three heads per plant were inoculated with *F. culmorum* (8 x 10^4 spores/ml) with the floret injection method. Disease severity for each line was calculated as a percentage of infected spikelets based on a grand mean of 3 to 10 infected spikes per line. Table 1 summarizes the overall performance of the fifty lines over two field and three greenhouse experiments. FHB resistance was characterized based on the mean of the 49 lines. DON content smaller than 2 ppm, severity smaller than 26% in field and 31.5% in GH were suggested as resistant reactions. Out of 50 lines evaluated, ten PNW lines (Whitebird, IDO629, Otis, Lolo, IDO599, IDO686, IDO668, UI Whitmore, Penawawa, and Lassik) and two resistance checks have good resistance and less DON toxin accumulation in the two field and three GH experiments. IDO599, IDO668, and IDO686 are potential new releases of soft white spring wheat. Lassik is a hard red spring wheat cultivar released by University of California, Davis (UCD). Otis is a hard white spring wheat cultivar released by Washington State University (WSU). Lolo and Whitebird are two soft white spring wheat cultivars released by University of Idaho (UI). Penawawa is a soft white spring wheat released by Washington State University. An additional eight cultivars and lines have good resistance and low DON content in the two field experiments while showing susceptible reactions in the three GH experiments. In addition, four of the 50 lines tested have good field and GH resistance; while four have good GH and DON resistance.

REFERENCES

1. Anderson, J.A., R.W. Stack, S. Liu, B.L. Waldron, A.D. Fjeld, C.Coyne, B. Moreno-Sevilla, F.J. Mitchell, Q.J. Song, P.B. Cregan, and R.C. Frohberg. 2001. DNA markers for *Fusarium* Head blight resistance QTLs in two wheat populations. Theor Appl Genet 102:1164-1168.

2. Buerstmayr, H., M. Lemmens, L. Hartl, L. Doldi, B. Steiner, M. Stierschneider, and P. Ruckenbauer. 2002. Molecular mapping of QTLs for Fusarium head blight resistance in spring wheat. I. Resistance to fungal spread (Type II resistance). Theor Appl Genet 104: 84-91.

3. Buerstmayr, H., B. Steiner, L. Hartl, M. Griesser, N. Angerer, D. Lengauer, T. Miedaner, B. Schneider, and M. Lemmens. 2003. Molecular mapping of QTLs for Fusarium head blight resistance in spring wheat. II. Resistance to fungal penetration and spread. Theor Appl Genet 107: 503-508.

4. Cai, X., P.D. Chen, S.S. Xu, R.E. Olive, and X. Chen. 2005. Utilization of alien genes to enhance Fusarium head blight resistance in wheat – A review. Euphytica 142:309-318.

5. Chen, J., C.A. Griffey, T.H. Pridgen, and M. Chappell. 2000. Assessment and rational utilization of scab resistance sources in the Virginia Wheat Breeding Program. *P*.10-17. *In*: Proceedings of the International Symposium on Wheat Improvement for Scab Resistance, Suzhou and NanJing, China, 5-11 May 2000. Edited by J. Raupp, Z. Ma, P. Chen, D. Liu. Kansas State Printing, Manhattan, Kansas.

6. Chen, J., C.A. Griffey, M.A. Saghai Maroof, E.L. Stromberg, R.M. Biyashev, W. Zhao, M. R. Chappell, T.H. Pridgen, Y. Dong, and Z. Zeng. 2006. Validation of two major Quantitative trait loci for f*usarium h*ead blight resistance in Chinese wheat line W14. Plant Breeding 124: 1-4.

7. Gervais, L., F. Dedryver, J.Y. Morlais, V. Bodusseau, S. Negre, M. Bilous, C. Groos, and M. Trottet. 2003. Mapping of quantitative trait loci for field resistance to Fusarium head blight in an European winter wheat. Theor Appl Genet 106:961-970.

8. Gooding, R.W., H.N. Lafever, K.G. Campbell, and L.D. Herald.1997. Registration of Freedom wheat. Crop Sci 37: 1007.

9. Griffey, C.A., T.M. Starling, A.M. Price, W.L. Sisson, M.K. Das, T.H. Pridgen, M.E. Vaughn, W.L. Rohrer, and D.E. Brann. 2001. Registration of Roane wheat. Crop Sci 41: 1359

10. Liu, S. and J.A. Anderson. 2003. Targeted molecular mapping of a major wheat QTL for Fusarium head blight resistance using wheat ESTs and synteny with rice. Genome 46: 817-823.

11. McKendry, A.L., J.E. Berg, D.N. Tague, and K.D. Kephart.1995. Registration of 'Ernie' wheat. Crop Sci 35: 1513.

12. Mesterhazy, A. 1995. Types and components of resistance to Fusarium head blight of wheat. Plant Breeding 114: 377-386.

13. Mesterhazy, A., T. Bartok, G. Kaszonyi, M. Varga, B. Toth, and J. Varga. 2005. Common resistance to different Fusarium spp. Causing Fusarium head blight in wheat. European Journal of Plant Pathology 112: 267-281.

14. Miedaner, T., N. Heinrich, B. Schneider, G. Oettler, S. Rohde, and F. Rabenstein. 2004. Estimation of deoxynivalenol (DON) content by symptom rating and exoantigen content for resistance selection in wheat and triticale. Euphytica 139: 123-132.

15. Mihuta-Grimm, L. and R. L. Forster. 1989. Scab of wheat and barley in southern Idaho and evaluation of seed treatments for eradication of *Fusarium* spp. Plant Disease 73: 769-771.

16. Miller, J.D., and M.A. Ewen. 1997. Toxic effects of deoxynivalenol on ribosomes and tissues of the spring wheat cultivars Frontana and Casavant. Natural Toxins 5: 234-237.

17. Oliver, R. E., X. Cai, S.S. Xu, X. Chen, and R.W. Stack. 2005. Wheat alien species derivatives: a novel source of resistance to Fusarium head blight in wheat. Crop Science 45: 1353-1360.

18. Paillard, S., T. Schnurbusch, R. Tiwari, M. Messmer, M. Winzeler, B. Keller, and G. Schachermayr. 2004. QTL analysis of resistance to Fusarium head blight in Swiss winter wheat (*Triticum aestivum* L.). Theor Appl Genet 109: 323-332.

19. Pestka, J. and A. T. Smolinski. 2005. Deoxynivalenol: toxicology and potential effects on humans. Journal of Toxicology and Environmental Health-part B-Critical Review 8: 39-69.

20. Schroeder, H.W., and J.J. Christensen. 1963. Factors affecting resistance of wheat to scab caused by *Gibberella zeae.* Phytopathology 53: 831-838.

21. Shen, X., M. Zhao, W. Lu, and H. Ohm. 2003a. Detection of Fusarium head blight resistance QTL in a wheat population using bulked segregant analysis. Theor Appl Genet 106: 1041-1047.

22. Shen, X., M. Ittu, and H.W. Ohm. 2003b. Quantitative trait loci conditioning resistance to Fusarium head blight in wheat line F201R. Crop Sci 43: 850-857.

23. Somers, D.J., G. Fedak, and M. Savard. 2003. Molecular mapping of novel genes controlling Fusarium head blight resistance and deoxynivalenol accumulation in spring wheat. Genome 46: 555-564.

24. Steiner, B., M. Lemmens, M. Griesser, U. Scholz, J. Schondelmaier, and H. Buerstmayr. 2004. Molecular mapping of resistance to *Fusarium* head blight in the spring wheat cultivar Frontana. Theor Appl Genet 109: 215-224.

25. Wilcoxson, R.D., R.H. Busch, and E.A. Ozmon. 1992. Fusarium head blight resistance in spring wheat cultivars. Plant Dis 76: 658-661.

26. Wang, Y.Z., and J.O. Miller. 1988. Screening techniques and sources of resistance to Fusarium head blight. In Klatt, A.R. (eds.), Wheat production Constraints in Tropical Environments. CLMMYT, Mexico: 239-250.

27. Yang, Z., J. Gilbert, G. Fedak, and D.J. Somers. 2005. Genetic characterization of QTL associated with resistance to Fusarium head blight in a doubled haploid spring wheat population. Genome 48: 187-196.

28. Zhou, W., F.L. Kolb, G. Bai, G. Shaner, and L.L. Domier. 2002. Genetic analysis of scab resistance QTL in wheat with microsatellite and AFLP markers. Genome 45: 719-727.

29. Zhou, W., F.L. Kolb, J. Yu, G. Bai, L.K. Boze, and L.L. Domier. 2004. Molecular characterization of Fusarium head blight resistance in Wangshuibai with simple sequence repeat and amplified fragment length polymorphism markers. Genome 47: 1137-1143.

Appendix A.

Table A1. Evaluation of FHB resistance in 49 spring wheat cultivars and advanced lines over three years.

Genotype	Class	DON (ppm)	Severity (%)	
		Field*	Field**	Greenhouse***
Sumai 3	SRW	0.20	**3.3**	**14.7**
W14	SRW	0.20	**4.0**	**6.9**
Whitebird	SWS	0.40	**8.8**	**23.0**
IDO629	SWS	1.50	**12.0**	**24.7**
Otis	HWS	0.35	**13.3**	**17.0**
Lolo	HWS	1.05	**15.5**	**23.7**
IDO599	SWS	0.75	**16.8**	**16.1**
IDO686	SWS	0.65	**17.8**	**13.1**
IDO668	SWS	0.35	**19.5**	**25.5**
UI Whitmore	SWS	0.55	**23.8**	**17.5**
Penawawa	SWS	1.60	**24.0**	**31.0**
Lassik	HRS	2.00	**24.4**	**20.0**
Challis	SWS	0.20	**13.6**	32.4
Jubilee	SWS	0.55	**12.0**	36.8
Nick	SWS	0.80	**12.5**	45.8
Alturas	SWS	0.80	**14.5**	38.0
Pristine	HWS	1.80	**15.5**	42.6
Cataldo	SWS	0.70	**17.0**	31.5
Scarlet	HRS	1.60	**23.8**	32.6
Macon	HWS	1.65	**25.5**	33.0
Treasure	SWS	2.25	**10.8**	**22.1**
Idaho 377s	HWS	2.45	**15.0**	**9.1**
Blanca Grande	HWS	2.05	**18.5**	**16.7**
Patwin	HWS	3.70	**19.8**	**13.9**
UI Alta Blanca	HWS	1.55	30.0	**17.5**
IDO563	SWS	0.60	31.8	**20.7**
Alpowa	SWS	0.65	33.7	**17.5**
Hollis	HRS	1.60	37.4	**30.9**
Pomerelle	SWS	4.30	**20.5**	28.4
Centennial	SWS	2.25	**22.3**	31.8
Choteau	HRS	2.75	**26.0**	77.0
Jefferson	HRS	3.00	26.3	56.2
UI Lochsa	HWS	1.40	26.8	42.9
Saxon	HRS	1.05	34.1	48.0
Eden	SWS	2.20	28.0	32.5
UI Pettit	SWS	1.10	28.5	38.5

Table A1. (cont)

Genotype	Class	DON (ppm)	Severity (%)	
		Field*	Field**	Greenhouse***
Jerome	HRS	2.60	34.8	67.2
IDO687	SWS	2.70	33.0	**12.4**
Iona	HRS	2.10	37.8	**30.0**
Summit	SWS	2.20	38.5	**20.0**
UI Winchester	HRS	2.70	38.5	**25.7**
Louise	SWS	3.50	36.0	71.5
WestBred 936	HRS	3.60	40.4	40.8
Winsome	HWS	1.95	43.0	56.3
Snow Crest	HRS	3.75	54.5	**14.7**
WestBred 926	HRS	4.00	36.5	62.3
Hank	HRS	5.15	43.8	50.8
Blanca Royale	HWS	5.70	41.9	**23.4**
Klasic	HWS	9.15	55.9	36.9
Mean		2.03	25.7	31.5

* DON content was tested using the grain harvested from MSU field nursery in 2009.

** Mean disease severity of MT (2009) and MN (2008) field nurseries.

*** Mean disease severity of three GH experiments in 2010 in Aberdeen, ID.

Low-Phytate Barley Breaks the Yield Barrier

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Low-phytate, or "high available P", barley has been in development for several decades by the USDA-ARS in Aberdeen, ID. More recently, aided by funding from the Barley for Rural Development grant, the USDA-ARS and UI have teamed up in the development effort.

The advantage of low-phytate barley lies in the form of phosphorus (P) in the grain. Normal barley stores 95% of its grain P in a molecule called phytate, which is indigestible when fed to non-ruminant animals such as pigs. Low-phytate barleys have less phytate, and more nutritionally available inorganic P[1]. Compared to normal barley varieties, low-phytate barley provides better P and mineral nutrition[2,3], and results in lower manure P levels, when fed to non-ruminant animals[4]. Reducing manure P levels is a critical aspect of limiting ground and surface water contamination, and is a particular concern of large scale animal producers.

Several different types of low-phytate barley, each type associated with a change in a different gene, have been developed. Each has slightly different characteristics with respect to P nutrition, ranging from almost no phytate (all available P) to more modest changes (50% reductions in phytate). Agronomic performance of lines with almost no phytate has been poor. LP1, the parent of the low-phytate hulled variety Herald[5], has a slight reduction in total P, a 50% reduction in phytate, and about 500% of available P. LP640, the parent of the hulless cultivar Clearwater[6], has similar characteristics but less reduction in total P. LP3 has about a 65% reduction in phytate and an 800% increase in inorganic P[7]. These increases in P availability can result in meeting, or substantially meeting, animal P requirements without the need of adding supplemental phosphorus to animal rations[7].

The low-phytate trait has been associated with slight reductions in yield and test weight, but recent breeding efforts have paid off. The latest breeding lines developed by the USDA-ARS and the University of Idaho now yield on par with the best hulled and hulless feed varieties. Test weight is adequate and as good as many 6-rowed varieties, although still slightly less than the best two-rowed feed varieties. Two lines showing the most promise are 08ID2661 (hulled 2-row, with the LP3 gene) and 08ID1549 (hulless 2-row, LP640 gene).

08ID2661 has yielded as well as or better than the high-yielding feed barley, Baronesse, across a variety of irrigated and rain-fed environments across Idaho, 2009-2011 (Table 1). Test weight is slightly lower than Baronesse, but much better than Herald. For both yield and test weight, 08ID2661 represents good progress. Grain yields and test weights were, respectively, 109% and 105% as compared to the first low-phytate, 6-rowed, hulled cultivar, Herald (Table 2).

The low-phytate, hulless, 2-rowed breeding line 08ID1549 also represents a move forward and has better yield and test weight than Clearwater (Table 1). Compared to Clearwater, grain yield of 08ID1549 was 112%, and test weight was 101%. Compared to CDC McGwire, a normal (not low-phytate), 2-rowed, hulless cultivar with good agronomic characteristics, grain yield is as good or better, although test weight is slightly less (Table 3).

Appendix B.

Table B1. Agronomic data from irrigated and rain-fed locations in Idaho, 13 location-years, 2009-2011.

	Heading date (days after Jan.1)	Height (inches)	Lodging (%)	Yield (bu/acre)	Test wgt. (lb/bu)	% plump kernels
08ID2661	193.5	32.8	13.8	123.4	51.5	82.5
Baronesse	191.6	31.8	21.4	117.0	52.3	84.9
08ID1549	192.5	34.1	27.1	105.6	58.9	68.8
Clearwater	192.3	35.3	23.9	94.0	58.4	68.6

Table B2. Agronomic data from irrigated and rain-fed locations in Idaho, seven locations, 2011

	Heading date (days after Jan.1)	Height (inches)	Lodging (%)	Yield (bu/acre)	Test wgt. (lb/bu)
Tetonia	194.7	29.4	21.2	125.1	52.6
08ID2661	195.2	30.5	15.3	123.8	51.5
Baronesse	193.6	29.3	26.3	119.6	52.2
Herald	189.4	35.4	16.0	113.1	49.0

Table B3. Agronomic data from irrigated and rain-fed locations in Idaho, nine locations, 2010-2011

	Heading date (days after Jan.1)	Height (inches)	Lodging (%)	Yield (bu/acre)	Test wgt. (lb/bu)	% plump kernels
08ID1549	192.5	33.6	28.5	103.0	58.7	68.4
CDC McGwire	192.8	34.4	26.1	99.8	59.9	55.8
Clearwater	192.3	34.6	24.2	91.2	57.6	67.0

References

1. Dorsch, J. A., A. Cook, K. A. Young, J. M. Anderson, A. T. Bauman, C. J. Volkmann, P.P.N. Murthy, and V. Raboy. 2003. Seed Phosphorus and inositol phosphate phenotype of barley *low phytic acid* genotypes. Phytochemistry 62:691-706.
2. K. Overturf, V. Raboy, Z. J. Cheng, and R. W. Hardy. 2003. Mineral availability from barley *low phytic acid* grains in rainbow trout (*Onchorhynchus mykiss*) diets. Aquaculture 9:239-246.
3. Thacker, P. A., B. G. Rossnagel, and V. Raboy. 2003. Phosphorus digestibility in low-phytate barley fed to finishing pigs. Can. J. Anim. Sci. 83:101-104.
4. Leytem, A. B., B. L. Turner, and P. A. Thacker. 2004. Phosphorus composition of manure from swine fed low-phytate grains: evidence for hydrolysis in the animal. J. Eviron. Qual. 33:2380-2383.
5. Bregitzer, P., V. Raboy, D. E. Obert, J. M. Windes, and J. C. Whitmore. 2007. Registration of 'Herald' barley. Crop Sci. 47:441-442.
6. Bregitzer, P., V. Raboy, D. E. Obert, J. Windes, and J. C. Whitmore. 2008. Registration of 'Clearwater' low-phytate hulless spring barley. J. Plant Regis. 2:1-4.
7. Bregitzer, P., and V. Raboy. 2006. Effects of four independent low-phytate mutations in barley (*Hordeum vulgare* L.) on seed phosphorus characteristics and malting quality. Cer. Chem. 83:460-464

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